From:	[redacted]
To:	One Earth Solar
Cc:	[redacted]
Subject:	CRITICAL AND UNRESOLVABLE NON-COMPLIANCE WITH FLOOD RISK AND WFD REGULATIONS DUE TO APPLICANT"S PROCEDURAL FAILURE (EN010159/APP/6.7.3 Revision 04) – One Earth Solar Farm
Date:	18 November 2025 10:14:39
Attachments:	Clinical Assessment and Regulatory Critique of the One Earth Solar Farm Environmental Statement.docx

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From: Stephehen Fox

Resident of North Clifton

Interested Party Reference number: [redacted]

By email.

To Examining Authority

One Earth Solar Farm (Scheme Ref: EN010159)

National Infrastructure Planning

Temple Quay House

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Bristol, BS1 6PN

Date 18.11.25

Dear Sirs

Reservation of Rights (Litigant in Person)

This submission is made under **explicit protest** and strictly **without prejudice** to the Interested Party's right to challenge the lawfulness and procedural integrity of the Examination.

The Interested Party's continued participation is legally **compelled** by the statutory process (Planning Act 2008) to maintain standing, but this action does **not** constitute a waiver, acceptance, or validation of any alleged procedural impropriety, ExA bias, unlawful censorship, or fundamental flaws in the Administrative Record.

All rights to seek Statutory Appeal and Judicial Review against the final Development Consent Order decision are fully reserved.

This submission serves as a formal covering letter introducing our comprehensive **Clinical Assessment and Regulatory Critique** of the Applicant's Chapter 7: Hydrology and Hydrogeology (Document Reference: EN010159/APP/6.7.3 Revision 04) which is attached.

My analysis confirms that the Applicant's claims regarding flood risk neutrality and water quality mitigation are fundamentally unreliable and violate core regulatory policy. The severity of the unmitigated risks identified herein is so profound that these deficiencies constitute **material uncertainty that legally precludes the grant of development consent.**

1. Fundamental Breach of Flood Risk Policy ("No Net Loss")

The Applicant's core claim of achieving "no increase in flood risk" is demonstrably unsupported on both static and dynamic levels:

- **Quantified Static Loss:** The assessment relies on an arbitrary 5 mm threshold for displacement within Flood Zones, resulting in a **quantifiable and uncompensated flood storage loss of at least 39,900 m^3**. This directly breaches the non-negotiable principle of "no net loss" of flood storage capacity.
- **Exponential Kinetic Failure:** The design ignores the scientifically proven Baiamonte effect, whereby the solar panel structure causes a non-linear hydrological shift. This effect results in a documented surge effect, increasing peak discharge rates locally by **up to 11.7 times** and dramatically accelerating flow speeds. This kinetic force renders the proposed mitigation (voided structures, standard drainage) hydraulically unstable and guarantees long-term scour damage and flood surge risk.

2. Failure of WFD Compliance and Procedural Impossibility

The combined deficiencies in volumetric compensation, kinetic modeling, and the absence of a legally enforceable monitoring regime (as formally objected to by the Environment Agency [1]) mean the Examining Authority cannot certify compliance with the Water Framework Directive (WFD).

Crucially, the necessity of the reports now required renders the Examination timetable unworkable. The Applicant and the Examining Authority have been alerted to the need for advanced 2D hydraulic and erosion modelling and full HIA competency verification since the Relevant Representation stages and Issue Specific Hearings. Leaving these fundamental issues—which challenge the core acceptability of the project—unresolved until this late stage is unacceptable. The inherent complexity of the **necessary technical reports** (specifically advanced, physically-based 2D erosion modeling) renders it impossible for the Applicant to perform, report on, and for statutory authorities and interested parties to professionally verify the results in the time remaining in the statutory Examination period.

Demand: Recommendation for Rejection

The Applicant’s strategy of delaying the provision of essential, verifiable flood and erosion data constitutes an unacceptable procedural tactic that has resulted in a failure of governance. Due to the proven statutory non-compliance and the impossibility of achieving technical resolution and verification by all responsible agencies within the remaining Examination timetable, **the only appropriate and legally defensible recommendation available to the Examining Authority is the firm rejection of the Development Consent Order application.**

Yours faithfully,

Stephen Fox

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Clinical Assessment and Regulatory Critique of the One Earth Solar Farm Environmental Statement: Chapter 7 Hydrology and Hydrogeology (EN010159/APP/6.7.3, Revision 04)

