Burn Gliding Club Response to The High-Level Investigative Report, Helios Renewable Energy Project, May 2024 (only received in December 24) as an Addendum to our Burn Gliding Club Further Information submitted in December 25. Also, Response to further questions from Pager Power submitted on 14 Jan 25.

1. The latest Pager Power report does not, in our opinion, address the all of the issues in the correct manner. Therefore, our position is unchanged by this late (only received in December) and slightly rehashed report AND it does not consider the effect of glint and glare or the combination of glint and glare, EFATO and thermal activity and turbulence.

2. We remain unconvinced that Pager Power understands fully a gliding site operation. We have invited the developers to come and visit us on site but they have not taken up our offer. We would wish to encourage Pager Power to visit us to gain a full understanding of our gliding operations.

3. We believe the following additional information may be of use in the further analysis of the impact of the proposed Helios Renewable Energy Project on our safe operations. This addendum does not repeat the information we provided in our previous report concerning glint and glare but will consider aerotow launch failure, the effect of updrafts and turbulence, the combination of all 3 (including glint and glare) and gives our response to Specific Stantec Further Questions.

**Engine Failure after Take Off. (Aerotow launch failure) EFATO**

4. Aerotow launch failures offer 2 opportunities: the first option is to land ahead or to make a modest turn into a suitable field; the second, with sufficient height, is to turn back safely to land at the gliding site. A major factor in both of these options is the competence of the pilot, the weather and the characteristics of the glider being flown and the performance of the tug aircraft.

**Field Selection**

5. Suitable Landing areas need to be large enough, they must have an unobstructed approach, suitable surface and be clear of stock. Throughout the year fields can change as the crops grow and ripen and are then harvested meaning the suitability as a safe landing option changes according to the crop state. For example, a rape field is not suitable for landing if the plant is beginning to flower, maize crops higher than 30cm are not suitable, other crops have different safe and unsafe periods of development. A guide to crops through the seasons can be found here:

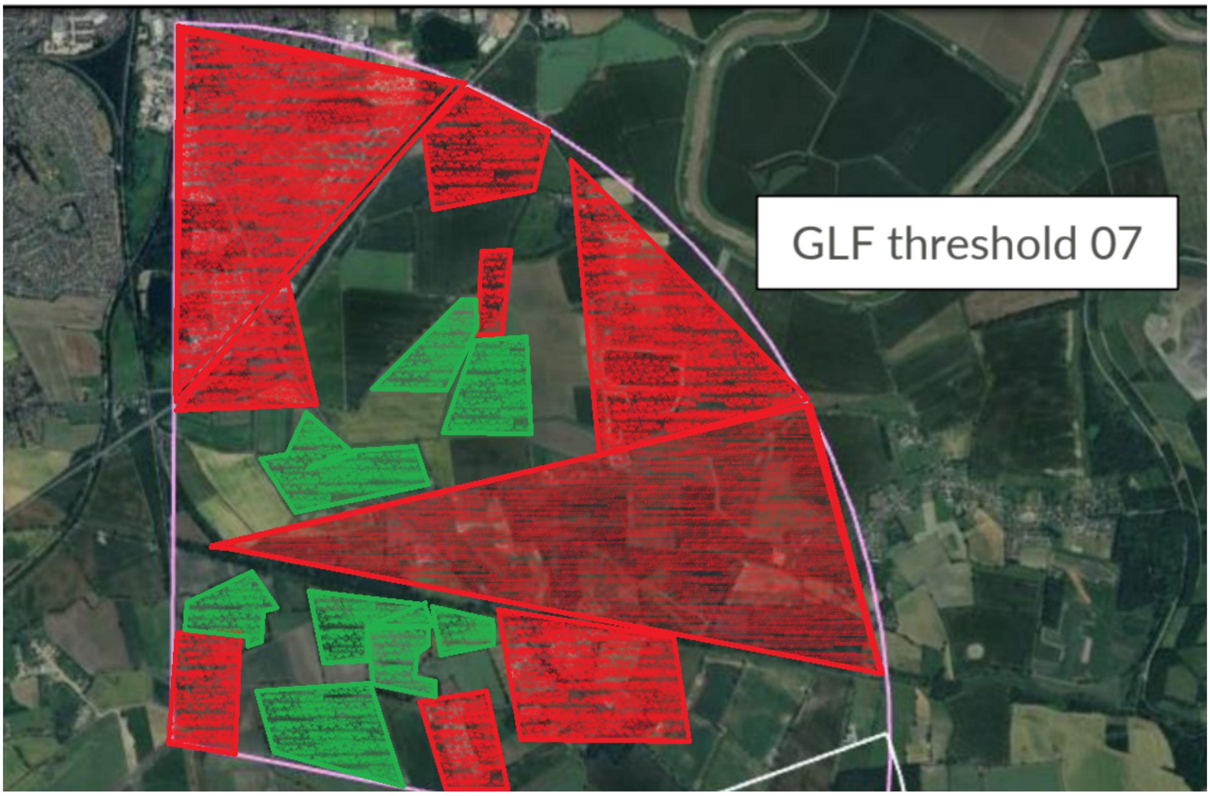
[redacted]

