Screening for dwelling receptors 137 to 142 and 146 to 164

Screening for dwelling receptors 143 to 145

Screening for dwelling receptors 165 to 168

Screening for dwelling receptors 169 to 173

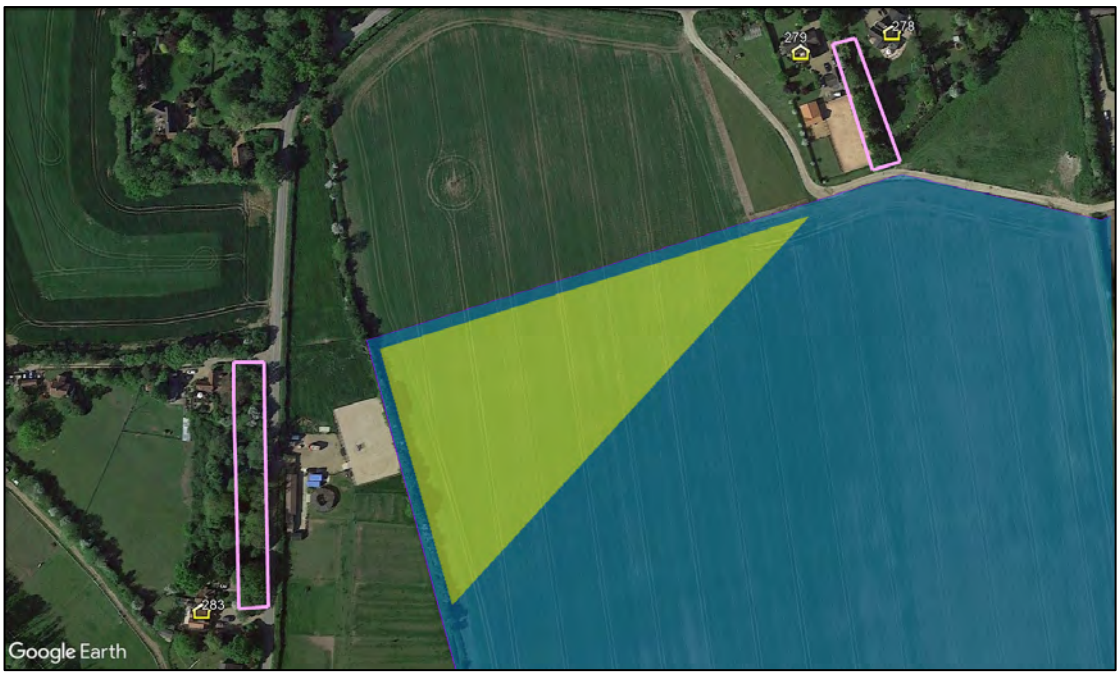
Screening for dwelling receptors 174 to 184

Screening for dwelling receptors 185 to 187

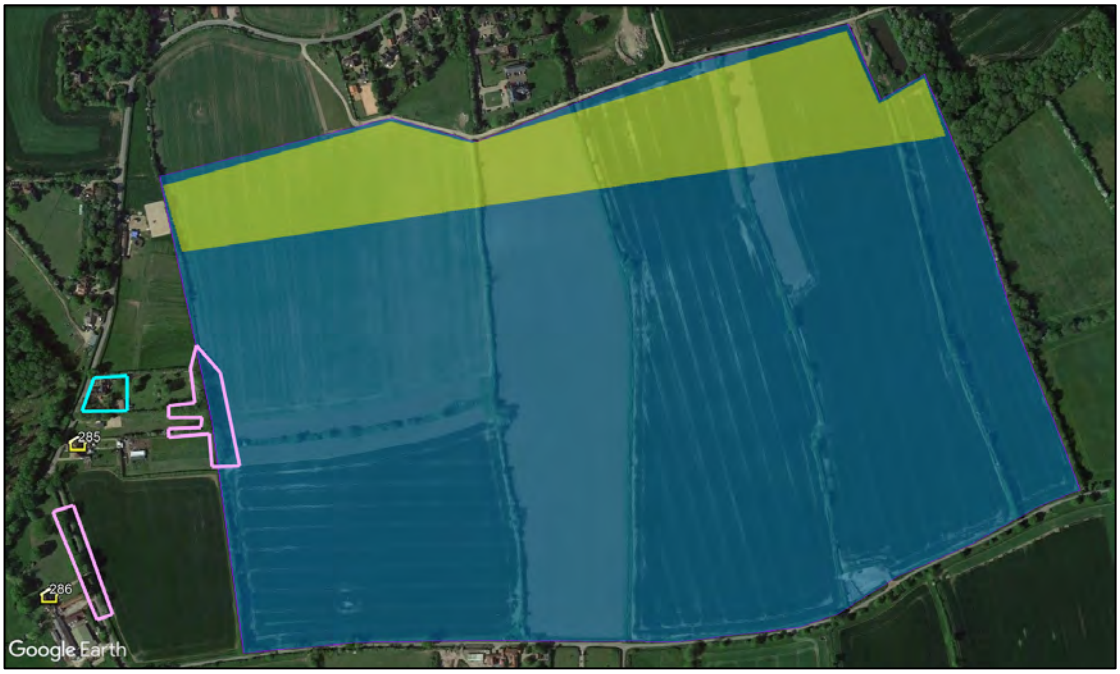
Screening for dwelling receptors 219 to 257

