Glint and Glare Assessment Addendum

Stourton Solar Farm

15/02/2023

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1. EXECUTIVE SUMMARY

1.1 This report forms an addendum to the original Glint & Glare report produced for the solar farm application on lands adjacent Sotby Woods, Stourton Road, Hatton.

1.2 There is little guidance or policy available in the UK at present in relation to the assessment of glint and glare from Proposed Development developments. However, it is recognised as a potential impact which needs to be considered for a Proposed Development.

1.3 Within 1km of the Proposed Development, there are 18 bridleway receptors. Four bridleway receptors were dismissed as they are located within the no reflection zones.

1.4 Geometric analysis was conducted at 14 individual bridleway receptors.

1.5 The assessment concludes that:

- Solar reflections are possible at 13 of the 14 residential receptors assessed within the 1km study area. The initial bald-earth scenario identified potential impacts as **High** at 10 receptors, **Low** at three receptors and **None** at the remaining receptor. Upon reviewing the actual visibility of the receptor, glint and glare impacts remain **High** for two receptors and reduce to **Low** at five receptors and **None** at the remaining receptors. Once mitigation was taken into consideration, all impacts reduce to **None**.

1.6 Mitigation measures are required to be put in place due to the **High** impacts that were found during the visibility analysis at Bridleway Receptors 1 and 2. Also, the Low impact views have been considered at Bridleway Receptors 3, 4, 6, 7 and 8. This includes native hedgerows and woodland to be planted/infilled and maintained to a height of at least 3m along the eastern boundary of the Proposed Development.

1.7 The effects of glint and glare and their impact on bridleway receptors has been analysed in detail and the impact on all receptors is predicted to be **None**, and therefore **No Effects**.

2. INTRODUCTION

2.1 Neo Environmental Ltd has been appointed by Push Generation and Supply Ltd, to undertake a Glint and Glare Assessment for a proposed solar farm development (the "Proposed Development") on lands adjacent Sotby Woods, Stourton Road, Hatton (the "Application Site").

2.2 This addendum report is in relation to the Glint and Glare Assessment submitted with a planning application (**Planning Reference: S/079/01078/22**) in June 2022 to East Lindsey District Council. The purpose of this addendum is to consider the potential impacts upon Brtidleway receptors within the study area of the Proposed Development. This addendum should be read in conjunction with the previously submitted Glint and Glare Assessment (**Planning Reference: S/079/01078/22**).

SCOPE OF REPORT

2.3 This report will concentrate on the effects of glint and glare and its impact on two additional receptors and is supported with the following Figures and Appendices.

- Appendix A: Figures
  - Figure 1: Bridleway Receptors
- Appendix B: Bridleway Receptor Glare Results
- Appendix C: Visibility Assessment Evidence

STATEMENT OF AUTHORITY

2.4 This Glint and Glare Assessment has been produced by Tom Saddington, Michael McGhee and David Thomson of Neo Environmental.

2.5 Having completed a civil engineering degree in 2012, Michael has produced Glint and Glare assessments for over 2GW of solar farm developments across the UK and Ireland.

2.6 Tom has an undergraduate degree in Bioengineering and graduated with an MSc in Environmental and Energy Engineering in January 2020. He has been working on various technical assessments including glint and glare reports for numerous solar farms in Ireland and the UK.

2.7 David has an undergraduate degree in physics, as well as a MSc in sensor design and a MSc in nanoscience. He is an Environmental Engineer currently working on various assessments including Glint and Glare.

3. BASELINE CONDITIONS

GROUND BASED RECEPTORS REFLECTION ZONES

3.1 In the northern hemisphere, there will never be solar reflections due south of a solar PV development as the position of the sun is always south. Furthermore, due to the slant of a solar panel (where the sun is due south, with an azimuth angle of 180 degrees), reflections will be directed skyward and not impact on ground-based receptors.

3.2 Based on the relatively flat topography in the area, solar reflections between five degrees below the horizontal plane to five degrees above it are described as near horizontal. Reflections from the Proposed Development within this arc have the potential to be seen by receptors at or near ground level.

