REPRESENTATION BY CREICH COMMUNITY COUNCIL

ON APPLICATION FOR

Balblair Wind Farm

ECU Reference ECU00005055

24/04/2025

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Introduction

1) These comments are submitted by Creich Community Council in **opposition** to the proposal for Balblair Wind Farm. The proposal is referenced as ECU00005055 and has been submitted by Wind Power North Two Limited.

2) These comments have been reviewed and agreed by the Community Council as representing the views of the overwhelming majority of the Creich residents.

3) The application is in multiple volumes plus the main report of the Environmental Impact Assessment[1]. When we reference the main submission, it is by volume number and chapter number – for example Vol1 Chpt5 – with more detailed reference as required.

4) The proposed development is located in the Kyle of Sutherland (KoS) and is roughly centred (Turbine 5) on National Grid Reference NH 61200 97100.

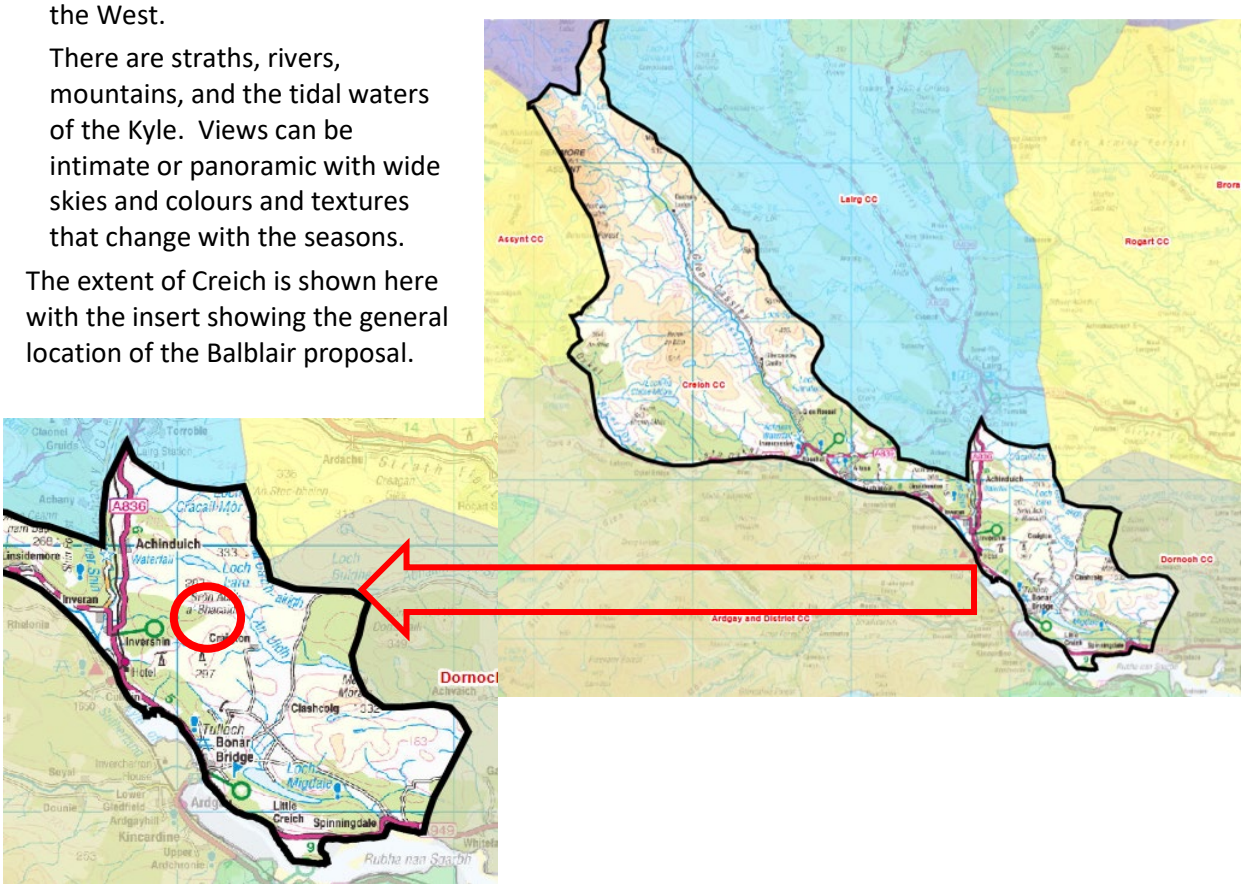
5) It is to consist of up to 8 turbines, with six having a maximum blade tip height of up to 180 m and two having a blade tip height of up to 200 m and battery energy storage, together with associated infrastructure. The turbine output is given as 36 MW and the battery storage as 30 MW (but with no MW-hr capacity quoted).

Creich and Creich Community Council

6) Creich Community Council represent the people in arguably one of the most scenic and scenically diverse areas of the highlands, encompassing the north shore of the inner Dornoch Firth, the Kyle of Sutherland and the north bank of the Oykel to the watershed at Assynt in the West.

7) There are straths, rivers, mountains, and the tidal waters of the Kyle. Views can be intimate or panoramic with wide skies and colours and textures that change with the seasons.

1) The extent of Creich is shown here with the insert showing the general location of the Balblair proposal.



[1] Balblair Wind Farm Environmental Impact Assessment Scoping Report February 2024 RSK for Wind Power North Two Limited
Balblair Wind Farm Planning Statement - Force 9 Energy Ltd February 202

8) Creich has some 6000 residents and about 200 wind turbines. Taken on a per capita basis, Edinburgh would have 16,300 turbines of which about 160 would be on Salisbury Crags and Arthur's seat on an equal area distribution. Of course, Edinburgh's wind turbines would be concentrated more than this – on the Braid Hills, Corstorphine Hill and, the heights of Holyrood Park. Wherever you looked in Edinburgh, wind turbines would intrude on the view.

9) We suspect this would be unacceptable to the douce citizens of the Capital. It is also unacceptable to the people we represent who are, almost without exception, opposed to the intrusion of the multiple wind farms, pylon lines and battery storage systems that litter and will further litter our parish.