Screening for dwelling receptors 258 to 264

Screening for dwelling receptors 271 to 275



Screening for dwelling receptors 278 to 279 and 283

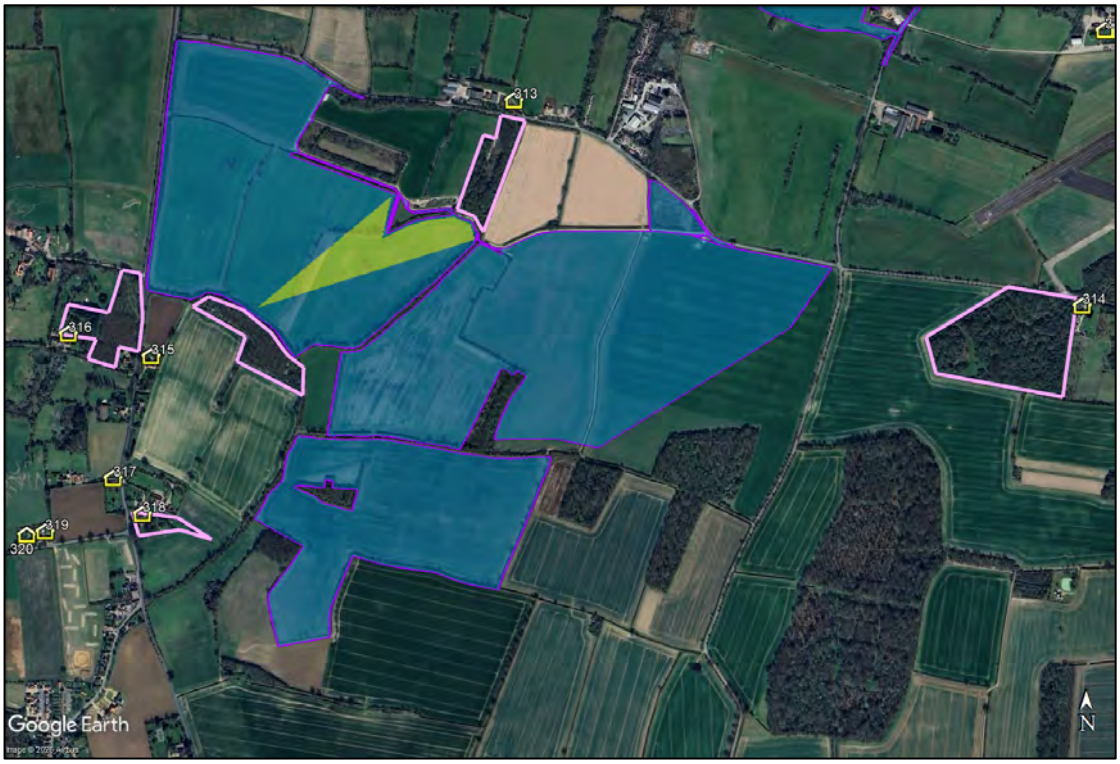


Screening for dwelling receptors 285 to 286

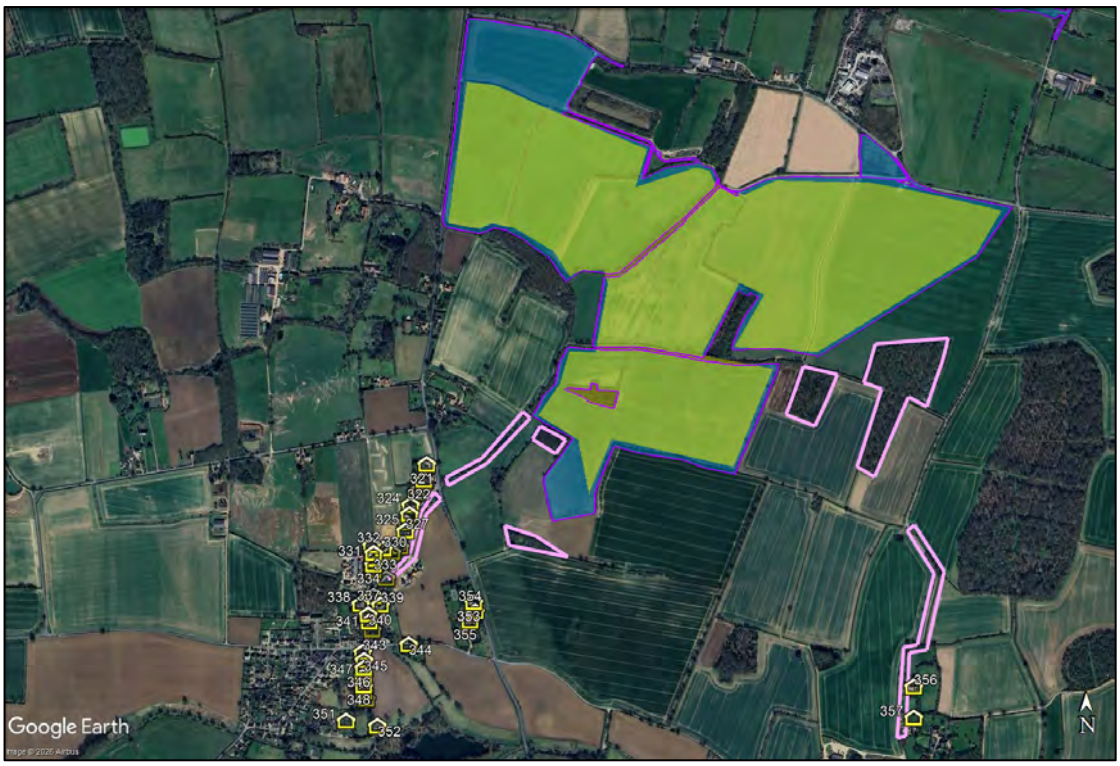
Screening for dwelling receptors 287 to 289

