RESPONSE TO APPLICANTS' SUBMISSION:

9.15 Outline Design Principles Document Rev.1, 28th April 2025:
Table 2.2 relating to Battery Energy Storage Systems (BESS)

Helios Submission	My Comments/Questions
The compound will include battery containers of up to 12.2m in length x 2.4m in width x 3.5m in height, including concrete supports 600mm in height.	There is no indication of **a) The energy capacity in MWh hours of each container?** **b) How many containers?** **c) Who is providing the containers?** **d) What safety tests have been carried out?**
Two separate points of vehicular access;	Under the NFCC guidelines, a map is required to show that there are two independent access points such that no matter what the prevailing wind fire crews do not have to battle against smoke. **Please see point 1 below**
▪ Circular service road providing unobstructed access to all BESS containers and designed to accommodate Fire and Rescue service vehicles;	
Scale Internal access tracks will cover a width of up to 6m.	**Is this sufficient to enable passing points and turning circles?**
All BESS containers are a minimum of 25m from the nearest occupied buildings and a minimum of 25m from Public Rights of Way and Site Boundaries;	This takes account of the issue of radiant heat affecting neighbouring properties, it does not take into account the distance of the toxic plumes should a fire/explosion occur. **Please see point 2 below**
▪ Spacing between BESS units is a minimum of 2m;	A standard minimum spacing between units of 6 metres is suggested under the NFCC guidelines unless suitable design features can be introduced to reduce that spacing. If reducing distances a clear, evidence based, case for the reduction should be shown. Any reduction in this separation distance should be design based by a competent fire engineer. There should be consideration for the fire separation internally and the total realistic load of fire. Proposed distances should be based on radiant heat flux (output) as an ignition source. (NFCC) NFPA 855 demands a more serious demonstration that a fire in one container will not propagate to an adjacent one. Some US Fire Departments are demanding full scale fire tests and there

	are rumours that NFPA 855 (2025) will be demanding this. **Please see point 3 below**
▪ Two sets of four Water Tanks;	8 water tanks in all. If the dimensions are interpreted correctly (i.e. cylindrical 3.65 m high and 3.45 m diameter) each when full should deliver 34000 litres.
Water Tanks Scale The maximum water tank dimensions are up to an elevation of 3.65m AGL and a diameter of up to 3.45m	NFCC requires enough water for 1900 litres per minute over 2 hours i.e. 228000 litres in total. **Please see point 4 below**
ES Appendix 3.1: Outline BESS Safety Management Plan [REP4-013] and the Site Specific Risk Engagement Document (SSRED) [APP-231].	
Fencing (Solar PV Site) Design The fence type will be plain wire, deer fencing with mammal gates included. Scale The maximum fence post height will be 2.1m.	

QUESTIONS/ISSUES

1. Two separate access points

The NFCC guidelines state that suitable facilities for safely accessing and egressing the site should be provided. Designs should be developed in close liaison with the local FRS as specific requirements may apply due to variations in vehicles and equipment.
This should include:

- At least 2 separate access points to the site to account for opposite wind conditions/direction.
- Roads/hard standing capable of accommodating fire service vehicles in all weather conditions. As such there should be no extremes of grade.
- A perimeter road or roads with passing places suitable for fire service vehicles.
- Road networks on sites must enable unobstructed access to all areas of the facility.
- Turning circles, passing places etc size to be advised by FRS depending on fleet.

For the Applicant to claim compliance, are two separate access points possible and can the Applicant provide the required map?

2. Spread of toxic plumes and particulates

2.1 I, and many others, are extremely concerned re the spread of plumes in the event of a fire. The smoke and fumes from a BESS fire can be highly toxic, fire is notoriously difficult to extinguish and the close packing of batteries in a BESS can lead to rapid fire propagation.
(CPRE Hertfordshire article: https://www.cpreherts.org.uk/news/are-battery-energy-storage-systems-bess-safe/)

Also the spread of the plumes can be more problematic in certain conditions such as temperature inversion conditions and slow moving hailstorms. The former prevents dissipation and dilution of effluent plumes and hold these close to ground level where they pose the most direct threat to human and wild life.

Hailstorms are more a problem in bringing particulate contamination from higher altitude down to earth and in doing so actually concentrate the levels of those contaminants.
The former is of greatest concern in the short term (and is more likely) while the latter can create long term ground and water contamination.

Such plumes contain hydrogen fluoride and carbon monoxide which pose a serious risk as exposure can lead to organ damage and could be fatal.

From BESS fires that have already occurred, the plumes are seen to spread far and wide dependent upon the prevailing winds at that time. In Moss Landing, California this year for example, the plumes exceeded the 3 km radius set by the fire service.
The photos below** of a substation fire near Warwick Avenue Station in London in April 2025, clearly demonstrate how such plumes can spread.
A fire at a BESS can be much worse than a fire at a substation, especially when it comes to the potential for thermal runaway, a rapid and uncontrolled release of energy that can lead to explosions and fires.
BESS fires can generate a significant amount of heat and toxic fumes, and the close proximity of batteries can lead to rapid fire spread. (Substations, while also involving electrical components, are typically more robust and may have fire-resistant design features, according to a report from UK Power Networks).