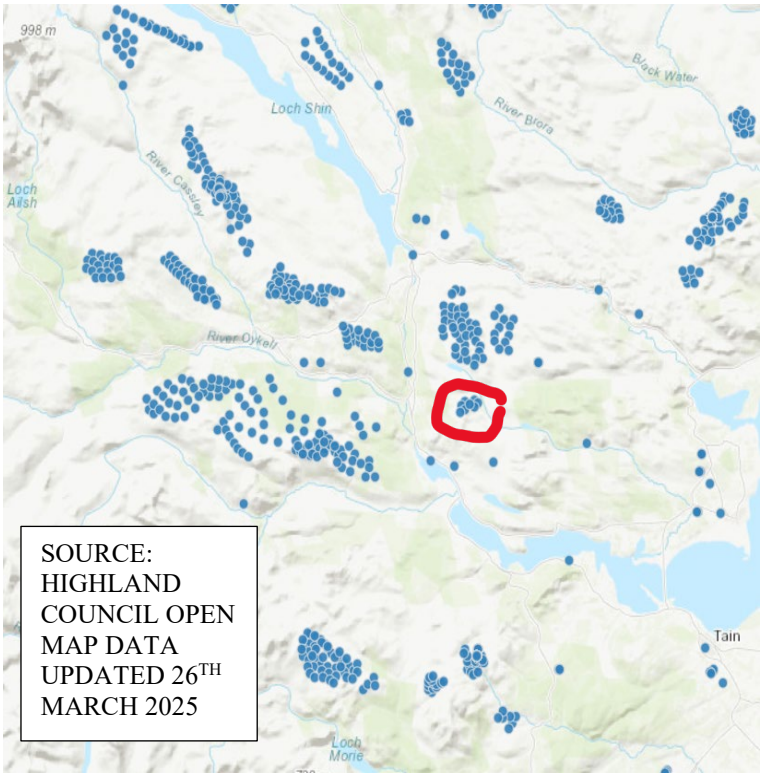
10) An overarching basis of our objection is that this and other proposals are inequitable. We suffer continual and continuing loss, intrusion, social, commercial and cultural damage, but with no benefit.

In the main, however, we base our objections to this planning application on:

- The cumulative visual and social effects of this proposal when taken with other existing and approved schemes
- The failure to consider a historic drove road that crosses the centre of the site and which, to date, has only been briefly explored, scarcely disturbed and where site features would be fragile in the face of a wind farm development.
- The hazards and risks associated with the equipment and, in particular, the potential for failures of battery storage units, inverters and transformers to cause immediate and irretrievable long-term harm to people, wildlife and the land.
- The damage caused to our roads and lifestyle by the heavy goods traffic associated with construction.
- The impact on the community in terms of social and commercial welfare.

Basis of Objection – Cumulative Effect

11) Our area has already been blighted by multiple wind turbine installations as shown here. Turbines installed or planned in 2024 are shown in blue. Balblair is ringed in red. We are ringed in the hills by turbines. This is a critical aspect of our objection.



12) It is important, therefore, to note that, throughout our comments every aspect of objection is amplified by the cumulative existing impact.

13) The constant addition of more and more developments and more and more turbines means there is a visual impact in every direction and few settlements and houses are not in proximity to or cannot see turbines or planned turbines.

14) Paragraph 8.5.14 of the Planning Statement refers to para 6.9.21 of the EIA and states that 'when each of the other consented, in-planning and scoping wind farms were considered to already form part of the baseline landscape, the proposed Development would not introduce a cumulative significant visual effect.'

15) This is a totally wrong and obtuse way of considering accumulation of anything. In normal life accumulation is taken as the sum of successive additions of related items rather than the first of a new set.

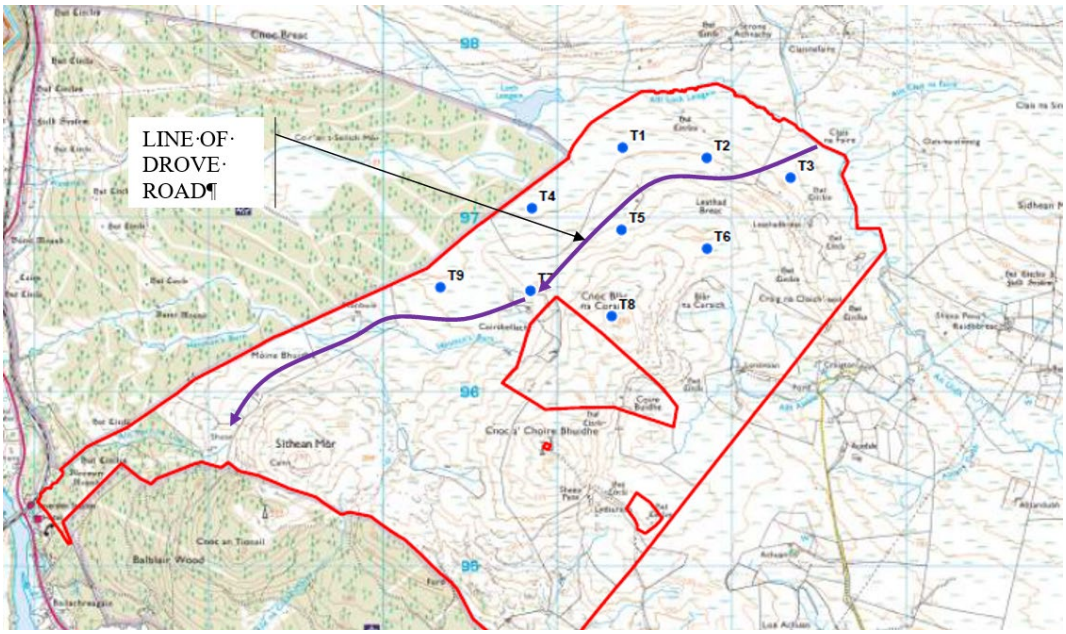
16) The way the applicant has phrased this makes a mockery of any requirement to consider the effect of the addition of this wind farm to all the others around Criech and the figure above is worth all the words of the planning application. It shows the true cumulative number of turbines *in planning* as of the start of 2025.

17) The applicant has not, therefore, taken account of the cumulative impact that the Balblair Wind Farm represents and on this basis the application should be rejected or sent back to discuss this issue properly.

Basis of Objection – Failure to Consider Historic Environment

18) Historic Environment Scotland have provided a minimalist comment based almost entirely on visibility from scheduled monuments.

19) They ignore entirely the drove road from Rogart to Invershin (Port na Lice) – details of which are given in the map below.



20) That drove road runs entirely through the proposed wind farm and, surprisingly is not shown at all in Figure 10.1 Known Heritage Assets Within the Site.

21) This route has not been properly reviewed in the past and is, therefore, relatively undisturbed. The type of work to develop a wind farm is precisely the type of work that will destroy any vestiges of historical interest

22) It is imperative, therefore, that proper consideration is given to this route and to the stances along it - - for example, at CoireShellach (Coire Seileach).[1]

23) Turbines T3, T2, T5and T7 will be sited directly on this historical path and the whole wind farm destroys the experience of following a drove road that has been little disturbed by modern farming or technology.

