

LAND TO THE EAST OF GREAT WYMONDLEY, HERTFORDSHIRE

**PROOF OF EVIDENCE
FLOOD RISK AND DRAINAGE**

Called In Planning Inquiry

Planning application reference: 21/03380/FP

Planning Inspectorate reference: APP/X1925/V/23/3323321

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Report Title	Land to the East of Great Wymondley, Hertfordshire Proof of Evidence - Flood Risk and Drainage Final Version 1.1
Client	AGR 4 Solar Ltd
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Appendix B1: Environment Agency Consultation Response Letter, 14 February 2022

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List of Reference Documents

- CD6 Flood Risk Assessment Report, Report ref: 5208/FRA/Final/v1.3/2022-05-30, Final, v1.3, 30 May 2022, Weetwood Services Ltd.
- CD31 Technical Note, Report ref: 5208/TN/Final/v1.1/2022-05-30, Final, v1.1, 30 May 2022, Weetwood Services Ltd.
- CD39 North Hertfordshire District Local Plan (2011-2031)
- CD40 Wymondley Parish Neighbourhood Plan (2015-2031)
- CD56 National Planning Policy Framework
- CD57 National Planning Practice Guidance (Part C Flood Risk and Coastal Change)
- CD87 Flood Investigation Report - Little Wymondley, Hertfordshire, Doc. Ref. ERP-INV-04, Final Report v04, November 2014, Hertfordshire County Council
- CD88 Flood Alleviation Feasibility Study - Little Wymondley, Doc. Ref. MCL250-07_DG03, Report v2, August 2015, McCloy Consulting Ltd.
- CD89 Hydrologic Response of Solar Farms, Cook LM and McCuen RH, Journal of Hydrologic Engineering, Vol. 18(5), pp 536-541, American Society of Civil Engineers, 2013

Glossary of Acronyms

AEP	Annual Exceedance Probability. (An event with an AEP of 1:30 has a return period of 30 years, and an event with an AEP of 1:100 has a return period of 100 years; these are sometimes referred to as the 1 in 30 and 1 in 100 events)
CC	Climate Change
EA	Environment Agency
HCC	Hertfordshire County Council
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NHDC	North Hertfordshire District Council
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PoE	Proof of Evidence
SoC	Statement of Case
SoCG	Statement of Common Ground

1 PROOF AUTHORSHIP

- 1.1 This Proof of Evidence (PoE) has been prepared by Dr Kevin Tilford.
- 1.2 I am Managing Director of Weetwood Services Ltd (“Weetwood”), a consultancy firm specialising in flood risk and drainage, a position he has held since 2015.
- 1.3 I hold a BSc(Hons) in Environmental Science from the University of Lancaster (1986), an MSc(Eng) in Water Resources Technology from the University of Birmingham (1987), a PhD from the University of Salford (1991) and an MBA from the Cranfield School of Management (2006).
- 1.4 I am a Chartered Water and Environmental Manager, a Fellow of the Chartered Institution of Water and Environmental Management (CIWEM), and a Chartered Environmentalist.
- 1.5 I currently serve as an elected member of the CIWEM Professional Standards Committee, a committee responsible for overseeing the maintenance of professional standards and ethics within the water and environmental management profession. Previously, I served as an elected member of the CIWEM Rivers and Coastal Group, the British Hydrological Society Pennines Hydrological Group, and the Royal Meteorological Society.
- 1.6 I have worked in the field of hydrology, water engineering and flood risk management since 1988, initially as an academic and thereafter as a consultant, initially with large multi-disciplinary consultants before joining Weetwood in 2010.
- 1.7 I have provided flood risk and drainage advice on a wide range of development projects, including many solar farm developments, for a range of clients.
- 1.8 I have been the technical lead for Weetwood on this project from inception. I have personally reviewed flood risk at and in the vicinity of the site, undertaken a walkover survey of the site, and visited the local area including Little Wymondley. I have also overseen site specific hydraulic modelling and the development of a scheme to manage surface water runoff from the developed site. I prepared the site specific Flood Risk Assessment (**CD6**) for the site and supplementary Technical Note (**CD31**).
- 1.9 The evidence and opinions presented in this document are true and professional judgements, based on the scientific evidence and professional experience.

2 BACKGROUND

- 2.1 This PoE relates to the proposed development of an 88 ha greenfield site to the north and east of Great Wymondley (“the site”) for use as a solar farm.
- 2.2 A planning application for “*Proposed solar farm measuring 88 hectares with associated battery storage containers, transformers stations, storage buildings, fencing etc including means of access (amended plans received 30.05.2022)*” was submitted on 6 December 2021 to North Hertfordshire District Council, the Local Planning Authority (LPA). The application was validated with planning reference 21/03380/FP.
- 2.3 The application was accompanied by a Flood Risk Assessment report prepared by Weetwood (report ref: 5208/FRA/Final/v1.1/2021-10-22, Final, v1.1, October 2021). A revised version of the report was submitted in June 2022 (report ref: 5208/FRA/Final/v1.3/2022-05-30, Final, v1.3, 30 May 2022) (**CD6**). Version 1.3 of the Flood Risk Assessment report is referred to in this proof as “the submitted FRA”. The submitted FRA was accompanied by a supplementary Technical Note (ref: 5208/TN/Final/v1.1/2022-05-30, Final, v1.1, 30 May 2022) (**CD31**).
- 2.4 North Hertfordshire Planning Control Committee resolved to grant planning permission for the planning application at a planning committee meeting on the 17 November 2022. The planning officer subsequently referred the application to the Secretary of State (SoS), through the Planning Casework Unit, by reason of it being located in the Green Belt.
- 2.5 The Planning Casework Unit advised on 26 May 2023 that the application would be determined by the SoS rather than the Local Planning Authority. The matters about which the SoS wishes to be informed include “*The extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change, flooding and coastal change as set out in the NPPF (Chapter 14)*”.
- 2.6 This PoE summarises the submitted information relating to flood risk and also presents updated information relating to surface water drainage and the management of overland flows.

3 PLANNING POLICY CONTEXT AND TECHNICAL GUIDANCE

Introduction

- 3.1 This section summarises the principal aspects of national and local planning policy, and relevant technical guidance relevant to the PoE.

National Planning Policy Framework

- 3.2 The National Planning Policy Framework (**CD56**) was introduced in March 2012 and most recently revised in July 2021. The NPPF sets out government's planning policies for England and how these are expected to be applied. The NPPF is supported by Planning Practice Guidance, introduced in November 2016 and most recently updated in August 2022.
- 3.3 In respect of flood risk, the NPPF seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed. Relevant NPPF paragraphs are outlined below.
- 3.4 NPPF para. 159 states that inappropriate development in areas at risk of flooding should be avoided and that development should be directed away from areas at highest risk (whether existing or future), but where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
- 3.5 NPPF para. 162 states that the policy of seeking to steer development to areas with the lowest risk of flooding, from any source, is implemented through the application of the flood risk Sequential Test. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development in areas with a lower risk of flooding. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.
- 3.6 NPPF para. 163 states that if it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives) the Exception Test may have to be applied. The need for the test will depend on the potential vulnerability of the site and of the vulnerability of the development proposed (as set out in Annex 3 of NPPF; also PPG Table 2). For example, the Exception Test need not be applied for less vulnerable development in any flood zone, or for more vulnerable development in flood zones 1 or 2.
- 3.7 NPPF para. 164 states that where the Exception Test must be applied, application of the test for development proposals at the application stage should be informed by a site-specific flood risk assessment. For the test to be passed it should be demonstrated that: (a) the development would

provide wider sustainability benefits to the community that outweigh the flood risk; (b) and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. NPPF para. 165 goes on to state that both elements of the test should be satisfied for the development to be permitted.

- 3.8 NPPF para. 167 states that a site-specific flood risk assessment should be provided for all development in flood zones 2 and 3 [whilst] in flood zone 1, an assessment should accompany all proposals involving: sites of 1 ha or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 3.9 NPPF para. 167 states that development should not increase flood risk elsewhere.
- 3.10 NPPF para.167 states that development should only be allowed in areas at risk of flooding where the flood risk assessment (and the sequential and exception tests, as required), demonstrate that: a) within the site, the most vulnerable development is located in areas of lowest flood risk (unless there are overriding reasons to prefer a different location); b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment; c) the development incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate; d) any residual (flood) risk can be safely managed; and e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.
- 3.11 NPPF para. 169 states that major development should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems should: a) take account of advice from the lead local flood authority; b) have appropriate proposed minimum operational standards; c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and d) where possible, provide multifunctional benefits.

