

## Can green development be both profitable and environmentally friendly? These case studies show you how...



Recognizing the continuing growth of sustainable development, NAIOP, with the assistance of the Green Building Alliance, an affiliate of the U.S. Green Building Council, initiated a Green Development Award in 2005 to honor commercial real estate for outstanding green development. The 2005 award winner, Corporate Office Properties Trust (COPT), and the 2006 award winner Hines, are featured here along with 17 other model properties. The properties are examples of innovative, environmentally-friendly approaches to green industry development. Also included is a bonus case study from a recently completed project that we thought informative.

Members of the Green Development Award Taskforce include: **Nancy Carey-Cassidy**, Picotte Companies; **Stephen Crosby**, CSX Real Property, Inc.; **Lynn DeLorenzo**, Lynn R. DeLorenzo & Co., LLC; **Jack Fersko**, Farer Fersko, A Professional Association; **Dewitt Peart**, Pittsburgh Regional Alliance; and **John Bryant**, National Association of Industrial and Office Properties.

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## Calamos Investments Headquarters Developer: Calamos Real Estate LLC

Calamos Real Estate LLC developed Calamos Investment's new corporate headquarters with an eye on the future. They believe that to attract and retain knowledge-based workers, companies must provide a superior work environment. They note that younger generations who dominate the workplace of today and tomorrow embrace environmental concepts and want to align themselves with companies that share their commitment.

The 195,000-square-foot project integrates many elements into the design to accommodate future marketplace needs. Beneath its handsome cable-supported non-reflective glass exterior, its elegant lobby with stone, wood and metal finishes and its modern interior design, lie many technological features. The building includes a 3,000-square-foot data center, a network operating center with web-based control over all building and data systems, and natural gas generators capable of independently powering the entire facility.

"Calamos Real Estate is a member of the United States Green Building Council and is committed to the promulgation of sustainable design. It has been proven that creating spaces which incorporate meaningful sustainable design strategies leads to higher occupant comfort, increased productivity and reduced absenteeism. It is Calamos Real Estate's belief that given the current competitive employment environment, corporate America will not only embrace these strategies but make them a requirement."

Daniel Slack, President, Calamos Real Estate

### FAST FACTS

**Address:** Naperville, IL

**Company/Developer:** Calamos Real Estate LLC

**General Contractor:** Power Construction Company

**Property Type:** Corporate Headquarters

**Square Feet:** 195,000 square feet

**Height:** 6 stories

**Building Description:** An innovative state-of-the-art office building that features many progressive sustainable design strategies, such as floor to ceiling glass, higher ceilings, indirect lighting and underfloor air distribution. The six-story glass exterior serves as a beacon for future development.

### GREEN FEATURES

#### SUSTAINABLE SITES

- Storm water management through a 10.1+-acre lake and wetland control of sediment, pollution and floods.
- 30 percent of undeveloped site area landscaped with fescue grass to encourage moisture retention and reduce heat islands.
- Light, reflective concrete on top garage deck to reduce heat islands.
- Vegetated top deck.
- Sedimentation and erosion control plan.
- Management, maintenance and water quality monitoring of lake and adjacent wetlands.

#### INDOOR ENVIRONMENTAL QUALITY

- Under-floor air distribution system that uses a pressurized raised floor to supply air to adjustable floor mounted swirl diffusers, allowing individual control and more than 90 percent ventilation effectiveness.
- Indoor air quality management plan in place during construction.
- Janitors' closets exhausted to outside.
- Walk-off mats installed at building entrances.
- Ongoing preventive maintenance to ensure ventilation rates don't exceed 10 cfm per person minimum of outside air and meet ASHRAE standards of 20 cfm per person.
- Environmental impact cleaning policy in place.
- No individual positioned more than 45 feet from exterior window wall allows daylight views.

### WATER EFFICIENCY

- Drought tolerant and native plants monitored by separate water meter.
- Low-flow fixtures with sensors to reduce building water use by at least 20 percent below requirements.

### ENERGY AND ATMOSPHERE

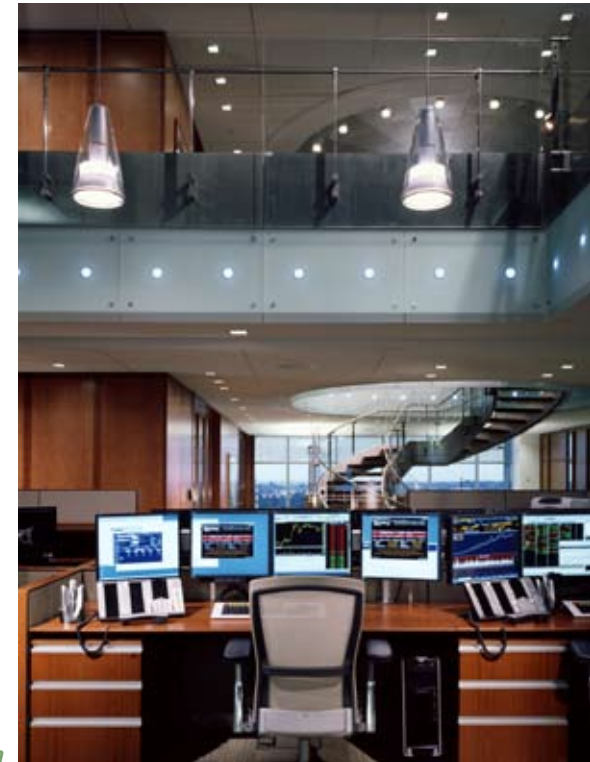
- Use of low-e insulated glazing units backed by automatic blinds on building envelope to control solar gain.
- Under-floor air distribution system allows base fan systems to operate at lower pressures.
- Control of building light systems integrated into building automation system for optimal scheduling.
- CFC reduction in HVAC equipment through air-cooled chillers that use zero ODP refrigerant.

### MATERIALS AND RESOURCES

- Recycling program for office and retail generated waste.



*State-of-the-art boardroom*



*Trading desk operation*



*WSSI building*

"The Peterson Companies believes that green development is here to stay. It is quietly gaining attention and momentum and will become a necessity in the future of the real estate industry. We are convinced that it is in our company's best interest to embrace environmental preservation and become a leader in addressing this trend."

Jon Peterson, Senior Vice President  
The Peterson Companies

## FAST FACTS

**Address:** Gainesville, VA

**Company/Developer:** The Peterson Companies

**Design/Builder:** W.A. Brown and Associates

**Property Type:** Office

**Square Feet:** 54,000 square feet

**Height:** 2 stories

**Building Description:** Completed in December 2005, the Wetland Studies and Solutions, Inc. (WSSI) facility received LEED-CI Gold certification in March 2006. The office building sits on 5.07 acres, 1.18 acres of which have been preserved as open space. The site plan uses retaining walls that minimize slopes, decrease encroachment and protect existing wetlands.

## Wetland Studies and Solutions, Inc. Developer: The Peterson Companies

Prince William County gave the WSSI facility a "targeted industry status" to show their commitment to green development. The status saved both time and resources through expedited permit processing and a 50 percent reduction in the County Review fee. Additionally, the county waived all review comments related to the low-impact development site plan and the atypical curb-and-gutter design. The WSSI facility is the eighth project in Virginia to receive LEED certification and the first to achieve the Gold certification level.