24) PhD theses by Adamson and Lowdon give information about this route and a short note forms Appendix A to this report. [2]

25) It is surprising that this issue was not raised by Historic Scotland and that is probably a function of the load being imposed on all Statutory Consultees by the multiple, rapid planning applications.

26) A moratorium on applications in any region or an extension of the time available to comment is urgently needed.

1 Note an error in naming in application figure 6.8.1 where noise receptor site at Lydsurach is called CoirShellach

[2] Adamson, Donald Beck (2014) Commercialisation, change and continuity: an archaeological study of rural commercial practice in the Scottish Highlands. PhD thesis University of Glasgow

Lowdon, Richard Edward (2014) To travel by older ways: a historical cultural geography of droving in Scotland. PhD thesis University of Glasgow

Basis of Objection – Failure to Consider Properly Hazards and Risks

27) Every new proposal intrudes on another view or affects more residents or, and very importantly, adds risk of substantial damage to land and environment from installation and commissioning failures, failures in equipment, failure to design correctly, failure to maintain and failure in operation.

28) In this case a 30 MW (capacity not stated) battery storage system is proposed. A three-phase transformer is also proposed.

2) No details are given except for one figure (Figure 2.9: Indicative Substation and Battery Energy Storage System Plan).

29) This is alarming as that means that the application does not discuss the hazards from BESS and the consequent risks that must be mitigated by design, safety and control measures.

30) Without that information no judgement can or should be made about the BESS component of this application

BESS Safety Background

31) There have been over 30 recorded serious thermal runaways in Battery Energy Storage Systems (BESS) worldwide. In 2020 a 20 MWh BESS in Liverpool took over 11 hours to contain and resulted in an explosion and release of toxic gasses. [1]

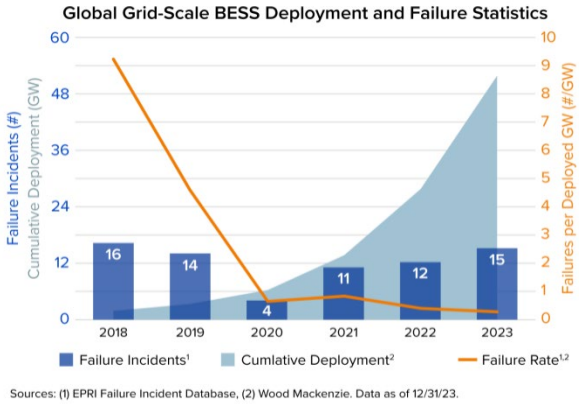
32) Incidents are gathered by the Electric Power Research Institute (EPRI)[2]. The collation of information was initiated in 2021 as part of a wider suite of BESS safety research after a concentration of lithium-ion BESS fires in South Korea and Surprise, Arizona, USA.

33) The database was created to inform energy storage industry stakeholders and the public on BESS failures and includes discussion of root causes (which are immediate) and underlying influencing factors.

34) The figure to the right (from EPRI) shows that, although the installed capacity of BESS has grown, the rate of incidents per GW installed remains relatively steady.

35) Thus, the industry may or may not have an 'improving' safety record, but the number of incidents in time is steady and the technology has very substantial potential for large scale catastrophic incidents and a steady rate of possible initiators.

36) There are 4 entries in the database for 2025 – three of these in the UK.



Hazards of Batteries

37) No competent engineer would suggest that a large-scale BESS does not present complex potential initiators of major hazards that may have low probability but have large

[1] Lithium-ion energy storage battery explosion incidents, Zalosh, Gandhi, Barowy Accessed 30/02/205 https://doi.org/10.1016/j.jlp.2021.104560

[2] EPRI BESS Failure Incident Database. Accessed 30/01/2025. https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database

consequences to life, the environment and to population health. The only engineering argument, we suggest, would be about whether the hazards are adequately controlled and whether thresholds of acceptable risk are exceeded.

38) An argument on the planning side would be whether the applicants have displayed in their application sufficient understanding of the risks involved in their project and shown the engineering competence to deal with them. In this case they have given no information.

39) Hazards for Li-ion batteries are not the same for thousands of cells as they are for one cell. There are reviews of the range of hazards in papers by Vazzana et al and Jevarajan et al[1]. This and other publications should be referred to for detail and we offer a summary here.

40) The impacts of failure vary with the size and volume of the battery, since the tolerance of a single cell to a set of off nominal conditions does not translate to a tolerance of the larger battery system to the same conditions.

41) Li-ion batteries are prone to overheating, swelling, electrolyte leakage, venting, fires, toxic and flammable smoke, and explosions. There is a summary of the process in Chen at al.[2]

42) The cells, if Li-ion, will degrade over time and repeated charge/discharge cycles.

43) In the worst case there would be a deflagration, a consequent explosion and an out-of-control thermal runaway.

44) The primary failures are likely to lead to a fast fire with associated pressure in the flame front – a deflagration.

45) However, the gases produced as a result of a fire, smoke, and/or thermal runaway can accumulate to a combustible level in the installation location and cause an explosion (detonation). They are also toxic. Chen et all [11] discuss their composition.

46) In general, the off-nominal conditions that can cause the occurrence of catastrophic events with Li-ion batteries can be categorized into electrical, mechanical, and environmental types.

47) The most common electrical hazards are over-charge/discharge, and external or internal short circuits.

48) Less common, although very relevant here, are the effects of sustained low temperature. If cells operate at low temperature their performance drops and while this may be commercially undesirable it is not all that happens.

49) As a cell is operated at low temperatures unobservable changes take place within the cell materials. These are not reversed when temperature rises again, and they are now defects in the cell and make the cell more likely to fail – usually with an internal short circuit

50) The performance of all Li-ion components at low temperatures is interdependent and interconnected resulting in a significant decrease of the capacity and faster degradation upon continuous cycling. Thus, operation at low temperature increases the inherent hazards of battery cells.

51) Further, however, there is evidence that at very low temperatures (as experienced in Eastern Sutherland) lithium cells experience counter-intuitive behaviour. The table below (from [3]) shows that cycling of cells at minus 10 Celsius produces faster times to thermal runaway (TR). This should be understood by those putting forward battery systems in northern Scotland.