Screening for dwelling receptors 290 to 300

Screening for dwelling receptors 301 to 310



Screening for dwelling receptors 311 to 320



Screening for dwelling receptors 321 to 355

Screening for dwelling receptors 356 to 405

Screening for dwelling receptors 406 to 407

Screening for dwelling receptors 408 to 410

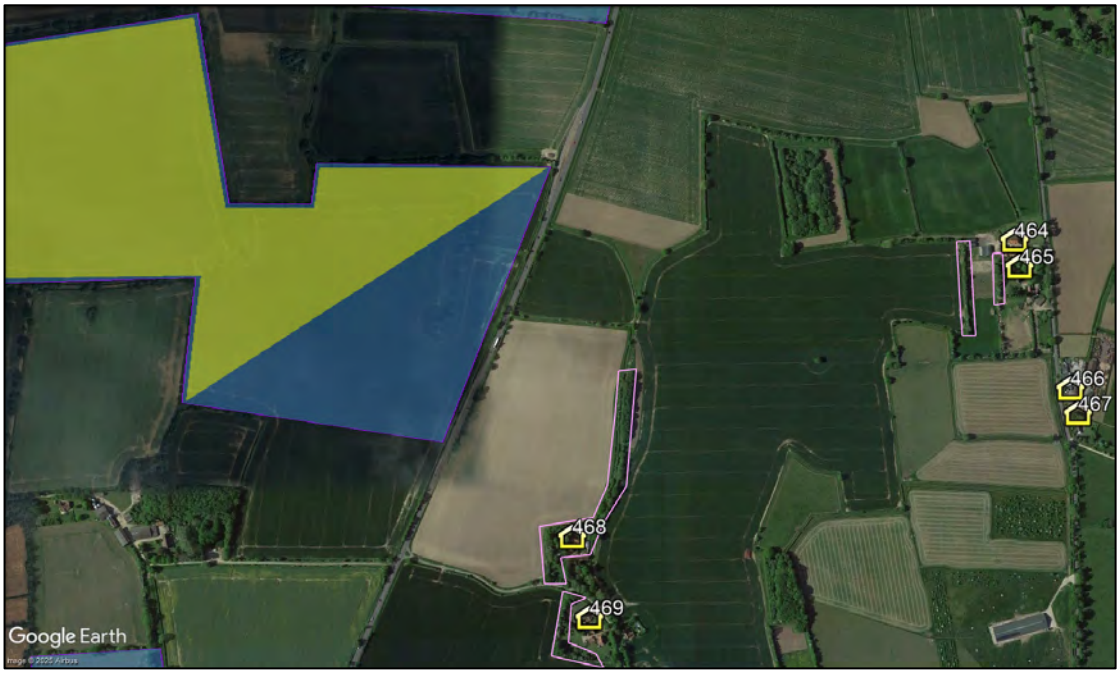
Screening for dwelling receptors 411 to 427

Screening for dwelling receptors 428 to 429

Screening for dwelling receptors 430 to 449

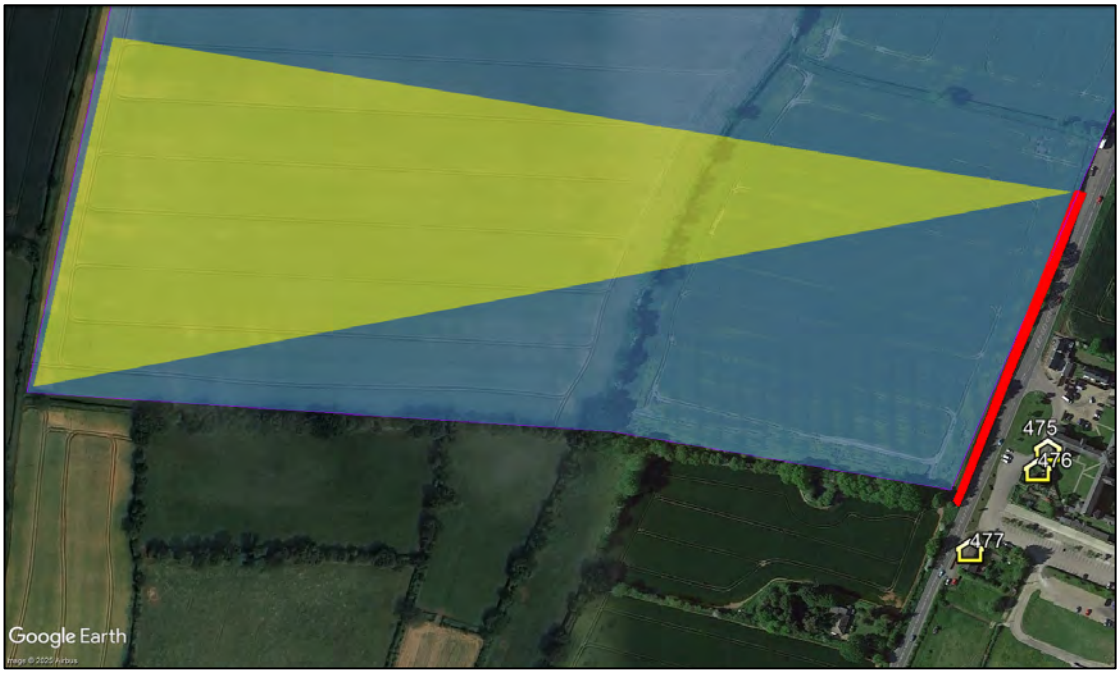
Screening for dwellings receptors 457 to 461

Screening for dwelling receptors 462 to 463



Screening for dwelling receptors 464 to 469

Screening for dwelling receptors 470 to 474



Screening for dwelling receptors 475 to 477

Screening for dwelling receptors 478 to 482

APPENDIX J – SOLAR PHOTOVOLTAIC GLINT AND GLARE STUDY ADDENDUM

Receptors Overview

The geometric glint and glare assessment has considered the specific circuit and approach paths for both powered and gliding aircraft, as defined by Norfolk Gliding Club. The details of the circuit and approach paths are presented below and on the following page.