### GREEN FEATURES

#### SUSTAINABLE SITES

- Secure bicycle storage adjacent to the employee entrance at the rear building. WSSI has purchased bicycles and helmets for employee use and installed a biking/nature trail between the building and the neighboring shopping center
- Locker rooms with shower facilities.
- Majority of roof is high reflectance (reflects light instead of converting it to heat), with remainder covered in a green roof.
- Located in a watershed already serviced by an existing regional stormwater management pond.
- A 3,626-square-foot single-story building extension houses a green roof accessible from a second-story meeting room. The roof has two wetland pods with individual moisture sensor triggered irrigation systems.
- An 8,000-gallon underground cistern captures the first half-inch of runoff from the building roof. The captured water is used to irrigate the native landscaping.
- A 265' water quality swale conveys a small amount of runoff from the southern edge of the site to an existing stream. Three rock check dams filter the BMP volume (approximately 270 cubic feet each) to reduce the pollutant load on downstream waters.
- Three types of pervious parking areas cover 34 percent of all driving surfaces, which allows water to filter slowly through an underground stone layer to an existing vegetated floodplain instead of draining from the site at erosive velocities as overland runoff.
- A 10,513-cubic foot area of underground gravel bed detention is the final holding place for site runoff. Reduction in peak runoff rate helps reduce downstream erosion and sedimentation.
- A 175 square-foot dedicated recycling room on the first floor with an exterior access door and dedicated "recycling pick-up" parking. The materials included for recycling are corrugated cardboard, paper, plastic, metal and glass.

## INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring using carbon dioxide sensors to determine the required level of fresh air. An alarm alerts the building engineer if the ventilation system is not working as intended.
- Low emitting materials throughout—including Benjamin Moore Eco-Spec paint, water-based concrete stain and sealer, carpet and carpet adhesives—exceed Carpet and Rug Institute’s “Green Label Plus” testing and product requirements.
- Systems furniture certified by the Greenguard Environmental Institute.
- Daylight-responsive lighting control within 15 feet of all windows in regularly-occupied spaces. Controls allow for calibration so that each zone can set the light to their desired levels.
- Smoking prohibited both within the building and within 25 feet of any operable window, door or ventilation intake.
- The building is equipped with 62 thermal zones and one thermostat per two employee seating areas. The thermostats allow each employee to change the zone temperature by four degrees from the zone set point, which has been customized per zone users’ requests.

## WATER EFFICIENCY

- Native landscaping acclimated to the weather and moisture cycles of the Northern Virginia region requiring irrigation only until they are established and in periods of drought. Irrigation provided by a specialized drip irrigation system for better efficiency.
- Combination of sensor-based faucet controls, low-flow toilets and showerheads and waterless urinals to gain an estimated 50 percent water reduction over a typical building of the same size and occupancy.

## ENERGY AND ATMOSPHERE

- Motion-responsive lighting control which ensure lights are never accidentally left on.
- Reduced lighting density of 0.9 W/sf. The main lights in all work areas are fluorescent bulbs surrounded by reflective parabolic fixtures which allow a lower amount of light to spread over a wider area.
- Over 90 percent of tenant appliances (including computers, monitors, printers and kitchen appliances) are Energy Star rated.
- HVAC system uses 18 percent less energy than suggested in the ASHRAE 90.1-2004 standard.
- No CFC-based refrigerants in the HVAC&R systems.

## MATERIALS AND RESOURCES

- 25 percent of locally manufactured materials including concrete block used in some building walls.



*Lobby*

- Contains 16 percent recycled material including wheatboard panels and substrate. Wheatboard replaces standard particleboard throughout the building in desks, cabinets and unpainted decorative panels. Upholstery fabric in all of the building's systems furniture fabric (cubicle wall panels and seating/storage unit covers) is created from polylactic acid (PLA). PLA is a post-industrial material made when salvaged corn by-products are chemically reduced to a starch-based polymer and woven into textile. It is safe and biodegradable and recyclable at the end of its life cycle. The corn fabric can be composted rather than discarded in a landfill.
- Post-consumer recycled plastic "sidelight" panels at the entrance to conference rooms, allowing light to filter from exterior windows to the building interior.
- Metal-shaving countertops (post-industrial recycled product) in the reception area, kitchen, bathrooms and locker rooms.
- Post-industrial recycled carpet that will be broken down at the end of its useful life and re-formed to create post-consumer carpeting.
- Kitchen floor is made from linoleum which contains rapidly-renewable cork dust and linseed oil.

#### INNOVATION AND DESIGN PROCESS

- Tenant purchased "green energy credits" to offset 100 percent of their power needs for two years. The money generated from the credits pays the difference between coal-fired electricity rates and renewable electricity rates, to ensure that the renewable electricity is provided to the regional grid.
- WSSI has given tours of the building to local regulatory agencies, engineers, developers and citizen groups. WSSI has created and distributed over 1,000 copies of a full-color brochure that outlines the components of economic and environmental sustainability of the facility.
- WSSI has hired two college interns to set up flow monitoring equipment at all strategic points in the landscape. This equipment will be networked and the data uploaded to a public web site. Members of academia, students and other interested parties will be able to freely download the data, which may be used to create robust models of flow through various LID techniques.

#### RETURN ON INVESTMENT ANALYSIS

- Estimated irrigation water savings of approximately 2,400,000 gallons of water, or \$6,100 per year over a conventional building of same size and acreage.
- Payback of 5.5 years based on conservative energy savings projections.

*Rear exterior view*





### ProLogis Headquarters

“Around the world, environmental sustainability is emerging as an issue of growing public interest and importance. Governments, research institutions and the private sector are working together to reduce energy usage, water consumption and carbon emissions associated with commercial and residential projects.”

Jack Rizzo, Managing Director for  
Global Development, ProLogis

### FAST FACTS

**Address:** Denver, CO

**Company/Developer:** ProLogis

**Design/Builder:** Gensler

**Property Type:** Corporate Headquarters

**Square Feet:** 89,021 square feet

**Height:** 5 stories

**Building Description:** The office building consists of six percent private offices and 94 percent open plan workstations. All work spaces feature direct natural lighting and views of the outdoors. Building amenities include a centrally located training and conference facility; a café and dining area; a fitness center with locker rooms and both aerobic and strength and conditioning fitness equipment; and a tie-in to the local sidewalk trail system, which consists of paved and concrete paths that are easily accessible to pedestrians and bicyclists.

## ProLogis Headquarters Developer: ProLogis

“Sustainability is quickly becoming a business imperative in our industry. In a future of heightened scrutiny and more stringent standards, companies will need a core competency in sustainable development in order to succeed.”