Local Planning Policy

- 3.12 The North Hertfordshire District Local Plan (NHDLP) (**CD39**) was adopted on 8 November 2022. The following policies, reproduced below are relevant in respect of flood risk and drainage: Policy SP11 Natural Resources and Sustainability; NE7 Reducing Flood Risk, Policy NE8 Sustainable Drainage Systems, and Policy NE9 Water Quality and Environment:

- Policy SP11: Natural resources and sustainability states: *This Plan seeks to meet the challenges of climate change and flooding. Part (b) relates to flood risk and states, “[We will...] Take a risk based approach to development and flood risk, directing development to areas at lowest risk in accordance with the NPPF and ensuring the provision of Sustainable Drainage Systems (SuDS) and other appropriate measures;”*
- Policy NE7: Reducing flood risk: This policy is reproduced in full below:
“Planning permission for development proposals will be granted provided that (as applicable):
 - a) Development is located outside of medium and high-risk flood areas (flood zone 2 and 3) and other areas affected by other sources of flooding where possible;*
 - b) Where (a) is not possible, application of the sequential and exception tests is demonstrated where development is proposed in areas of flood risk using the Strategic Flood Risk Assessment (SFRA) and Environment Agency flood maps;*
 - c) A FRA has been prepared in accordance with national guidance that considers the lifetime of the development, climate change impacts and safe access and egress;*
 - d) It will be located, designed and laid out to ensure the risk of flooding is reduced whilst not increasing flood risk elsewhere;*
 - e) The impact of any residual flood risk will be minimised through flood resistant, resilient design and construction;*
 - f) Any flood protection and mitigation measures necessary will not cause harm to nature conservation, heritage assets, and/ or landscape and recreation and, where possible, will have a positive impact in these respects; and*
 - g) Overland flow routes and functional floodplain areas are protected from all development other than that which is “water compatible” and this must be designed and constructed to remain operational and safe for users during flood events, resulting in no net loss of flood plain storage and not impeding water flows or increasing flood risk elsewhere.”*
- Policy NE8: Sustainable drainage systems: This policy is reproduced in full below:
Planning permission for development will be granted provided that:
 - a) The most appropriate sustainable drainage solution is used taking into account technical, viability and design issues to reduce the risk of surface water flooding, enhance biodiversity, water quality and provide amenity benefits;*

- b) *It aims to mimic the natural drainage patterns and processes as far as possible; and*
- c) *Drainage solutions follow the SuDS hierarchy.*

- **Policy NE9: Water quality and environment:** This policy is reproduced in full below:

Planning permission for development proposals will be granted provided that they make appropriate space for water, including (as applicable):

- a) *Maintaining a minimum 8 metre wide undeveloped buffer zone from all designated main rivers;*
- b) *Maintaining a minimum 5m wide undeveloped buffer zone for ordinary watercourses; and*
- c) *River restoration and resilience improvements where proposals are situated close to a river or considered to affect nearby watercourses.*

3.13 The Wymondley Parish Neighbourhood Plan (2015-2031) (WPNP) (CD40) was made on 26 September 2019. Policy FR1 Flood risk and Policy FR2 Flood Risk Management are relevant in respect of flood risk and drainage, and are reproduced in full below:

- **Policy FR1: Flood risk** – *“Development proposals which would result in an increase in flood risk will not be supported. Development within 12m of a watercourse should be supported by any required Flood Risk Assessment and adequate information to assess the potential impact of the proposal on flooding both on and off site.”*
- **Policy FR2 Flood Risk Management:** *“We believe an integrated, risk-based approach to flood risk management is the way forward, and strongly support the inclusion of Sustainable Urban Drainage Systems (SUDS) in any development proposal.”*

Technical Guidance

3.14 Guidance on the control of runoff for new drainage systems discharging to any drain, sewer or surface water body is provided in the Non-Statutory Technical Standards for Sustainable Drainage Systems prepared by DEFRA in March 2015. For greenfield sites the guidance states that surface water drainage systems must be designed so that:

- The peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

- Where reasonably practicable the runoff volume from the proposed development to any highway drain, sewer or surface water body in the 1 in 100 annual probability 6 hour rainfall event should not exceed the greenfield runoff volume for the same event, and where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with the above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.
 - Flooding does not occur on any part of the site for a 1 in 30 annual probability rainfall event, unless an area is designed to hold and/or convey water as part of the design;
 - Flows resulting from rainfall in excess of a 1 in 100 annual probability rainfall event are managed in exceedance routes that minimise the risks to people and property, so far as is reasonably practicable.
- 3.15 Hertfordshire County Council (HCC) as Lead Local Flood Authority (LLFA) issued summary guidance for developers on the management of surface water drainage in August 2021. The guidance promotes the use of sustainable drainage systems for new development and encourages the drainage hierarchy to be followed. With regards to runoff rates, the guidance states that peak discharge rates from site must not increase as a result of the proposed development (for up to a 1 in 100 event including an allowance for climate change storm event) and that all applicants are expected to achieve greenfield runoff rates for greenfield development sites.
- 3.16 Government Guidance on Climate Change Allowances in February 2016 (last updated in May 2022). The guidance sets out the amount by which peak river flows and rainfall intensities should be increased in flood risk and drainage assessments, based on anticipated future increases due to the effect of climate change, to ensure that new development will be safe from and will not increase flood risk elsewhere (for the lifetime of the development).
- 3.17 To assess flood risk from surface water for site-scale applications, e.g. drainage design and for surface water flood mapping for small catchments (less than 5 sq km), the guidance states the peak rainfall intensity allowances for the Central Allowance should be applied for the relevant management catchment.
- 3.18 The site is located in the Upper and Bedford Ouse Management Catchment. The Central Allowance for this catchment is 25% for both the 1 in 30 and 1 in 100 annual exceedance probability (AEP) events.

4 APPLICATION APPRAISAL – FLOOD RISK AND DRAINAGE

Site Overview

- 4.1 The 88 ha site is located to the east of Great Wymondley, Hertfordshire. The main part of the site (“the panelled part”) is effectively divided into two by Graveley Lane. The proposed point of connection to the main electricity grid is at the Wymondley Substation approximately 1.8 km south-west of the main part of the site.

Development Proposals

- 4.2 The proposals are for the construction of a photovoltaic solar array and associated support frames; inverter/transformer stations, battery storage containers, a storage building, switchgear building and control building and maintenance access tracks. Full details of the proposals are presented in Section 2 of the Statement of Common Ground (SoCG).

Consultation Responses from Statutory Consultees

Environment Agency

- 4.3 The Environment Agency (EA) objected to the proposals by way of its consultation letter dated 20 January 2022 (refer **Appendix A1**).
- 4.4 The basis for the objection was that flood risk in relation to the grid connection route had not been appropriately assessed, and that the EA was concerned that flood risk may increase during the construction of the grid connection.
- 4.5 The matter raised by the EA was addressed in the submitted FRA (**CD6**). The amended FRA confirms that no excavated spoil would be stored in flood zone 3 and excavation would progress in approximately 100 m lengths that would be backfilled the same day following the installation of ducting. As such the construction works within flood zone 3 would not increase the risk of flooding elsewhere.
- 4.6 The EA confirmed that it had withdrawn its objection by way of a further consultation letter dated 21 June 2022 (refer **Appendix A2**).

Lead Local Flood Authority (Hertfordshire County Council)

- 4.7 The LLFA objected to the proposals by way of its consultation letter dated 14 February 2022 (refer **Appendix B1**). The thrust of the letter was that the LLFA was concerned that the development would increase flooding downstream.
- 4.8 To address its concerns the applicant was advised to undertake further work and provide additional information, as summarised below:
- That a hydraulic assessment/site specific modelling should be undertaken to establish overland flow routes and flood extents (i.e. the LLFA will not accept reliance on the EA surface water modelling to identify the extent of watercourse/drains and as an indicator of the overland pathways);
 - That ground truthing should be undertaken to confirm the location and condition of the ordinary watercourses;
 - A comprehensive scheme to manage surface water runoff from the development should be developed. (The response states that the LLFA regards solar panels as impermeable, and that managing runoff from the development by gravel tracks and grassland is not considered acceptable);
 - Infiltration testing, ground investigations and groundwater monitoring would need to be undertaken, prior to determination, if infiltration is proposed as a means of managing runoff.
- 4.9 The letter also advised that:
- The development must avoid the Priory Lane Stream/tributaries and their associated flood extents, as any changes to ground levels or impedance to flows may increase flood risk;
 - The proposals should provide betterment to the existing flood risk from overland flows.
- 4.10 The matters raised by the LLFA in its letter were addressed in a Technical Note prepared by Weetwood and submitted in June 2022 (**CD31**). Specifically, the Technical Note presents:
- The findings of a site visit to validate existing on site drainage ditches and overland flow pathways;
 - The outputs of site specific 2D direct rainfall-runoff hydraulic modelling to accurately model overland flow routes (pathways) across the site;
 - A detailed scheme to manage overland flows across the developed site. The scheme is based on the discharge of runoff to existing drainage ditches at controlled/restricted rates to reduce downstream flood risk;

- A revision to the proposed site layout to mitigate the risk of obstructing overland flow pathways.
- 4.11 The LLFA responded to the informally to the Technical Note (**CD31**) by way of an email to the LPA case officer dated 10 November 2022, almost six months after the Technical Note was submitted and just four working days before the North Hertfordshire Planning Control Committee (on 17 November 2022).
- 4.12 The email acknowledged the “*significant delay*” in responding [to the Technical Note], and advised the case officer that the LLFA intended to maintain its objection and seek further clarification in relation to the surface water drainage proposals. The LLFA email was forwarded by the case officer to the applicant on the same day.
- 4.13 On the 11 November 2022, the applicant sought a meeting with the LLFA to discuss the matters it had raised in its email. No response was received from the LLFA until the 15 November 2022 stating “*It is currently not appropriate for me to respond as I need approval from management as to whether we are able to recommend conditions or not due to the current objection in place as explained to the LPA.*”
- 4.14 Given the refusal of the LLFA to meet to discuss its concerns, a response to the concerns raised by the LLFA was made on behalf of the applicant by way of an email dated 15 November 2022.
- 4.15 The LLFA responded by way of an email on the same day stating “*I’m afraid with time constraints with getting a response to the LPA today I have not been able to consider any additional information*”. The email concludes “*I am only working until 3pm today so I am not available.*”
- 4.16 The LLFA provided a formal response to the Technical Note (**CD31**) by way of a consultation letter dated 15 November 2022 (refer **Appendix B2**), two working days before the North Hertfordshire Planning Control Committee was held on 17 November 2022.
- 4.17 The letter stated that LLFA still considered the proposed development to be unacceptable, that the LLFA would “*maintain its recommendation of objection until further detail is provided*”, but that if the LPA was minded to approve the application two “*stringent*” conditions were recommended to “*ensure a suitable strategy*”.