[1] Risk Management in Energy Storage using Lithium-Ion Batteries: Emerging Risks Associated with Bess Systems Vazzanaa et al. Chemical Engineering Transactions vol. 111, 2024
Battery Hazards for Large Energy Storage Systems. Jevarajan et al, ACS Energy Letters, 7, 2022

[2] Lower explosion limit of the vented gases from Li-ion batteries thermal runaway in high temperature condition. Chen e al., accessed 30/1/2025; Journal of Loss Prevention in the Process Industries https://doi.org/10.1016/j.jlp.2019.103992

[3] Kong D et al; Effect of low temperature on thermal runaway and fire behaviours of 18650 lithium-ion battery: A comprehensive experimental study. Process Safety and Environmental Protection 174 (2023) 448–459

Table 2
The summary of key results for cells at different cycling conditions.

Case	Fresh cell	25 °C/0.5 C	25 °C/1 C	0 °C/0.5 C	0 °C/1 C	-10 °C/0.5 C	-10 °C/1 C
Time to crack of pressure valve (s)	286	274	246	226	206	189	161
Time to TR(s)	474	441	337	264	224	191	162
Surface T just before the cracking of pressure valve (°C)	131.35	125.96	128.57	122.43	131.67	123.36	117.58
Surface T just before TR (°C)	204.15	187.37	176.08	163.76	162.35	125.27	118.48
Mass loss (g)	38.75	36.15	28.90	26.99	21.37	20.89	19.70
Maximum flame T (°C)	803.64	738.35	662.12	638.09	582.00	434.26	570.66
Maximum surface T (°C)	738.39	734.79	732.68	696.72	631.89	729.10	708.61
Maximum T-rate (°C/s)	143.39	115.07	94.25	67.28	48.73	123.48	112.59

Transformers as Initiators

52) It is a fact that transformers explode and cause fire despite their protective systems.

53) The processes involved happen in around 200 to 400 milliseconds, for which standard protections are not designed to react.

54) Typically, for some reason there will be an internal short-circuit in the transformer. The short-circuit reaches 1,200 degrees Celsius and the oil, in contact with this temperature, vaporizes and creates explosive gases. Within milliseconds, a pressure wave is traveling at the speeds above 1,000 m/sec. The pressure wave propagates internally, and pressure may build inside the casing to greater than 10 atmospheres and the transformer ruptures.

55) The explosive gases generated during the short-circuit will be in contact with oxygen and the oil contained in the transformer, which leads to an explosion and associated fire. This is, in essence a Boiling Liquid Expanding Vapour explosion or BLEVE with greater energy flux than a jet or pool fire. A typical 25 MVA transformer may hold 8 tonnes of mineral oil with a flash point around 160 degrees Celsius.

56) In one study[1], peak overpressure caused severe damage within 20 m of the explosion centre with a 100% probability of the thermal radiation from a BLEVE causing fatalities to a distance of 140 m. A majority of the fragments would land within a range of ~100 metres.

57) Even a 'simple' fire will generate temperatures capable of 'flashing off' other oils at distances of 10/15 metres depending on wind speed.

58) Clearly leaked burning oil extends the influence of a transformer oil fire.

59) At Balblair we do not know the number, size and rating of the transformer units and, no doubt, claims will be made about the safety of the selected units.

60) What we do know, however, is what the costs of incidents in transformers rated 25 kVA and above has been in an interval from 1997 to 2001[2]. The tables show the results:

Table 1 – Number and Amounts of Losses by Year

Table 1	Total # of Losses	Total Loss	Total Property Damage	Total Business Interruption
1997	19	$ 40,779,507	$ 25,036,673	$ 15,742,834
1998	25	$ 24,932,235	$ 24,897,114	$ 35,121
1999	15	$ 37,391,591	$ 36,994,202	$ 397,389
2000	20	$ 150,181,779	$ 56,858,084	$ 93,323,695
2001	15	$ 33,343,700	$ 19,453,016	$ 13,890,684
Grand Total	94	$ 286,628,811	$ 163,239,089	$ 123,389,722

** Total losses in 2000 includes one claim with a business interruption portion of over $86 million US*

[1] Fire and Explosion Risks and Consequences in Electrical Substations - A Transformer Case Study
Mohanad El-Harbawi ASME Open Journal of Engineering 2022, Vol. 1 / 014501-1
[2] Analysis of Transformer Failures. William H. Bartley P.E. ; The Hartford Steam Boiler Inspection & Insurance Co. 2003

Table 1A – Number and Amounts of Losses by MVA and Year

Table 1 A	Total # of Losses	Losses w/data	Total MVA reported	Total PD (with size data)	Cost /MVA
1997	19	9	2567	$20,456,741	$7969
1998	25	25	5685	$24,897,114	$4379
1999	15	13	2433	$36,415,806	$14967
2000	20	19	4386	$56,354,689	$12849
2001	15	12	2128	$16,487,058	$7748
Total	94	78	17,199	$15,4611,408	

61) In another study, causes were split into internal (water content in the oil, insulation failure, short circuits between windings, short circuits between windings and their tanks, and failures of bushing connections)[1]. External causes were lightning strikes, switching errors and short circuits on transmission lines. Internal to external causes were 40/10.

62) The rate of transformer explosion as initiator rate for BESS incidents is not trivial. On average it is 3/1000 per year per unit. This does not account for common mode failure in linked groups of transformers.

63) The point here is that BESS and associated power conversion/transmission systems could be treated as major hazard sites on the basis of transformers alone.

64) In this case, the transformer is shown in Figure 2.9 as about 10 metres from the nearest battery unit.

65) If we assume that this is a 25 MVA transformer then it will contain ~10 tonnes of oil.

66) The separation of this hazard (transformer and oil) from the battery units is inadequate.

67) The separation of this unit from the control room is inadequate.

Thermal Incidents in Battery Storage

68) Thermal runaway (TR) is a release of the electrochemical energy in a Li-ion battery cell as heat.

69) There are two sources of heat during a TR - the electrochemical energy in a battery cell being released and the combustion of the off-gases, vapours and fumes etc. from the decomposition of the contents of the battery cell. The energy released as heat will typically be a factor of 20 on the rated electrical energy storage capacity of the BESS.

70) TR will continue in a Li-ion battery cell until the mass or reactive materials is depleted. Heat propagating from cell to cell explains the name as it is self fuelled. Once started, a TR can only be contained, not extinguished or put out, until the energy in the cells is used.

71) There are differences between this energy release and a conventional fire such that conventional fire suppression systems will work. Conventional systems operate by cooling and removing oxygen. TR does not require oxygen and can only be cooled using very large and continuous drenching with water.

72) Provision of suitable amounts of water within a short reaction window is an issue and, given the toxic nature of some fire products from a Li-ion fire, the fire water then becomes a problem in itself.

