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Night Sky and Light Pollution

I have removed the references and emailed them directly.

Additional submitted attachment is included below.

Comments on Staff Assessment Section 5.15, Visual Resources — Night Lighting and Night Sky Brightness

Corby Battery Energy Storage System Project Docket No. 24-OPT-05

These comments address the night lighting and night sky portions of Section 5.15, which do not appear to have been addressed by other commenters on this section.

I am not a lighting professional. The observations below come from two things any member of the public can do: comparing statements made in different parts of this docket against each other, and taking readings from a free, publicly available sky brightness map. Every point cites a page or a coordinate so that staff can verify it directly rather than take my word for it.

1. The less-than-significant finding does not rest on any measurement

Staff concludes that new light and glare from the project would have a less-than-significant impact with implementation of COCs VIS-1 through VIS-3 (p. 5.15-56), and that VIS-3 would reduce night lighting impacts below significance (p. 5.15-62).

The section contains no measurement of existing night sky brightness at or near the site, no estimate of how much light the project would add, and no numerical threshold against which any increase was judged. A significance determination compares an existing condition to a projected condition. Only one condition is described, and it is described rather than measured.

Requested: Identify the baseline sky brightness relied upon, the projected value after the project is built, and the threshold applied. If none exist, identify the substantial evidence supporting the determination.

2. The description of the permanent lighting does not match the applicant's plan

Staff's impact discussion at p. 5.15-51 states that "Low-elevation (i.e., less than 14-foot), controlled security lighting would be installed at primary access gates and the on-site substation."

Two parts of that sentence are contradicted elsewhere in the record.

Mounting height. Four pages later, staff states that approximately fifteen permanent LED fixtures would be installed "at heights ranging from 8 feet to 30 feet" (p. 5.15-55). The applicant's lighting schedule confirms the higher figure: eleven of the fifteen fixtures are mounted at 30 feet (TN 262555, Appendix 10-B). The "less than 14-foot" description fits only four of fifteen.

Location. The applicant states that "The Project will include permanent lighting within the Project substation only; no permanent lighting will be installed at site entrance gates or within the BESS array" (TN 262555, response to DR VIS-7). Staff's description places security lighting at the primary access gates.

Mounting height and fixture location determine how far light carries off site. The paragraph in which staff explain why the lighting would not be a problem describes an installation that differs from the one on file.

Requested: Correct the project description at p. 5.15-51 to match the mounting heights and fixture locations in Appendix 10-B, and confirm whether permanent lighting is proposed at the access gates.

3. The baseline relies on a 2016 dataset whose authors warn it under-reports LED light

Staff characterizes existing conditions using the "World Atlas Night Sky Brightness" layer on darkskymap.com, accessed November 28, 2025 (p. 5.15-54 and footnote 24; Figure 5.15-12 caption, p. 5.15-55; References, p. 5.15-69).

That layer corresponds to Falchi et al., *The New World Atlas of Artificial Night Sky Brightness*, published in June 2016 and modeled from satellite data collected before publication. Viewing a 2016 dataset in 2025 does not make the underlying data current.

The authors of that atlas published a specific limitation alongside it. The satellite sensor it relies on has limited sensitivity to blue light, so in areas converting to LED lighting the instrument tends to show light pollution decreasing even while the sky as seen by the human eye grows brighter.

That matters here. Every permanent fixture proposed for this project is an LED (TN 262555, Appendix 10-B). Staff characterized the baseline using a method its own authors state under-reports the kind of light this project would emit.

I was also unable to get the cited darkskymap.com layer to display brightness data when I tried it; the page loaded a base map with no overlay.

Requested: State when the underlying satellite data was collected. Explain how staff accounted for the sensor's documented insensitivity to blue-rich LED light when using this dataset to evaluate an all-LED installation. Confirm the cited layer currently displays the data relied upon.

4. The Bortle range given is too coarse to support a determination, and differs from current data

Staff describes the area as transitional between Class 4 and Class 7 on the Bortle scale (p. 5.15-54; Figure 5.15-12 caption, p. 5.15-55). Bortle is a nine-step description of how dark a sky looks to the naked eye, not a measurement.

On September 12, 2026, I took twelve readings from lightpollutionmap.info, which reports a brightness figure in microcandelas per square meter alongside a Bortle class. Representative results:

Location	Coordinates	Artificial brightness ($\mu\text{cd}/\text{m}^2$)	Bortle
Project site (Kilkenny/Byrnes)	38.39458, -121.90690	787	5
Sacramento Valley National Cemetery	38.41479, -121.87474	564	5
Lagoon Valley Park	38.33487, -122.01505	977	5
Andrews Park, Vacaville	38.35816, -121.98634	1,640	6
I-80 at Nut Tree overpass	38.36954, -121.95784	1,880	6
I-80 at Allison overpass	38.36166, -121.96931	1,880	6

Location	Coordinates	Artificial brightness ($\mu\text{cd}/\text{m}^2$)	Bortle
Liberty Island Ecological Preserve	38.30593, -121.70300	357	4
Monticello Dam	38.51250, -122.10490	200	4

Two observations follow.

