

May 18, 2023

Courtney Smith, Development Manager
Newcastle Partners, Inc.
4740 Green River Road, #110
Corona, CA 92878

RE: Ellis Logistics Center Glint and Glare Analysis

Dear Courtney:

Kimley-Horn and Associates has performed a glare analysis for the proposed Ellis Logistics Center development in Perris, California. The glare analysis included potential negative impacts from the proposed rooftop solar to the Perris Valley Airport operations. The objective of the analysis was to identify any hazardous glare to the site and determine if mitigation was possible through panel specifications, and physical buffers surrounding the site.

Airport Operations Glare Analysis Results

For purposes of the modeling it was assumed that fixed angle solar panels will be used for this project. The proposed building height of 50 feet is assumed to be completely covered with solar panels. The height of the solar panels is assumed at 10 feet for the analysis. ForgeSolar modeling software was used to evaluate all fixed tilt angles of the solar panels from 0 to 30 degrees at 2-degree intervals and an orientation from 170 to 190 degrees at 2-degree intervals as well. The model assumes a worst-case scenario (sunny all year, no terrain obstructions, no buildings) which is conservative for the results. After reviewing the results, the following determinations were made.

Yellow and green glares with potential after image is noticed under the following circumstances:

- When the orientation is between 170° and 178° and the panel tilt is between 0° and 4°, 0.5 mins/day of green glare and 3.5 mins/day of yellow glare were found.
- When the orientation is between 180° and 186° and the panel tilt is between 0° and 6°, 0.5 mins/day of green glare and 3.5 mins/day of yellow glare were found.
- When the orientation is between 188° and 190° and the panel tilt is between 0° and 8°, 0.5 mins/day of green glare and 3.5 mins/day of yellow glare were found.

However, adjusting the panels orientation and tilt can eliminate all glare on the airport operations from the proposed rooftop solar panels. Figure 1 shows the orientations and tilts at which the yellow glare will be eliminated.

Based on the assumptions, limitations, and results of the ForgeSolar modeling analysis, it is recommended that the proposed rooftop solar panels be installed consistent with the specification listed below regarding solar panel orientations and tilts to avoid any glare to airport operations at Perris Valley Airport. The following orientations and tilts were when no glare was identified:

- When the orientation is between 170° and 178° and the panel tilt is between 4° and 30°
- When the orientation is between 180° and 186° and the panel tilt is between 6° and 30°
- When the orientation is between 188° and 190° and the panel tilt is between 8° and 30°

The recommendation based on the glare results is to set the panel tilts and orientations to the ranges mentioned directly above so that no glare is identified throughout the entire solar panel system.

Yellow: glare with potential for after-image found.

Green: glare with low potential for after-image.

Blue: no glare found.

Tilt → Orient ↓	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°
170°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
172°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
174°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
176°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
178°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
180°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
182°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
186°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
188°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
190°	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 1: Optimization Test Color Coded Hazard Summary Table

Sincerely,

KIMLEY-HORN



Patrick Butler, (CA 93719)

Civil Engineer