Jeff Schwartz, Chief Executive Officer, ProLogis

### GREEN FEATURES

#### SUSTAINABLE SITES

- Bicycle racks available for over five percent of the building occupants and electric car charging stations for over three percent of the building’s parking spaces.
- Changing/locker rooms available for employees who use the ground floor fitness center and ride their bikes to work.
- Over 90 percent of exposed roof area is covered with a white, Energy Star compliant, PVC roof membrane. The only roof areas that are not covered are areas where rooftop equipment is located.
- Specialty paving conditions include highly reflective pavers for the visitor parking area, light-colored concrete paving around the main entry and exterior dining patios, light gray concrete paving on the loading dock and trash dumpster area and numerous light gray concrete sidewalks throughout the site.
- Heavily landscaped site with numerous trees in the parking lot area sized at 2.5 to 3” in caliper at the time of planting, providing significant shading on the black asphalt area within five years.
- Erosion and storm water control plan implemented during the construction phase of the project. Erosion control measures included temporary seeding and mulching, permanent stabilization, protection of storm outlets into the office park retention pond with rip rap, silt fencing around the entire property line, inlet protection at all storm inlet areas, and sedimentation basins at the outfall structures that tie into the office park retention pond.

#### INDOOR ENVIRONMENTAL QUALITY

- A carbon dioxide monitoring system that maintains appropriate CO2 levels for the building. Sensors within the common air shafts for each RTU are tied into building control software that will open or close the outside air dampers based on the CO2 levels.
- Sealants and adhesives meet the volatile organic compound (VOC) content limits of the South Coast Air Quality Management District Rule #1168.
- All installed carpets are certified to meet the requirements of the Carpet and Rug Institute’s Green Label Plus protocol.

- All paints and coatings meet the requirements listed by Green Seal Standard GS-11.
- Pedimat walkway system located at all of the employee and visitor entry doors.
- To maximize daylight entering the building, 12-foot ceilings are located throughout the space and the ceiling was aligned with the top of the exterior windows. Exterior glass had a high shading coefficient but still allowed a significant amount of visible light penetration. These features allowed 77 percent of the floor area of the building to have a daylight factor of 2 percent or greater.
- Daylight harvesting system utilizes sensors that measure the amount of incoming light through the exterior glazing and automatically dims the lights to prevent the excess lighting of office space.
- Glass sidelights at all private office entries and, in some cases, entire glass walls separating the private offices from the open office areas. This allows staff who work in the interior areas of the building to have access to exterior views even when bordered by private offices (97 percent of the regularly occupied office space has a view to the exterior).
- Above-average levels of human thermal comfort including air temperature, air velocity and humidity levels.

#### WATER EFFICIENCY

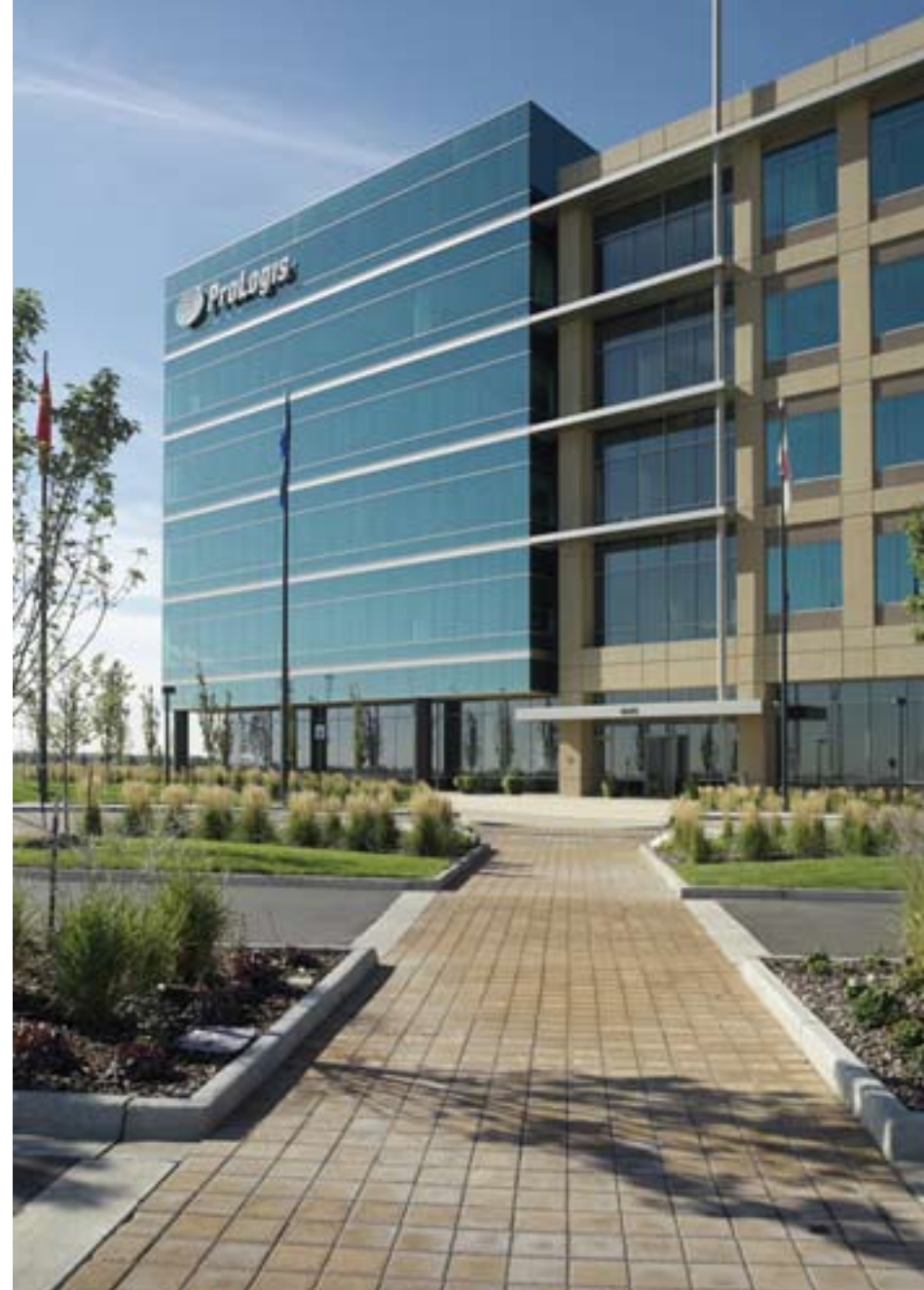
- Building uses 100 percent recycled water for all irrigation via a municipally supplied recycled water system.

#### ENERGY AND ATMOSPHERE

- No CFC-base refrigerants in the HVAC equipment.

#### MATERIALS AND RESOURCES

- High percentage of local and regional source materials to reduce the environmental impact of transportation. The materials include pre-cast concrete for the structure and large portion of exterior skin; all concrete for sidewalks and foundations, imported soils, landscaping, asphalt paving, various stone paving, some structural steel components, millwork cabinetry, some of the building insulation and fireproofing, metal wall panels, glazing, gypsum wall board, metal studs and some interior signage.
- On site sorting of all waste production by construction laborers—over 74 percent of all construction, demolition and land clearing debris had been diverted from landfills into recycling facilities by project completion.
- Building components that contain recycled content include the miscellaneous structural steel and rebar, the particle board and plastic laminate within the millwork cabinetry, the metal wall panels, the gypsum wall board, the acoustic ceiling grid and tile, the carpet, the accent cork flooring, the vinyl floor tile and wall base, the aluminum curtain wall and window framing, the metal doors and frames, as well as the metal studs that were used throughout the project.