The direction of furrows is also a factor, landing across the furrows of any crop is likely to lead to damage or injury. Harvested fields, once any bails are removed, are suitable for landing but again landing parallel to the furrows offers the safest option. We also need to consider livestock too as fields with animals are not suitable for landing.

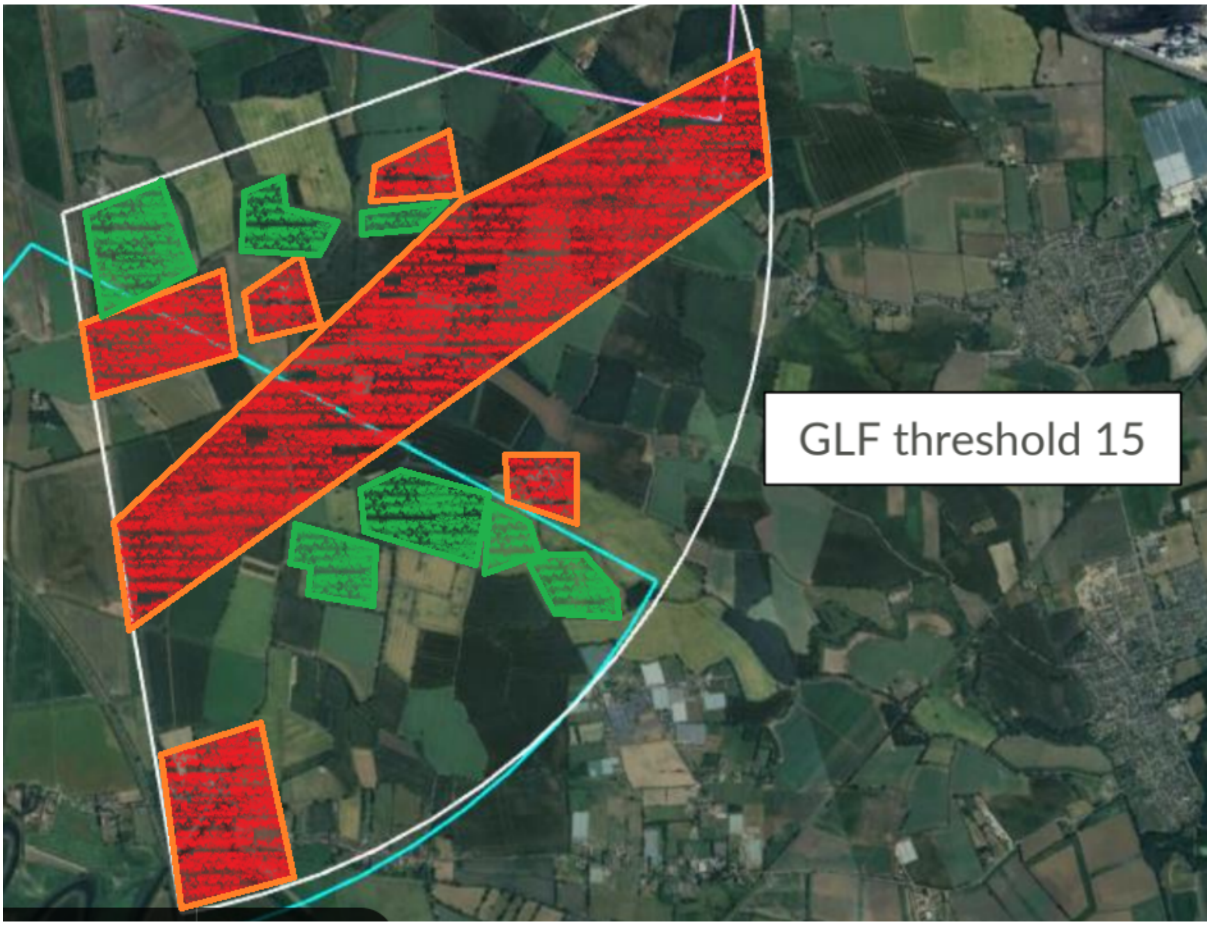
6. Suitable fields need to be flat and clear of overhead cables. A gentle upslope can be accepted but a landing across a slope is not encouraged while landing down a slope is not achievable. Any obstructions on the downwind boundary will increase the size of field required by 10 to12 times the height of the obstruction. Obstructions upwind also require increased field size as the turbulence and wind shadow compromise the approach and the ground run. Wind direction is a key factor in the landing direction chosen. As the aerotow launch will be planned to have taken off using the into wind component it is accepted that the fields ahead will have an into wind component too. In summary we need options available to mitigate the variables such as weather, crop type, crop condition, furrow orientation, stock, slope etc.

