

Vanderweil GreenNotes

Vanderweil GreenNotes is a quarterly update that profiles our everyday efforts towards sustainable design and practices.



Manulife

■ Featured Project: Venetian Resort Hotel Casino - The Palazzo

The Palazzo in Las Vegas will become the largest LEED® Silver rated project on record.

The Palazzo is a 7.5 million SF hotel, casino, and retail complex in Las Vegas, NV currently under construction. The project includes a 50-story hotel tower with 3,000 guest suites, a 2-story podium with casino, retail, restaurants, performance theatre, and back-of-house services, over 25 pools, spas, and water features, and a 4,000 car underground parking garage. Vanderweil was hired to provide mechanical, plumbing, and hydraulic pool design in 2003 following completion of The Venezia on the same site. Estimated construction cost is \$1.8 billion dollars.

Although a LEED® rating wasn't an original project goal, a set of recent "carrot and stick" incentives prompted owners to reconsider the design of a project under construction. First, the State of Nevada adopted the IECC 2006 Standards with Southern Nevada Amendments, one of the most

stringent energy standards in existence. Second, the State provided significant financial incentive to all projects earning LEED® Silver, Gold, or Platinum in the form of immediate and long-term tax savings. In December of 2006, the design team was faced with the question, "What would it take to make The Palazzo LEED® Silver within the next six months?"

- Interior lighting: In order to comply with the specific mandatory requirements of ASHRAE 90.1-2004, extensive efforts were made to reduce lighting power density in all areas. Lighting was significantly redesigned in the garage, back-of-house, hotel corridors, and guest suites reducing power density up to 65% space-by-space. Occupancy sensors were added to the back-of-house lighting, and master switches were added to the guest suites to allow all lights to be turned off at once.
- Exterior lighting: Even though exterior façade lighting is subject to ASHRAE exceptions "advertising signage or directional signage" and "theme elements in theme/amusement parks," a 100 kW photovoltaic array will be installed on

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MIT Ray & Maria Stata Center

■ Vanderweil LEED®

Vanderweil demonstrates a strong track record with the LEED® Rating System.

Our objective on every project is to create building systems that support comfort and productivity, use energy and water efficiently, perform economically and reliably, and exceed the expectations of our clients.

Because these objectives guide all of our designs, Vanderweil has demonstrated great success applying the LEED® Green Building Rating System to our work. Since 2004, eleven of our buildings have earned LEED® certification, and over thirty-five are registered with the USGBC to submit documentation in the next two years alone.

This summer, two more projects joined our growing list:

Grinnell College East Campus Dormitories in Grinnell, IA earned a LEED-NC v2.1 Rating. Consisting of four 24,000 SF buildings, the dorms feature four-pipe chilled/hot water fan coil units with individual control, highly-efficient lighting, water conserving plumbing fixtures, and a mixed-mode ventilation system: mechanical ventilation in public spaces and operable windows for naturally ventilated private suites. As part of the LEED® documentation effort, the team modeled air flow through the rooms to demonstrate ventilation effectiveness.

The team consisted of Charles Clapp, Leonid Rabkin, Dave Howard, and Josh Brain.

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Yale University Engineering Research Building



National Wildlife Federation Headquarters



■ Featured Project: The Palazzo

the shared parking garage. Energy generated during the day will offset the power density overage of the site lighting power used at night.

- **Water Use:** In order to meet water use reduction goals, several thousand plumbing fixtures were replaced with water conserving fixtures. Lavatory faucets and showerheads will be 0.5 and 1.5 gallons per minute respectively throughout. High-efficiency toilets using just 1.28 gallons per flush will be installed in the guest suites. Back-of-house water closets will use dual flush valves and all urinal flush valves will be “fuzzy logic” technology ranging from 0.5 to 1.0 per flush. Overall savings exceeds 15 million gallons per year, representing approximately 35% of domestic water use.
- **Water Heating:** In compliance with ASHRAE 90.1 Section 7.4.5.2, solar thermal panels will be installed on the podium roof to provide at least 60% of the annual heating energy for the main pools and spas. During summer months, when pool heating loads are low, the panels will provide energy for the domestic hot water heating demand. In addition, because of the water conservation effort, domestic hot water loads were reduced by approximately 40%.
- **Outdoor Air Delivery:** The ventilation system was originally designed for maximum building occupancy based on egress capacity and Southern Nevada Amendments to the 2000 IBC which requires a minimum of 15 CFM of outside air per occupant. The airflow, without additional outside air economizer capacity, yields total ventilation rates exceeding ASHRAE 62.1-2004 requirements by 130% to 1880%, with the average provided ventilation capacity approximately 220% beyond

ASHRAE. It is worth noting that the luggage storage areas were the only spaces that did not comply with ASHRAE 62.1 at 80% of the required 0.12 CFM/SF. Vanderweil submitted a narrative describing design rationale: luggage does not “off-gas objectionable or dangerous odors” typically found in storage areas and providing additional outside air increases energy consumption without benefit.