Appraisal of Flood Risk Matters

- 4.18 The basis of the LLFA objection relates not to flood risk to the proposed development itself, but that the proposed solar farm would increase downstream flood risk, and in particular in Little Wymondley.
- 4.19 To understand this concern, it is necessary to: (a) summarise the risk of flooding to the site; (b) outline the flooding issue downstream of the site; (c) outline the potential effect of the proposed solar farm on flood risk; (d) outline the drainage/overland flow management proposals; and (e) confirm how the proposals will not increase, and will actually reduce, off-site flood risk.

(a) Risk of Flooding at the Site

- 4.20 The risk of flooding to the site is presented in the submitted FRA (**CD6**). This assessment is summarised below:
- The EA Flood Map for Planning (Fig 5 of **CD6**) determines the main part of the site to be in Flood Zone 1, whilst the length of grid connection along Stevenage Road (circa 700 m) is indicated to be in Flood Zone 3. Table 1 of the NPPG (**CD57**) defines flood zone 1 as land at a low (less than 0.1% annual probability) of flooding (from rivers and the sea), flood zone 3a as land having a high (1% or greater annual probability) of river flooding, and flood zone 3b as land where water from rivers or the sea has to flow or be stored in times of flood (functional floodplain) - normally defined as land having a 3.3% or greater annual probability of flooding.
 - The EA Flood Risk from Surface Water map (Fig 6 of **CD6**) indicates that the majority of the main part of the site is at Very Low risk of surface water flooding. The mapping does indicate that four separate overland flow pathways may develop during storm events.
 - The risk of flooding in the main part of the site from all other known sources is assessed to be Very Low/Negligible.
 - There are no records of historic flooding of the main site in the Environment Agency recorded flood outlines database.

It is concluded that the main part of the site is generally at a low/negligible risk of flooding from all known sources.

(b) Off Site Flood Risk

- 4.21 It is recognised that Little Wymondley has a history of flooding and there are believed to be records of flooding in the period 1926-1956, 1968, 1993, 2000/01, December 2013, February 2014, and most recently in March 2016 (Source: **CD87; CD40**).
- 4.22 The principal source of flooding in Little Wymondley is Ash Brook. Ash Brook drains a catchment of approximately 14 sq km. Approximately 2 sq km of this catchment comprises land to the north-east of Little Wymondley, including the site; this sub-catchment is drained by an un-named watercourse often referred to as Priory Lane Stream. To provide context, the site constitutes circa 5% of the total catchment of Ash Brook draining to Little Wymondley.
- 4.23 The February 2014 flood event caused internal flooding of five properties and resulted in the closure of Stevenage Road through the village. The rainfall event in February 2014 has been estimated to be a 1 in 1 to 1 in 2 AEP event, with the resultant flood event estimated to be broadly comparable to a 1 in 30 AEP event (due to the saturated catchment conditions). The causes of the flooding were attributed to multiple factors including insufficiently sized culverts, blocked debris screens, and inadequate maintenance on Ash Brook and Priory Lane Stream (Source: **CD87; CD88**).
- 4.24 In respect of planning policy (refer Section 3 of this PoE): NPPF para. 167 states that development should not increase flood risk elsewhere; Policy NE7 of the NHLP states that “[development] *will be located, designed and laid out to ensure the risk of flooding is reduced whilst not increasing flood risk elsewhere*”; and Policy FR1 of the WPNP states– “*Development proposals which would result in an increase in flood risk will not be supported*.”

(c) The Potential Effect of the Proposed Solar Farm on Flood Risk Elsewhere

- 4.25 The solar panels would be arranged in a series of linear arrays across the site. The panels are approximately 6.5 m long and inclined at 20 degrees to the horizontal. Each line of panels is 5 m from the adjacent panels. Each panel is supported on steel posts approximately 110 mm by 70 mm (All dimensions indicative and subject to confirmation at detailed design stage).
- 4.26 Rainfall would run down the face of the panels and drip off the lower edge onto the ground below. Thereafter, the rainfall will infiltrate into the ground and/or flow overland.
- 4.27 The definitive research into the impact of solar-farm panels on runoff rates and volumes was undertaken by researchers at the University of Maryland in the early 2010’s. Their published research paper (**CD89**) found the following:

- For a solar farm site where the ground comprised of well managed vegetation such as grass cover, and assuming no mitigation is provided, runoff rates were found to increase by 0.31% and runoff volumes by 0.35% compared to the pre-panelled scenario;
- For a solar farm site where the ground comprises bare earth, runoff volume and rates increased by 7% and 72% compared to the pre-panelled, grass cover, scenario.

4.28 Given the above, surface water runoff from the solar farm would be positively managed as follows:

- The site would comprise permanent grassland (not bare earth);
- Runoff infiltrating into the internal access tracks and ancillary equipment hardstanding areas would be positively managed by a surface water drainage scheme;
- Surface water runoff generated from the panelled part of the site would be attenuated through the provision of flow attenuation basins.

4.29 The effect of the above measures is summarised in (e) below. However, before discussing these results, the surface water drainage and overland flow management proposals are presented below.

(d) Overview of Surface Water Drainage and Overland Flow Management Proposals

4.30 The strategy for managing overland flows from the developed site is presented in **CD31** and summarised below.

- The internal site access tracks and areas of hardstanding would be constructed of permeable Type 3 granular material. Infiltration testing has confirmed that it would not be feasible to dispose of surface water runoff to the ground. Therefore, rainfall infiltrating into the access tracks and hardstanding areas would be conveyed within a perforated pipe located in the base of the build-up to Priory Lane Stream (land to the north of Graveley Lane) or to existing drainage ditches (land to the south of Graveley Lane), an approach that complies with the drainage hierarchy set out in para. 56 of the Planning Practice Guidance (**CD57**): Flood Risk and Coastal Change). The peak pass forward runoff rate would be restricted by outlet control devices and surface-based attenuation storage would be provided to temporarily store runoff.
- Overland flow generated from the panelled part of the site would be intercepted and stored in additional surface-based attenuation basins. Runoff would be released from the attenuation basins at a controlled (low) rate to the receptors referenced above, again in accordance with the drainage hierarchy.

- 4.31 A preliminary layout of the access tracks/hardstanding areas drainage system and the overland flow attenuation basins is provided as Annex 2 of **CD31**. Since document **CD31** was issued, the surface water drainage and overland flow management proposals have been further refined as part of work undertaken to prepare the technical information required to accompany a discharge of condition application. The revised scheme is presented as **Annex 1** to this document.
- 4.32 The revised scheme does not vary significantly from the scheme presented in **CD31**, the principle changes are: (i) the introduction of an additional overland-flow attenuation basin; and (ii) the reduction of the proposed surface discharge rate from the access tracks/hardstanding areas drainage system.

(e) Flood Risk Reduction – How the Proposals Provide Betterment

- 4.33 Detailed site-specific hydraulic modelling has been undertaken to calculate the runoff generated across the “existing” site for a pre-development scenario, and also for the proposed, panelled scenario for the revised surface water drainage and overland flow management scheme. The results of the analysis are presented in the following two tables:
- Table 1: Compares the peak runoff rates from the site in its existing (pre-developed) state, with the peak runoff rates from the site in its proposed (developed) state, with the panelled part of the site comprising managed grassland.
 - Table 2: Compares the peak runoff rates from the site in its existing pre-developed state, with the peak runoff rates from the site, if the panelled part of the site comprised bare earth. (Note that this is a hypothetical scenario because the panelled site would not actually comprise bare earth.)
- 4.34 The modelling demonstrates that for the proposed scenario (**Table 1**), peak runoff rates exiting the site are reduced in all modelled events.
- 4.35 The modelling further demonstrates that even if the entire panelled site comprised bare earth, the peak runoff rate (and hence downstream flood risk) would be reduced for the present day 1 in 30 AEP event, with minimal changes for the other modelled events.
- 4.36 It is concluded that the proposed solar farm would not increase flood risk downstream, as required by planning policy, and would actually reduce flood risk downstream.