7. It's worth highlighting the field selection must be made quickly and instinctively by the pilot whose workload will be extremely high at this point. The addition of thermal updraft or glint and glare at this point could be extremely dangerous.

8. The images below suggest areas (in RED) where a forced landing will not be possible in the event of an aerotow launch failure from the 3 runways 07, 19, 15. Possible landing areas are shown in GREEN.



Possible landing areas in green when aerotowing from Runway 07. Suitability will vary according to time of the year and the agricultural use of the field.




Possible landing areas in green when aerotowing from Runway 15. Suitability will vary according to time of the year and the agricultural use of the fields. There is a 400kV transmission line crossing here which does eliminate options beneath and beyond.

Possible landing areas in yellow when aerotowing from Runway 19. Suitability will vary according to time of the year and the agricultural use of the field. Some heavier Aerotow combinations turn right and track parallel to the 400kV lines rather than overfly them.

**Thermal Updraughts and Turbulence.**

9. Any thermal and turbulence on the circuit increases the workload on the glider pilot because he or she has to make corrections to maintain safe progress along the circuit. The purpose of a circuit is to allow orderly flow of aircraft to land in the prescribed part of the airfield. Unlike powered aircraft, gliding circuits are designed to ensure the landing area is always within range allowing alternative landing decisions to be made as the circuit progresses subject to weather conditions, other aircraft taking off and landing, pilot ability, launch failure and training exercises.

10. Gliders do not have the option of being able to “abort the landing and “go around”. So, training (in accordance with BGA procedures) is intended to enable the pilot to land in any suitable field using visual references only to judge height. Lookout is the primary means of maintaining separation from other aircraft, any distraction which detracts from lookout such as temporary vision impairment and increased pilot workload in maintaining safe flight will increase the safety of the flight.