- **Outdoor Air Monitoring:** Over 1.5 million CFM of outdoor air through a main air supply shaft and series of 24 air handling units. All air intakes are equipped with permanent monitoring systems and will generate alarms at the BMS when conditions vary by more than 10%. Only one area, the Noodle Bar Restaurant is expected to have an occupant density greater than 25 people per 1,000 SF, requiring carbon dioxide monitors within the breathing zone. All other areas are equipped with carbon dioxide monitors either in the breathing zone or in the return air ductwork for demand control ventilation at reduced occupancy loading.
- **Smoking:** The project has only one designated indoor smoking room within the LEED® certified space. The Plaza Club, located on the top floor, is designed to be directly exhausted with no recirculation to non-smoking areas. The room is enclosed with impermeable deck-to-deck partitions and operated at negative pressure. Because smoking is also allowed on the main casino floor, this large area is not part of the LEED® submission or eligible for state incentives. There is a 25 foot non-smoking buffer between the certified space and non-certified spaces. Non-smoking pathways throughout the building and multiple building entrances enable employees and guests to travel without going through smoking areas.
- **Thermal Design:** The entire building was originally designed to meet conditions prescribed by ASHRAE 55-2004 Figure 5.2.1.1. The Las Vegas climate is very dry with ASHRAE 1% design values of approximately 108 DB / 68 WB for cooling and 25 DB for heating. The dewpoint temperature of approximately 44 degrees F yields an indoor relative humidity of 30% which is well below comfort humidity per ASHRAE 55-2004. However, due to the dry climate, significant energy savings occur with both water-side economizer operation and enthalpy-based outside air economizer operation.
- **Refrigerant Management:** Refrigerants were selected to minimize the building’s contribution to ozone depletion and global warming as defined by the LEED® Rating System. The combined cooling capacity of the entire project is approximately 12,290 tons. The main chillers provide a cooling capacity of 12,000 tons: four centrifugal chillers use R-123 and a fifth chiller uses R-134a. Additional cooling is provided with either

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■ Vanderweil LEED®

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Grinnell College East Campus Dormitories in Grinnell, IA

Yale Sterling Hall of Medicine I-Wing 1st Floor Renovation in New Haven, CT earned LEED-CI Silver Rating. The project includes water-saving laboratory and domestic plumbing fixtures, highly-efficient lighting, day-lighting control, and several energy conservation measures. The design team consisted of Dave Pinto, Dave Finlay, Joe Pescatore, and Kien Diep. This is Vanderweil's fourth project at Yale to earn a LEED® Rating, right on the heels of SHM C-Wing three months ago.

■ Featured Project: The Palazzo

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split units or packaged units using R-22 or R-410a refrigerants. The split system DX units have higher refrigerant charge, use of refrigerant per ton of capacity, because of the interconnecting piping between the DX coil and the compressor.

- **Cooling Tower Water:** As water evaporates and drifts from cooling tower operation, dissolved minerals concentrate in the recirculated water. In order to increase the cycles of concentration from 2.5 to a minimum of 4, the cooling tower is designed with an advanced treatment system that injects 98% pure sulfuric acid into the tower water. This system is specifically designed for the Las Vegas water supply with a relatively high pH of 7.6-8.0 because the acid prevents the recirculated water from becoming so basic that it attacks the condenser water system. This innovative approach reduces the volume of municipal water consumed by nearly 10 million gallons per year or approximately 10% of the domestic water use.

Team: John Apostolopoulos, W. Bradford Bucklin, Chris Curran, Hans Grabau, Jaroslav Halaska, Douglas Knapp, Frederic Livingston, Joseph Manfredi, Julie Paquette, Daniel Paulkner, Keith Prata, Leonid Rabkin, Charlie Kalasinsky, Joseph Tremblay and Alexander Vanderweil

■ New in the Q

The Green Design Resources folder on the Q-Drive has moved to the intranet. Check it out!

- **IAQ Guidelines for Occupied Buildings Under Construction:** The Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) originally wrote these guidelines in 1995. They serve as the standard for LEED® EQc3.1, Indoor Air Quality during Construction.
- **ASHRAE/USGBC/IESNA Standard 189:** This draft for public review represents a joint effort between ASHRAE, the USGBC, and IESNA to set a standard for high-performance green buildings. This is the first edition of Standard 189.
- **USGBC Updates:** USGBC membership recently approved a measure to require all LEED® projects registering after June 26, 2007 to achieve at least two EAc1, Optimize Energy Performance points. This means that all LEED® projects must demonstrate energy performance at least 14% better than ASHRAE 90.1-2004. To help projects achieve this new mandate, a prescriptive (i.e. non-modeling) path is currently under development.
- **LEED® AP Exam Preparation Materials:** For those of you who are studying to become a LEED® Accredited Professional, there are several resources available including readings and two practice exams.
- **Advanced Buildings Benchmark:** The New Buildings Institute and Energy Center of Wisconsin developed a suite of Advanced Building products including the Energy Benchmark for High Performance Buildings. Benchmark provides comprehensive guidelines for energy efficient design, is used by an increasing number of utilities as a basis for rebates, and offers one point under LEED® EAc1, Optimize Energy Performance.

In an effort to get green on the agenda early in a project and to simplify project management, you'll notice that all new jobs on the server will include a LEED® folder with universal access. The LEED® folder may be populated with sample templates, calculations, and relevant cut sheets for easier access during documentation. **Bonus:** you'll know where to look when trying to find examples of how other projects earn points!

