



A total of 182 fixtures line the mall. Each globe includes a downlight, an uplight and a ring of twinkle lights.



the way walking humans see and move. Psychological comfort and satisfaction, along with physical safety, must be achieved."

In other words, Brandston wanted the same lighting for this outdoor living space that people would use in their own home. And that meant an incandescent source manifested in an ornamental globe fixture that included a ring of vibrant twinkle lights, plus a floodlight element for the building façades.

While the incandescent fixture fit Brandston's requirement for full spectrum with color rendition close to daylight, maintenance proved to be its undoing. The city was constantly changing lamps, and by 1996, the Denver Downtown Partnership (DDP) chose to substitute high-pressure sodium lamps for the incandescents.

The low CRI, orange-color HPS scheme, however, compromised the warm ambience of Brandston's original design. The light did not get past the sidewalk—eliminating the earlier multi-layered approach—and the HPS lamps guzzled energy, using 250 watts (285-295 including the ballast). After living with the HPS system for more than a

decade but unhappy with the aesthetics and performance, the DDP reached out to another lighting luminary to help restore the mall to its past glory.

Enter Nancy Clanton.

#### ANOTHER ICON STEPS IN

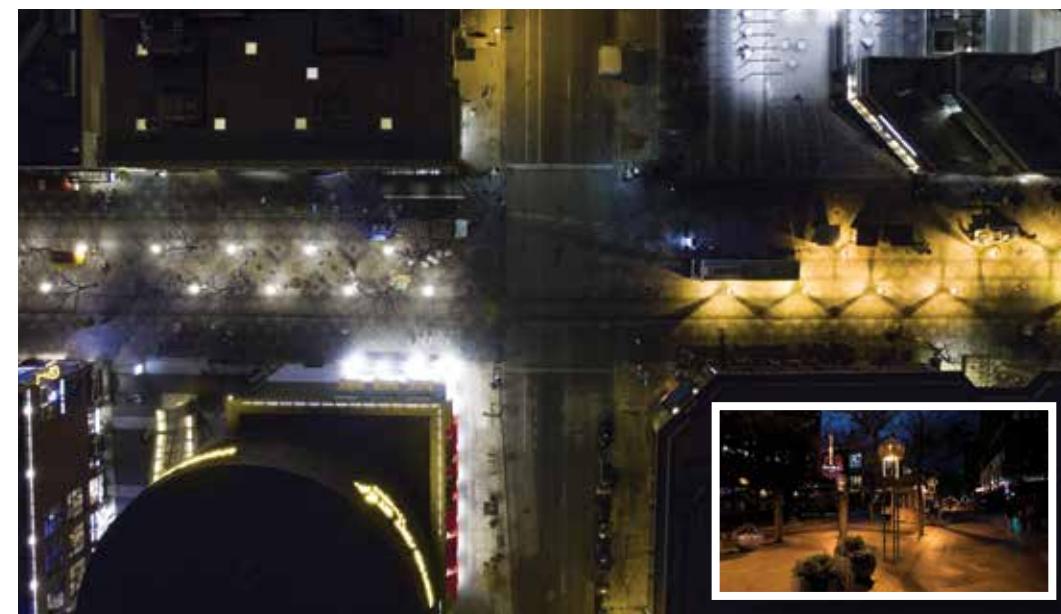
"The question," says Clanton, "was do we renovate or do we replicate?" Ultimately, the answer was to replicate, as renovation scenarios would have sacrificed the classic ornamental globe.

"It's tough to replicate a Howard Brandston design, so the first thing I did was call Howard. I learned so much," Clanton recalls. "Howard mentioned that this was one of his favorite projects, with the Statue of Liberty being his absolute favorite. He also told me that since he used incandescents, the impression of his design was that it was energy inefficient, but because of the low light levels and dimming the lamps, he [estimated] that energy use was probably one of the lowest for any mall, and the incandescents lasted a long time in their dimmed state. Howard was also proud of designing one pole structure that not only provided ambient light for the pavement, but sparkle with the ring of lights, and an uplight for the building façades." Ultimately, the only feature not duplicated in the Clanton design was the façade lighting, since building inhabitants found this objectionable.