Contents

I Executive Summary: Audit Findings and Regulatory Deficiencies

I.1. Overall Compliance Verdict and Recommendation Status

I.2. Critical Deficiencies Identified

I.3. Recommendation

II. Contextual and Regulatory Framework Audit

II.1. Scope of Review: Document Identification and Examination History

II.2. Compliance Benchmark: Environment Agency (EA) and UK Regulatory Standards

II.2.1. Water Framework Directive (WFD) 2017 Requirements

II.2.2. Hydrogeological Impact Assessment (HIA) Mandate

II.2.3. Flood Risk Policy

II.2.4. Non-Linear Hydrological Risk Assessment Mandate

III. Critique of Assessment Methodology and Baseline Integrity

III.1. Audit of Study Area and Baseline Data Integrity

III.1.1. Study Area Limitation

III.1.2. Data Scrutiny

III.1.3. Receptor Identification Transparency

III.2. Critical Analysis of Significance Criteria and Bias

III.2.1. Temporal Reliance in Magnitude Assessment

III.2.2. Judgement and Consistency

IV. Clinical Review of Flood Risk Management and Mitigation Adequacy

IV.1. Sequential Test and Vulnerability Assessment

IV.2. Technical Adequacy of Structural Compensation Measures

IV.3. Residual Flood Risk and Enforceability of Commitments

V. Hydrogeological, Water Quality, and WFD Deficiencies

V.1. Review of Groundwater Resource Impact and Contamination Risk

V.2. Clinical Audit of Water Quality Mitigation and Enforcement Gaps

V.3. WFD Compliance and Screening Gaps

VI. Conclusion and Definitive Recommendations

VI.1. Summary of Critical Findings

VI.2. Definitive Recommendations for DCO Requirement Wording

VI.2. R1 Recommendation 1: Water Quality Monitoring Protocol (Revising CEMP/DEMP Requirements)

VI.2. R2 Recommendation 2: Hydraulic Performance Security and Compensation

VI.2. R3 Recommendation 3: Specialist Accreditation Assurance

Reservation of Rights (Litigant in Person)

This submission is made under **explicit protest** and strictly **without prejudice** to the Interested Party's right to challenge the lawfulness and procedural integrity of the Examination.

The Interested Party's continued participation is legally **compelled** by the statutory process (Planning Act 2008) to maintain standing, but this action does **not** constitute a waiver, acceptance, or validation of any alleged procedural impropriety, ExA bias, unlawful censorship, or fundamental flaws in the Administrative Record.

All rights to seek Statutory Appeal and Judicial Review against the final Development Consent Order decision are fully reserved.

I. Executive Summary: Audit Findings and Regulatory Deficiencies

This report presents a clinical assessment and regulatory critique of Chapter 7: Hydrology and Hydrogeology (Document Reference: EN010159/APP/6.7.3, Revision 04), submitted by One Earth Solar Farm Ltd1 for the Nationally Significant Infrastructure Project (NSIP) EN0101592. This revision, dated November 2025, represents an iteration of the Environmental Statement (ES) submitted at Deadline 4 of the examination period4.

I.1. Overall Compliance Verdict and Recommendation Status

The Applicant has submitted documentation confirming necessary steps like applying the Sequential Test (siting sensitive infrastructure outside the design flood extent) and committing to standard mitigation measures such as freeboard and hydraulically neutral voided structures with the objective of ensuring “no increase in flood risk outside the Order Limits”3. However, these policy-level commitments are immediately rendered technically unverified and insufficient by the failure of the underlying design assumptions to compensate for the known hydrological changes induced by the solar array (the Baiamonte effect)8. Research demonstrates this effect causes a fundamental and exponential shift in hydrology: local peak discharge rates increase by up to 11.7 times8,15, the time to peak flow is halved or less (creating a dangerous surge effect)15, and overall site runoff volume increases by up to 35%8,16. Furthermore, forensic analysis identifies an uncompensated material flood storage loss of at least 39,900 across Flood Zones 2 and 3 due to reliance on an arbitrary 5 mm tolerance threshold17. This combination of quantifiable static loss and exponential kinetic energy increase renders the core conclusion of 'no increase in flood risk' technically unsupported, inappropriate in design context, and legally incapable of substantiation without certified hydraulic modelling3,12,18.

Furthermore, the technical conclusions regarding negligible impacts on water quality and hydrogeology during the construction and decommissioning phases are currently unsupported by enforceable detail, leading to a severe regulatory deficiency3,5,9.

I.2. Critical Deficiencies Identified

Despite being an advanced submission (Revision 04), the chapter's reliance on environmental measures secured in the Outline Construction Environmental Management Plan (oCEMP) is undermined by specific statutory objections from the Environment Agency (EA)5,9. The EA has identified that the monitoring regimes proposed for water quality lack the requisite detail, particularly in Table 3.5 of the CEMP and Section 5.2 of Appendix 7.4 (Stage 1 Water Framework Directive (WFD) Screening Assessment)5.

This absence of prescriptive protocols, compounded by the known hydrological concentration and increase in runoff from solar panel arrays (the Baiamonte effect, which can increase peak flows by up to 35%)8,16, means the predicted 'Neutral' effects for water quality are based on mitigation measures that are currently unenforceable and technically inadequate3,9,12.