It is well documented that lithium-ion batteries are intrinsically unstable and prone to fire and we also know that a fire in the lifetime of a BESS is likely:

- The leading lithium-ion battery manufacturer, DNV, has stated that at least one failure in a Li-BESS is expected over the lifetime of a project. Expecting zero failures is unrealistic.
- The developers at Moss Landing, Vistra Energy, claimed they had 'state of art', accredited BESSs but they were still overwhelmed
- Yiguang Ju, Engineering Professor Princeton University has stated "No matter what kind of lithium battery you use, when you reach a certain size, it is inherently very dangerous and easy to catch fire"

Surely the proximity of the proposed BESSs to residential dwellings and the huge numbers involved (thereby increasing the risk) and the fact that over 4000 people live within a 2 mile radius must be considered?

3. Safe distances between BESS containers

The Applicant has previously cited NFPA 855 2023 (the accepted 'bible' of standards in the absence of any British Standards) and UL 9540A which provides guidance on distances between BESS containers, the key issue being to avoid the possibility of fire propagating to adjacent containers. Regarding testing, NFPA 855 states: 9.1.5.1.2
The testing shall be conducted or witnessed and reported by an approved testing laboratory to characterise the composition of the gases generated and show that a fire involving the BESS unit will not propagate to an adjacent unit.
If the Applicant is to limit the distance between BESSs of 2m, this surely requires a proper demonstration that fire will not propagate to a neighbouring container, especially noting that the fire at Moorabool, Australia, in 2021 scorched an adjacent container that was 2.5 m away.

a) **Has/will the applicant witness the UL95840A test and, if so, submit it as part of their application?**
b) **Also NFPA 855 and UL9540A are standards and not regulations and as such will change as more research emerges. Will the Applicant always endeavour to meet these developing standards whatever the guidance turns out to be? For example what will the applicant do if the guidance on distance between BESSs becomes more stringent?**

It should be noted that Professor Paul Christiansen, who is acknowledged as the UK expert, has observed that BESS can still go on fire even those that have passed the UL9540A test. Passing UL 9540A is therefore not a 'gold standard' of safety and does not give any assurance that a fire in a container will not propagate to an adjacent one.

3. Sufficient Water Capacity

The dimensions of the water tanks all taken together would be sufficient but this is assuming that the tanks are all filled to these maximum dimensions.
As each tank is exhausted how long before water can be resumed from the second tank.

a) **Are the current proposals sufficient, mindful that the Liverpool Fire in 2020 took 11 hours to control?**
b) **Are there any water hydrants nearby?**

4. Remote Monitoring

As previously stated, the batteries are inherently unstable and wholly depend upon remote control systems to monitor and manage charging and discharging in a way which is supposed to minimise the risk of thermal runaway. This poses a number of concerns:

- The Carnegie Road site in Liverpool was remotely managed and operated by Orsted who are based in Denmark, leading to communication problems and causing delays in instigating switch off and electrical safety measures via Scottish Power.
- Electro Magnetic Field (EMF) is/would be generated in and around neighbouring solar arrays, by the constant rotation of the solar panels discharging electricity to the batteries. The resultant EMF is known to interfere with communication signals and can interfere with the remote monitoring systems and any WiFi
- The risk of cyber interference with BESS safety systems, which is considered to be a "soft and attractive target for bad actors" by a cyber security expert working in association with a top defence aerospace contractor

How can we therefore be assured that this site is capable of being remotely managed and can effectively highlight problems before a fire/explosion occurs and alert appropriate bodies?

5. Consultation and Engagement with the NYFRS

It is understood that the fire and rescue services are not statutory consultees in planning process. However the NFCC guidelines states that the National Fire Chiefs Council would encourage *early* engagement with the local FRS, *continuing throughout* the planning process.
The Applicant, even at this late stage, has still not engaged with NYFRS in any meaningful way, which for a project of this size is extremely worrying.

How can we be assured that our future health, safety and livelihoods are being adequately considered when all we have is assurances (with no guarantees) from the Applicants paid expert from Green Fire Solutions, a company that comprises three individuals and was only established in February 2025?

6. Conclusion

I conclude with two quotes

- County Supervisor Glen Church from Monterey County Board of Supervisors re Moss Landing Fire in Jan 2025, "with this being the fourth fire incident in little over 5 years in Moss Landing, it is obvious

this technology is in need of both government ability to regulate it and private industry's ability to control"
"best described as a worst case scenario of a disaster that's happened here" a "Wake up call for the industry"

- Professors Peter Dobson and Peter Edwards of Oxford University* state:
"There is a worrying possibility that BESS could become the next legacy - fire safety issue with all the risks to the public from fire, explosion and toxicity and the attendant clear dangers to employees at these facilities, to First-Responders, Firefighters and the local population as well as to their impact on the environment"

I therefore ask that you refuse this application until the public examination of risks associated with a large scale BESS fire is carried out AND until the necessary health and safety standards and practice are adopted through established regulatory conditions for BESS hazards is in place.

NOTES

* "Remarks on the Safety of Lithium -Ion Batteries for Large-Scale Battery Energy Storage Systems (BESS) in the UK" Peter P. Edwards, Department of Inorganic Chemistry, University of Oxford, Oxford OX1 3QR, UK
Peter J. Dobson *, Department of Engineering Science, University of Oxford, Oxford OX1 3PJ, UK
Received: 26 June 2024/Accepted: 18 November 2024

** Photos of the Substation fire near Warwick Avenue in London April 2025

Fire erupts at London substation

People urged to avoid the area as plumes of black smoke fill sky near Warwick Avenue station

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