Table 1: Analysis of Pre-Development and Post-Development Runoff Rates

AEP Event	Peak Runoff Rate from Site (cu m/s)		% Change in Peak Runoff Rates
	Existing Scenario (Assuming grassland)	Proposed Scenario (Managed grassland) (0.35% increase in runoff volume)	
1:30	0.601	0.515	14.3% reduction
1:30+25% CC	0.830	0.800	3.6% reduction
1:100	0.900	0.857	4.8% reduction
1:100 +25% CC	1.265	1.219	3.6% reduction

Table 2: Analysis of Pre-Development and Post-Development Runoff Rates – Worst Case

AEP Event	Peak Runoff Rate from Site (cu m/s)		% Change in Peak Runoff Rates
	Existing Scenario (Assuming grassland)	Bare Earth Scenario (7.0% increase in runoff volume)	
1:30	0.601	0.552	8.2% reduction
1:30+25% CC	0.830	0.839	1.1% increase
1:100	0.900	0.901	0.1% increase
1:100 +25% CC	1.265	1.303	3.0% increase

NHDC Statement of Case

4.37 NHDC’s position in respect of flood risk is summarised in its SoC. Specifically:

- Para. 5.26 of NHDS’s SoC states *“The effect upon flood risk was also carefully considered, with amendments to the Proposal made to address the comments of the Lead Local Flood Authority (LLFA). The Council considers that these amendments along with conditions suggested by the LLFA would ensure that the impacts of the development upon flood risk would be adequately mitigated and a limited benefit would arise from the Proposal based upon the attenuation ponds and water detention areas potentially reducing overland flow of storm water from the site.”*
- Para. 5.41 of NHDS’s SoC states *“The proposed drainage strategy is intended to improve drainage compared to the existing greenfield situation, through reducing the flow of water from the site during and following storm events. This would make a contribution towards reducing flood risk or its effects in Little Wymondley, where there is a history of flooding. Whilst the overall effect is likely to be modest, it would nevertheless be an improvement to the existing situation, and this is a planning benefit to which limited weight should be attributed.”*

4.38 Based on the above, the proposals, insofar as they relate to flood risk are accepted as common ground.

4.39 Proposed planning condition 7 is not accepted as currently drafted for the reasons set out in the Statement of Common Ground (SOCG).

5 RESPONSE TO THIRD PARTY REPRESENTATIONS

Objections to the Submitted Application

- 5.1 I understand that, allowing for duplicate responses, 163 objections were submitted to the planning application, a number of which referenced a “Local Residents Standard Template Objection Letter”, or a “Standard Petition Objection Letter”. I also note that a “Petition” was submitted, prepared by AFA Planning Consultants.
- 5.2 The Local Residents Standard Template Objection Letter and the Petition prepared by AFA Planning Consultants do not reference flood risk.
- 5.3 The Standard Petition Objection Letter does reference flooding stating that runoff from the panels, hard surfaces and buildings will make flooding worse and that “... *we doubt that a few ponds will mitigate the problem*”.
- 5.4 Aside from the above, approximately 19 letters of objection specifically reference flood risk. In each case, the letters express a concern that the proposed solar farm will increase flood risk (Graveley Lane, Priory Lane and Little Wymondley are referenced). Some of the letters suggest that the proposals to manage surface water runoff from the solar farm site will be ineffective and will not alleviate flooding.
- 5.5 The matters raised in the letters are not substantiated by any evidence and have been addressed in the submitted FRA (CD6) and the associated Technical Note (CD31). In addition, the evidence presented in this PoE confirms that the proposals would not make flooding worse and would actually reduce peak runoff rates and hence reduce flood risk.

Third Party Representation Submitted to the Appeal Inquiry

- 5.6 I am aware of thirteen letters of representation submitted by local residents since the application was called in. Two of the letters reference flood risk, citing in particular surface water runoff from fields onto Graveley Lane and Priory Lane, and flooding in Little Wymondley. I have addressed both matters in my PoE.

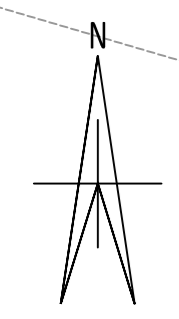
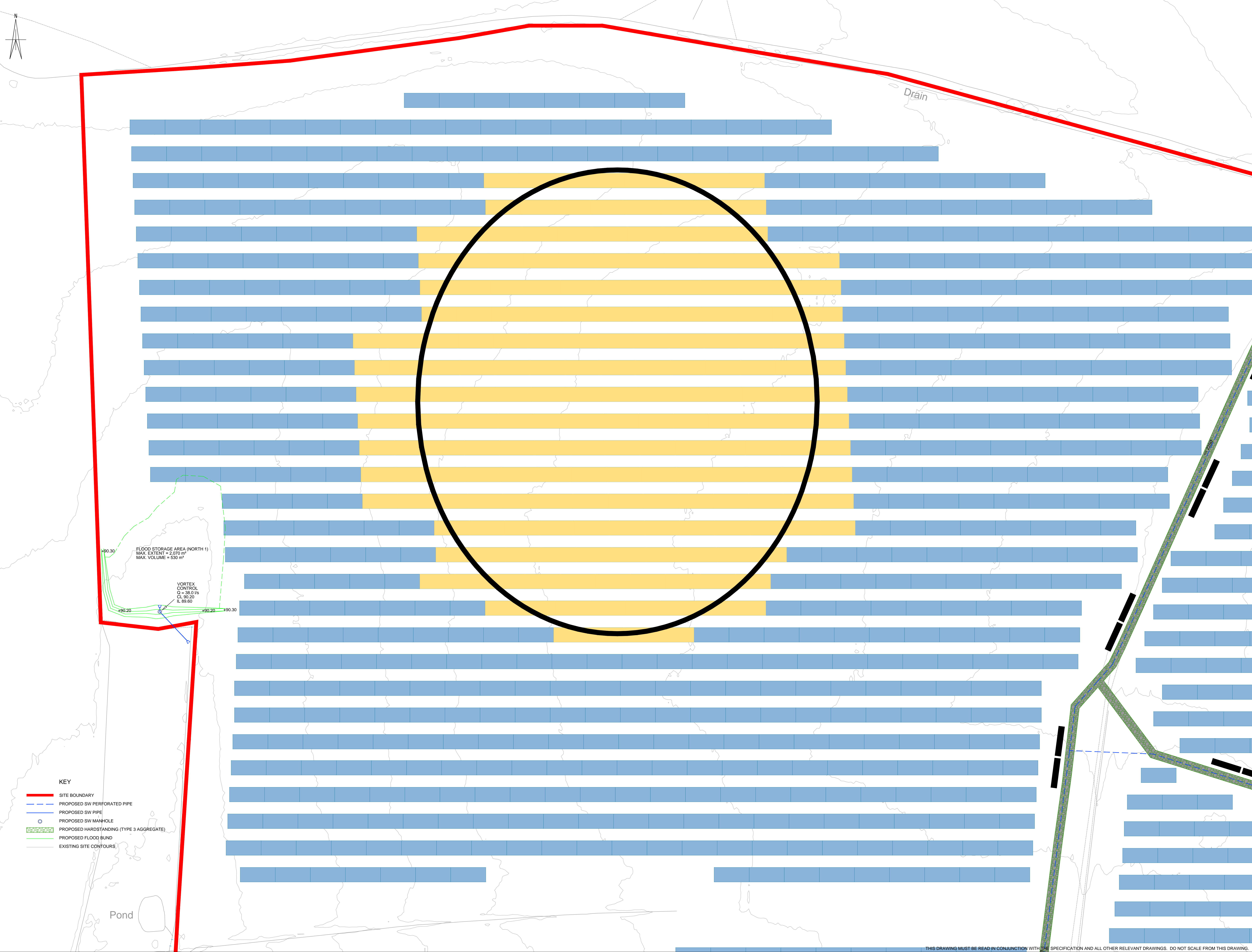
6 SUMMARY AND CONCLUSIONS

- 6.1 A planning application for “*Proposed solar farm measuring 88 hectares with associated battery storage containers, transformers stations, storage buildings, fencing etc including means of access (amended plans received 30.05.2022)*” was submitted on 6 December 2021 to North Hertfordshire District Council (planning reference 21/03380/FP).
- 6.2 The application was accompanied by a Flood Risk Assessment report (prepared by Weetwood). To respond to points of objection from the Environment Agency and the Lead Local Flood Authority, a revised version of the initial report was submitted in June 2022 (**CD6**) along with a Technical Note (**CD31**). The Environment Agency subsequently withdrew its objection.
- 6.3 In preparing this Proof of Evidence, I have summarised relevant planning policy and technical guidance, summarised the risk of flooding to the site, outlined the flooding issue downstream of the site, outlined the potential effect of the proposed solar farm on flood risk, and summarised the proposals to manage surface water runoff and overland flow from the developed site.
- 6.4 I have also presented the findings of an analysis of the effects of the proposed solar farm on flood risk based on detailed site-specific hydraulic modelling. The analysis demonstrates that the development would reduce off-site flood risk, subject to implementation of the proposed surface water drainage and overland land flow management scheme. The development would be safe from flood risk for its lifetime.
- 6.5 The local planning authority agrees that the proposals accord with national and local planning policy in respect of flood risk and drainage, and that the planning control committee granted planning permission based on the officer’s recommendation.
- 6.6 I conclude that flood risk has been appropriately considered and mitigated, and that the development would be safe from flood risk for its lifetime and not increase flood risk elsewhere.
- 6.7 On that basis, in my opinion, there is no reason why the application should not be approved as a result of flood risk or drainage matters.