This poses a significant and demonstrably high risk of non-compliance with the Water Environment Regulations 2017 (WFD Regulations) by failing to demonstrate how the risk of water body status deterioration has been successfully screened out6,7,10. Crucially, the Examining Authority (ExA) cannot legally certify WFD compliance based on the current body of evidence and unresolved statutory objections from the Environment Agency6,9.

I.3. Recommendation

Consent is precluded until the material uncertainty is resolved6,10. The demonstration of zero residual flood risk must move beyond a statement of intent and be conclusively verified3,12. Accordingly, the revision and robust legal security of key technical documents via the Development Consent Order (DCO) Requirements—specifically, detailed and prescriptive Water Quality Monitoring Plans and certified hydraulic modelling reports—must be assured and approved by the relevant statutory consultees (EA and Lead Local Flood Authority (LLFA)) before the conclusion of the Examination3,18. The current deficiencies represent a material uncertainty that must be resolved to meet the requirements of the Planning Act 2008 and associated regulatory guidance, as the current unverified technical claims fail the legal test for acceptability6,12.

II. Contextual and Regulatory Framework Audit

II.1. Scope of Review: Document Identification and Examination History

The focus of this analysis is the revised Chapter 7: Hydrology and Hydrogeology, which forms part of the Environmental Statement (Volume 6.0) for the One Earth Solar Farm NSIP3. The document, Application Document Ref: EN010159/APP/6.7.3, Revision 04, was submitted to the Planning Inspectorate (PINS) for Examination4.

The iterative nature of the documentation, reaching Revision 04, confirms that the technical components of the assessment have been subject to repeat scrutiny throughout the consultation process, including via Issue Specific Hearings (ISH3)4. The fact that critical issues remain unresolved at this advanced stage suggests persistent technical disagreement or a reluctance to provide the level of detail required for securing mitigation, as documented in the EA's response submitted at Deadline 59.

II.2. Compliance Benchmark: Environment Agency (EA) and UK Regulatory Standards

The assessment must be judged against stringent UK regulatory requirements specific to NSIPs, including policy on flood risk management, water resources protection, and the Water Framework Directive (WFD)6,11.

II.2.1. Water Framework Directive (WFD) 2017 Requirements

The Water Environment Regulations 2017, which transpose the WFD into UK law, require that NSIPs protect and enhance all surface waters, coastal waters, and groundwater, ensuring that the status of these water bodies does not deteriorate6.

The required WFD assessment utilizes a tiered approach. Stage 1 involves screening water bodies within the Zone of Influence (ZoI) for potential impacts based on the source-pathway-receptor principle7,10. Crucially, any impacts that are 'screened out' from further detailed assessment must be clearly justified7. The Applicant utilized Appendix 7.4 (Stage 1 WFD Screening Assessment) to address this requirement3,9. As detailed below, the EA's comments regarding the lack of detail in this appendix fundamentally challenge the validity of the screening conclusion5,9.

II.2.2. Hydrogeological Impact Assessment (HIA) Mandate

The proposed development, given its scale and confirmed proximity to Environment Agency Drinking Water Protected Areas and Drinking Water Safeguard Zones, requires a robust assessment of hydrogeological impacts13. The EA guidance dictates that a Hydrogeological Impact Assessment (HIA) must follow a tiered approach to work out risks in context of the complexity of the hydrogeological setting and the environmental sensitivity11.

Furthermore, the preparation of an HIA is a detailed process requiring specialist skills. The person carrying out the assessment must hold or be working towards an appropriate accreditation, such as Chartered Geologist, Chartered Scientist (specialising in hydrogeology), or Chartered Engineer (specialising in hydrogeology)11. The rigorous requirement for specialist accreditation establishes a high technical threshold against which the assessment methodology must be scrutinised, particularly regarding the categorisation of risks to high-sensitivity groundwater receptors11.

II.2.3. Flood Risk Policy

Compliance with flood risk policy requires adherence to the principle of no net loss of flood storage capacity and no increase in flood risk off-site12. The assessment confirms the use of a stringent definition for the Design Flood Event, which includes the 1 in 100 year river flood (or 1 in 200 year tidal flood) plus an appropriate allowance for climate change12. The use of a 40% increase in rainfall intensity is cited when assessing surface water flood risk and drainage systems for the future baseline conditions, which aligns with standard practice for long-term infrastructure planning in the UK12.

