Technical Case Study

Historic Façade Illumination

Enlighten Solutions

www.enlightensolns.com

contact@enlightensolns.com

313-300-2843

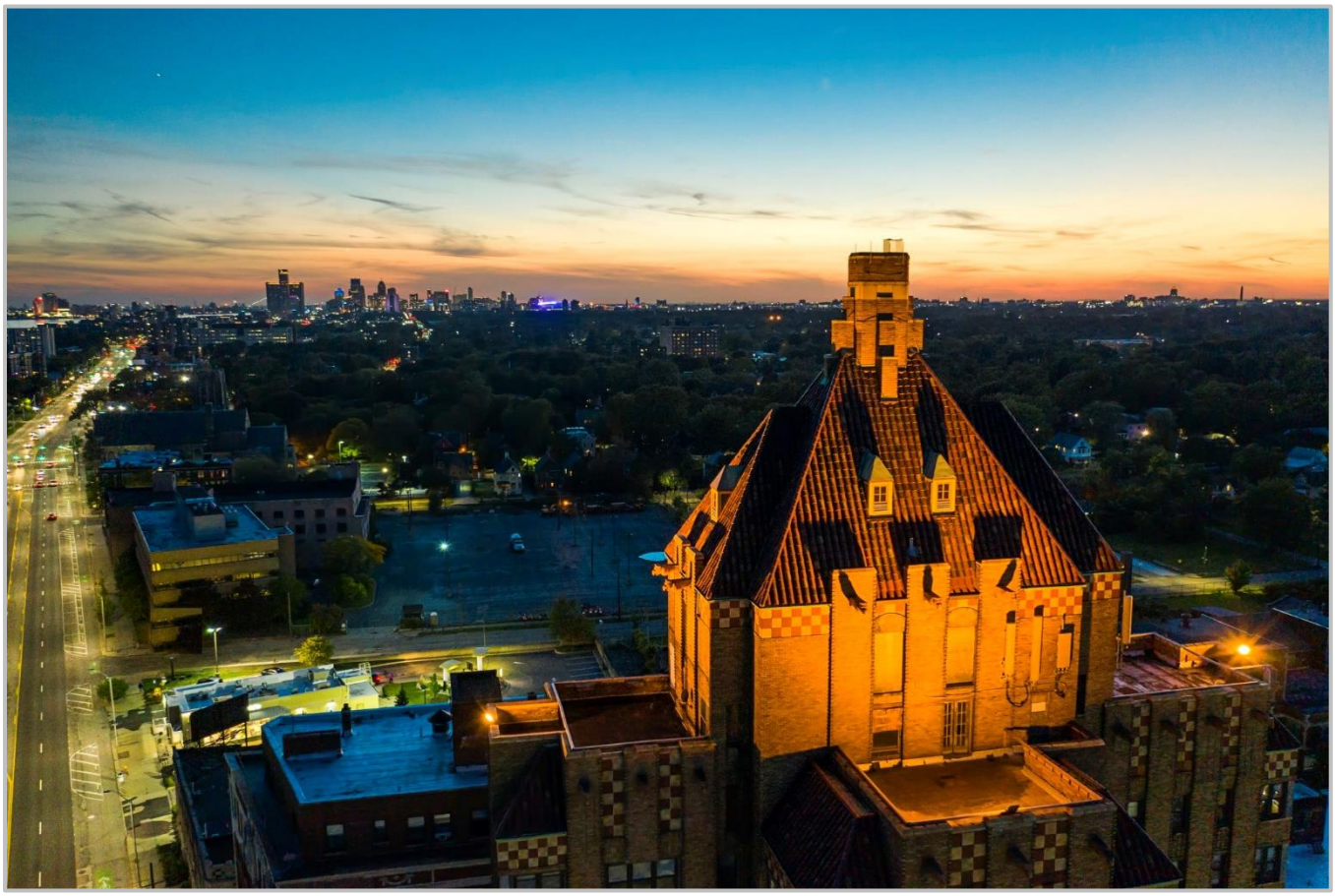
10.1.2021

Background

The Kean building was a capstone in Detroit's rich, Art Deco history. Built in 1931 at the onset of the Great Depression, it was one of the last high rises erected until after World War II. The Charles Noble design is abundant in architectural elements containing an ornate stonework entrance, a terracotta-tile roof, and over thirty griffin-gargoyles guarding the building.

When an existing client asked Enlighten to provide a new roof lighting system, maintaining the integrity of this architectural asset was priority one. Although not an overly complex setup, care was taken in the design phase to ensure an excellent outcome that honored the history and excellence of the structure.

a) Highlighting of All Key Architectural Features
b) Sufficient Illumination
c) Minimal Washout
d) Minimal Wasted Light
e) Maintenance of Historical Integrity