73) Venting of flammable release products may lead to flash vapour fires when safety valves open. Failure to vent, however, in a process to starve a fire of oxygen will build up pressure and temperature inside the container and lead to high energy explosive ignition of flammable gases which may be considerably more damaging in terms of propagation that a vented fire.

[1] Analysis of Major Failures of Power Transformers. Tenbohlen, Hanif, Martin; on behalf of Cigre

74) Fire fighting for a battery fire comes down to the liberal use of water. If, at the same time however, there is a burning oil 'pool' fire which should be smothered and not drenched with water, the situation becomes more complex. Again, separation of hazard sources is important.

75) The only way to contain a TR once started, is to cool the surrounding battery cells to prevent propagation and let the cells in TR burn out. The best medium for this, according to National Fire Chiefs Council (NFCC) guidance is water – hundreds of tonnes of water.

76) We reference the three BESS TRs that have happened worldwide in 2025. Moss Landing in California was 'extinguished in 2 days but re-ignited 2 days later and battery delinking or isolation was only completed more than 3 weeks after first ignition. At the time of this submission, the site is still not free from any risk of re-ignition.

77) There were two in the UK, one at Thurrock in Essex on 19th and 20th February 2025 and one at Rothienorman in Aberdeenshire on 21st February 2025.

78) The Essex County Fire and Rescue Service (ECFRS) took ten minutes to respond to the fire and took 48 hours to contain and control the site.

79) The Fire Commander on the ground at Thurrock stated, "The response was supported by the site's safety measures, including a reliable local fire water supply and appropriate spacing between battery units, which helped limit the spread of the fire."

Gases and Vapours From Battery Fires

80) At a minimum, the following can be released by a Li-ion battery fire:

Hydrogen (H_2)	Gas, flammable
Oxygen (O_2)	Gas, that promotes and intensifies combustion
Carbon Monoxide (CO)	Gas, chemical asphyxiant and flammable
Carbon Dioxide (CO_2)	Gas, simple asphyxiant
Methane (CH_4)	Gas, simple asphyxiant, flammable
Ethylene(C_2H_4)	Gas, flammable
Hydrogen Fluoride(HF)	Acutely toxic vapour - fatal if swallowed, in contact with skin or if inhaled. Causes severe skin burns and eye damage
Hydrofluoric Acid(HF)	Acutely toxic liquid and fumes
Hydrogen Cyanide(HCN)	Gas, chemical asphyxiant, flammable
Phosphorus Pentafluoride(PF_5)	Toxic and corrosive vapour
Phosphoryl Fluoride(POF_3)	Vapour that causes severe skin burns and eye damage - Fatal if inhaled
Nitrogen Oxide(NO)	Intensifies fire; oxidizer. Toxic, corrosive fatal if inhaled
Hydrogen Chloride(HCl)	Vapour that causes severe skin burns and eye damage - Fatal if inhaled

81) Hydrofluoric Acid (HF) is considered in both anhydrous and Hydrofluoric Acid form as the major contaminants from a TR. HF exposure poses a risk to health and life at 30ppm, and exposure for 30 minutes will result in death.

82) HF has been measured in smoke from TRs at up to 600ppm. HF is very reactive in the environment and quickly forms salts. When HF is released into the atmosphere, it will react and dissociate on contact with soils, water, structures and all living matter. Plants and some wildlife are susceptible to HF exposure. Very low HF vapour concentrations 0.1 to 0.5ppm can injure or kill vegetation. Birds are very susceptible due to their high respiratory rates. Fish and other aquatic life can be affected with very low Fluoride concentrations in water.

83) There is no mention in the application of gas release which, given the failure to mention battery fires except in passing, is probably not surprising.

Spacing

84) The 'Good Practice Guidance for Applications under sections 36 and 37 of The Electricity Act 1989 (July 2022 edition)' states in paragraph 5.2.3: "A S36 application should also clearly set out the detail of the generation station(s) that consent is being sought for. For each generating component, details of the proposal should include:

> "The scale of the development (for example dimensions of the wind turbines, solar panels, battery storage); components required for each generating station; and for battery storage, the approximate export capacity in megawatts (MW) and megawatt hours (MWh)."

85) Paragraph 5.3.8 of the Government Onshore Wind Policy Statement 2022 recognises the value and benefits of co-locating onshore wind with battery storage. That should not, however, be read as cheek by jowl.

86) Safe operation and mitigation of accidents must reasonably dominate considerations of convenience and cost

87) No details are given in this application of the battery type nor of the power conversion units although there is a proposed layout of battery modules and inverter/transformers

88) A fire in a transformer or in a battery storage unit is a reasonably predictable event. Both transformer fires and battery fires are associated with explosions, deflagrations and continuing fires.

89) A primary safety variable in battery storage and electricity sub-station design is space.

90) A good safety design uses space as an effective fire control measure. Space allows energy dissipation so that projectile damage is somewhat mitigated. Space mitigates thermal effects, and space also allows access for firefighting to isolate dangerous units.

91) The design layout shown in Figure 2.9 shows ***no space used in design for safety reasons***. Power conversion units are placed metres away from battery units and battery units themselves are separated by 3 metres.

92) The National Fire Chiefs Council (NFCC) recommends a *minimum* separation distance of **6m** (National Fire Chiefs Council, 2022) between battery enclosures.

93) Transformer incidents will throw debris with high energy to at least 20 metres and possibly to 100 metres so that transformer separation from battery units (and control/monitoring units) is also critical

94) The applicants have not shown any basis for their separation choices. They should show by calculation with their information sources how they calculate the spacing.

95) Space may not come free, but it is very cheap to incorporate into a design at the earliest (planning) stages and the running costs are minimal.

96) We suggest that the applicants must show by calculation (with sources) and using probabilities of individual unit failure, multiple unit failure and consequential unit failure, the separation required to mitigate fires, deflagration pressures and explosions.

97) Without this level of detail the application cannot be judged and should be rejected.

Emergency Access and Firefighting

98) Linked to the risk of battery and transformer incidents is the need to control the fires that follow.

99) There is no water supply at the Balblair site, let alone a "reliable local fire water supply" and there is not even a mention of fire systems.

100) If water is used to contain a TR it will be contaminated with toxic chemicals. No detail on how that contaminated water will be contained or how it will be removed from the site is

mentioned in any of the documentation. There is no obvious bunding at the BESS substation compound that could contain the 100's of tonnes of water that would be played on the battery units.

101) Planning for intervention is a critical part of safety engineering. No such planning is exhibited here.

Summary of Objections Based on Safety

102) Reasonably foreseeable incidents will produce emergency situations with very high potential for damage to requiring emergency response. The application does not mention these.