II.2.4. Non-Linear Hydrological Risk Assessment Mandate

The Applicant's assessment must be held to the highest standard of contemporary hydrological science8,15,16. The Environment Agency's review must explicitly confirm that the Applicant's methodology has moved beyond generic, volume-based (linear) hydrological modelling and has demonstrably incorporated the non-linear, high-velocity flow dynamics associated with large PV arrays (the Baiamonte effect)8,15,16. Crucially, the Baiamonte research demonstrates that the kinetic energy and concentration of flow is directly attributable to the solar panel structure itself16, making this mechanism independent of—but compounded by—the condition of the underlying ground cover16. The acceptance of mitigation strategies based solely on simple drip line treatments or 1D drainage calculation methods is scientifically insufficient to manage the exponential increase in shear stress and kinetic energy generated by concentrated runoff from solar panels8,16. If the EA's statutory response relies on the Applicant's outdated methodology that fails to model flow velocity and shear stress, their own regulatory position is technically deficient for securing the long-term environmental integrity of the site8,16.

III. Critique of Assessment Methodology and Baseline Integrity

III.1. Audit of Study Area and Baseline Data Integrity

III.1.1. Study Area Limitation

The ES defines the study area using a fixed 1 km buffer around the Order Limits3. While this fixed distance is deemed appropriate to capture catchments and allow for the deposition and dilution of surface pollutants, it presents an arbitrary limit for a comprehensive hydrogeological assessment11. Groundwater flow paths are rarely confined to simple radii, especially in complex geological settings. In cases involving high-sensitivity receptors like Drinking Water Protected Areas, the Zone of Influence for groundwater impacts should be defined dynamically by verified hydrogeological modelling and flow pathways, rather than a fixed buffer, to ensure full adherence to HIA principles11.

III.1.2. Data Scrutiny

The strength of the baseline section (Section 7.4) is its reliance on authoritative and current data sources13. These include:

- Environment Agency (EA) Flood Maps (Flood Zones 2 and 3) and Risk of Flooding from Surface Water mapping13.
- Mapping from the relevant Strategic Flood Risk Assessments (SFRAs) for Bassetlaw District, Newark and Sherwood, and West Lindsey13.
- Detailed geological context provided by British Geological Survey (BGS) geology maps and borehole records13.
- Critically, the use of the Hydraulic Modelling of the River Trent provided by the EA (Tidal Trent 2023)13. The integration of the most current authoritative hydraulic model validates the flood risk context used for the design of mitigation measures12.

III.1.3. Receptor Identification Transparency

The methodology states that a description of sensitive receptors is provided in the baseline conditions section, alongside the definition of future baseline conditions3,14. However, the methodology section itself does not explicitly define the technical criteria used to classify a receptor's sensitivity (High, Medium, Low, Negligible)3,12. This lack of codified criteria reduces the transparency required for independent verification, making the sensitivity classification appear subjective rather than objectively defensible12. The baseline confirms the presence of ordinary watercourses and field drains that discharge ultimately to the River Trent, establishing a direct hydrological pathway, which reinforces the need for rigorous protection protocols14.

III.2. Critical Analysis of Significance Criteria and Bias

The significance of an environmental effect is determined by combining the Magnitude of Impact and the Sensitivity of the Receiving Receptor12.

III.2.1. Temporal Reliance in Magnitude Assessment

The criteria used to define the Magnitude of Impact are heavily dependent on the duration of the effect12. High magnitude is defined by a long-term duration (approximately 60 years), while Low magnitude is associated with approximately 5 years12. This duration-based approach introduces a systemic bias against adequately assessing high-severity, short-term acute risks, which are particularly relevant during the construction phase12.

This flaw is exacerbated by known hydrological responses of large-scale solar arrays (the Baiamonte effect), which concentrate rainfall and increase peak discharge by up to 35%8,16. This shift in hydrology guarantees higher severity, short-term acute risk (erosion/siltation) which the duration-based criteria systematically ignores8,16.

An acute, high-impact accidental pollution event (such as a major spillage of hydrocarbons or large-scale mobilisation of sediment) lasting days or weeks would, under this framework, likely be classified as 'Low' or 'Negligible' magnitude due to its duration (less than 1 year or approximately 5 years)12. Consequently, when cross-referenced against high-sensitivity receptors (such as the nearby Drinking Water Safeguard Zones or a Main River WFD body), the resultant Significance of Effect would be systematically downgraded to 'Minor' or 'Moderate' instead of 'Major'12. This structural flaw in the criteria matrix allows the ES to systematically reach ‘Not Significant’ conclusions (i.e., Neutral, Minor, or Moderate where the Major/Moderate threshold is missed) for construction phase risks, even if the severity of the potential harm is catastrophic12.

Table 1 illustrates the inherent structural limitations of the duration-based significance criteria.

Magnitude Definition	Duration (as per ES)	Receptor Sensitivity (Example)	Audit Critique and Implication
High	Approx. 60 years	River Trent (WFD Water Body)	Appropriately captures permanent/long-term physical displacement effects. Fails to adequately assess catastrophic acute pollution risk, as duration criteria dominates severity.
Medium	Approx. 20 years	Ordinary Watercourse (Flow Regime)	Suitable for reversible operational impacts (e.g., minor increased runoff).
Low	Approx. 5 years	Field Drain/Small Feature	Skews assessment of construction impacts (e.g., erosion/siltation) which are often short

			duration but high severity during peak rainfall events. This risk is exacerbated by the Baiamonte effect.
Negligible	Less than 1 year	Localized, temporary effects	Supports the "Not Significant" conclusion for the construction phase, even if risk of occurrence and severity is high.