The third partner instrumental in the mall's revival was manufacturer Landscape Forms. "The Howard Brandston light on the 16<sup>th</sup> Street Mall is such an iconic piece that I think it's obvious that preserving it was the best option," adds Rick Utting, director of engineering + lighting. "We collaborated with Clanton & Associates to propose a design strategy centered around pedestrian tasks and vision."

The design strategy called for the following:

- Replacement of the existing acrylic globes
- Removal of all fiber optic components
- Refit of the light ring with LEDs
- Installation of low wattage, high color rendering ceramic metal halide lamps and ballasts



When seen from above, the mall's grid-like pattern resembles the skin of a diamondback snake. At left are the new LED fixtures. At right (and inset) are HPS fixtures that replaced the original incandescent source.

for both the uplight and downlight

- Restoration of the uplight and downlight reflectors
- Repaint all steel components

Landscape Forms built one CMH/LED unit to be tested on-site. "While we were building the light, we asked Nancy if it would be okay if we gave the city a second replica light for free, outfitted with all LED," recalls Utting. "She said sure, so we did. The city installed them both and the rest is history." At the end of the four-year trial period, DDP opted for the all-LED solution.

The high-CRI, 3000K LEDs have brought back Brandston's vision of a place for people—a "living room" for Denver. The downlight component illuminates the entire pedestrian walkway with light of comfortable intensity, improved distribution, and spectrum that properly renders humans, plants and street furniture. An uplight illuminates the tree canopy along the mall. The new twinkle ring of small LEDs encircling the inside of the globe provides stimulation and liveliness, and a new box light reduces the harsh shadow previously created by the control box, thus eliminating black voids within the pedestrian space.

Completed in late 2016, the project consists of

a total of 182 fixtures, mounted 12 ft high, with an energy savings of 75 percent.

#### TWO-TRACK STUDY

The new design, however, was just the start. Once the installation was complete, the evaluation began. Shelby White, a former graduate student at the University of Colorado and now a lighting designer with Horton Lees Brogden, embarked on a research study funded by Landscape Forms to assess both the "physical/objective" and "perceptual/subjective" impact of the new LED lighting versus the HPS system.

For the *objective* impact, the research found that:

- CCT changed from 1875K (pre-installation) to 3134K (post-installation)
- CRI increased from 28.5 to 83
- Horizontal illuminance decreased, but not enough to fall below recommended levels
- Vertical and semi-cylindrical illuminance decreased, but not enough to prevent facial recognition
- Uniformity greatly increased
- Contrast ratios decreased

For the *subjective* impact, the research found that:

**FAST FACTS**

- Incandescents were used when the mall opened in 1982.
- High-pressure sodium was installed in 1996, but their color and performance was inadequate.
- An all-LED solution debuted in 2016.

- Visual task performance was not affected by the decrease in illumination
- Visual comfort showed no improvement
- Perception of security improved

In summary, White's research found that the "new lighting more accurately encompasses Howard Brandston's vision and original design intent" in terms of "high CRI, mental satisfaction and physical safety."

Finally, something perhaps Brandston could only have imagined in the early 1980s may improve the design even further. In an effort to reduce light trespass, the plan is to add controls so the uplights can be dimmed during the fall and winter months when the tree canopy above the mall is bare. □

**THE DESIGNERS**

**Howard Brandston**, Fellow IES (Member 1959), Hon. FCIBSE & FSLL, FIALD, is a lighting designer, educator and author whose 60-year career in theatrical, artistic and commercial lighting has earned him international distinction. He has been recognized with more than 100 awards including the IALD Lifetime Achievement Award and every major award (Medal, Distinguished Service, Louis B. Marks, Fellow) given by the IES.



**Nancy Clanton**, PE, Fellow IES (Member 1994), IALD, LEED Fellow, is president of Clanton & Associates, Boulder, CO, a member of 13 IES committees and a recipient of the IES Distinguished Service Award.