3.3 Further analysis showed that this will only occur between the azimuth of 241.92 degrees and 291.18 degrees in the western direction (late day reflections) and 71.36 degrees and 121.27 degrees in the eastern direction (morning reflections) and therefore any ground-based receptor outside these arcs will not have any impact from solar reflections.

3.4 Figure 1: Appendix A shows the respective study area whilst also subtracting form this the areas where solar reflections will not impact on ground-based receptors due to the reasons set out in paragraphs 3.1 – 3.3.

RESIDENTIAL RECEPTORS

3.5 18 Bridleway receptors have been identified withn the 1km study area. Both residential receptors con be seen on Figure 1: Appendix A.

3.6 Table 3 - 1 shows a list of the 18 receptor points that are to be assessed.

Table 3 - 1: Bridleway Receptors

Receptor	Easting	Northing	Glint and Glare Possible
1	519842	377360	Yes
2	519860	377195	Yes
3	519936	377007	Yes
4	519956	376808	Yes

5	520090	376735	Yes
6	520134	376900	Yes
7	520199	377043	Yes
8	520356	377168	Yes
9	520318	377369	Yes
10	520425	377474	Yes
11	520416	377648	Yes
12	520351	377816	Yes
13	520624	377519	Yes
14	520813	377581	Yes
15	520282	377994	No
16	519851	377983	No
17	519837	377769	No
18	519831	377574	No

4. IMPACT ASSESSMENT

4.1 Following the methodology outlined earlier in this report, geometrical analysis comparing the azimuth and horizontal angle of the receptors from the Proposed Development and the solar reflection was conducted. Although this assessment did not consider obstructions such as vegetation and buildings, discussion on the potentially impacted receptors is provided where necessary.

BRIDLEWAY RECEPTORS

4.2 **Table 4 – 1** shows a summary of the modelling results for each of the Bridleway Receptor Points whilst the detailed results and ocular impact charts can be viewed in **Appendix B**.

4.3 The four receptors within the no-reflection zones outlined previously have been excluded from the detailed modelling as they will never receive glint and glare impacts from the Proposed Development.

Receptor	Green Glare (mins)	Yellow Glare (mins)	Red Glare (mins)	Magnitude of Impact
1	8161	10610	0	High
2	950	3274	0	High
3	11340	10463	0	High
4	2200	5604	0	High
5	1188	3274	0	High
6	1080	3506	0	High
7	1099	2391	0	High
8	1521	2003	0	High
9	2580	1164	0	High
10	1671	25	0	High
11	245	0	0	Low
12	0	0	0	None
13	989	0	0	Low

14	580	0	0	Low

4.4 As can be seen in **Table 4 -1**, there are 10 receptor points which have potential glare impacts with the "potential for after-image" (yellow glare), which is a **High** impact and three receptor points which have potential glare impacts with the "low-potential for after-image" (green glare), which is a **Low** impact. **Appendix C** shows detailed analysis of when the glint and glare impacts are possible, whilst also showing from which parts of the solar farm the solar glare is reflected from.

4.5 **Appendix C** shows Google Earth images that give an insight into how each receptor will be impacted by glint and glare from the Proposed Development. There is a mixture of images used, which include aerial, ground level and street level. The aerial images show the location of the receptor with the solar farm drawn as a white polygon and can be seen on the images when the solar farm is theoretically visible. The area of the solar farm from where reflections may be possible has been drawn as a yellow polygon. The ground level terrain is based on the height data of the surrounding land showing no intervening vegetation or buildings. The white and yellow polygons can be seen in this view also. The street view gives a good indication as to whether the area of the solar farm where reflections are theoretically possible will be visible from the receptor point.

Receptor 1

4.6 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a northern section of the Proposed Development can potentially impact on the receptor.

4.7 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development. This image confirms that the vegetation is insufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact remains **High**.

Receptor 2

4.8 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a northern section of the Proposed Development can potentially impact on the receptor.

4.9 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). This image confirms that the vegetation is insufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact remains **High**.

Receptor 3

4.10 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a central section of the Proposed Development can potentially impact on the receptor.

4.11 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation will screen most views into the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **Low**.

