

COMBINING
ENERGY EFFICIENCY
AND QUALITY DESIGN

DEIDRE'S...GREAT CLOTHES, ETC...

A *knowhow*™ CASE STUDY

demonstrating lighting

The store uses a combination of ambient and accent lighting to illuminate the space.



DEIDRE'S...great clothes, etc... located in Pittsfield, Massachusetts, is a high-end women's clothing store that also specializes in formal and bridal wear. This specialized merchandise required a great lighting system to highlight and accentuate the variety of textures and fabrics on display within the store. Sequins, beads, and lace produce a brilliant sparkle all of their own and under the right lighting system, will always catch the eye of a customer or passer-by.

After a lighting designer overlooked them for a "bigger job," owners, Deidre and Joe Torra, put together their own lighting scheme for their 2,800 square foot store.

Designing the lighting scheme builds on Joe's earlier career as owner of a sound and lighting company. Joe calculated the store power density in watts per square foot as recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. for retail stores, and made other simple lighting design estimations. In addition, he credits the capabilities and flexibility of his general contractor, Jim's Building and Remodeling, and electrical contractor, DF Electric. "They were quick to change or adapt construction at a moment's notice in order to adhere to our lighting requests."

The result is a beautifully orchestrated lighting system that utilizes ten different specialty halogen track lighting circuits and two ambient 2 by 2-foot parabolic lighting circuits to interplay high accent and low ambient lighting. The effects establish an elegant,

comfortably lit and a pleasant shopping space for upscale women's clothing. It's a standout in Pittsfield's four-year-old downtown redevelopment area.



PROBLEMS OVERCOME

Joe originally planned for 36 four-lamp 2 by 4-foot acrylic lens troffers to cover the store on one circuit. The Western Massachusetts Electrical Company (WMECO) contacted Joe and Deidre early in the construction of their new store specifically to discuss opportunities to reduce long-term energy operating costs. Robert Dvorchik of WMECO's Conservation & Load Management Department reviewed Joe's original lighting design, and offered recommendations to lower energy use and equally important, to significantly improve the quality of lighting.

While WMECO can not design a customer's complete lighting system, they see their responsibility as providing energy conservation knowledge and lighting design tools which are not available to customers, particularly small customers, from any other single source. Robert reviewed the *DesignLights™ Consortium's knowhow™ Series* guide on small retail lighting with the Torras, and advised that it would be an excellent tool to use to create a lighting plan appropriate for their upscale store.

Upon reading the guide and several additional consultations with Robert, Joe realized potential problems with his original layout. Having all fixtures on one circuit would require the lights to stay lit all the time. Adjusting lighting levels and energy use would have to involve employees unscrewing lamps. A mass of bright lights of equal intensity also would create a supermarket or giant discount retail store effect. This was the complete opposite of the high quality and elegance that the Torras intended. So Joe used the guide to create a new layout.



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LIGHTING QUALITY

The Torras' orchestration of low ambient and high accent lighting produces a spectrum of effects to bring an elegant yet varied atmosphere, while saving energy.

Joe selected 2 by 2-foot low iridescent parabolic troffers for ambient lighting because of their smart look, low glare qualities and low energy consumption. Under direction from the *Lighting knowhow™ Series* guide, he selected two 31-watt T-8 U-tube lamps for each troffer with an 830 high color rendering index which provides good quality and visual comfort.

Track lighting with spot or narrow floodlights was chosen to accent and highlight particular displays in and around the store. As mentioned in the guide, spotlights are used to provide a higher level of light to accentuate a particular display in relation to its surroundings. The use of these accent lights around the store gives the Torras the ability to draw attention to individual displays without having to wash the entire store in a brighter light.

U-tube lamps with a CRI value of 830 is recommended by the *Knowhow* guide for higher-end shops.

DEIDRE'S...great clothes, etc...epitomizes personal service. In the bridal/prom area, a round raised platform for trying on gowns sits below a 12-lamp incandescent chandelier suspended 4 feet from the center of an 8-foot square coffered ceiling enclosing four fluorescent strip fixtures. The chandelier and fluorescent strips, on separate switches, are turned on to create an elegant setting for the customer being fitted. Some days, these lights remain off for three to five hours.

QUALITY LIGHTING SOLUTION

Delivering DEIDRE'S...great clothes' unique impact are two circuits of 2 by 2-foot, nine-cell low iridescent parabolic troffers recessed in the 10 1/2-foot high ceiling, and ten individual circuits controlling 78 track heads on dimmers with 50W halogen lamps.

Three 2 by 2-foot troffers remain on all the time for nightlight/security reasons. Then, fifteen strategically placed 2 by 2-foot fixtures on circuit number one are added when the store opens. The other thirteen 2 by 2-foot fixtures on circuit number two are turned on during the darker days and toward evening.

The 78 track heads are fitted with narrow flood, or narrow spot lamps depending on how far from a wall they are placed to attain the desired spot width. The placement of tracks and selection of lamp beam widths was determined by ceiling-mounted obstructions such as HVAC ducts, fan coils, vents and sprinkler system.