ANNEXES

Annex A

Surface Water Drainage and Overland Flow Management Scheme



NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

FLOOD STORAGE AREA (NORTH 1)
 MAX. EXTENT = 2,070 m²
 MAX. VOLUME = 530 m³

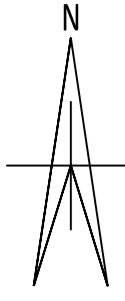
VORTEX CONTROL
 Q = 38.0 l/s
 CL. 90.20
 IL. 89.60

- KEY**
- SITE BOUNDARY
 - PROPOSED SW PERFORATED PIPE
 - PROPOSED SW PIPE
 - PROPOSED SW MANHOLE
 - PROPOSED HARDSTANDING (TYPE 3 AGGREGATE)
 - PROPOSED FLOOD BUND
 - EXISTING SITE CONTOURS

REV	DATE	DESCRIPTION	DRAWN	CHECK
P4	08.08.23	FENCE LINES REMOVED	JA	KT
P3	24.07.23	DRAINAGE LAYOUT UPDATED	JA	KT
P2	30.05.22	SITE LAYOUT UPDATED	JA	KT
P1	24.05.22	INITIAL ISSUE	JA	KT

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 Bytner Gwair, Mold
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 info@weetwood.net
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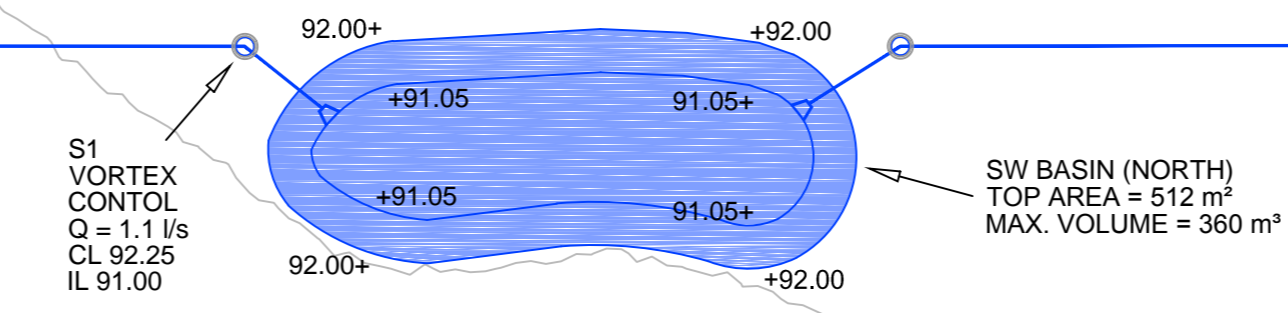
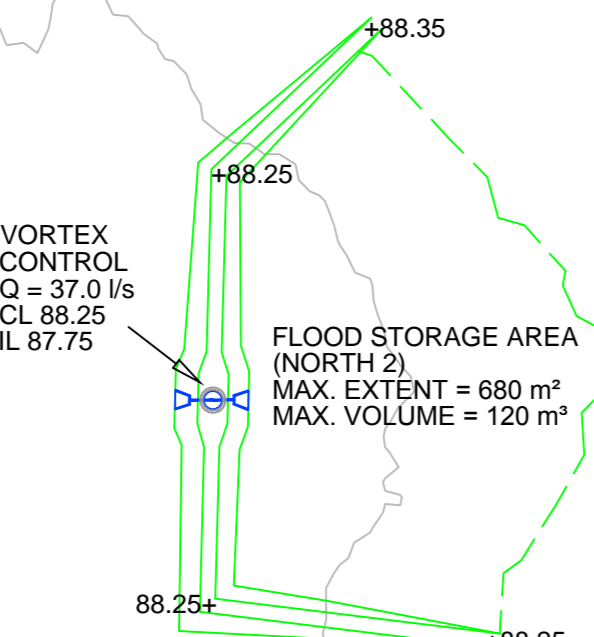
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AXIS PED		Scale (A0)	1:500
Drawing Status		Drawn	JA
PLANNING		Checked	KT
Project		Project No.	5208
LAND EAST OF GREAT WYMONDLEY		Drawing No.	100
Title		Revision	P4
PROPOSED DRAINAGE LAYOUT SHEET 1 OF 6			



KEY

- SITE BOUNDARY
- PROPOSED SW PERFORATED PIPE
- PROPOSED SW PIPE
- PROPOSED SW MANHOLE
- ▨ PROPOSED HARDSTANDING (TYPE 3 AGGREGATE)
- PROPOSED FLOOD BUND
- EXISTING SITE CONTOURS

Pond



93.9m

GRAVELEY LANE

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

REV	DATE	DESCRIPTION	DRAWN	CHECK
P4	08.09.23	FENCE LINES REMOVED	JA	KT
P3	24.07.23	DRAINAGE LAYOUT UPDATED	JA	KT
P2	30.05.22	SITE LAYOUT UPDATED	JA	KT
P1	24.05.22	INITIAL ISSUE	JA	KT

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Client AXIS PED	
Drawing Status PLANNING	Date MAY 2022
Project LAND EAST OF GREAT WYMONDLEY	Scale (A0) 1:500
Drawn JA	Checked KT
Project No. 5208	Drawing No. 101
Title PROPOSED DRAINAGE LAYOUT SHEET 2 OF 6	Revision P4



- KEY**
- SITE BOUNDARY
 - PROPOSED SW PERFORATED PIPE
 - PROPOSED SW PIPE
 - PROPOSED SW MANHOLE
 - PROPOSED HARDSTANDING (TYPE 3 AGGREGATE)
 - PROPOSED FLOOD BUND
 - EXISTING SITE CONTOURS

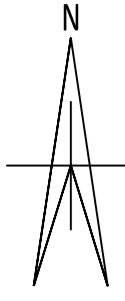
NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

REV	DATE	DESCRIPTION	DRAWN	CHECK
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P3	24.07.23	DRAINAGE LAYOUT UPDATED	JA	KT
P2	30.05.22	SITE LAYOUT UPDATED	JA	KT
P1	24.05.22	INITIAL ISSUE	JA	KT

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Client AXIS PED	
Drawing Status PLANNING	Date MAY 2022
Project LAND EAST OF GREAT WYMONDLEY	Scale (A0) 1:500
Drawn JA	Checked KT
Project No. 5208	
Title PROPOSED DRAINAGE LAYOUT SHEET 3 OF 6	Drawing No. 102
	Revision P4



- KEY**
- SITE BOUNDARY
 - - - PROPOSED SW PERFORATED PIPE
 - PROPOSED SW PIPE
 - PROPOSED SW MANHOLE
 - ▨ PROPOSED HARDSTANDING (TYPE 3 AGGREGATE)
 - ▨ PROPOSED FLOOD BUND
 - EXISTING SITE CONTOURS

S2
VORTEX
CONT'D
G = 1:1
CL 98.05
IL 98.05

99.00+ +99.00
+98.05 98.05+ +99.00

SW BASIN (SOUTH 1)
TOP AREA = 150 m²
MAX. VOLUME = 95 m³

GRAVELEY LANE

Track

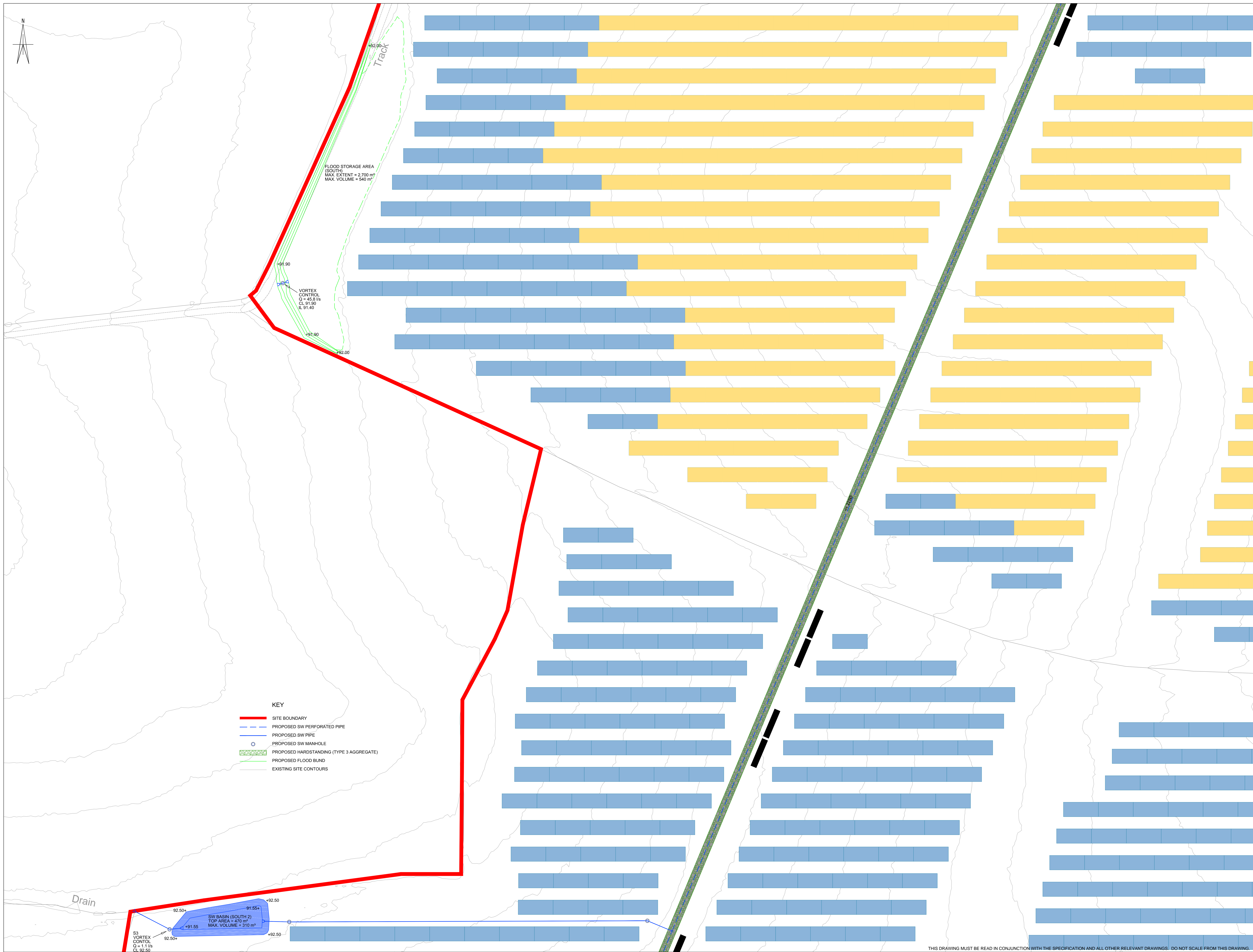
NOTES
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

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P3	24.07.23	DRAINAGE LAYOUT UPDATED	JA	KT
P2	30.05.22	SITE LAYOUT UPDATED	JA	KT
P1	24.05.22	INITIAL ISSUE	JA	KT

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Client AXIS PED	
Drawing Status PLANNING	Date MAY 2022
Project LAND EAST OF GREAT WYMONDLEY	Scale (A0) 1:500
Drawn JA	Checked KT
Project No. 5208	Drawing No. 103
Revision P4	Title PROPOSED DRAINAGE LAYOUT SHEET 4 OF 6

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER RELEVANT DRAWINGS. DO NOT SCALE FROM THIS DRAWING.