The scale is too coarse for the use staff makes of it. Among these readings, Class 5 covers 564 to 977 and Class 4 covers 200 to 357 — each class spanning roughly a factor of two in brightness. Staff's four-class range therefore spans close to a factor of ten. A description that broad cannot distinguish a significant increase from an insignificant one in either direction.

The site reading and the figure caption both differ from current data. The project site returns Class 5, not a range from Class 4 to Class 7. Staff's Figure 5.15-12 caption states that Vacaville and the adjacent I-80 corridor are rated "C8 City Sky." Two points on I-80 about a mile apart, and downtown Vacaville, all returned Class 6. No reading among twelve locations across fifteen miles exceeded Class 6.

I do not claim to know why these differ. Possible explanations include a newer model version, real change since 2016, the sensor limitation described above, or an error in reading the map. Staff is better positioned to determine which. Either way, the two characterizations should be reconciled.

Requested: Identify the specific Bortle class or brightness value staff assigns to the project site rather than a four-class range. Explain the basis for the "C8 City Sky" characterization and reconcile it with current readings from the same source.

5. The record does not demonstrate that all proposed fixtures satisfy COC VIS-3

COC VIS-3 requires project luminaires to be "fully shielded (BUG Rating U0)" and to be "DarkSky International 'DarkSky Approved' program products" (p. 5.15-66, subsections e and f). A U0 rating means no light is emitted above horizontal. Staff describes fully shielded, full-cutoff fixtures as the gold standard and notes that no light escapes upward (p. 5.15-56).

VIS-3 requires the applicant to submit drawings showing "the approximate location, direction and angle of each luminaire" (p. 5.15-66, item 2). That information is already on file, and it raises three questions.

The lighting schedule on drawing BCR-P010-03 (TN 262555, Appendix 10-B) lists fifteen fixtures:

Fixture	Type	Wattage	Mounting height	Orientation	Tilt
LT1–LT11	Lithonia RSX2 area light	190W	30 ft	0° / 180°	0
LT12	Lithonia DSXF2 flood light	145W	8 ft	150°	135
LT13	Lithonia DSXF2 flood light	145W	8 ft	210°	135
CLT1, CLT2	GE Evolve wall pack	29W	10 ft	90° / 270°	0

a. The aiming angle on file points above horizontal. The tilt diagram printed on that same drawing runs from 0° straight down, through 90° at horizontal, to 180° straight up. A tilt of 135° therefore aims LT12 and LT13 roughly 45 degrees above horizontal. The drawing's own note supports this: the light levels shown were measured at 230kV switch blade height, well above these fixtures' 8-foot mounting. The specification sheet offers visors for use where shielding is required, but no visor — or optic type, lumen package, or catalog number — is specified for any fixture in the schedule.

b. No uplight rating is published for these fixtures. The RSX2 specification sheet reports backlight, uplight, and glare values in separate columns, showing uplight of 0 for every configuration listed. The DSXF2 sheet contains no such columns. No U0 rating for the DSXF2 appears anywhere in the record. At 145W these fixtures produce roughly 17,000 lumens each.

c. No dark-sky certification is claimed for these fixtures. The applicant states that the Dark-Sky Association Fixture Seal of Approval is available for the Lithonia RSX2 and GE Evolve products at 3000K (TN 262555, response to DR VIS-7). The DSXF2 is not mentioned. The RSX2 page carries a Fixture Seal of Approval statement and the GE Evolve ordering table

references approved configurations at 3000K; the six DSXF2 specification pages contain no reference to DarkSky, the IDA, or the Fixture Seal of Approval.

The two fixtures aimed above horizontal are the same two with no published uplight rating and no certification claim.

I am not asserting that these fixtures necessarily violate VIS-3. A visor or a different aiming angle might satisfy it. The point is that the record does not show compliance, and VIS-3 as written would not require it to be shown: the condition calls for product brochures and aiming diagrams, not evidence that the installed configuration emits no light upward.

Requested: Confirm the tilt convention used on drawing BCR-P010-03 and state whether LT12 and LT13 as specified emit light above horizontal. Identify the published uplight rating for the Lithonia DSXF2 in its specified orientation, including any shielding accessory relied upon. Confirm whether the DSXF2 is a DarkSky Approved product as VIS-3(f) requires. Require evidence of uplight as installed, rather than product literature alone.

