Headquarters
Hindlip Park
Worcester
WR3 8SP

Tel 0345 122 4454
Web www.hwfire.org.uk
Email info@hwfire.org.uk

HEREFORD & WORCESTER HWFR FIRE AND RESCUE SERVICE

Chief Fire Officer / Chief Executive
Jonathon Pryce MBA, Dip, GIFireE

Malvern Hills District Council
Planning & Infrastructure Department

FAO Lee Walton - Case Officer

Telephone: 0808 196 9500

21/01/2025

Dear Sir

Planning Reference: M/24/01781/FUL – Monksfield Farm, Worcestershire, WR13 5BB

Whilst Hereford & Worcester Fire and Rescue Service (HWFRS) are not a statutory consultee under the Town & Country Planning Act 1990, or the Regulatory Reform (Fire Safety) Order 2005 on such planning applications, you have requested comments in relation to this particular planning application.

Recently the National Fire Chiefs Council (NFFC) have published guidance specifically relating to Battery Energy Storage Systems (BESS) and therefore the comments below are based upon this national guidance. We hope that these comments will be fully considered prior to a decision being taken in regarding this application.

We will seek to work with the local planning authority throughout the application process and engage with the project developers where appropriate.

General Comments

The developer should produce a risk reduction strategy as the responsible person for the scheme as stated in the Regulatory Reform (Fire Safety) Order 2005.

We would also expect that safety measures and risk mitigation is developed in collaboration with the Service. The strategy should cover the construction, operational and decommissioning phases of the project.

HWFRS recognises the use of batteries (including lithium-ion) as Energy Storage Systems (ESS) is a new and emerging practice in the global renewable energy sector. As with all new and emerging practices within UK industry the Service would like to work with the developers to better understand any risks that may be posed and develop strategies and procedures to mitigate these risks.

A comprehensive risk management process must be undertaken by operators to identify hazards and risks specific to the facility and develop, implement, maintain and review risk controls. From this process a robust Emergency Response Plan should be developed.

The following principles should be considered by owners, developers and operators: -

1. Effective identification and management of hazards and risks specific to the siting, infrastructure, layout, and operations at the facility.
2. Impact on surrounding communities, buildings, and infrastructure.
3. Siting of renewable energy infrastructure so as to eliminate or reduce hazards to emergency responders.

4. Safe access for emergency responders in and around the facility, including to energy storage infrastructure and firefighting infrastructure.
5. Provision of adequate water supply and firefighting infrastructure to allow safe and effective emergency response.
6. Vegetation sited and managed so as to avoid increased bushfire and grassfire risk.
7. Prevention of fire ignition on-site.
8. Prevention of fire spread between site infrastructure (solar panel banks, wind turbines, battery containers/enclosures).
9. Prevention of external fire impacting and igniting site infrastructure.
10. Provision of accurate and current information for emergency responders during emergencies.
11. Effective emergency planning and management, specific to the site, infrastructure and operations.
12. Owner to have a comprehensive Emergency Response Plan, showing full understanding of hazards, risks, and consequences.

Information required regarding system design and construction

1. The battery chemistries being proposed (e.g. Lithium-ion Phosphate (LFP), Lithium Nickel Manganese Cobalt Oxide (NMC)). Because:
    a. Battery chemistries will directly affect the heat released when a cell goes into thermal runaway
    b. Battery chemistries will influence vapour cloud formation.
    c. An understanding of the battery chemistry is useful when requesting scientific advice during an incident.
2. The battery form factor (e.g. cylindrical, pouch, prismatic)
3. Type of BESS e.g. container or cabinet
4. Number of BESS containers/cabinets
5. Size/capacity of each BESS unit (typically in MWh)
6. How the BESS units will be laid out relative to one another.
7. A diagram / plan of the site.
8. Evidence that site geography has been taken into account (e.g. prevailing wind conditions).
9. Access to, and within, the site for FRS assets
10. Details of any fire-resisting design features
11. Details of any:
    a. Fire suppression systems
    b. On site water supplies (e.g. hydrants, EWS etc)
    c. Smoke or fire detection systems (including how these are communicated)
    d. Gas and/or specific electrolyte vapour detection systems
    e. Temperature management systems
    f. Ventilation systems
    g. Exhaust systems
    h. Deflagration venting systems

12. Identification of any surrounding communities, sites, and infrastructure that may be impacted as a result of an incident.

Testing

Details of any evidence-based testing of the system design should be requested, for example, results of UL 9540A testing.

Detection and monitoring

- Provision of an effective Battery Management System (BMS) and/or a specific electrolyte vapour detection system.
- Should thermal runaway conditions be detected then there should be the facility in place for the early alerting of emergency services.
- Detection systems should also be in place for alerting to other fires that do not involve thermal runaway (for example, fires involving electrical wiring).
- Continuous combustible gas monitoring within units should be provided.