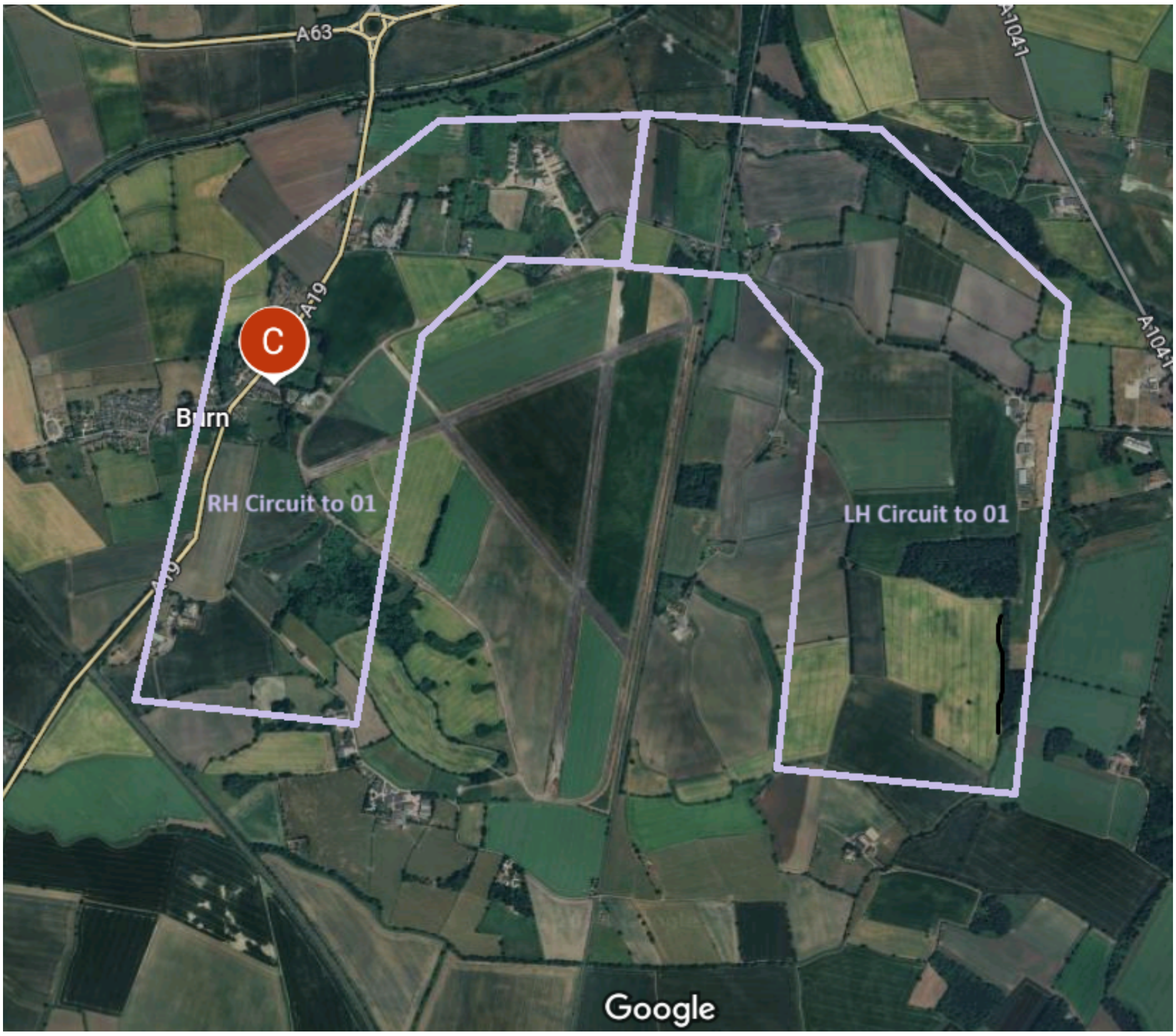
11. In the extract from the environmental study in the High-Level Investigative Report Helios Renewable Energy Project May 2024 Section 5.2.2 Updraft*,* it acknowledges that updraught can be encountered in the immediate vicinity of the panels. There is no reference to the height or the strength of these updraughts.