Front entrance



## INNOVATION AND DESIGN PROCESS

- All exterior lighting has full cut-offs and shields to better control light direction, preventing high light levels from exiting the property boundaries while still providing adequate lighting levels for all of the parking lot and pedestrian walkways.
- Lighting for the 45-foot tall flagpoles on the site through a special fixture that is mounted at the top in lieu of having a series of powerful uplights shining on the flag from the ground.
- All exterior signage has been designed with LED lighting to allow the ProLogis signage to be seen from a distance without allowing any lamp lumens to spill over the property line.
- Information about the building's design, construction and environmental attributes is featured in the gallery area of the main lobby.

## RETURN ON INVESTMENT ANALYSIS

- The cost premium to incorporate sustainable and green building features and technologies in the design and construction of the facility was less than 3 percent of the total project budget.

*Exterior view*





*Environmental Protection Agency*

“Building green is fairly easy to accomplish and it significantly improves our world. I wish more clients were willing to endure a little headache to bring their buildings to the next level in intelligent and high-performance design.”

Kathy Barcus  
Davis, Carter, Scott Ltd.

## FAST FACTS

**Address:** Arlington, VA

**Company/Developer:** Crescent Resources, LLC

**Design/Builder:** Davis, Carter, Scott Ltd.

**Property Type:** Government Headquarters/Office

**Square Feet:** 629,159 square feet in two buildings

**Height:** 12 stories each building

**Building Description:** The speculative red brick masonry office buildings (One and Two Potomac Yard) with street-level retail were designed with post-tension concrete beams, nine-foot windows on each of the office floors and large HVAC systems. The green roof building connector, environmentally-friendly fixtures and finishes and the use of recycled content in most of the construction products are some of the features.

## Environmental Protection Agency Developer: Crescent Resources, LLC

The Environmental Protection Agency (EPA) pre-leased 100 percent of One Potomac Yard and 65 percent of Two Potomac Yard, listing various design criteria they preferred for their space. When pursuing the EPA lease, Crescent Resources established the objective of attaining at least a Silver LEED-NC rating. Upon completion in May 2006, both buildings received a Gold LEED Certification.

The two office buildings are part of the Potomac Yard master development project, a 300-acre redevelopment of the former Richmond Fredericksburg and Potomac Railroad (RF&P) rail transfer station in Arlington and Alexandria, VA. Upon completion, the mixed-use project will include 4.5 million square feet of office space, 3,000 residential units, 200,000 square feet of retail space, 1,250 hotel rooms and 92.4 acres of open space and parks.

## GREEN FEATURES

### SUSTAINABLE SITES

- Located within one-half mile of Washington Metrorail and a Virginia Railway Express station and served by two major bus lines.
- Secure storage for 201 bicycles and changing rooms with 28 showers within 200 yards of the building for at least five percent of the occupants.
- Replaced impervious surfaces with native or adapted vegetation.
- An accessible patio and 1,711-square-foot green roof planted with sedum in four-inch trays are located on the fourth level connection between the two towers.
- Single sand filter for stormwater treatment reduces the total suspended solids in runoff by 83 percent and the total phosphorus in runoff by 41 percent.
- Three levels of above-grade and three levels below-grade parking.
- Each building has two separate roof covering systems—a flat-roof (Carlisle White EPDM system) and a curved-roof system with reflectivity and emissivity (Berridge system with a LEED-compliant, field-applied coating).
- Erosion and sedimentation control plan follows Arlington County and Commonwealth of Virginia regulations. Site contractor, Metro Earthworks, implemented the plan before earth-moving activities began and maintained the erosion and sedimentation control measures until after final building inspections.
- Construction waste management program recycled and salvaged materials, diverting 73 percent of construction waste from landfills.
- Recycled content of 10 percent (post-consumer plus half post-industrial) on ceiling tile, safig insulation, gypsum board and ceramic tile.

- EPA installed two pantries on every floor using sustainable materials and finishes such as recycled aluminum in counter tops, metal laminate cabinetry, linoleum flooring and rubber bases. The pantries are stacked from floor to floor so they can easily direct exhaust to the outside.

#### INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring and Construction IAQ Management Plan during construction —testing plan for both buildings, developed by EPA, GSA and Healthy Buildings International, followed the protocol detailed in the USGBC LEED Credit Ruling.
- Baseline IAQ tests conducted by Healthy Buildings International before the spaces were occupied—five contaminants were tested: carbon dioxide; formaldehyde particulates; total volatile organic compounds; 4-phenylcyclohexene (associated with new carpet odor); and carbon monoxide.
- Low-emitting adhesives and sealants, paints and coatings, carpet, composite wood and agrifiber products (particleboard).
- Permanent entryway systems (grills and grates) to capture dirt, particulates, etc., at all high-volume building entrances.
- Housekeeping and copy areas are appropriately ventilated.
- Water and chemical concentrate mixing will not occur.
- Open floor plans and nine-foot tall windows, allowing views to the outside from 90 percent of the regularly occupied interior spaces.
- The furniture is Green Guard certified for indoor air quality material emissions. Other sustainable features include ergonomic chairs, energy efficient T-2 task lighting and corn-based fabric on workstation exterior panels.
- Occupancy sensors with manual override switches in enclosed offices and shared support spaces.

#### WATER EFFICIENCY

- Drought-tolerant landscape materials for both buildings that need only rain for irrigation and do not depend on artificial irrigation systems to survive.
- Low-flow fixtures, including low-flush urinals, dual-flush toilets, and low-flow showerheads and faucets that reduce the use of potable water.
- CFC-free HVAC and refrigeration systems.

#### ENERGY AND ATMOSPHERE

- Lighting-power densities that fall between 0.74 and 0.90 watts per square foot.
- High-performance window and entry systems that maximize thermal performance, reduce solar gain, and minimize air leaks and uncontrolled water infiltration.
- Light-colored materials that maximize the affect of daylight and reduce energy use and heat gain from artificial light sources.
- Building-management control systems that monitor carbon dioxide, humidity and temperature and that control air-movement and temperature.

*Front entrance*



## MATERIALS AND RESOURCES

- 27 percent of building materials contain recycled content (value of post-consumer content plus half of post-industrial content as percentage of total cost of materials).
- 61 percent local and regional source materials to reduce the environmental impact of transportation. More than 50 percent of the building's wooden materials were procured from manufacturers supporting sustainable harvesting practices outlined by the Forest Stewardship Council (FSC), including structural framing, flooring finishes, furnishings and non-rented temporary construction such as bracing, concrete formwork and pedestrian barriers.
- 83 percent of wood-based materials and products were certified by the Forest Stewardship Council.
- Recycling bins on each floor to collect bottles, cans, paper, cardboard, batteries, CD/DVD diskettes and toner/inkjet cartridges. A recycling room next to the loading dock in each building stores recyclables until they are hauled to offsite recycling facilities.