III.2.2. Judgement and Consistency

The overall significance of effects is stated to be determined using professional judgement12. While the application of professional judgement is an accepted part of EIA methodology, for an NSIP of this complexity and scale, particularly regarding flood risk and water quality impacts on high-sensitivity receptors, the resulting conclusion must be fully evidenced and supported12. The current methodology fails this test for accountability: The reliance on professional judgement to conclude "Minor" or "Neutral" significance for effects amplified by the Baiamonte effect, combined with the structural flaws in the criteria matrix (duration bias) and the absence of verifiable 2D hydraulic modelling, renders the judgement indefensible8,16,18. Furthermore, the reliance on professional judgement must be clearly justified and documented; here, the lack of underlying technical data and the unverified competency of the HIA author (see Section V.1) fatally undermine the basis upon which such professional accountability is claimed11.

IV. Clinical Review of Flood Risk Management and Mitigation Adequacy

The central technical claim of Chapter 7 is that the Proposed Development, incorporating environmental measures agreed in principle with the Environment Agency (EA) and Lead Local Flood Authority (LLFA), will result in no increase in flood risk outside the Order Limits3.

IV.1. Sequential Test and Vulnerability Assessment

The Applicant confirms adherence to the Sequential Test by adopting a design approach that minimises exposure to flood risk3. The proposal dictates that the majority of sensitive electrical equipment, specifically all substations and the Battery Energy Storage System (BESS), will be located outside of the design flood extents3. This is a compliant and robust approach to mitigating high flood risk associated with critical infrastructure failure3.

IV.2. Technical Adequacy of Structural Compensation Measures

For components that cannot be entirely located outside the flood zone, specific structural compensation measures are proposed:

- Freeboard for Inverters and Modules: Inverters and solar modules situated within the design flood extent are proposed to be raised above the design flood level, achieving a minimum freeboard of 300mm3. This standard provides an essential safety margin against uncertainties in modelling and future changes in extreme flood profiles. The proposal to raise the bottom of the panel heights to achieve this 300mm freeboard across the majority of the site has been discussed with the EA3.

- Unverified Hydraulic Performance of Voided Structures: The most critical technical assumption relates to inverters well within the design flood extents. The proposal suggests raising these on "voided structures". The intention is that these structures will allow floodwater to flow and be stored beneath the equipment, thereby having a negligible impact on flood flows and storage capacity3,18. The assumption of "negligible impact" is purely a design hypothesis at this stage and fails to account for the confirmed hydrological shift, known as the Baiamonte effect8,16. This phenomenon dictates that solar arrays can concentrate rainfall, potentially increasing peak flow and runoff volume by up to 35%8,16. Therefore, the compensation measures must not only manage the existing flood risk but must also fully compensate for the project-induced increase in surface water runoff8,16.

IV.3. Residual Flood Risk and Enforceability of Commitments

The commitment to review "Land raising options... at detailed design where feasible" introduces an element of technical flexibility but also residual uncertainty3. For a project at Deadline 4/5, the fundamental feasibility of primary flood mitigation techniques should be confirmed3. The absolute certainty required for the claim of "no increase in flood risk" necessitates that this residual flood risk must be demonstrated to be zero before the proposal is approved3,18. This means all design specifications related to freeboard and hydraulic compensation (including the performance of voided structures and compensation for array-induced runoff) must be legally secured through DCO Requirements and explicitly detailed in the Works Plans18.

Critically, the Applicant’s reliance on an arbitrary 5 mm tolerance threshold, reportedly accepted by the EA, for displacement and subsequent flood modelling is unacceptable17. This tolerance results in a material and uncompensated flood storage loss of at least 39,900 across the Flood Zones17. This quantifiable volumetric deficiency, combined with the unverified hydraulic performance of the voided structures and the surge effects of the Baiamonte phenomenon, means the "no increase" claim remains a statement of intent8,16,18. The residual flood risk, both locally and elsewhere, cannot be deemed acceptable under the Planning Act 2008 and associated policy until it is conclusively confirmed as zero, and leaving final compliance to the detailed design stage via DCO Requirements cannot be accepted by the Environment Agency, the Lead Local Flood Authority, or the Examining Authority6,12.

V. Hydrogeological, Water Quality, and WFD Deficiencies

V.1. Review of Groundwater Resource Impact and Contamination Risk

The baseline environment establishes a high degree of sensitivity, including the confirmed presence of Drinking Water Protected Areas and Drinking Water Safeguard Zones managed by the EA13.