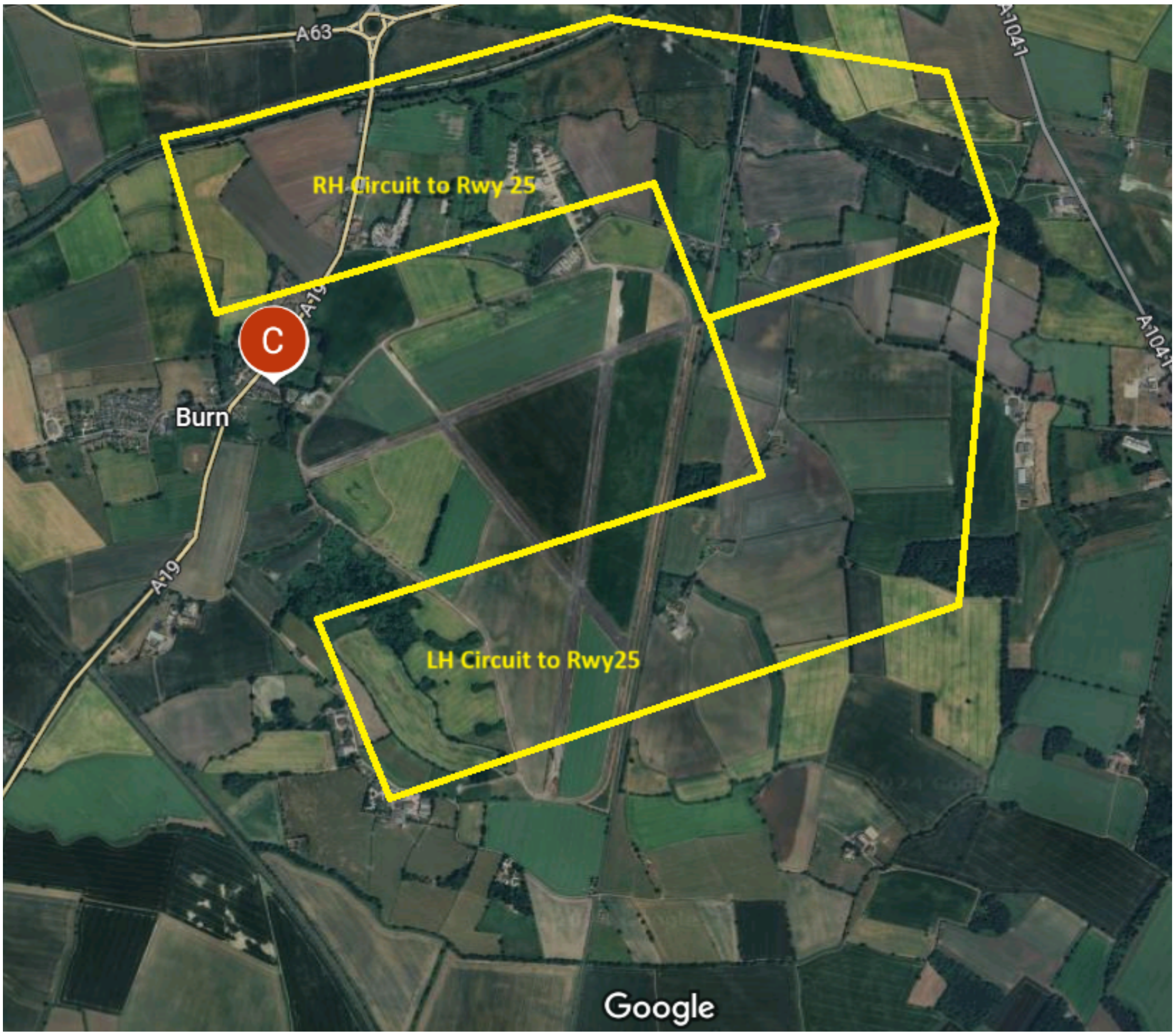
A natural thermal occurs due to the land being heated by the sun. The different surfaces absorb this heat at different rates. (Differential Heating). The Air above the ground is then heated by the radiated heat from the ground and once the “parcel” of air is sufficiently warmer than the surrounding air it breaks away and rises. Natural thermals rise thousands of feet with sufficient energy to allow gliders to climb at hundreds of feet per minute.