## INNOVATION AND DESIGN PROCESS

- Eight LEED-accredited professionals on the team.
- Development of a Green Education Plan—Crescent Resources documented the LEED process and produced a guide of the “Greening of One and Two Potomac Yard” which details each credit the building qualified for, concise pictorial illustrations and how the intent was met. A signage program was developed and tours of the facility are offered.
- Green housekeeping plan—Crescent worked with Woodmark and Red Coats to develop an appropriate plan.

*Exterior view*





## Maryland Department of Transportation Headquarters

### Developer: Heffner & Weber

Located in a Smart Growth and Priority Funding area, this government building meets the state's goal of focusing new development in areas of existing and planned growth to maintain consistency with local land use plans, promote the use of mass transit and reduce sprawl. Located adjacent to the Baltimore-Washington International Airport at Heffner & Weber's BWI Corporate Center South, MDOT headquarters is a state-of-the-art project that demonstrates excellence in sustainable design.

The building integrates green concepts and goals with a fully developed, cutting-edge, mid-rise design. Its immediate proximity to the crossroads of multi-modal transportation systems for the region was the primary factor in selecting its location. The building footprint was established to most efficiently use the path of the sun and the existing surrounding woods to aid heating and cooling. Through use of state-of-the-art mechanical and electrical systems, energy cost savings are projected at 48 percent.

"The green building movement will abound in the foreseeable future as the development community and end users continue to recognize and embrace the need for environmental consciousness and building efficiency. The salient principles and goals of the movement will ultimately shape the standards by which all buildings—both public and private sector—are designed and operated and thus, the mandate for building green will be sustained for future generations."

Mitch Weber, President, Heffner & Weber

### A Green Model for Government Class A Office Space

Housing an ever-growing roster of 275 state employees, this 110,000-square-foot building enjoys more than \$83,000 in annual energy savings when compared with buildings using only ASHRAE baseline standards. As a nonresidential Green Building of at least 20,000 square feet, MDOT also receives an 8 percent tax credit.

## GREEN FEATURES

### SUSTAINABLE SITES

- A long-span steel pedestrian bridge that provides access to and from the BWI Amtrak-MARC station and recreational hiker-biker trails.
- Bicycle storage for up to 5 percent of building occupants.
- Changing rooms and showers within 90 yards of bicycle storage.
- Preservation of surrounding habitat during development through strict regulations, such as underground storm water management and adherence to a 100-foot limit of disturbance for wetland areas.
- Reduction in impervious parking surfaces through inter-modal transportation planning.
- Carpool and vanpool parking areas.
- Use of vertical space to reduce building footprint.
- Retaining walls to minimize grading disturbances.
- A storm water management design that uses collected storm water to recharge the surrounding wetlands, preserving long-term site hydrology.

## FAST FACTS

**Address:** Baltimore, MD

**Company/Developer:** Heffner & Weber

**Design/Builder:** Heffner & Weber

**Property Type:** Government Office

**Square Feet:** 110,000 square feet

**Height:** 5 stories

**Building Description:** The multi-use headquarters facility features state-of-the-art energy efficient building systems, "green" building standards, environmentally sensitive site design elements and cutting edge mechanical, electrical and telecommunications systems and distribution that include a first-of-its-kind Web-based integrated building management system offering desk-top computer control of building operating systems.

- Erosion control that equals or exceeds EPA standards.
- Brick pavers with high-albedo reflectance in more than 40 percent of non-roof impervious surfaces to reduce heat islands.
- A highly reflective and innovative roofing system.

#### INDOOR ENVIRONMENTAL QUALITY

- Interior vision glazing that maximizes natural light for more than 90 percent of building occupants.
- Demountable partitions in space layout for flexibility.
- Use of low VOC adhesives, sealants, paints and carpet and no urea formaldehyde used in the composite wood products.
- An air quality management plan that emphasizes HVAC protection, source control, pathway interruption, housekeeping and scheduling.
- Indoor chemical pollutant control through a permanent entryway system in both the front and rear, and dedicated exhaust to areas with structural deck-to-deck partitions.
- An HVAC system that maintains an air change effectiveness rate of .9 or greater in all building areas.

#### WATER EFFICIENCY

- Drought resistant landscaping that does not require irrigation.
- Waterless urinals, dual flush toilets with a 1.6 and .8 gallon flush and shower and faucet sensors and aerators to reduce water use by more than 30 percent compared to conventional standards.

#### ENERGY AND ATMOSPHERE

- An HVAC system that includes high-efficiency boilers, chillers, air handlers and leading edge, energy-saving heat enthalpy wheels.
- Daylight sensors, occupancy light sensors and fiber-optic technology dimming ballasts.
- A building management system that integrates Web-based technology to provide maximum operational and energy efficiency.
- HCFC- and halon-free HVAC, refrigerant and fire suppression systems.

#### MATERIAL AND RESOURCES

- A waste management plan to recycle more than 75 percent of construction waste.
- Use of rapidly renewable and recycled content used in most interior finishes, such as carpet, ceiling tiles, ceramic tile, raised-floor tile, recycled rubber floor and toilet partitions made from recycled milk cartons and bubble gum wrappers; wheat board for millwork; and bamboo and cork tile for floor and wall finishes.

#### INNOVATION AND DESIGN PROCESS

- A provision for a five-year post-construction monitoring of the endangered bog fern and adjacent stream systems that includes monitoring of temperature, humidity, sunlight, groundwater elevation, groundwater quality and composition of the vegetative community.
- Transport of a thousand square feet of existing bamboo to the National Zoological Park in Washington, D.C. to feed exotic baby elephants and apes.



*Use of selected green materials, natural light and neutral color schemes provide a comforting and productive environment for employees and visitors.*

*Typical multi-purpose common area on each floor: restrooms are located across the hall to the right, copy machine/fax/supply areas are next to kitchen areas.*





### *GSA Bureau of the Public Debt*

"As developers and owners, it is our obligation to lead our industry in responsible, environmentally conscious developments that will form the foundation of our industry in the future."

Alan J. Beaudette  
Senior Vice President  
Lowe Enterprises Real Estate Group

## FAST FACTS

**Address:** Parkersburg, WV

**Company/Developer:** Lowe Enterprises

**Design/Builder:** Re: Vision Architecture

**Property Type:** Government Headquarters

**Square Feet:** 182,500 square feet

**Height:** 5 stories

**Building Description:** The facades of the building are clad in metal panels, with aluminum window framing and low-e, safety laminated, insulated glass. The entire perimeter is wrapped in glass in order for windows to provide light and capitalize on the views for the office spaces. The window wall maintains a consistent sill and head height throughout and utilizes a regular five-foot module for flexibility in partitioning. Documentation has been submitted for Silver LEED certification.

## GSA Bureau of the Public Debt Developer: Lowe Enterprises

The two-phase build-to-suit office building was constructed on a 6.12-acre site located at Fourth and Avery Streets in downtown Parkersburg. Direct access on the ground floor to the main conference/training facility is available from the lobby. The conference and training rooms are arranged around a break-out space to encourage interaction.