In total, 38 circuit and approach paths have been modelled considering both the minimum and maximum heights at each section of the downwind, base legs and final approaches for both powered and gliding aircraft.

'Glide slopes and descent gradients

Tibenham is primarily a gliding airfield with winch cables up to 3,000ft above ground level (agl) and because of this, does not allow for what is in powered aircraft terms called an 'overhead join'. In this type of situation the pilot would fly over the runway in use and descend to circuit height.

At a gliding site this cannot be allowed because of danger presented by the winch cables and pilots are told to join the circuit on the downwind leg

Downwind leg – power

Whilst intending to make the downwind/base turn in the range of 500ft to 800ft agl, at the point of joining downwind many pilots are still descending

Downwind leg – gliders

The target height for gliders is to start the downwind leg at about 800ft agl and complete the diagonal to base turn at about 600ft agl.

However as described earlier there are many factors the affect the rate of descent and some (thermals) that cause the glider to climb

Base leg - both

The target height for the final turn is around 400ft agl but the distance of that turn from the threshold can vary according to a number of factors which in turn affects the descent gradients'

Appendix B

Runway and Circuit Dimensions

Notes

All dimensions are based on the datum being the threshold or centre line of the appropriate runway
All runway numbers use the standard aviation format - ie 03 means that the direction of travel (for take off or landing) is 030 degrees when looked at a 360 degree compass rose
The suffix 'R', 'L' and 'S' refers to Right, Left and Short of the asphalt runway when viewed from the cockpit of an aircraft on the approach leg
For the purposes of clarity the dimensions of the glider diagonal leg have been omitted
The accompanying diagrams are a representation of the various circuits and are not to scale

Runways

			Runway width (m)		Runway length (m)			Downwind leg from runway centreline (m)		Length of final approach to threshold (m)		Length of base leg to runway centreline (m)		Notional length of downwind leg (m)	
Runway designator	Circuit Direction	Aircraft type	Asphalt	Grass	Asphalt	Grass	Location of Grass runway	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
03	RHD	Power	46		1,600			2,500	2,000	1,500	1,000	2,500	2,000	5,000	4,500
		Glider						2,000	1,500	1,000	500	2,000	1,500	3,000	2,000
03R	RHD	Glider		65		550	To the east of the asphalt runway	1,945	1,445	1,000	500	1,945	1,445	3,000	2,000
08	LHD	Power	46		700			2,500	2,000	1,500	1,000	2,500	2,000	3,000	2,500
		Glider						2,000	1,500	1,300	800	2,000	1,500	2,500	2,000
08S	LHD	Glider		120		400	Threshold 400m before that of the asphalt runway	2,000	1,500	900	400	2,000	1,500	2,500	2,000
08L	LHD	Glider		100		360	To the north of the asphalt runway, threshold is displaced by 50m to the grass beyond Runway 03/21	1,927	1,427	1,250	750	1,927	1,427	2,500	2,000
15	RHD	Power	46		1,250			2,500	2,000	1,500	1,000	2,500	2,000	3,000	2,500
		Glider						2,000	1,500	1,300	800	2,000	1,500	2,500	2,000
15L	RHD	Glider		100		500	To the north of the asphalt runway, threshold is displaced by 500m to the grass beyond Runway 03/21	2,070	1,570	1,800	1,300	2,070	1,570	2,500	2,000
21	LHD	Power	46		1,600			2,500	2,000	1,500	1,000	2,500	2,000	5,000	4,500
		Glider						2,000	1,500	1,000	800	2,000	1,500	3,000	2,000
21L	LHD	Glider		100		500	To the east of the asphalt runway, threshold displaced south by 100m	1,927	1,427	1,100	600	1,927	1,427	3,000	2,000
26	RHD	Power	46		700			2,200	1,700	1,500	1,000	2,200	1,700	3,000	2,500
		Glider						1,700	1,200	1,000	500	1,700	1,200	2,500	2,000
26R	RHD	Glider		100		400	To the north of the asphalt runway, threshold is displaced by 200m to the grass beyond Runway 15/33	1,627	1,127	1,200	700	1,627	1,127	2,500	2,000
33	RHD	Power	46		1,250			2,200	1,700	1,500	1,000	2,200	1,700	3,000	2,500
		Glider						1,700	1,200	1,000	500	1,700	1,200	2,500	2,000
33R	RHD	Glider		100		500	To the east of the asphalt runway, threshold is displaced by 500m to the grass beyond Runway 08/26	1,627	1,127	1,500	1,000	1,627	1,127	2,500	2,000

Geometric Modelling Results

The table on the following page presents the geometric modelling results of the assessed circuits and approaches.