6. The cumulative analysis reaches conclusions that appear contradictory

At pp. 5.15-57 to 58, staff states that the project "would have a cumulatively considerable effect on the environment during construction, even with implementation of COCs VIS-1 through VIS-3 and MMs VIS-1 and VIS-2," and separately that daytime visibility of the two projects "could result in cumulatively considerable aesthetics effects," again even with mitigation.

The section then addresses night lighting, concludes the project's contribution would not be cumulatively considerable, and closes by concluding that the project "would not result in a cumulatively considerable effect on the environment during construction and operation."

These statements appear contradictory. The closing sentence may have been intended to cover only the night lighting discussion immediately preceding it, in which case its wording is broader than intended. Alternatively it may be the section's overall finding, in which case it conflicts with the two above it. The section does not reconcile them.

Requested: Clarify which conclusion controls for cumulative Aesthetics effects during construction and during operation, and correct the text accordingly.

7. VIS-3 restates the DarkSky principles without making them measurable

At p. 5.15-52 staff summarizes DarkSky International's recommendations: lighting should be on only when needed, light only the area that needs it, be no brighter than necessary, minimize blue light emissions, and be fully shielded.

VIS-3(a) through (e) restates those five principles nearly word for word. Only (e), fully shielded, carries a measurable criterion — the U0 rating. Subsections (a) through (d) contain no threshold, no limit, and no test by which compliance could be judged or a violation identified.

The verification provisions (pp. 5.15-66 to 67) require submittal of product brochures and location diagrams, permit inspection, and require response to light and glare complaints within 48 hours. None measures an outcome. Nothing requires checking sky brightness or light trespass after construction, and nothing triggers corrective action if the installed result exceeds what staff assumed.

Staff relies on VIS-3 to reduce an acknowledged potentially significant impact below significance (p. 5.15-62). A condition carrying that weight should establish results that can be measured.

The applicant states that substation lighting will be on manual switches except the control house, which will use motion sensors, and that the facility will be unmanned with routine maintenance expected during daylight (TN 262555, response to DR VIS-7). That is a meaningful operational limit. It is not a requirement of VIS-3, and a manually switched light left on stays on.

Requested: Convert each principle in VIS-3 into an enforceable standard:

- **(a) Only on when needed** — require automatic controls and a curfew for permanent fixtures rather than manual switching.
- **(b) Only light the area that requires lighting** — require a lighting plan demonstrating zero foot-candles of direct illumination at the property line.
- **(c) No brighter than necessary** — specify maximum light levels by task area consistent with Illuminating Engineering Society recommended practice.
- **(d) Minimize blue light emissions** — state a maximum color temperature as a number. The fixtures in the record are 3000K, so a 3000K ceiling would impose no new burden while making the requirement enforceable.
- **(e) Fully shielded** — require published uplight ratings for each fixture as installed, including tilt and any shielding accessory.
- **Reflected light** — light aimed downward onto gravel, concrete, and equipment reflects upward and adds to sky glow regardless of fixture shielding. Require the lighting plan to address total light output and the reflectance of ground and equipment surfaces.

- **Verification** — require measurement after installation confirming the predicted result, with a defined corrective-action trigger.
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8. Citation error

The statement that DarkSky Approved luminaires limit visible light in the 380 to 520 nanometer range to no more than seven percent spans pp. 5.15-52 to 53 and is supported by footnote 23. Footnote 23, on p. 5.15-53, reproduces footnote 22's definition of visible light rather than providing a source for the seven percent figure.

Requested: Supply the correct citation.

Conclusion

Section 5.15 treats night lighting considerably less rigorously than it treats daytime visual effects. For daytime conditions, staff evaluated nine Key Observation Points, completed an evaluation worksheet for each, reviewed rendered simulations at one-year and five-year landscape conditions, and concluded the impact is significant and unavoidable at six of the nine (p. 5.15-62). For nighttime conditions, the analysis rests on a single web map, includes no simulations at any viewpoint, contains no measurement, and describes the lighting installation in terms the applicant's own plan contradicts.

The project site sits at the edge of an area where genuinely dark skies remain accessible. Liberty Island Ecological Preserve and Monticello Dam both measure Bortle Class 4, within a half-hour's drive. The relevant nighttime question is not whether a passing motorist notices glare at the fence line, but whether the edge of the brightened area moves outward into the surrounding county.

I respectfully request that staff supplement Section 5.15 with a measured baseline, an estimate of the project's contribution to sky brightness, a corrected project description, reconciliation of the cumulative conclusions, and enforceable lighting standards in VIS-3, before final findings are adopted.

Respectfully submitted,

Charlene Schmid
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