The site was owned by the City of Parkersburg and was transferred to Lowe Enterprises through an assignment of a purchase option agreement between the City of Parkersburg and the U.S. The site had environmental contamination (certain identified hydrocarbons) and the land Purchase Option Agreement stipulated that the City of Parkersburg would be responsible for any existing environmental condition requiring remediation.

## GREEN FEATURES

### SUSTAINABLE SITES

- Green roof and/or high albedo materials cover at least 75 percent of the total roof area.
- General office areas benefit from a nine-foot ceiling height to increase the diffusion of light. The typical floor configuration places over 86 percent of the office space within 40 feet of the exterior window wall to maximize access to light and views for all staff members.
- Commuter rail 0.3 miles from site (Emerson Route); Downtown Trolley 0.1 miles from site (200 Third Street Building); East Rider Bus Line 0.1 miles from site.
- Internal configuration of the typical office floors places the vertical circulation core at the intersection of the three phases, with separate mechanical and bathroom cores in each phase.

### INDOOR ENVIRONMENTAL QUALITY

- HVAC system with carbon dioxide monitoring sensors integrated with the building automation system.
- Non-smoking building.
- All adhesives employed on the project (including, but not limited to, adhesive for carpet, carpet tile, plastic laminate, wall coverings, adhesive for wood) were those with the lowest possible VOC content below 20 grams per liter and met the requirements of the manufacturer of the products.
- Adhesives and sealants with no formaldehyde or heavy metals were used.
- Low-emitting paint and carpet products.
- Ventilation—filter frames are oversized to accept HEPA type filters; fans provide necessary static pressure for larger units.

### WATER EFFICIENCY

- High-efficiency irrigation technology used in conjunction with native and xeriscape landscape design.
- 30 percent of paved area will be shaded within five years.
- Dual flush water closets.

### ENERGY AND ATMOSPHERE

- Building complies with energy code ASHRAE/IESNA 90.1-1999.
- No CFC-based refrigerants in the HVAC&R systems.

### MATERIALS AND RESOURCES

- Storage and collection of recyclables.
- Construction waste management.
- 15 percent Recycled content—site disposal services and containers for recycling cardboard, paper, cans, glass and plastic provided.
- 40.61 percent of materials manufactured and harvested locally.
- 60.69 percent of wood-based materials and certified wood products from Forest Stewardship Council (FSC) certified forests.
- Green housekeeping.
- LEED-accredited professional on the team.

### RETURN ON INVESTMENT ANALYSIS

- Total building costs including land were \$212 per square foot for the entire 182,500 square-foot project.
- According to the 2006 BOMA Experience Exchange Report, the average operating costs (psf) for the project are \$5.44 (utility costs psf of \$0.86). These numbers include taxes of \$3.35 psf and expected EnergyStar building utility costs.



*Security Gate*



*Conference Room*



## Arizona Department of Environmental Quality Developer: Opus West Corporation

This LEED-certified project, located in the Capital Mall district in Phoenix, is the new home for the offices and labs of the Arizona Department of Environmental Quality (ADEQ) and 10 other government agencies.

Once the site of an abandoned mortuary and two city blocks of deteriorated asphalt parking lots, this development features landscaped plazas surrounded by a beautiful, environmentally friendly office building and a space-saving parking structure. Not only did the ADEQ building enhance the 12th Avenue and Adams Street block, it captured the historical elements of the area by drawing much of the design and architecture from the historical Evans House and Carnegie Library across the street.

Because the agency is dedicated to protecting Arizona's natural environment, the ADEQ needed a building that would support this effort and serve as an example of their mission. The project was designed and built using green building practices, including the use of high-recycled content materials, recycling of nearly all construction waste, energy conservation techniques, low water-use landscaping and alternative fuel measures for employees.

In the final analysis, the state of Arizona was able to significantly reduce their overall occupancy costs by consolidating several state departments into one efficient building and Opus West enjoys a 25-year lease, after which time the state will buy the building for a dollar.



"The Opus design-build method is ideal for the creation of green buildings. Our process employs a fully integrated team of design, construction and real estate professionals who work seamlessly together from concept to completion to create a successful green project for all!"

Michael Herman, Senior Project Manager,  
Opus West Construction Corporation

### FAST FACTS

**Address:** Phoenix, AZ

**Company/Developer:** Opus West Corporation

**General Contractor:** Opus West Construction Corporation

**Property Type:** Government Office

**Square Feet:** 300,000 square feet plus 1,000-square-foot parking garage

**Height:** 6 stories

**Building Description:** Constructed primarily of architectural pre-cast concrete, masonry and tinted, reflective, insulating glass, this building features energy conserving methods, such as high performance glazing. The first two floors include masonry to complement materials used on the adjacent historic Evans House. The site also includes a landscaped plaza with a view of the Historic Carnegie Library.

### GREEN FEATURES

#### SUSTAINABLE SITES

- Fifteen electric vehicle charging stations on site.
- Bicycle storage and shower facilities.
- More than 50 percent of the site restored to provide habitat and promote biodiversity.
- Storm water management.
- 42 percent of impervious paving surfaces shaded to reduce heat islands.
- An Energy Star roof to reduce heat islands.
- Erosion control and storm water management combined.

#### INDOOR ENVIRONMENTAL QUALITY

- Use of low VOC adhesives, sealants, paints and carpet and no urea formaldehyde used in the composite wood products.
- Plumbing designed for appropriate disposal of liquid waste.

### WATER EFFICIENCY

- A graywater tank system that provides landscaping water by recycling bleed water from the building's cooling towers.

### ENERGY AND ATMOSPHERE

- Energy Star transformers used selectively.
- Use of VFDs on all HVAC electrical equipment.
- Motion sensors on all interior lighting fixtures.
- Solar panels on rooftop carports.
- CFC reduction in HVAC equipment.

### MATERIALS AND RESOURCES

- 87.5 percent of all construction debris recycled.
- More than 50 percent of the site was restored to provide habitat and promote biodiversity.



*Lobby*



*Entrance*



“It was tremendously rewarding to salvage an existing building on the verge of collapse and rehabilitate it to its original design. And by using LEED guidelines, we created a high-performance, environmentally friendly, healthy place to work that will be historically certified in the process.”

Randy Peacock, Project Manager, Construction  
Melaver, Inc.

## FAST FACTS

**Address:** Savannah, GA

**Company/Developer:** Melaver, Inc.

**General Contractor:** MFI Construction

**Property Type:** Historic

**Square Feet:** 10,000 square feet

**Height:** 2 stories

**Building Description:** The Whitaker Building is a mixed-use, historic renovation project located in the heart of downtown Savannah. This project is the first LEED-Certified building in Savannah, receiving a Silver certification from the U.S. Green Building Council in Winter 2004. The challenge of balancing the historical integrity of the building with the sustainable practices in LEED resulted in a wonderful historic renovation that is 40 percent more energy and water efficient than a comparable new building built to code.

## Whitaker Building Developer: Melaver, Inc.

The first renovation of a building on the National Registry of Historic Places in the Southeast to receive LEED certification, this circa 1891 structure is now a fully leased building that combines technology and heritage.

The tax credits, 100 percent occupancy with long-term leases, reduced operating costs and competitive rate of return all translate into economic success for Melaver, but the developer uses a three-prong approach to evaluate its bottom line—balancing economic, environmental and social considerations.