103) The Scottish Fire and Rescue Service (SFRS) will not reach the Balblair site within the 10 minutes that Essex Fire and Rescue Services achieved – the response time will probably be more than an hour. A battery fire and possible thermal runaway will be well established before there is any intervention. Access to the site if there are thermal releases and toxic smoke releases may be difficult along the access road. There is no mention of liaison with emergency services, times to react and numbers and types of appliances.

104) Conventional fire suppression systems have a low probability of containing the situation – and even then, only for a short time. Only one sentence mentions fire suppressant systems without describing them.

105) There will be production of toxic and combustible gases, vapour and fumes and hence large amounts of contaminants reaching the environment. Released materials are extremely harmful to humans, wildlife in all forma and to the land. There is no recognition of this in the impact assessment.

106) Any response to a fire incident will require large volumes of water that can be applied for long periods of time. There is no discussion of water sourcing, storage or quantities. And yet, this is the only way to deal with a runaway battery fire.

107) Emergency evacuation of residents may be required. No emergency plan is discussed.

108) Because the construction of this site is covered by H&S legislation we do have a whole section of Technical Appendix "4 Emergency Preparedness And Response" which covers the day to day issues of a construction site – but absolutely nothing . . . nothing at all . . . on the hazards and risks of battery storage and heavy electrical systems. That gap speaks volumes for the engineering competence of the designers.

109) In **Appendix B** we set out why we think this, and similar sites, should fall within or be treated as equivalent to Major Industrial Hazards.

110) This application should be rejected unless and until the applicants display knowledge of the risks inherent in their design and treat the site and operations as a containing major industrial hazards..

Traffic Construction and Access

111) There are associated hazards and costs from construction traffic on our small roads. Not only risks to people but also costs that will fall on the community from damage to the roads which will accumulate and often become evident after the wind farm traffic has gone. This is another aspect of cumulative effects that is often ignored.

112) Damage to roads is roughly proportional to the axle weight raised to the fourth power. Thus an 8.5 tonne axle load from an HGV will cause ~190 times more damage than the 2.3 tonne axle of alight van.

113) Damage caused can be rutting, cracking or initiation of local weakness that will develop into potholes. As is well known freeze/thaw in winter rapidly attacks these weaknesses.

114) It is probable that the Applicant will enter into a Section 96 (wear and tear) Agreement or a suitable alternative for the local adopted roads / routes to be used by construction vehicles. This purports to inspect before and after use and to restore the roads to the condition at first inspection.

115) Our objection here is that experience shows that issues of damage after heavy loads traverse highland roads may not show up immediately after use. Like fatigue in steel, failure is accelerated but may not show immediately.

116) Local people will bear the burden of this damage through their council rates for many years to come.

Basis of Objection - Impact on Wildlife and People

117) The area is heavily focussed on tourism with the landscape a primary reason for visiting. The steady accumulation of wind farms is already causing loss as the reputation for beauty and peace is taken away with every new development.

118) Some areas – almost always the very rural places - suffer most from the intrusion into their lives of construction noise and traffic. Considerable stress is being caused as is evidenced by the opposition to these schemes and the stress caused by feeling of helplessness in the face of government and industrial pressure is severe.

119) There is little or no commensurate benefit to the community. Construction workers and machines are sourced outwith Sutherland; small sums are disbursed to the community that bear no relationship to the profits made from the projects; roads are damaged and there is a very real probability of danger and damage to nature, people and the environment lurking in the engineering systems used.

Conclusion

120) On behalf of the people of Creich in the Kyle of Sutherland we oppose the granting of planning permission for the Balblair Wind Farm. Enough is enough.

Appendix A Neglected Drove Road

Rogart Drove Road

Start location: Unclassified road off A839 (NN 666 037)

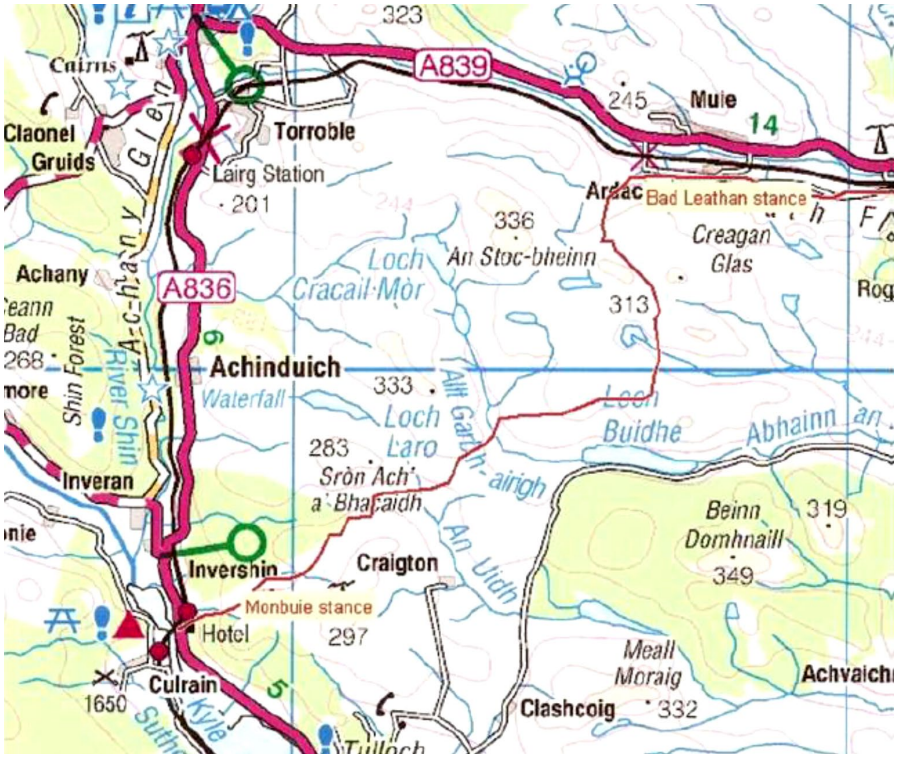
End location: Invershin Hotel (NN 580 953)

Geographical area: Sutherland

Path Type: Drove Road

Path distance: 13.2km

Accessibility info: Suitable for pedestrians



Route Description

There is no path at all to follow for the vast majority of this route and you mostly have to walk over the heather moors. However, it's not too difficult for the fit but you are unlikely to meet anyone at all on the way and so good navigation skills are essential.