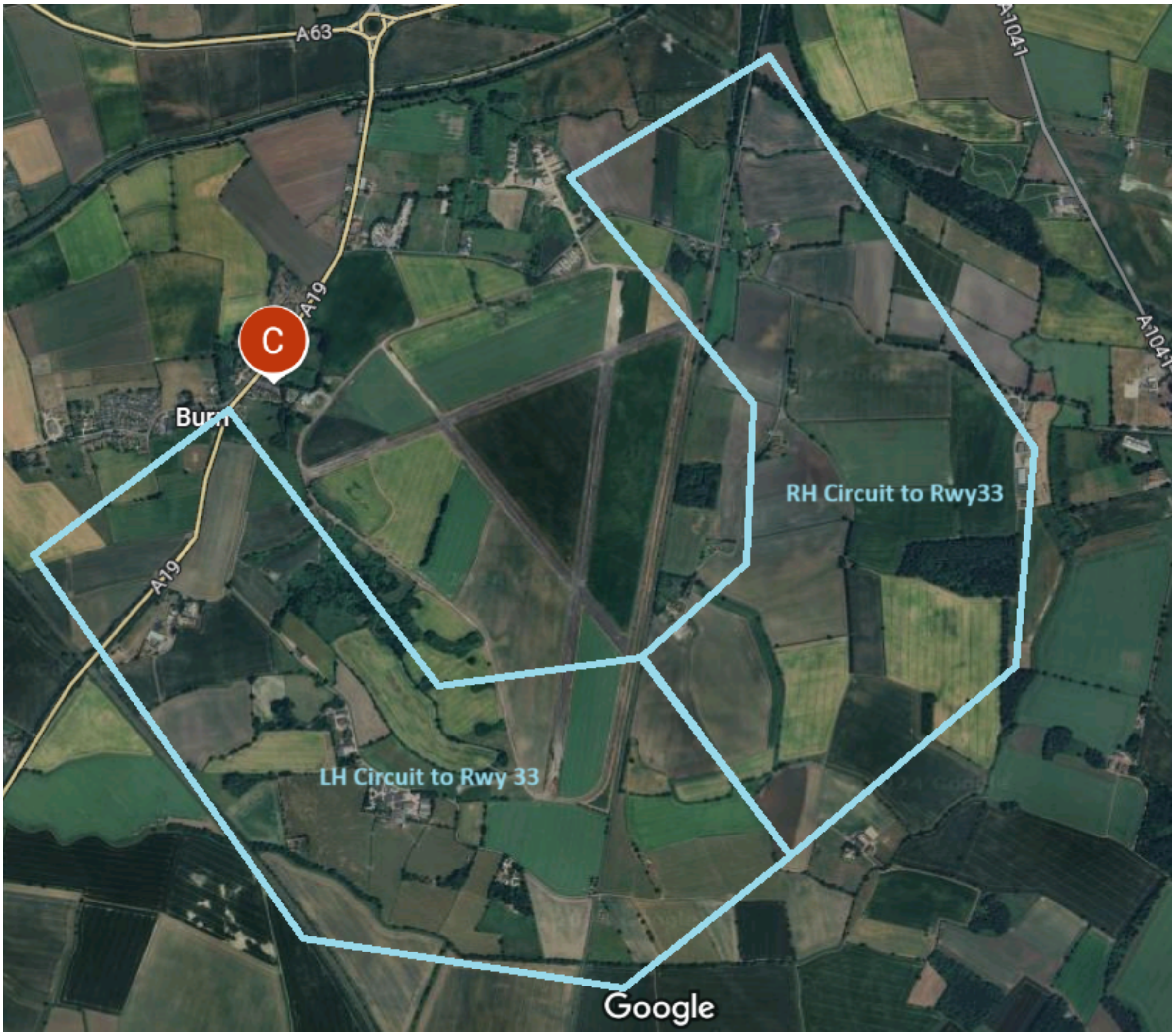
12. What this does mean is the solar panel array will be heated by the direct sun or ambient light level. This heat will warm the surrounding air which once sufficiently buoyant will rise in the same way as a natural thermal. If the solar array is large as proposed then huge areas of thermal updraughts can be expected directly under our usual circuit paths. Thermals are affected by and can influence wind patterns.
As the warm air rises cooler air is drawn in to replace it, in practice this is recognised by a pilot as turbulence, we fly through the air and experience increased rates of descent (sink) or ascent (lift). This can be quite violent and require immediate control inputs to maintain safe flight. It is more hazardous at circuit heights as it requires more pilot effort to maintain safe flight. (The only reference to height we teach is that the final turn should be completed above 300ft).