Reference to the pilot's field-of-view considers 180 degrees (90-degrees either side of the bearing relative to the direction of travel).

Assessment Conclusions

- The instances of 'yellow' glare are predicted for at most 8.64% of daylight hours per year;
- Solar reflections with 'yellow' glare are predicted at times when the Sun is low in the sky beyond the reflecting panels. This means that a pilot will likely have a view of the Sun within the same viewpoint of the reflecting solar. The Sun is a far more significant source of light, and therefore the glare originating from the proposed development will not be significant;

- The 'yellow' glare only marginally exceeds the 'yellow' threshold on the intensity chart. 'Green' glare (or glare with 'low potential for temporary after-image') is considered an acceptable level of glare intensity for aircrafts on approach;
- For the majority of circuits and approaches, effects would be fleeting due to their short duration along the visual circuits and the restricted size of the reflecting panel area;
- The weather would have to be clear and sunny at the specific times when the glare was possible to be experienced. A pilot would also have to be on approach/the circuit path at the times when solar reflections are possible.

It is expected that operational measures already used by pilots to mitigate the effects of direct sunlight could potentially be used to mitigate the effects of solar glare from the panels. The instances of 'yellow' glare could potentially be operationally accommodated, subject to consultation with Norfolk Gliding Club.

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
03 RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 400m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
03 RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 400m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
03 RHD Power Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
03 RHD Power Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
03R RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
03R RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant. For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
08 LHD Power Minimum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08 LHD Power Maximum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08 LHD Glider Minimum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08 LHD Glider Maximum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
08S LHD Glider Minimum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08S LHD Glider Maximum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08L LHD Glider Minimum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.
08L LHD Glider Maximum	Yellow	• Reflecting panel areas are within the field-of-view in-line with a pilot's bearing; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A moderate impact is predicted and could be operationally accommodated, subject to consultation with Norfolk Gliding Club.

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
15 RHD Glider Maximum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted
15 RHD Glider Minimum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted
15 RHD Power Maximum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
15 RHD Power Minimum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted
15 RHD Glider Maximum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted
15 RHD Glider Minimum	Green	The glare intensity is considered acceptable in accordance with the associated guidance, assessment methodology, and industry best practice. No further considerations to the reflecting panel areas relative to a pilot's direction of travel are considered A low impact is predicted
21 LHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
21 LHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
21 LHD Power Maximum	Yellow	For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
21 LHD Power Minimum	Yellow	For sections that are within the field-of-view: • The reflecting panel areas towards the 800m-sections are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
21L LHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 800m- and 200m-sections are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
21L LHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 800m- and 400m-sections are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
26 RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
26 RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted
26 RHD Power Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted
26 RHD Power Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted
26R RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted
26R RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant No significant impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
33 RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
33 RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 600m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
33 RHD Power Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 800m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
33 RHD Power Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 800m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Circuit and Approach	Maximum Glare Intensity	Conclusions and predicted impact
33R RHD Glider Maximum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 1,800m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted
33R RHD Glider Minimum	Yellow	Reflecting panel areas from sites behind a pilot (i.e. beyond 90 degrees) will not be within the field-of-view and therefore not considered significant For sections that are within the field-of-view: • The reflecting panel areas towards the 1,800m-section are not directly in front of a pilot and therefore will be fleeting in nature; • Solar reflections coincide with views of the Sun, which is considered a more significant source of glare. A low impact is predicted

Geometric modelling results – Norfolk Gliding Club

Figure 10 03 RHD Glider Maximum

Figure 11 03 RHD Glider Minimum

Figure 12 03 RHD Power Maximum

Figure 13 03 RHD power Minimum

Figure 14 03R_RHD_Glider_Maximum