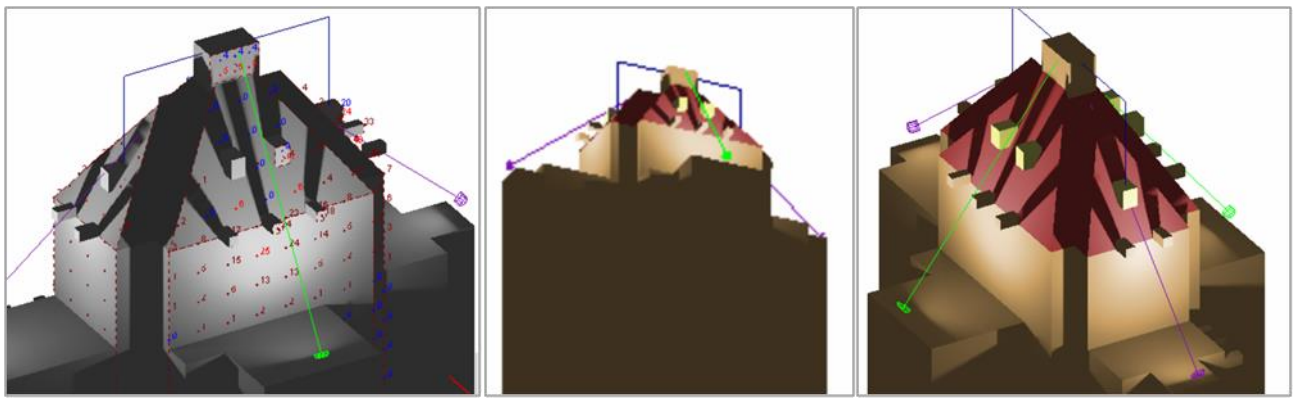
Photometric Analysis:

Balanced Lighting

Only targeting an average foot candle metric is not a sufficiently thorough approach when designing façade lighting. In many façade lighting applications, illumination goals are not so much functional but rather aesthetic. The greater focus of façade lighting is to highlight the architectural features of the building. (Secondarily illuminating facades can help define site and boundary lines giving a better sense of space, wayfinding, safety, and comfort in outdoor night-time areas.) Thus Enlighten went beyond simply targeting an average foot candle value. Contrast ratios and preventing washout was a much higher aim. To achieve this, we focused on a target illuminance range and target luminance ratios.

Illuminance, or foot candle, targets focus on the amount of light hitting a plane (in this case, the façade). However, illuminance is only partially correlated to how bright a lit surface appears. Luminance on the other hand focuses not on the amount of light hitting a plane, but rather on the concentration of light that is reflected back off that plane and enters a viewer's eye. Two facades, one of dark material and one of lighter, may have the exact same amount of foot candles falling on them. However, the lighter façade is going to appear much bright as it will reflect significantly greater light. (For example a white surface will reflect around 90% of light while a dark grey surface may only reflect 20 – 30% of light). Luminance takes the reflectivity of a material along with other variables into account.

Luminance metrics are therefore much more helpful in predicting glare and washout. If one section of the façade is too brightly lit, it might appear overly white and all its detail lost. (Avoiding washout is particularly important with a historic façade where ornate brick and tile work provide rich textural detail). Glare and washout levels can be predicted by higher maximum-to-average luminance ratios. Thus, Enlighten targeted maintaining a max-to-avg ratio of approximately 5:1. This range would ensure that the historic façade had appropriate contrast but also didn't overly contain bright areas that were washed out.



3D Photometric Analysis helped ensure an excellent real-life outcome. Luminance Range of 5 – 25 foot candles was targeted and a Max-To-Avg Luminance ratio of 5:1 was targeted.

Go the Distance / Minimize Waste

One of the more elementary hurdles of this design was that access the to power and fixture mounting points were over 50 feet from some of the targeted illumination surfaces (i.e. chimney). To overcome this obstacle, Enlighten utilized luminaires with targeted optics specific to their mounting distance. Using these narrow, distance-specific optics also ensured most of the light hit the façade and was not wasted by spilling off into the sky. In the same vain, it helped minimize the fixture wattages required to achieve the design goals.

Emphasize Tones / Maintain Historical Integrity

Often one of the reasons people cite for opposition to LED lighting is saying they don't like cool-white color temperatures. However, this perception is based on a significant misunderstanding. LED lights are actually available in a wide range of color temperatures including 2200K which is reminiscent of older incandescent and high-pressure sodium lights. 2200K sources have more red light in their spectral distribution. Containing more red light was particularly appropriate for the Kean project as the façade materials—tan brick and red terracotta tile--appear warmer, richer, and more historically accurate under this type of illumination.

Outcome

Although this lighting system only contained a handful of fixtures, care was taken to ensure the historical and architectural richness of the building was honored and preserved. Enlighten took not only light spill and color temperature into account in its design, but also contrast and luminance ratios. The result speaks for itself: a beautifully lit, architectural gem that adds to Detroit's portfolio of iconic Art Deco treasures.

"Enlighten had a clear vision and strong guidance on this project from the start. Their expertise is apparent in the outcome. We are very happy to be able to honor this historic building properly." *North Coast Partners (Building Owner)*

Contact

For questions on this case study or general lighting and control services contact the below. Enlighten is an LED lighting and advanced controls wholesaler and consultant. We partner with owners, designers, and engineers to provide and implement lighting solutions for commercial and industrial locations.

Brennan Booms CEM, LC, MSE
(p) 313-300-2843 | bbooms@enlightensolns.com