The installation of the solar array infrastructure, particularly through piling or cable trenching, creates the permanent risk of preferential pathways that could compromise the integrity of geological layers designed to confine surface contaminants. This allows contaminants to migrate into the underlying high-sensitivity groundwater body11. This risk is not merely confined to the temporary construction phase; rather, it represents a continuous operational liability for the entire 60-year life of the project11. The potential for long-term contamination of the high-sensitivity Drinking Water Protected Areas and public supply requires the assessment to conclusively demonstrate that the permanent infrastructure will not result in the deterioration of the groundwater body status, adhering to the stringent requirements of a formal Hydrogeological Impact Assessment (HIA)11.

The technical assurance is further compromised by the lack of clear, publicly verifiable confirmation that the initial Hydrogeological Impact Assessment (HIA) within Chapter 7 was prepared by a professional holding the mandatory accreditation (e.g., Chartered Geologist, Chartered Scientist specialising in Hydrogeology, or Chartered Engineer specialising in Hydrogeology) as dictated by Environment Agency guidance11. This absence of transparent competency assurance undermines the credibility of the risk categorizations (e.g., classifying public supply impact as ‘Minor Adverse’) and necessitates formal verification before consent can be granted11.

The assessment lists impacts to surrounding Anglian Water and Severn Trent distribution mains as ‘Minor Adverse’ and impacts to Public Water Supply as ‘Minor Adverse’3. Given the sensitivity classification of Drinking Water Protected Areas, classifying the overall impact on public supply as ‘Minor Adverse’ requires rigorous justification, as the consequences of failure (regardless of low probability or short duration) are inherently ‘Major Adverse’12.

V.2. Clinical Audit of Water Quality Mitigation and Enforcement Gaps

Chapter 7 relies heavily on the implementation of the Outline Construction Environmental Management Plan (oCEMP) and a Water Resources Plan to secure mitigation against water quality impacts3. Based on this, the chapter concludes that impacts to existing watercourses in terms of water quality are Neutral and Not Significant during construction3.

However, this conclusion is fundamentally challenged by the confirmed statutory objection from the Environment Agency (EA)5,9. The EA response explicitly states that there are "minimal details in Table 3.5 of the CEMP" and the Decommissioning EMP (DEMP) regarding Water Quality Monitoring (EAWQ)5,9.

This deficiency represents a fundamental regulatory failure, especially when combined with the Baiamonte effect8,16. Since the solar array design is known to increase the intensity and concentration of surface runoff—a hydraulic impact directly demonstrated to be caused by the panel structure itself16—the likelihood and severity of sediment run-off during construction earthworks are inherently higher than predicted under a simple baseline8,16. Crucially, because the level of mitigation is severely underestimated due to the failure to incorporate the non-linear peak discharge and flow acceleration of the Baiamonte effect, there will be permanent, long-term soil erosion issues during the operational phase8,16. This intensified runoff, if not controlled by specialised, high-shear-stress-resistant mitigation, will lead to accelerated post-construction rill and gully formation, resulting in the permanent degradation of soil quality and persistent pollutant (silt) loading into watercourses, ultimately breaching WFD non-deterioration requirements6,8,16. Without clearly defined:

- Specific chemical parameters to be monitored (e.g., Total Suspended Solids (TSS), hydrocarbons).
- Locations (upgradient and downgradient of works).
- Frequency of sampling (linked to high-risk activities or rainfall events).
- Quantifiable trigger levels for immediate intervention or work cessation.

The mitigation measures are legally and technically insufficient5,9,10. The commitment to water quality protection becomes an unenforceable intention, and the predicted 'Neutral' conclusion for water quality risk during the construction and operation phases is therefore rendered technically unreliable3,9,12.

V.3. WFD Compliance and Screening Gaps

The regulatory gaps extend directly to WFD compliance. The WFD assessment process requires that the Applicant demonstrates how embedded measures and good practice reduce the potential for deterioration of screened-in water bodies6,7,10.

The Environment Agency has also raised concerns regarding the "minimal details in... section 5.2 of Appendix 7.4" (Stage 1 WFD Screening Assessment)5,9. Section 5.2 of the WFD Screening should articulate the specific procedural controls that guarantee WFD compliance6,10. If the necessary procedural details for monitoring and controlling potential pollutants are absent from this appendix (and the CEMP), the Applicant cannot adequately justify that the risk of WFD deterioration has been successfully screened out6,7,9,10. This places the project at high risk of non-compliance with the Water Environment Regulations 20176,7,10.

Crucially, the statutory objection from the EA combined with the failure of the methodology to account for the hydraulically induced pollution risk (the Baiamonte effect) means the Examining Authority (ExA) cannot certify compliance with the WFD Regulations 2017, as the legal requirement to demonstrate the prevention of deterioration is currently unmet and unenforceable6,9,10.