NOTES

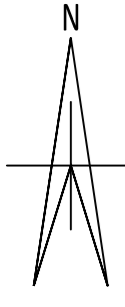
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

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P4	08.09.23	FENCE LINES REMOVED	JA	KT
P3	24.07.23	DRAINAGE LAYOUT UPDATED	JA	KT
P2	30.05.22	SITE LAYOUT UPDATED	JA	KT
P1	24.05.22	INITIAL ISSUE	JA	KT

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 www.weetwood.net

Client AXIS PED	
Drawing Status PLANNING	Date MAY 2022
Project LAND EAST OF GREAT WYMONDLEY	Scale (A0) 1:500
Drawn JA	Checked KT
Project No. 5208	Drawing No. 104
Revision P4	

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER RELEVANT DRAWINGS. DO NOT SCALE FROM THIS DRAWING.



- KEY**
- SITE BOUNDARY
 - PROPOSED SW PERFORATED PIPE
 - PROPOSED SW PIPE
 - PROPOSED SW MANHOLE
 - ▨ PROPOSED HARDSTANDING (TYPE 3 AGGREGATE)
 - PROPOSED FLOOD BUND
 - EXISTING SITE CONTOURS

S3
VORTEX
CONTROL
Q = 1.1 L/s
CL 92.50
IL 91.50

SW BASIN (SOUTH 2)
TOP AREA = 470 m²
MAX. VOLUME = 310 m³

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.

REV	DATE	DESCRIPTION	DRAWN	CHECK
P2	08.08.23	FENCE LINES REMOVED	JA	KT
P1	24.07.23	INITIAL ISSUE	JA	KT

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www.weetwood.net

Client AXIS PED	
Drawing Status PLANNING	Date JULY 2023
Scale 1:500	Drawn JA
Project LAND EAST OF GREAT WYMONDLEY	Checked KT
Project No 5208	Drawing No 105
Title PROPOSED DRAINAGE LAYOUT SHEET 6 OF 6	Revision P2

APPENDICES

Appendix A

Lead Local Flood Authority Consultation Response Letters

Shaun Greaves
North Hertfordshire District Council
Planning Control & Conservation
Council Offices Gernon Road
Letchworth Garden City
Hertfordshire
SG6 3JF

Our ref: NE/2021/133999/01-L01
Your ref: 21/03380/FP
Date: 20 January 2022

Dear Shaun

PROPOSED SOLAR FARM MEASURING 88 HECTARES WITH ASSOCIATED BATTERY STORAGE CONTAINERS, TRANSFORMERS STATIONS, STORAGE BUILDINGS, FENCING ETC INCLUDING MEANS OF ACCESS

PRIORY LANE, GRAVELEY LANE, GREAT WYMONDLEY

Thank you for consulting us on the above application. I apologise for the delay in our response and trust that our response can still be taken into consideration.

Whilst the solar array site is within Flood Zone 1, the route of the grid connection cable from the site to the Transforming Station is within Flood Zones 2 and 3 (Flood Zone 3b in the absence of detailed modelling). We are concerned that the installation of this will likely involve excavation and possible spoil in the floodplain.

Environment Agency position

In the absence of an acceptable Flood Risk Assessment (FRA) we object to this application and recommend that planning permission is refused.

Reason(s)

The submitted Flood Risk Assessment (FRA) does not comply with the requirements for site-specific flood risk assessments, as set out in paragraphs 30 to 32 of the Flood Risk and Coastal Change section of the planning practice guidance. The FRA undertaken by Weetwood Services Ltd (Final Report v1.1, dated October 2021) does not therefore adequately identify the site and assess the flood risks posed by the development now and taking the impacts of climate change into account.

- There are two contradictory plans showing the red line boundary of the site.
 - The red line boundary of the site within the FRA includes the solar array site only which is located within Flood Zone 1.
 - The red line boundary of the application (drawing no. 3004-01-002 Statutory Plan, Rev B) shows the site and includes the grid connection from the site to the Transforming Station. The cable route goes through Flood Zones 2 and 3.
- The North Hertfordshire District Council Strategic Flood Risk Assessment (dated July 2008) and the North Hertfordshire District Council Strategic Flood Risk Assessment Update (dated 2016) states that "Where information on 3b doesn't exist (i.e. outside of the Hitchin area), Flood Zone 3a should be taken to illustrate flood plain in the first instance as was set out in the original SFRA." In the absence of detailed modelling, the extent of Flood Zone 3b 'functional floodplain' would be equal to Flood Zone 3a 'high risk'.

The Local Planning Authority will need to confirm the vulnerability classification of the grid connection. However the following advice is given on the basis that the cable for the grid connection is considered to be essential infrastructure within Flood Zone 3b.

Essential infrastructure, located in Flood Zone 3b (functional floodplain), that has to be there and has passed the Exception Test should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

An amended FRA which addressed the above points for the works (including during construction) should for the grid connection from the site to the Transforming Station should be submitted. If the grid connection cable is not essential infrastructure and / or land levels within the floodplain will be altered as a result of the works, further assessment of flood risk may be required. We would welcome further discussions on this once confirmed.

Overcoming our objection

To overcome our objection, the applicant should submit a revised FRA which addresses the points highlighted above and demonstrates that the development will not increase risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application. Production of an FRA will not in itself result in the removal of an objection.

We ask to be re-consulted with the results of the FRA. We will provide you with bespoke comments within 21 days of receiving formal reconsultation. Our objection will be maintained until an adequate FRA has been submitted.

If you are minded to approve the application contrary to our objection, please contact us to explain why material considerations outweigh our objection. This will allow us to make further representations. Should our objection be removed, it is likely we will recommend the inclusion of conditions on any subsequent approval.

Please let me know if you have any questions.

Yours sincerely

**Deborah Simons
Planning Advisor**

Direct e-mail HNLsustainablePlaces@environment-agency.gov.uk

Shaun Greaves
North Hertfordshire District Council
Planning Control & Conservation
Council Offices Gernon Road
Letchworth Garden City
Hertfordshire
SG6 3JF

Our ref: NE/2021/133999/02-L01
Your ref: 21/03380/FP
Date: 21 June 2022

Dear Shaun

Proposed Solar Farm measuring 88 hectares with associated battery storage containers, transformers stations, storage buildings, fencing etc including means of access.

Priory Lane, Graveley Lane, Great Wymondley

Thank you for consulting us on the revised Flood Risk Assessment (FRA) and technical note for the above application.

We have reviewed the revised FRA, dated 30 May 2022, version 1.3, and consider that this addresses the issues raised in our previous letter of objection. We are able to **withdraw our objection** to the proposed development.

The revised FRA states that no spoil would be stored along Stevenage Road, which is located within Flood Zone 3. In order to ensure there is no loss of floodplain or increase in flood risk elsewhere during the construction phase, we strongly recommend that the following condition is imposed on any planning permission granted

Condition:

During installation of the underground cables, no spoil or material will be stored adjacent to Stevenage Road, within the extent of Flood Zone 3. This shall form part of a construction management plan that shall be agreed in writing with the Local Planning Authority prior to any development commencing. Works shall then be carried out in accordance with the agreed plan.

Reason:

To ensure there is no loss of floodplain or impedance to flood water flows and no increase in flood risk elsewhere during the construction phase.

Please let me know if you have any questions.

Yours sincerely

Deborah Simons
Planning Advisor

Direct e-mail HNL.SustainablePlaces@environment-agency.gov.uk

Appendix B

Environment Agency Consultation Response Letters, 15 November 2022

Director of Environment & Transport:
Mark Kemp



Shaun Greaves
North Herts District Council
Council Offices
Gernon Road
Letchworth
Herts
SG6 3JF

Lead Local Flood Authority
Post Point CHN 215
Hertfordshire County Council
County Hall, Pegs Lane
HERTFORD SG13 8DN

Contact Sophie Taylor
Email FRMConsultations@hertfordshire.gov.uk

Date 14 February 2022

RE: 21/03380/FP - Land to The North and East of Great Wymondley, Hertfordshire

Dear Shaun,

Thank you for consulting us on the above application for a Proposed solar farm measuring 88 hectares with associated battery storage containers, transformers stations, storage buildings, fencing etc including means of access at Land to the North and East of Great Wymondley, Hertfordshire.