**<u>Glide slopes.</u>**

13. Gliders are very efficient, a glide ratio for a training glider can be 34:1. (for 1000ft feet in height the glider can glide 34000 ft. A higher performance modern glider can achieve a glide ratio of 60:1. This offers glide slopes on the circuit typically between 1.2 and 2 degrees, while the final approach is as much as 20deg with the use of airbrakes. These glide angles are determined on weather, glider type, pilot ability and the situation at the intended landing area. The images below indicate the circuit areas typically used by gliders at Burn.


A63
A19
A1041
C
Burn
RH Circuit to 01
LH Circuit to 01
A19
A1041
Google


A63
A19
A1041
RH Circuit to Rwy 25
C
Burn
LH Circuit to Rwy25
Google




**Response to Specific Stantec Further Questions**

14. We have responded below by the specific addition questions asked by Stantec.

- **Maximum elevation within circuit;** 1000 to 800 ft, judged by eye not altimeter

- **Approach angle for circuit/approach**; As stated above - Gliders have a glide slope on the circuit between 1.2 and 2 degrees, while the final approach is as much as 20 degrees. These glide angles are determined on weather, glider type, pilot ability and the situation at the intended landing area.

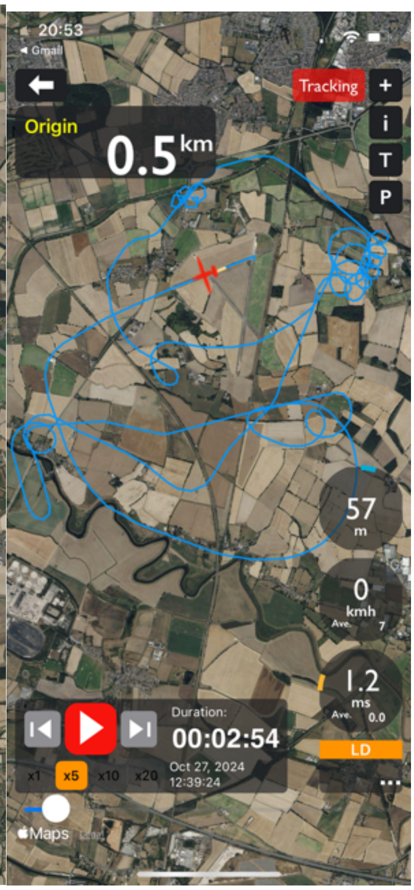
- **Please confirm the operating hours are as previously stated within the Zoom meeting on 14/11/24 – between 10am and 30 minutes after sunset;** Confirmed although we are allowed to launch earlier if desired

- **Please provide a circuit plan for the standard circuits at Burn – an example from Sherburn-in-Elmet airfield have been provided below for reference of what is required:** see the examples given above.