This survey goes from north to south as the drovers would done so start at Acheilidh at 666 037 and head directly south along the track to Bad Leathan. The track soon disappears after Bad Leathan and the direction to head is south going betwwen Loch na Saobhaidhe and the small hill to its north east. There is some evidence of cattle droves on the shoulder of this hill where there are multiple small terraces and cuts in the hill side. Then turn south east towards the southern slope of Meall Meadhonach before crossing the Allt Lochan na Gaoithe and assending Meall na Tulchainn. This hill is very flat on the top and can be quite boggy so it may be better to contour round the northern or southern slope. If you go straight off the west of the hill you should drop straight onto the old Broch, Dun-garbh-airigh and the ruined cottage built from its stone. At this point you should notice a massive boulder to the south

west that marks the corner of the old township just south of Garvary. The Allt Garbh-Airidh would be quite difficult to cross if there were not a very narrow wooden plank crossing it a little downstream, the bridge took this 11 stone surveyor fine but it is not for those with vertigo or poor balance. Now you can join the track and head south before taking the fork north west. You then head south west for Clais na Faire, the very big boulder at the meeting of the Allt Clais na Faire and the Allt Loch Leisgein.

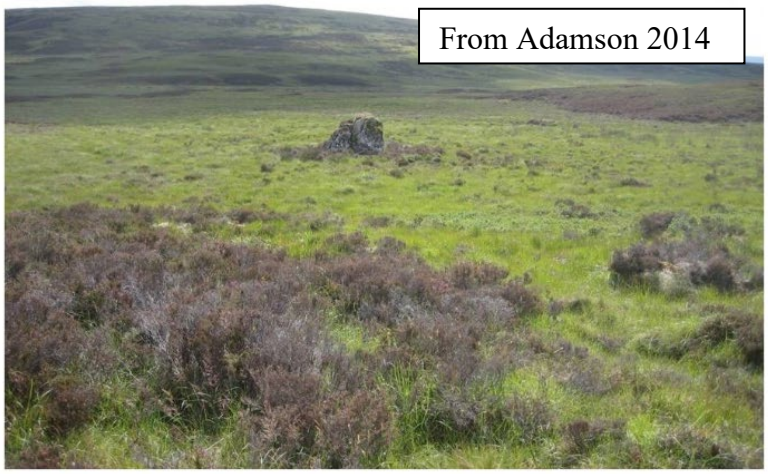


Figure 74 Clais na Faire (Defile of the Watching). The photograph is looking south, along the line of the old route which has entirely disappeared into the soft ground. The stone gives a good line for the most direct route to firmer ground.

Cross the burn and head up the hill and countour to the south west till you get to the cleared township of Coirshellach and from here you can easily follow Henman's Burn to the drovers' stance of Monbuie. Then you follow the fence line to another cleared township of Shean. From here it would have been a very short walk along a road to Invershin but this route is now well overgrown and so the only other option is to head into the nearby Forestry Commission plantation where a nearby track will take you direct to the main road only a couple of hundred metres from Invershin Hotel where a well deserved drink awaits.

This is a very little known drove road that Haldane did not mention in his seminal book, The Drove Roads of Scotland.

There was a documented drove along this route in 1739 by a 17 year old John Macdonald and his cousin William Macdonald, John's droving career was cut short as he took the 'King's Shilling' the night after he reached Invershin. During their drove the men would have passed Monbuie, which is about 2km north east of Invershin Hotel and was a Drovers' Stance where drovers, and their cattle, would have rested and stayed the night before continuing on their journey. Monbuie is made up of the remains of a large longhouse (presumably housing the stance owner), outside of a very large boundary wall (housing the travelling cattle overnight) and inside the boundary wall are the remains of a smaller structure (probably for housing the drovers). Nearby are the remains of a dam to ensure water is available for visiting cattle. It is also known that there was a ferry at Invershin, which was then known as Portnalick that took cattle.

We can therefore say that cattle were coming this way and stopping at Monbuie before being ferried over the Kyle of Sutherland. We can be less certain of the exact route but the

suggested route is locally thought to have been the historic route and it does avoid the worst of the bog. In addition there are places where it seems you can see traces of the movement of cattle such as the south west shoulder of the hill west of Creagan Glass where there are numerous cuts and terraces, surely a sign of a lot of traffic.

We can also be pretty certain that the route fell out of use almost exactly two hundred years ago as the heavily populated area was forcibly cleared between 1810 and 1820 and Bonar Bridge was built in 1813, rerouting the cattle traffic. The instant removal of the populace is likely the reason it is so hard to trace now as not only did cattle stop using it but people did as well.

There must have been many thousands of cattle travelling this at one time, which has gone largely undocumented and it is just local knowledge that remembers its importance today.

From Adamson's thesis

> In 1811, in Patrick Sellar's listing of the entire Sutherland Estate's landed assets, Invershin is shown as held on a 19 year lease by Gilbert McKenzie for an annual rental of £50. The lease was to expire in 1820. The Sutherland Estate, however, held under reservation "the Market and resting place of Monubuie and dues uplifted thereat" (Adam 1972: i 55). So there is documentary evidence of Monbuie being used as a cattle market and stance. In 1814, Gilbert McKenzie went bankrupt and by 1815, the land had been converted into a sheep farm at the annual rental of £220 (Adam 1972: i 152). It is unclear whether the market stance continued to be operated by the Estate after this time.
>
> In 1801, the lease to Gilbert McKenzie for Invershin also reserved for the Sutherland Estate, "power to resume possession of 30 acres next adjacent to Portanlick, tenant having a fair deduction of rent therefor" (Adam 1972: i 55). Presumably this reservation of right was in relation to the crossing, and the possibility of a bridge being built there, (which actually was constructed just down the Kyle, by Thomas Telford, at Bonar Bridge in 1812).
>
> There is also a reference in the New Statistical Account 1834-45 for Criech Parish that suggests that the market may have moved from Monbuie to Bonar Bridge sometime just before 1834. It comments: "The great Kyle markets, as they are called, for the sale of cattle of Sutherland and Caithness, are now held here, in the months of July, August and September. A suitable piece of ground is enclosed for the purpose, and the convenience of the public will be greatly promoted by the desertion of the very inconvenient place at Portenleik, where they have hitherto been held" (NSA 1834-45, Vol 15: 20-21). It might be surmised that this refers to Monbuie, which would now indeed be very inconvenient. It stands above Port-na-Lice. By 1834, the hinterland of Sutherland had been largely cleared of people, and the routes past the various townships to Monbuie were falling out of use. Sheep had taken over from black cattle as the main export product of the county, and they could not swim the Kyle of Sutherland at Port na Lice. At Bonar Bridge, by contrast, there was a new bridge, suitable for the transport of sheep southwards.