The applicant has submitted the following information in support of their application:

- Flood Risk Assessment Version 1.1 dated 22 October 2021 prepared by Weetwood

We were previously consulted on a Scoping Opinion for this application site, reference 21/02228/SO dated 27 August 2021. Within this response we provided detailed comments and advice on what would be required within a Flood Risk Assessment and Surface Water Drainage Strategy.

Upon review of the submitted Flood Risk Assessment in support of this application we can confirm that the information and assessment required has not been provided as part of the FRA to demonstrate that the proposed application will not increase flood risk to the site and the surrounding area.

The information provided to date does not provide a suitable basis for an assessment to be made of the flood risk arising from the proposed development. Therefore, we object to the grant of planning permission.

In order for the Lead Local Flood Authority to advise the relevant Local Planning Authority that the site will not increase flood risk to the site and elsewhere and can provide appropriate sustainable drainage techniques the following information is needed:

Flood Risk from surface water overland flows

The site forms a large area of the Priory Lane catchment which drains to an ordinary watercourse via several tributaries along Priory Lane just north of Little Wymondley. The ordinary watercourse then flows into the Ash Brook in Little Wymondley at the junction of Priory Lane and Stevenage Road. This was subject to a Section 19 Flood Investigation following frequent flooding events of the main road, Priory Lane, and several properties in Little Wymondley. Subsequent to the S19 investigation, a Flood Alleviation Study was carried out to qualify key contributing factors that caused the flooding within Little Wymondley. One of the key contributing factors was the overland surface water run-off from the surrounding fields adjacent and north of Priory Lane where it enters an ordinary watercourse, then overflows down Priory Lane.

The application site is located at the head of each of the tributaries and their associated flow paths which flow into the ordinary watercourse along Priory Lane. Each of these tributaries are also classified as ordinary watercourses. It is therefore imperative that these watercourses and their associated flood extents are avoided. Any changes to the ground levels and or impedance to flows may increase flood risk. We would be seeking a betterment as a result of the development rather than just avoidance where technically possible.

We would also be seeking a betterment to the existing flood risk from surface water overland flows where technically viable to provide an opportunity to reduce flood risk to Little Wymondley, in particular during the 1 in 30-year event which is shown as high risk on the EA Surface Water maps and modelling contained within the Flood Alleviation Feasibility Study for Little Wymondley.

The applicant will need to establish and carry out a hydraulic assessment and site-specific modelling to establish the existing overland flow routes and their extents for all return periods up to the 1 in 100 year + climate change event. This should also include ground truthing of the location of the ordinary watercourses and their condition.

Surface Water Drainage

With regards to the proposed access tracks, storage units and other built development including the solar panels, as detailed in our Scoping Opinion response, the applicant is required to carry out infiltration testing if infiltration is the proposed method of surface water disposal. We know from the S19 investigation that the ground conditions are not favourable to infiltration once saturated. It is therefore important that infiltration tests are carried out across the entire area to establish the feasibility and efficiency of infiltration for the lifetime of the development. The tests should be carried out in accordance with BRE Digest 365. The depth of the tests should be carried out to the plane of proposed infiltration.

'We would advise that we would regard the proposed solar panels to be impermeable, and the run-off falling on the panels will need to be actively managed. Solar panel infrastructure will change the dynamics of the greenfield site. The applicant will need to provide a formal drainage layout and strategy. We would suggest that a system of filter drains, gravel trenches, perforated pipes to ensure flows are actively managed. Considering the impact of compaction and changes on site, if it is proposed to infiltrate,

infiltration tests should be undertaken, else flows should be attenuated, conveyed and restricted following the surface water discharge hierarchy’.

‘This should include detailed assessment of ground conditions, groundwater levels, permeability of the underlying geology, with infiltration tests carried out in accordance BRE Digest 365 for shallow infiltration and falling head tests if deep bore infiltration is proposed. The FRA / SWDS should also demonstrate that there will be sufficient surface water quality treatment by implementing an appropriate amount of management and treatment of surface water through the use of SuDS, in accordance with the SuDS Manual by Ciria. An appropriate management and treatment train should be provided to manage any potential contaminants from surface water run-off from car parking areas and access roads’.

‘Details of required maintenance of any SuDS features and structures and who will be adopting these features for the lifetime of the development should be provided. It is up to the Local Planning Authority to ensure that the drainage/SuDS system can be managed for the lifetime of the development’.

Providing gravel surfaced tracks and different grass type to manage the increase in surface water run-off is not acceptable.

The applicant will need to establish the pre-development surface water run-off catchment areas as this is a large site where surface water may flow naturally to different parts of the site. This should be mimicked as closely as possible.

If it is found that infiltration is not technically viable, the applicant will need to assess discharging to the nearest watercourse where feasible and based on the flood risk to the area, we would be seeking a betterment to the existing pre-development greenfield run-off rate. This will require on site attenuation which should be based on the SuDS hierarchy providing above ground SuDS measures. Below ground attenuation will not be acceptable on a greenfield site unless it can be technically justified.

We would only accept discharge of surface water to a surface water sewer should both infiltration and to a watercourse be unviable and permission has been confirmed from the relevant water authority providing a betterment to the pre-development greenfield run-off rate.

Pre and post development greenfield run-off rates should be provided and detailed surface water calculations for all rainfall events up to and including the 1 in 100 year + climate change event to demonstrate that the proposed drainage scheme can cater for the surface water runoff generated by the development for its lifetime. The applicant will also need to demonstrate that any proposed infiltration and attenuation measures can half drain down within 24 hours.

Summary

As it stands the applicant has not demonstrated that the proposed development will not increase flood risk to the site and the surrounding area. We are concerned as it stands the development will increase flooding downstream and we will not be in a position to remove our objection until it can be shown there will be a betterment as a result of the

development to the existing flood risk from overland flows and the implementation of a sustainable management system of surface water run-off which will be increased as a result of the development, providing infiltration at source where possible and or a betterment to the pre-development greenfield run-of rates where discharge off site is required.

Informative

Please find a link to the Little Wymondley Section 19 Flood Investigation here; <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/flood-investigations/little-wymondley-flood-investigation-report.pdf> and the Flood Alleviation Feasibility Study here; <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/flood-investigations/little-wymondley-flood-alleviation-feasibility-study.pdf>

For further guidance on HCC's SuDS policies, HCC Developers Guide and Checklist and links to national policy and industry best practice guidance please refer to our surface water drainage webpages:

<https://www.hertfordshire.gov.uk/services/recycling-waste-and-environment/water/surface-water-drainage/surface-water-drainage.aspx>.

The applicant should be aware that any works proposed, permanent and/or temporary to be carried out that may affect the flow within an ordinary watercourse will require the prior written consent from the Lead Local Flood Authority (Hertfordshire County Council) under the Land Drainage Act 1991. This includes any permanent and/or temporary works, regardless of any planning permission.

For further advice on Ordinary Watercourses, please visit our Ordinary Watercourse webpage via the following link:

<https://www.hertfordshire.gov.uk/services/recycling-waste-and-environment/water/ordinary-watercourses/ordinary-watercourses.aspx#>

Yours sincerely,

Sophie Taylor
SuDS and Watercourses Support Officer
Environment & Transport

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Hertfordshire County Council
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HERTFORD SG13 8DN

Contact Sophie Taylor
Email FRMConsultations@hertfordshire.gov.uk

Date 15 November 2022

Dear Shaun

RE: 21/03380/FP - Land to The North and East of Great Wymondley, Hertfordshire

Thank you for re-consulting the LLFA on the above application for a Proposed solar farm measuring 88 hectares with associated battery storage containers, transformers stations, storage buildings, fencing etc including means of access at Land to the North and East of Great Wymondley, Hertfordshire.

In response to our previous objection dated 14 February 2022 the applicant has provided the following information:

- Technical Note- 5208 dated 30 May 2022 Final V1.1 prepared by Weetwood
- SWD and Overland Flow Management Strategy dated 30 May 2022 prepared by Weetwood

Based on the information provided we maintain our objection for the following reasons:

1. **Discharge rates-** The applicant is proposing a discharge rate of 5/l/s. This is at the higher end of what we would expect, in particular where we have requested a betterment of the current situation.
2. **No reference to Section 19-** having referred the applicant to this document and subsequent modelling and mitigation report, no direct reference has been made to this within the FRA and Drainage Strategy to ensure there is a full understanding of the prior modelling, constraints, catchment, assets and flood mechanisms.
3. **Catchment survey-** no condition survey of the culverts has been carried out. Please see S19 for information on the condition of culverts etc in this area (apart from the 285m length culvert which was not included). We are concerned that these watercourses do not have the capacity to accept additional volumes and in some

places are broken and under capacity. This needs to be taken into account when carrying out the hydraulic model to reflect the real conditions of the catchment. The 285m culvert referenced within the northern parcel has not been surveyed. Therefore, the condition and capacity of both of these culverts is unknown. In order to accept discharge rates and volumes into these catchments, this information is required. Please also refer to the S19 regarding the culvert downstream along Priory Lane from Gravelly Lane.