Receptor 4

4.12 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a central section of the Proposed Development can potentially impact on the receptor.

4.13 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation will screen most views into the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **Low**.

Receptor 5

4.14 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a southern section of the Proposed Development can potentially impact on the receptor.

4.15 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **None**.

Receptor 6

4.16 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a central section of the Proposed Development can potentially impact on the receptor.

4.17 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation will screen

most views into the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **Low**.

Receptor 7

4.18 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a central section of the Proposed Development can potentially impact on the receptor.

4.19 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation will screen most views into the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **Low**.

Receptor 8

4.20 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a central section of the Proposed Development can potentially impact on the receptor.

4.21 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation will screen most views into the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **Low**.

Receptor 9

4.22 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a northern section of the Proposed Development can potentially impact on the receptor.

4.23 The first image in **Appendix C** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view of the vegetation that is located to the west of the receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **None**.

Receptor 10

4.24 The 'Glare Reflections on PV Footprint' chart in **Appendix B** shows that reflections from a northern section of the Proposed Development can potentially impact on the receptor.

4.25 The first image in Appendix C is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development. This image shows dense vegetation located to the west of the receptor and confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None.

Receptor 11

4.26 The 'Glare Reflections on PV Footprint' chart in Appendix B shows that reflections from a northern section of the Proposed Development can potentially impact on the receptor.

4.27 The first image in Appendix C is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development. This image shows dense vegetation located to the west of the receptor and confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None.

Receptors 13 and 14

4.28 The 'Glare Reflections on PV Footprint' chart in Appendix B shows that reflections from a northern section of the Proposed Development can potentially impact on the receptors.

4.29 The first image in Appendix C is an aerial image showing the position of the receptors (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red dot). The second image is a street view image with a view towards the Proposed Development and of the vegetation that is located to the west of the receptors. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None.

5. GROUND BASED RECEPTOR MITIGATION

5.1 Mitigation is required to ensure the High impact views from Bridleway Receptors 1 and 2 into the Proposed Development are screened. Also, the Low impact views have been considered at Bridleway Receptors 3, 4, 6, 7 and 8. This includes:

- Native hedgerows to be planted/infilled and maintained to a height of at least 3m along the eastern boundary of the Proposed Development. This will screen views from Bridleway Receptors 1, 2, 3, 4, 6, 7 and 8. Therefore, reducing the impact to None.

6. SUMMARY

6.1 There is little guidance or policy available in the UK at present in relation to the assessment of glint and glare from Proposed Development developments. However, it is recognised as a potential impact which needs to be considered for a Proposed Development.

6.2 Within 1km of the Proposed Development, there are 18 bridleway receptors. Four bridleway receptors were dismissed as they are located within the no reflection zones.

6.3 Geometric analysis was conducted at 14 individual bridleway receptors.

6.4 The assessment concludes that:

- Solar reflections are possible at 13 of the 14 residential receptors assessed within the 1km study area. The initial bald-earth scenario identified potential impacts as **High** at 10 receptors, **Low** at three receptors and **None** at the remaining receptor. Upon reviewing the actual visibility of the receptor, glint and glare impacts remain **High** for two receptors and reduce to **Low** at five receptors and **None** at the remaining receptors. Once mitigation was taken into consideration, all impacts reduce to **None**.

6.5 Mitigation measures are required to be put in place due to the **High** impacts that were found during the visibility analysis at Bridleway Receptors 1 and 2. Also, the Low impact views have been considered at Bridleway Receptors 3, 4, 6, 7 and 8. This includes native hedgerows and woodland to be planted/infilled and maintained to a height of at least 3m along the eastern boundary of the Proposed Development.

6.6 The effects of glint and glare and their impact on bridleway receptors has been analysed in detail and the impact on all receptors is predicted to be **None**, and therefore **No Effects**.

7. APPENDICES

APPENDIX A: FIGURES

- Figure 1: Bridleway Receptors

APPENDIX B: BRIDLEWAY RECEPTOR GLARE RESULTS

APPENDIX C: VISIBILITY ASSESSMENT EVIDENCE

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