### Balancing History and the Future

During construction, historic preservation standards required by the Department of Interior were sometimes at odds with LEED standards. For example, historic guidelines required windows to look like their original design, which posed a challenge to energy efficiency. The design team located an energy-efficient pane that preserved the original appearance while offering 72 percent less ultraviolet light transmittance. Creative approaches like this allowed the building to meet Silver LEED certification and earn the Georgia Trust for Historic Preservation’s 2004 award for Excellence in Rehabilitation.

## GREEN FEATURES

### SUSTAINABLE SITES

- Accessibility to public transportation, including 12 bus routes.
- Bicycle storage and changing rooms for 17 percent of the regular tenant base.
- Energy Star TPO roofing membrane on 100 percent of roofing area.

### INDOOR ENVIRONMENTAL QUALITY

- Air quality that meets ASHRAE 62 standard.
- Outdoor air introduced at .2 cfm/SF on the retail level and 20 cfm/SF on the office level.
- Air change effectiveness rate of .9.
- Smoking prohibited in the building and within 50 feet of any entry.
- Use of low VOC paints and wheatboard cabinetry that does not use urea-formaldehyde as a binder.
- Chemical storage in a separately ventilated area.
- Use of Green Seal approved cleaning products.
- 2 percent daylight factor in more than 75 percent of all space occupied for critical visual tasks.
- Direct lines of site to perimeter glazing in 95 percent of regularly occupied spaces.

### WATER EFFICIENCY

- Dual-flush toilets, low-flow showerheads, low-flow faucets with aerators and tankless water heaters contribute to a 39 percent decrease in water use compared to conventional buildings.

### ENERGY AND ATMOSPHERE

- Insulation above the roof deck.
- High efficiency HVAC units.
- Dual-ballasted T-8 lighting.
- White roof to reflect heat.
- CFC reduction in HVAC equipment.

### MATERIALS AND RESOURCES

- 100 percent of the structural shell reused.
- 50 percent of internal elements reused.
- 85 percent of the existing wood floors refurbished, with the remainder coming from another Savannah-based deconstruction.

### INNOVATION AND DESIGN PROCESS

- Green property management practices that encourage green maintenance.
- Student tours on sustainable design.



*Extensive daylighting, energy efficient light fixtures and significant material reuse helped contribute to the LEED Silver Certification.*



*Spectrally selective glass and a highly efficient HVAC system are some of the features contributing to the 40 percent savings in electricity.*



"The most important benefit of green building, from our perspective, is higher productivity for our customers. Simply put, green buildings can help our customers work better and make more money—and that's an easy sell for us at Fogg."

Mike Merle, Executive Vice President,  
Ray Fogg Corporate Properties, LLC

## FAST FACTS

**Address:** Cleveland, Ohio

**Company/Developer:** Ray Fogg Corporate Properties, LLC

**General Contractor:** Ray Fogg Building Methods, Inc.

**Property Type:** Distribution Facility

**Square Feet:** 250,000 square feet

**Height:** 30' clear

**Building Description:** This building occupies nearly 60 percent of a 10-acre urban site. The steel frame pre-engineered structure is designed with large wide-span bays for unobstructed order staging and an irregular structural grid designed to complement rack storage systems and material handling operations. The moderate-hazard general warehouse includes 7,000 square feet of office area. Two high-hazard flammable liquids warehouses are separated from the main structure by a four-hour rated fire wall. The facility is served by 30 truck dock doors and is designed to accommodate future rail service.

## Oatey Distribution Center

**Developer:** Ray Fogg Corporate Properties, LLC

Built on the site of an old fertilizer plant, the \$8 million Oatey Distribution Center is not your typical warehouse. Entry gates are solar powered by photovoltaic panels. Skylights illuminate the workspace. A collection system captures rain and stores it in a 6,000 gallon underground cistern for non-potable use in toilets and for irrigation. And Oatey is working with the Wildlife Habitat Council to increase the wildlife on adjacent wetlands and develop it as an educational resource. These are just a few of the green features built into this 250,000-square-foot facility that is currently LEED silver pending.

### Building on a Company's Values

Bill Oatey, Vice Chairman of the Oatey Company, sees green building as a logical extension of his company's commitment to environmentally and socially responsible business practices.

Building green added about \$300,000 to development costs, but the company expects to save \$75,000 annually in energy costs, thanks to the use of natural light and sensor-driven fluorescent lights instead of mercury vapor lights typically found in warehouses.

## GREEN FEATURES

### SUSTAINABLE SITES

- Extensive environmental remediation of brownfield site.
- A storm water pollution prevention plan to protect adjacent wetlands.

### INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring throughout construction.
- Use of low VOC adhesives, sealants, paints and carpet and no urea formaldehyde used in the composite wood products.
- Building automation system that continuously monitors and controls carbon dioxide, temperature and humidity levels.
- Windows and skylights deliver daylight in all spaces occupied for critical visual tasks.

### WATER EFFICIENCY

- Greywater collection and reuse that will reduce the building's demand for processed municipal water by more than 50 percent.

### ENERGY AND ATMOSPHERE

- A building automation system that monitors and controls highly efficient lighting and mechanical systems to reduce energy consumption by about 40 percent.
- Photovoltaic panels to power automated access gates to the facility.

### MATERIALS AND RESOURCES

- Use of high recycled content, including concrete, structural steel, ceiling tile and carpet.
- More than 50 percent of construction waste diverted from landfill disposal.



*Wide bay, day-lit staging area. Automatic sensors turn off fluorescent fixtures when natural lighting is sufficient.*

*Indoor air quality is continuously monitored to provide a comfortable, healthy working environment in all office areas.*





Photography by Peter Vanderwarker

“We think there will be tremendous payback on the people part of the equation, in terms of performance and attitude. We expect to see reduced absenteeism and greater employee retention.”

Gordon Brailsford Jr., Senior Project Manager,  
Genzyme

## FAST FACTS

**Address:** Cambridge, MA

**Company/Developer:** Lyme Properties, LLC

**General Contractor:** Turner Construction Company

**Property Type:** Life Sciences

**Square Feet:** 350,000 square feet

**Height:** 12 stories

**Building Description:** Genzyme Center is the corporate headquarters for a biotechnology company, with offices, employee cafeteria, library, gardens, training rooms, conference center, cafes and public retail space. Genzyme Center was designed to reflect a philosophy of building from the inside out, from the individual work environment to the complex structure of the building. Largely due to the unique collaboration of the developer, tenant, design team and construction staff, this led to an environmentally friendly, highly communicative and innovative signature building.

## Genzyme Center Developer: Lyme Properties, LLC

A soaring 12-story atrium with skylight, extensive indoor gardens, more than 800 operable windows, direct outdoor views from most desks, a 144-seat state-of-the-art auditorium and a 12<sup>th</sup> floor cafeteria with sweeping views of Boston are just some of this project’s stunning features.

Described by the *Boston Globe*’s Robert Campbell as “probably the most green building yet built in this region,” and “the best and most delightful office building, bar none, this writer has seen in the Boston area,” this Platinum-level LEED certified building combines exquisite beauty with environmental responsibility.