Table 2 synthesises the audit findings regarding the unresolved statutory consultation issues post-Deadline 4.

Key Document Reference	Issue Raised by EA	Chapter 7 Rev 04 Conclusion	Assessment of Resolution Status
Outline CEMP (Table 3.5)	Minimal detail in Water Quality Monitoring Regime.	Construction impacts are Neutral/Minor Adverse.	Material Regulatory Deficiency. Predicted conclusions rely on unsecured protocols. Details regarding parameters, frequency, and action triggers are required immediately.
Appendix 7.4 (Section 5.2)	Minimal detail regarding WFD water quality controls.	WFD Stage 1 Screening conducted.	WFD Non-Compliance Risk. Inadequate procedural detail weakens the justification for screening out the risk of water body status deterioration. The ExA cannot certify WFD compliance.

Flood Storage Loss	Uncompensated static loss of 39,900 due to 5 mm tolerance acceptance.	Flood Risk Neutral.	Fundamental Volumetric Deficiency. Quantified loss means the "no net loss" principle is violated. Requires full volumetric compensation, not reliance on arbitrary tolerance.
Appendix 7.2 FRA (Outline Drainage)	Requirement for verified hydraulic performance of voided structures.	Design secured via Works Plan to ensure no increase in flood risk.	Technical Certainty Gap. Requires submission of detailed hydraulic reports that explicitly compensate for the array-induced runoff increase (Baiamonte effect) and must be signed off by an accredited professional prior to implementation to validate the 'negligible impact' claim.

VI. Conclusion and Definitive Recommendations

VI.1. Summary of Critical Findings

Chapter 7: Hydrology and Hydrogeology (Revision 04) presents a nominal design that adheres to the Sequential Test and commits to freeboard3. However, the assessment is critically undermined because the proposed mitigation measures are demonstrably insufficient, leading to an unacceptably high and unmitigated risk of both flooding and permanent environmental deterioration over the project's 60-year lifespan3,8,16. The flaws are structural:

- Fundamental Flood Risk Breach: The commitment to "no increase in flood risk" is violated by a quantifiable uncompensated flood storage loss of at least 39,90017. This is compounded by the Baiamonte effect, which causes an exponential increase in peak discharge (up to 11.7x) and flow velocity, rendering the design hydraulically unstable and leading directly to flood surge risk and structural scour damage8,15,16. The Applicant's claim of flood risk neutrality is therefore fundamentally unreliable3,8,16,17.
- Unaccountable Design and WFD Failure: The reliance on unverified professional judgement and methodology biases (duration bias) systematically understates the severity of acute pollution events12. This flaw, combined with the confirmed statutory failure of the Environment Agency to secure prescriptive Water Quality Monitoring Plans5,9, means the project lacks any legally enforceable mechanism to prevent water body deterioration6,10. The absence of certified 2D hydraulic modelling and technical

competency verification (HIA accreditation) means the Examining Authority cannot legally certify WFD compliance or that the flood risk has been adequately mitigated8,11,18,19,20,21.

VI.2. Definitive Recommendations for DCO Requirement Wording

Given the magnitude and persistence of the unmitigated risks—which challenge the core acceptability of the project—the current failure to provide verifiable technical solutions necessitates a recommendation for rejection of the proposal3,6,8,9,12,18.

The Applicant and the Examining Authority have had adequate time to address these critical technical deficiencies since they were formally raised at the Relevant Representation stages and Issue Specific Hearings (ISH3)4,5,9. Leaving these fundamental issues—which challenge the core acceptability of the project—unresolved until this late stage is unacceptable3,6,9,12. The necessity of these reports renders it impossible to perform and report on the necessary updates in the time left in the Examination and prevents interested parties and statutory authorities from being allowed the professional time necessary to verify the results before the close of the statutory period3,6,9,12.

Recommendation 1: Water Quality Monitoring Protocol (Revising CEMP/DEMP Requirements)

The DCO Requirement securing the Construction and Decommissioning Environmental Management Plans (CEMP/DEMP) must mandate that the relevant sections pertaining to water quality shall not be implemented until a detailed, site-specific Water Quality Monitoring Plan (WQMP) has been submitted to and approved by the Environment Agency5,9,10. This WQMP must explicitly define, but not be limited to:

- Baseline data for comparison, derived from pre-construction monitoring.
- Clearly mapped monitoring locations (upgradient and downgradient) covering all receptors identified in the baseline.
- Frequency of sampling, explicitly linked to high-risk activities (e.g., earthworks) and meteorological trigger conditions (e.g., rainfall exceeding a specified intensity) that accounts for the increased runoff dynamics of the solar array8,16.
- Full list of analytes, including minimum requirements for pH, suspended solids, and hydrocarbons.
- Quantifiable trigger levels for immediate site-level intervention, formal work cessation, and an incident reporting protocol.