Suppression systems

- Suitable fixed suppression systems should be installed in units in order to help prevent or limit propagation between modules.
- Any calculations for sufficient water supply for an appropriate suppression system will need to be completed by a competent person considering the appropriate risk and duration of any fire.
- Water run-off and potential impact on the environment, along with mitigation measures, should be considered and detailed in the Emergency Response Plan.
- Lack of sufficient water supplies at a particular site location should not be considered as the basis for a suppression system choice. Such an approach could result in potentially ineffective and/or dangerous system designs.

Deflagration Prevention and Venting

- BESS containers should be fitted with deflagration venting and explosion protection appropriate to the hazard.
- Flames and materials discharged as a result of any venting should be directed outside to a safe location and should not contribute to any further fire propagation beyond the unit involved or present further risk to persons. The likely path of any vented gasses or materials should be identified in Emergency Response Plans to reduce risk to responders.
- Explosion/deflagration strategies should be built into the emergency plan such that responders are aware of their presence and the impact of their actions on these strategies.

Site access

- Access for Fire Service Vehicles must comply with the requirements of ADB 2019 Vol. 2 B5, section 15 & Table 15.1 with regards the proposed floor area, height of the building and type of fire appliance.

- Access road to be in accordance with ADB 2019 Vol. 2 Table 15.2 with regards access widths and carrying capacity. At least 2 separate access points to the site to account for opposite wind conditions/direction.
- 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.

Access between BESS units and unit spacing

- A standard minimum spacing between units of 6 metres is suggested 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.
- HWFRS does not support the stacking of containers/units on top of one another on the basis of the level of risk in relation to fire loading, potential fire spread, and restrictions on access.

Distance from BESS units to occupied buildings & site boundaries

Individual site designs will mean that distances between BESS units and occupied buildings/site boundaries will vary. Proposed distances should take into account risk and mitigation factors. However, an initial minimum distance of 25 metres is proposed prior to any mitigation such as blast walls. Reduction of distances may be possible in areas of lower risk (e.g. rural settings).

Water Supplies

As a minimum, it is recommended that hydrant supplies for boundary cooling purposes should be located close to BESS containers (but considering safe access in the event of a fire) and should be capable of delivering no less than 1,900 litres per minute for at least 2 hours. HWFRS may wish to increase this requirement dependant on location and their ability to bring supplementary supplies to site in a timely fashion.

Signage

Signage should be installed in a suitable and visible location on the outside of BESS units identifying the presence of a BESS system. Signage should also include details of:

- Relevant hazards posed
- The type of technology associated with the BESS
- Any suppression system fitted
- 24/7 Emergency Contact Information

Signs on the exterior of a building or enclosure should be sized such that at least one sign is legible at night at a distance of 30 metres or from the site boundary, whichever is closer.

Operational Response Comments

The risks of vapour cloud, thermal runaway and explosion are unfortunately very real and are becoming more common as we see an increase in the number of BESS installations develop across the United Kingdom.

There is currently no definitive or 'preferred' way of putting out a lithium ion / lithium iron fire. There are in effect two main options; one being let it burn, the other being to use significant amounts of water for a protracted period.

In this case, should the 'let it burn' approach be taken, it may create a chain reaction from one unit to the next. Therefore, even in this case, there is a high possibility that attending crews will require large amounts of water to protect the exposure risks and disperse the vapour cloud (to ensure it remains below the explosive thresholds). This is likely to continue for the period of multiple hours whilst the unit(s) burns itself out. If we were to let it burn, there would be significant impact on the surrounding communities which would all be significantly impacted from the vapour / smoke plume for at least 24-48 hours and therefore recommend that the Planning Authority consider this potential impact.

To provide a suitable water supply, it would require a water relay from the hydrants in the area, this would impact more roads in the local area once the water relay was in place. There are minimal alternative options for water, however due to the significant amounts we would use, the Environment Agency (EA) and Severn Trent may need to consider the impact of run-off in to local water courses.

Due to the risk involved in these types of BESS, we would deploy minimum staff into the risk area for the shortest amount of time to place ground monitors, with a view that two or three of these would be used to apply water from multiple sides (where possible). Guidance suggests that Lithium ion / lithium iron batteries should be doused with significant amounts of water, and ideally subject to full submersion of the batteries for a period of 24 hours.

For example, taking a two-ground monitor attack for 24 hours would apply approximately 5.5 million litres of water, and the resulting run-off of these tactics would likely have a significant impact on the surrounding area. We therefore recommend the EA consider this potential impact. Further to this the EA would also need to consider the impact of any ground water seepage and any potential for impact on Severn Trent from the contaminated run-off filtering through nearby aquifers.

I do hope that the above comments and NFCC guidance will assist you in the determination of this planning application.

Yours sincerely

John Jennings

Fire Safety Inspector