4. **Method of overland flow management-** It is proposed to install 2 ponds which are to be bunded. By using 'raised' methods, these become 'formal' flood assets. We therefore have concerns over their purpose, capacity and structural design to be able to manage flows from each catchment. It is stated that these are only design to manage the additional '7%' of extra run-off from the solar panels, despite our requirement to manage the run-off from the panels at source and avoidance of the existing natural overland flows. We have concerns that these ponds will naturally receive run-off and the overland flows as identified in our own modelling and within the applicants and these ponds will become redundant. The use of attenuation was assessed as part of the mitigation options as part of the S19 to manage over land flows under current conditions as was discounted due to the volumes and velocities of flows required to be accommodated, introducing 'flood management' structures which would require regular maintenance and cost, which if should fail would have negative downstream consequences. Any 'flood assets' approved would have to be formally registered by the LLFA on their flood defence register and permission to alter or remove them in the future would require prior written consent from the LLFA.

5. **Hydraulic modelling-** Paragraphs 18-28 discuss runoff and show this is represented. It states that there is an increase in rainfall applied of 7% compared with existing rainfall. However, with the small amount of storage being provided, we are unclear as to how the calculated figures have been concluded, particularly given that the main inlet to all of the attenuation features is a piped inlet from the access track. We are assuming that the flows presented in the table are for the outlet from the basin and not the total runoff from the site. If so then the increase in 7%, suggests that what has been applied cannot be catered for as there is no attenuation of all of the flow paths from the site. Therefore, how is the applicant providing mitigation for runoff from the site that does not pass through the attenuation features? Also is there a bund proposed through and over an existing track and how realistic is this? How are the bunds managing the 7% if all of the primary flow paths are not catered for? There are no post implementation scenario flood maps which are required to demonstrate what the impact of the development is. It is unclear where they have taken the measurements of flow for the graphs and tables from. We would expect to see a cut line across the full length of the boundary (can spilt across the two sites if necessary). The proposed access roads cut across the contour so has the runoff been calculated from the upslope catchment – therefore can they be treated in isolation? The question marks '?' on the sketch indicate the flow paths that have no mitigation. Therefore, we are not sure how it can be demonstrating such a large decrease in flow

for the 1 in 30 year unless the mitigation is only picking the points of overspill from the bunds and not looking at the rest of the site.

6. **Surface water management-** It is stated that attenuation ponds will be installed to manage the run-off from the 'developed' areas excluding the panels, however based on the proposed locations, these ponds will also capture natural run-off from the land. Has this been taken into account when calculating the capacity of the ponds an appropriate freeboard above the 1 in 100year + climate change rainfall event. There are insufficient surface water calculations, all other events from the 1 in 1 year event up to the 1 in 100 year + climate change event should be provided. We need more information on how run-off from the solar panels will be managed. Based on the topography and location of the proposed ponds, in particular the south basin 1 there seems to be an outfall into the field with no ditch location. There are lengthy pipes to and from the ponds which may be prone to blockage and place the drainage system deeper.
7. **Treatment Train-** There is no treatment train from the proposed track and other hardstanding areas prior to the discharge into the attenuation ponds. The proposed perforated pipes are to be set into the gravel track, therefore at risk of blockage from silt etc washing through the track blocking the perforations and blocking the pipe runs which will then cause flows to flow overland and make the proposed ponds redundant. The tracks need to be formally managed as part any other road. Roadside swales/filter strips may be more suitable and will manage at source reducing the need for lengthy pipes.
8. **Half drain down-** no half drain calculations have been provided for the attenuation and overland flow features. It needs to be demonstrated that these can half drain within 24 hours based on an appropriate discharge rate.
9. **Works to ordinary watercourse-** no details have been provided on the construction of the proposed new headwalls and capacity of the watercourses. Regardless of any planning permission, consent from the LLFA will be required under the Land Drainage Act 1991 will be required. The applicant will also need to ensure landowner permission if the works are not within their ownership. In principle agreement should be in place at planning application stage to ensure the drainage scheme is viable.

It is proposed to place one of the overland flow basins online to the Old Priory Lane watercourse, this is not acceptable as it will not manage the flows sufficiently and will hydraulically change the watercourse. Any proposals should be offline with a controlled outlet into the watercourse.

10. **Adoption and Maintenance-** Please provide this information.
11. **During Construction-** prior to the site having established grass and managed vegetation, how will the run-off and overland flows be managed including the management of silt and soil from heavy traffic and construction, ensuring sufficient

management of run-off and water quality with no negative impact on the existing ordinary watercourses.

With regards to the EA removing their objection on flood risk grounds, this only relates to the Flood Zones outside of the main development area with regards to the cables to the substation. These are associated with the Ash Brook which runs through the village of Little Wymondley and relates to the management of levels during construction, which the applicant has confirmed not materials will be storage in flood zone areas. This is not related to the complex management of existing overland flows and increase in overland flows and surface water run-off as a result of the main development area.

If this catchment is not managed appropriately and given the detailed assessment it requires, the impact downstream increasing flood risk is high. The Priory Lane catchment contributes flooding along Priory Lane and Little Wymondley where it joins the Ash Brook. This may negate the mitigation works on the main road undertaken by HCC Highways if there is an increase in run-off rates and volumes as a result of the development. Whilst we appreciate the development is to improve the environment with a sustainable source of energy this should not be prioritised above increasing flood risk which is also a climate change issue and should also be managed sustainably and for the lifetime of the development.

LLFA Position

For the reasons above, the proposed development is currently not acceptable to the LLFA and we maintain our recommendation of objection until further detail is provided.

If the LPA are minded to approve the application we recommend the following stringent conditions to secure an acceptable strategy.

Condition 1

No development including ground works and ground preparation works shall take place until a surface water drainage scheme and flood risk assessment for the site, based on sustainable drainage principles and an assessment of the hydrological and hydro geological context of the development, has been submitted to and approved in writing by the local planning authority. The drainage strategy should demonstrate the surface water run-off generated up to and including the 1 in 100 year + climate change critical storm will not exceed the run-off from the undeveloped site following the corresponding rainfall event. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed.

The scheme shall also include:

1. A detailed response to our letter dated 15 November 2022 which satisfactorily addresses the 11 points of concern with the proposed surface water drainage scheme and overland flow management scheme.
2. Carry out any necessary amendments to the proposed surface water drainage scheme and hydraulic modelling for the overland management scheme for LLFA

approval. Once the baseline information is agreed the following information should be provided;

3. Detailed condition survey of all known culverts including the receiving catchments.
4. Demonstrate an overall betterment to the existing pre-development surface water greenfield run-off rates.
5. Demonstrate an overall betterment of the existing pre-development overland flow paths for the 1 in 30 year event, ensuring the flow paths are maintained and not made worse for events above the 1 in 30 year event up to the 1 in 100 year + climate change event.
6. Detailed engineered drawings of the proposed SuDS/ flood risk mitigation features including their location, size, volume, depth and any inlet and outlet features including any connecting pipe runs and all corresponding calculations/modelling to ensure the scheme caters for all rainfall events up to and including the 1 in 100 year + 40% allowance for climate change event.
7. Detailed engineered drawings of all proposed discharge locations including headwall details, evidence of landownership and relevant permissions. A condition survey of these specific locations should also be provided and any mitigation required should be carried out prior to development taking place.
8. Demonstrate appropriate SuDS management and treatment and inclusion of above ground features reducing the reliance on piped drainage.
9. Provision of half drain down times for surface water drainage features within 24 hours.
10. Silt traps for protection of any residual tanked elements.
11. Construction phase surface water and flood mitigation management plan.
12. Details of how the scheme shall be maintained and managed after completion including adoption details.

Reason

To prevent the increased risk of flooding, both on and off site in particular to Priory Lane and Little Wymondley.

Condition 2

Upon completion of the surface water drainage / flood management works for the site in accordance with the timing / phasing arrangements, the following must be submitted to and approved in writing by the Local Planning Authority:

1. Provision of a verification report (appended with substantiating evidence demonstrating the approved construction details and specifications have been implemented in accordance with the surface water drainage scheme). The verification report shall include photographs of excavations and soil profiles/horizons, installation of any surface water structure (during construction and final make up) and the control mechanism.
2. Provision of a complete set of as built drawings for site drainage.

3. A management and maintenance plan for the SuDS features and drainage network.
4. Arrangements for adoption and any other measures to secure the operation of the scheme throughout its lifetime.

Reason

To prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site.

Informative to the LPA

We would recommend the LPA obtains a management and maintenance plan, to ensure the SuDS features can be maintained throughout the development's lifetime. This should follow the manufacturers' recommendation for maintenance and/or guidance in the SuDS Manual by CIRIA.

Informative

Please find a link to the Little Wymondley Section 19 Flood Investigation here; <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/flood-investigations/little-wymondley-flood-investigation-report.pdf> and the Flood Alleviation Feasibility Study here; <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/flood-investigations/little-wymondley-flood-alleviation-feasibility-study.pdf>. These documents should be considered as part of any future application.

For further guidance on HCC's SuDS policies, HCC Developers Guide and Checklist and links to national policy and industry best practice guidance please refer to our surface water drainage webpages:

<https://www.hertfordshire.gov.uk/services/recycling-waste-and-environment/water/surface-water-drainage/surface-water-drainage.aspx>.

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Please note if the LPA decide to grant planning permission, we wish to be notified for our records should there be any subsequent surface water flooding that we may be required to investigate as a result of the new development.

Yours sincerely

Sophie Taylor
SuDS and Watercourses Support Officer
Environment & Transport

Weetwood

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Flood Risk Assessments
Flood Consequences Assessments
Surface Water Drainage
Foul Water Drainage
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