Various circuits are turned on and off during the day. For instance, on bright, sunny days, the store doesn't need the second circuit of thirteen 2 by 2-foot parabolic troffers, so Deidre turns it off and lets natural light do most of the work. She switches both circuits on towards the

| QUALITY INDICATORS | RATING | | |
|---|------------|------|-----------|
| | ACCEPTABLE | GOOD | EXCELLENT |
| Control of Direct and Reflected Glare | | | ✓ |
| Light on Walls and Ceilings | | | ✓ |
| Fixture Location Related to People | | | ✓ |
| Light Patterns and Uniformity | | | ✓ |
| Daylight Integration | | | ✓ |
| Color Rendering and Color Temperature | | | ✓ |
| Lighting Controls and Flexibility | | | ✓ |
| Quantity of Light on Horizontal Surfaces (fc) | | | ✓ |



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evening and on darker days. As another effect, Deidre might turn on certain tracks in the morning to focus on areas where employees will be working. Or she would turn on track circuits in exterior show windows, wall displays or in-store displays to spotlight items she wants to stand out. Deidre often redirects the track heads when displays change.

Some evenings, Deidre turns off all ambient lighting and just leaves on accent lights, creating an elegant glow for pedestrians outside. Other evenings, she shines only the lights in the bridal section for the same effect.

As another energy saver, the store's five dressing rooms are lit by three of the 2 by 2-foot fixtures shining through the rooms' open ceilings. Torra credits his general contractor with that idea. "Planning and placement of the ceiling grid with respect to the rooms, made it possible for us to eliminate two extra fixtures," he says.

IMPRESSIONS

The combination of a friendly, knowledgeable, sales staff with the relaxed atmosphere created by a tightly orchestrated lighting presentation puts smiles on customers' faces. Customers find it pleasing to be immersed in the aura created by background music and the accent lighting. The relaxed elegance offsets the highly charged event of buying an evening dress, prom or bridal gown.

The Torras' own design, fixture selection and control scheme capture the spirit of the DesignLights™ Consortium's *Lighting knowhow™ Series*. DEIDRE'S ... great clothes, etc... resoundingly meets the DLC's goal of reducing energy operating costs while improving lighting quality.

"The Lighting Bible," as Joe calls it, "brought us information that wasn't available to us in any other form. Without the guide, we wouldn't even be in the ballpark."

AND NOW THE NUMBERS

After experimenting with the various circuits, leaving some on and others off during the day, Torra shaved consumption by an average of 6.2 percent per month for each of the first four months that the store was open.

The store's ambient light reaches a maximum of 0.67 watts per square foot with both circuits on. On a sunny day, when only one 2 by 2-foot parabolic circuit is energized, ambient light falls to 0.32 watts per square foot as natural light does much of the work.

Toward the center of the store, light levels under the parabolic fixtures consistently measure above 40 footcandles. When selected track lights are lit, levels jump to 110 footcandles. Light levels approaching the front and rear windows increase rapidly to 90, 120, and 140 footcandles.



People who ask about the store's lighting engineer are surprised to learn that the Torras did it all themselves. "The *Knowhow* book gave us the look we wanted. We did it right the first time. We're really proud of the way it came out," Joe says.

Deidre & Joe Torra, owners

COSTS

| | |
|------------------------------------|----------|
| Total fixtures and lamps | \$8,216 |
| Total installation labor | \$3,300 |
| Installed system cost | \$11,516 |
| Materials per square foot | \$2.93 |
| Installation labor per square foot | \$1.18 |
| Total cost per square foot | \$4.11 |

SAVINGS

| | |
|--|----------|
| Demand reduction | 1 KW |
| Watts saved per square foot | 0.2 W/SF |
| Annual utility cost savings ¹ | \$248 |

¹Based on 3,100 hours per year usage and local utility rate of \$0.08 per kilowatt-hour.



PROJECT SUMMARY

- Utility:** Western Massachusetts Electrical Company
Utility Representative: Robert Dvorchik
Customer: Deidre and Joseph Torra
Facility: DEIDRE'S...great clothes, etc.
Location: Pittsfield, Massachusetts
Space: Retail
Area: 2,800 square feet
Ceiling Height: 10 feet 6 inches
Fixtures Used: Lithonia 2 by 2-foot parabolic troffers with 31-watt T-8 U-tube lamps. Lightolier 9320 Bell Cylinder and Lightolier 9220 Step Cylinder track fixtures with 50-watt halogen lamps. Thomas M2012-1 two-tier, 12-lamp 27 by 24.5-inch chandelier. Columbia 4-foot single tube with 3500K Ultralume lamps.
Layout: 2 by 2 foot troffers on 8-foot centers; track light layout varies
Light Levels Achieved: Average of 50 footcandles
Lighting Power Density: 2.0 watts per square foot
Lighting Specifier: Joseph and Deidre Torra
Installing Contractor: DF Electric
General Contractor: Jim's Building & Remodeling

THE LIGHTING KNOWHOW™ SERIES

The DesignLights™ Consortium publishes the *knowhow™ Series* for office, small retail, classroom and industrial/warehouse lighting. This *demonstrating lighting knowhow™ Case Study* highlights a specific installation of lighting that showcases quality, comfort and efficient use of energy. With members located throughout the Northeast and the Mid-Atlantic, the DesignLights™ Consortium is “a regional collaboration seeking to influence naturally occurring lighting events towards quality, comfort and efficiency.” The DLC includes among its members many electric utilities as active participants, as well as several other interested stakeholders. The DLC created these case studies with the intention of helping contractors and lighting specialists sell and deliver the benefits of high quality, energy efficient lighting to their customers in the commercial building market.

Efficiency Vermont

Long Island Power Authority

National Grid

- Massachusetts Electric
- Narragansett Electric
- Granite State Electric
- Nantucket Electric

Northeast Energy Efficiency Partnerships, Inc.

Northeast Utilities

- The Connecticut Light and Power Company
- Western Massachusetts Electric Company

New York State Energy Research and Development Authority

NStar Electric

United Illuminating Company

Unitil

- Fitchburg Gas and Electric Light Company



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