Recommendation 2: Hydraulic Performance Security and Compensation

The DCO Requirement governing the commencement of works within identified Flood Zones (Flood Zone 2 and Flood Zone 3) must mandate the submission of a Final Flood Risk Mitigation Design and accompanying hydraulic modelling3,12,18. This submission must be certified by a Chartered Hydrologist or Chartered Engineer and must:

- Detail the final, agreed configuration, spacing, and height of the solar array within the flood extents.
- Provide the precise design specifications and location of all ‘voided structures’ used for hydraulic compensation3,18.

- Present verified advanced, physically-based 2D hydraulic and erosion modelling that conclusively demonstrates the development achieves zero net impact on flood storage and flow conveyance for the Design Flood Event (including climate change allowance), specifically compensating for the quantified at least 39,900 flood storage loss and the array-induced exponential increase in peak discharge (Baiamonte effect), and addressing any potential increase in hydraulic roughness across the Order Limits8,15,16,18,19,20,21.

Recommendation 3: Specialist Accreditation Assurance

To satisfy the technical integrity demanded by EA guidance for complex hydrogeological issues, the DCO Requirement securing site investigation and remediation (such as Requirement 22 or equivalent) must explicitly confirm that all Phase 2 site investigations, risk assessments, and groundwater management plans are prepared, reviewed, and formally approved by an appropriately accredited professional (specifically a Chartered Geologist or Chartered Scientist specialising in Hydrogeology)11,22.

Footnotes (Citations)

1. Planning Data, One Earth Solar Farm. General project name and reference.

2. EN010159 Statement of Common Ground with Environment Agency (Clean). References One Earth Solar Farm Ltd as the Applicant.

3. EN010159/APP/6.7.3 Revision 04, Chapter 7: Hydrology and Hydrogeology. Key conclusions, flood risk neutrality, mitigation (freeboard, voided structures), and negligible impact conclusions.

4. EN010159 Applicant's Deadline 5 Covering Letter. Confirms Chapter 7 Revision 04 submission at Deadline 4.

5. EN010159 Environment Agency Deadline 4 response, Appendix 2 ISH3 Action Points. Confirmed statutory objection regarding minimal details in Table 3.5 of the CEMP and Section 5.2 of Appendix 7.4 (Stage 1 WFD Screening Assessment).

6. GOV.UK, Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. References WFD Regulations 2017 and duties of the Examining Authority.

7. GOV.UK, WFD Stage 1 Screening. Requirement that impacts screened out must be clearly justified.

8. Baiamonte et al., "Evaluating the potential impacts of solar farms on hydrological responses". Confirms peak discharge increase up to 11.7 times.

9. Environment Agency response EN010159 Chapter 7 Hydrology Revision 4 Deadline 5. Confirms minimal detail objection in CEMP and DEMP.

10. National Grid, WFD Risk Assessment – How to Assess the Risk of your Activity. Details WFD assessment stages (Stage 1 Screening) and appendices referenced.

11. GOV.UK, Preparing a Hydrogeological Impact Assessment. Mandates HIA tiered approach and specific accreditations (Chartered Geologist, Chartered Scientist, Chartered Engineer).

12. EN010159/APP/6.7.2 Chapter 7 Hydrology and Hydrogeology (Clean). Defines Design Flood Event (1 in 100 year + CC).

13. EN010159/APP/6.7.3 Revision 04 document. Baseline data sources (EA Drinking Water Protected Areas).

14. EN010159 ES Chapter 7 Hydrology and Hydrogeology. Confirms runoff is directed to ordinary watercourses and field drains, which ultimately discharge to the River Trent.

15. Baiamonte et al., "Impact of solar panels on runoff generation process". Confirms peak discharge increase up to 11.7 times and time to runoff reduction (halved).

16. How a photovoltaic panel impacts rainfall-runoff and soil erosion processes on slopes at the plot scale. Confirms increments of peak flow volume up to 35% are obtained for roughness coefficient reductions.

17. EN010159 Interested Party Submission (Stephen Fox) Deadline 5. Quantifies uncompensated flood storage loss of at least 39,900 due to the arbitrary 5 mm tolerance threshold.

18. Hess Copernicus, Agrivoltaism. Demonstrates that rain redistribution and flow concentration dynamics are directly attributable to the geometric characteristics of the mobile panels (panel structure itself).

19. EN010159/APP/3.1.5 Draft DCO (clean). References Requirement 22 regarding Phase 2 site investigation and risk assessment methodology.

20. ResearchGate, Two-dimensional rainfall-runoff and soil erosion model on an irregularly rilled hillslope. Discusses the need for 2D distributed models integrating erosion.

21. MDPI, EROSION-3D. Describes EROSION-3D as a physically-based distributed hydrological model simulating runoff and soil erosion.

22. MDPI, EROSION-3D. Discusses EROSION-3D model as raster-based and using digital elevation model (DEM).