Monbuie drove stance. The drove stance owner's house is in the foreground with the boundary for keeping the cattle in behind and the bothy for the drovers in the distance. Copyright: Neil Ramsay

This is Monbuie from a distance as you approach it. The presence of cattle, even two hundred years ago, is evident from the patch of yellowish grass in contrast to the square miles of heather all around. This is the result of heavy dunging long ago. Copyright: Neil Ramsay

Image 5 of 8

CLOSE ✕

This is the remains of the dam at Monbuie drove stance where cattle would have been able to take a well earned drink. Copyright: Neil Ramsay

Image 4 of 8

CLOSE ✕

Appendix B Need for Application of the Control of Major Industrial Hazard (COMAH) Regulations

Major Industrial Hazards and Balblair - Grid Scale BESS Should be Regulated under COMAH

B.1) The Control of Major Industrial Hazard Regulations (COMAH[1])require businesses to identify, prevent and mitigate the effects of major accidents involving dangerous substances. The aim is to avoid risks arising from accidents involving toxic, flammable, environmentally hazardous and explosive substances.

B.2) COMAH is applied to storage activities, explosives sites, nuclear sites and other industries where quantities at and above given thresholds of dangerous substances (identified in the regulations) are kept and used

B.3) The regulations referred to are the CLP ((Chemical Classification, Labelling and Packaging Regulations[2])

B.4) A major (or indeed any reasonably sized BESS and associated transformers) combines hazards of fire, deflagration, explosion, release of harmful toxic and flammable vapours, release of short and long term environmentally damaging materials, other releases both toxic and damaging to humans and the potential to start consequential fires in peatlands and moorland with hugely damaging and long-term effects on climate change.

B.5) Incidents in the BESS may also cause damage to the nearby electricity sub-station with effects on grid stability and operation. These effects may be electrical (which should be protected against), physical in terms of projectile damage, thermal in terms of radiation and operational in terms of restrictions on access to the sub-station.

B.6) Indeed, it is our view, that a burn of moorland started by a BESS incident would cause vastly more damage than any benefit in terms of displacement of hydrocarbon fuels.

B.7) That BESS are not included in sites where COMAH applies is due entirely to a quirk of labelling and a lack of joined up thinking in Government. That is, it is an accident of Government stupidity that large scale battery storage systems are not classified as major industrial hazards.

B.8) Batteries, so far as CLP is concerned, are articles. As articles they are treated on their own as individuals. While, as items they may be like snowflakes - individually charming – in bulk they are very far from being innocuous.

B.9) 5 litre containers of petrol are, similarly, not a major hazard, but 3.0 million cubic metres of various hydrocarbons as at Stanlow Terminals on the banks of the Mersey Canal most certainly do constitute a major industrial hazard.

B.10) If the same weight or volume of fertiliser was stored at a site as in the batteries of a large-scale BESS, the site would fall under COMAH.

B.11) The hazard is caused by the gathering together in one place of individual items that require strict control at cell level, at module level and at system level.

[1] Control of Major Accident Hazards Regulations 2015. Simply put, the COMAH regulations are applicable to any establishment storing, or otherwise handling, large quantities of chemicals or substances of a hazardous nature, including production facilities, warehouses, and some distributors.
[2] Chemical Classification, Labelling and Packaging Regulations (CLP)

B.12) Into that set of hazards is thrown the additional hazard from transformers with their probability of fire, explosion and consequent projectile production.

B.13) Enough is known right now about the hazards and partial mitigation for BESS (especially but not confined to Li-ion based systems) for a BESS to be treated, if not in law as a COMAH site, but at least in common sense, and practicality as such a site. Because the law is stupid, organisations and the engineers within them do not have to act stupidly.

B.14) It is possible that the law will catch up as a House of Lords private members bill attempts to impose a binding obligation on the local planning authority and require consultation of the Environment Agency and the Health & Safety Executive in addition[1]. The bill also gives the government the power to regulate the granting of environmental permits for BESS units containing Lithium-ion cells. We will not, however, hold our breaths.

B.15) In short, both the applicant and those who approve such grid-scale BESS should accept responsibility for any future incidents that can be avoided by competent engineering. **[We request that as part of any approval (if given) the applicant be required to act in all respects as if the site, equipment, maintenance and operations were subject to COMAH.]**

Implications of COMAH and the Common Planning Framework

B.16) In detail, we note that for a planning application of a site where COMAH applies, the minimum requirement is a major accident prevention policy that describes the operator's understanding of the risks involved and their approach to controlling them.

B.17) There should be set out broadly acceptable target risk levels and the philosophy (As Low as Reasonably Practicable or ALARP) that would be followed if acceptable levels were not achieved including setting out the upper tolerable level of risk.

B.18) As part of the planning application, therefore, there should be a detailed description of the possible major accident scenarios and their probability or conditions under which they might occur.

B.19) There should be a summary of the events that may trigger these scenarios either internally or external to the site.

B.20) In a broad spectrum of other matters,

- Safety precautions built into the plan and equipment from design should be shown – for example, separation as a major mitigation for projectile risk
- Active measures to limit the consequences of a major upset or accident such as immediate fire suppression and times to hold escalation should be described – with estimates of the uncertainty associated with the time to hold.
- Realistic emergency plans should be set out that that are interfaced with local authority resources and plans. There is little value in 'holding' escalation for an hour if a 3-hour mobilisation of external resources is the best available.

B.21) Over and above that, COMAH does not cover the ground of the Hazardous Substances (Planning) Common Framework published in 2021.

B.22) Whereas, COMAH relates to on-site controls to minimise the risk of a major accident, the Planning Framework refers to residual off-site risk. That is, the risk of a major accident

[1] HL Bill 8 of 2024–25 Lithium-ion Battery Safety Bill [HL]. This also has a good review of some of the hazards associated with Li-ion cells https://researchbriefings.files.parliament.uk/documents/LLN-2024-0050/LLN-2024-0050.pdf

arising due to the proximity of hazardous substances to other development or sensitive environments.

B.23) This location sensitive issue was considered to be a spatial planning matter to be addressed through planning controls. It is these planning controls we are suggesting should, in equity, apply here.

[Planning consideration must look at the post incident effects of fire and noxious releases as well as immediate matters of fire detection, suppression and extinction]

B.24) The hazardous substances regime requires local planning authorities to comply with various consultation requirements and consider any major accident hazard issues before they can grant planning permission in relation to establishments, to certain types of development near such establishments, and hazardous substances consent.

B.25) Insofar as they apply, or should apply we refer to :

- The Planning (Hazardous Substances) (Scotland) Act 1997
- The Town and Country Planning (Hazardous Substances) (Scotland) Regulations 2015
- The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013