- **Please provide any logs or examples of flights that have been completed within the last 6 months, including time of day, runway designation, flight path. This is so that we can have a better understanding of the operations at the airfield to ensure we have considered the critical points.** We are able download the flight traces from Flarm. Some examples are shown below:

- 

- 
18:41
Tracking
Origin
0.0km
i
T
P
47
m
0
kmh
Ave.
0
0.0
ms
Ave.
0.0
LD
Skip To Takeoff
Duration:
00:00:00
x1
x5
x10
x20
Nov 28, 2024
13:48:24
Maps

20:50
Gmail
Tracking
Origin
0.5km
i
T
P
N
60
m
0
kmh
Ave.
7
1.5
ms
Ave.
0.0
LD
Duration:
00:02:53
x1
x5
x10
x20
Oct 17, 2024
11:29:36
Maps
-
- 
20:51
Gmail
Tracking
Origin
0.5km
i
T
P
66
m
0
kmh
Ave.
7
3.0
ms
Ave.
0.1
LD
Duration:
00:02:52
x1
x5
x10
x20
Oct 24, 2024
15:32:09
Maps

20:53
Gmail
Tracking
Origin
0.5km
i
T
P
57
m
0
kmh
Ave.
7
1.2
ms
Ave.
0.0
LD
Duration:
00:02:54
x1
x5
x10
x20
Oct 27, 2024
12:39:24
Maps

20:55
Gmail
Tracking
Origin
0.0 km
48
m
0
kmh
Ave.
0
0.0
ms
Ave.
0.0
LD
Skip To Takeoff
Duration:
00:00:00
Oct 28, 2024
00:03:04
x1
x5
x10
x20
Maps

22:22
Gmail
Tracking
Origin
0.1 km
69
m
0
kmh
Ave.
4.0
ms
Ave.
0.1
LD
Duration:
00:02:36
Feb 18, 2024
16:24:13
x1
x5
x10
x20
Maps


- 
- 

22:27
Gmail
Tracking
Origin
0.1 km
N
67
m
0
kmh
Ave.
2.8
ms
Ave.
0.0
LD
Duration:
00:02:36
Apr 25, 2024
14:32:21
x1
x5
x10
x20
Maps

22:41
Gmail
Tracking
Origin
0.1 km
81
m
0
kmh
Ave.
7.0
ms
Ave.
0.1
LD
Duration:
00:02:36
May 30, 2024
12:58:12
x1
x5
x10
x20
Maps


- 

- **Following on from the previous point, please confirm the order of priority for use of the runways/the typical runway used due to prevailing and the general circuit direction that is used.** Typically, right-hand circuits are followed. This information is not captured and can only be determined by examining the Flight traces individually. However, given the option the preferred runway is **Runway 25** because this is the most common into wind option, the approach and touchdown area is acceptable. **Runway 01** offers poor winch launch length and any westerly component risks a winch cable crossing the railway. **Runway 33** is a good choice if the full length is available for winch launch but poor for aerotow and winch launch failures in light wind conditions. **Runway 19** has poor touchdown options and requires a long retrieve after each landing. However, it is good for winch launches but any westerly component risks a winch cable crossing the railway. **Runway 07** is not used often as we do not get easterly winds very often. **Runway 15** suffers from poor touchdown options and all landings require a long retrieve.

**<u>Conclusion</u>**

15. This additional report above does not repeat the information we provided in our previous report concerning glint and glare but has considered EFATO land out options and gives details of which fields are available to us now. The project team should be aware which fields will be denied our use if their proposals are implemented. We have explained the likely effect of updrafts and turbulence on a glider in the circuit and we have highlighted the dangers posed by the combination of all 3 (including glint and glare). Moreover, we have detailed our response to Specific Stantec Further Questions.