Situated on a 10-acre brownfield site, the Genzyme Center is the cornerstone of Lyme’s development that will include a performing arts center, residences, a hotel, office and laboratory space, retail shops and landscaped parks.

### A Tenant’s Perspective on the Benefits of Going Green

Including furnishings and finishes, Genzyme spent \$140 million for its new facility (or about \$400 per square foot). About \$23 million of that was spent on green features. But they expect to save at least 30 percent on energy and water costs over conventional building costs. And they hope to see benefits in employee performance and attitude.

## GREEN FEATURES

### SUSTAINABLE SITES

- Green living roof and water collection system on the roof that reduces storm water runoff by 50 percent.
- Below-ground parking and an Energy Star roof reduce heat islands.
- Lighting that matches the illuminating ESNA standard.

### INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring system.
- Use of low VOC adhesives, sealants, paints and carpet.
- Operable windows and light control per 200 square feet within 15 feet of a perimeter wall.
- Automated heat and humidity control.
- 90 percent of regularly occupied spaces have direct line of sight to vision glazing.
- 2 percent daylight factor in 75 percent of all regularly occupied spaces.
- Roof solar panels to illuminate fire escape stairwells.

## WATER EFFICIENCY

- Soil sensors to detect ground water and optimize the watering process.
- Rain water captured on roof and used as makeup water for the cooling tower.
- Waterless urinals, dual-flush toilets and low-flow faucets.

## ENERGY AND ATMOSPHERE

- 100 percent of power from renewable resources, including wind, solar and emitted gas from landfill.
- Concrete superstructure that acts as a thermal mass to keep the building cool in summer and warm in winter.
- Operable windows and heat exchanger in the skylight to utilize outside air.
- Use of by-product steam for heating and cooling.
- An automated building management system that maximizes efficiency and minimizes energy consumption.
- Double glass façade in 30 percent of the building with a four-foot loggia space for improved thermal insulation.
- Roof heliostats to direct sunlight through the atrium.
- Photovoltaic arrays on top of the mechanical penthouse as a renewable energy source.

## MATERIALS AND RESOURCES

- 75 percent of construction waste recycled or salvaged.
- 25 percent of building materials contain a 20 percent post-consumer or 40 percent post-industrial recycled content material.
- 20 percent of building materials manufactured locally or within 500 miles of the building site.
- 50 percent of local materials used harvested locally.
- 50 percent of wood materials are Forest Stewardship Council Guidelines certified.



*Twelve-story atrium*

Photography by Peter Vanderwarker



*Lobby*

Photography by Peter Vanderwarker





Photography by Ben Benschneider, 2004

“Green building is simply a logical extension of our decision-making process that results in a higher quality and more efficient, high-performing building—one that produces a more valuable investment and enhances the community as well.”

Douglas Howe, President,  
Touchstone Corporation

## FAST FACTS

**Address:** Seattle, WA

**Company/Developer:** Touchstone Corporation

**General Contractor:** Lease Crutcher Lewis

**Property Type:** Life Sciences

**Square Feet:** 215,000 square feet

**Height:** 11 stories

**Building Description:** This rigid concrete and steel building features 15' floor-to-ceiling heights and column spacing designed for lab module use; space designed for up to 15–20 air changes per hour; chiller space capacity for up to 2,100 tons; and three passenger elevators plus one dedicated freight elevator with a 5,000 lb. load capacity.

## 9<sup>th</sup> & Stewart Life Sciences Building Developer: Touchstone Corporation

Located in downtown Seattle’s rapidly growing Denny Triangle neighborhood, the 9<sup>th</sup> & Stewart Life Sciences Building merges the practical with the desirable—blending environmental considerations with creative solutions that enhance both the project’s overall value and continued efficiency. The 11-story, 215,000-square-foot biotechnology research and development building includes 212,000 square feet of rentable lab and office space, secured parking for 200 cars and 4,000 square feet of ground-level retail space.

Named NAIOP Washington State Chapter’s 2004 Technology Building of the Year and 2004 Real Estate Deal of the Year, and SIOR’s 2004 Office Development of the Year, this project is a candidate for the Silver LEED Core and Shell rating as a pilot project—a rare accolade for a commercial building.

### Bucking Economic Trends

As an independent, regional developer, Touchstone Corporation bucked development trends—an economic downturn and high vacancy rates—to build green. They landed a 15-year lease with Glaxo Smith Kline (formerly Corixa Corporation) for 65 percent of the building’s rentable space.

By planning energy-efficient features early in the design phase, Touchstone was able to incorporate them at greatly reduced cost. They also received financial incentives from Seattle City Light and BetterBricks, an initiative of the Northwest Energy Efficiency Alliance. Currently leased at 75 percent, Touchstone projects a return on investment of \$1–\$2 per square foot on operating expenses.

## GREEN FEATURES

### SUSTAINABLE SITES

- Bicycle storage and changing rooms.
- Refueling stations.
- Accessibility to more than 30 bus routes within a two-block radius.
- Parking fully within the building footprint to reduce heat islands.
- Above-grade parking that reduces energy use through natural ventilation.
- A landscaped rooftop to reduce head islands.
- Environment-enhancing landscape design.

### INDOOR ENVIRONMENTAL QUALITY

- A permanent air quality monitoring system.
- Use of low VOC adhesives, sealants, paints and carpet.

- No smoking during construction phase.
- Hazard chemical areas separated from tenant-occupied areas.
- Ample daylight in interior spaces.
- Two rooftop decks.

#### WATER EFFICIENCY

- A water use reduction system that uses 45 percent less water than a typical building.
- A “dolphin” cooling tower that uses microwave technology to kill bacteria and prevent corrosion and uses less water than conventional systems.
- Waterless urinals, dual-flush toilets, low-flow faucets with sensors and high efficiency irrigation.

#### ENERGY AND ATMOSPHERE

- Regenerative elevators that produce electricity with every trip, reducing elevator energy use by 30 percent.
- Zero CFC-based refrigerants in HVAC, refrigeration and fire suppression equipment.
- A highly efficient chiller system and an innovative floor-by-floor air handling system that allows optimal configuration of individual tenant spaces.
- Energy-efficient lighting fixtures with sophisticated controls.
- A contract with a wind-power provider to provide 50 percent of the building’s electricity over the next two years.

#### MATERIALS AND RESOURCES

- More than 75 percent of construction debris recycled.
- Use of recycled materials in pre-cast concrete panels and window systems.



*Exterior*

Photography by Ben Benschneider, 2004

Photography by Ben Benschneider, 2004



*Exterior with view of Seattle's Space needle*



“When we started doing green buildings, we did it because we thought it was the right thing to do. That’s still our primary motivation, but we’re also finding that it’s good for business. We put a lot of effort into designing environmentally responsible buildings. A byproduct of that is better design.”

Dennis Wilde, Senior Project Manager,  
Gerding Edlen Development

## FAST FACTS

**Address:** Portland, OR

**Company/Developer:** Gerding Edlen Development Company, LLC

**Property Type:** Medical Office

**Square Feet:** 400,000 square feet

**Height:** 16 stories

**Building Description:** The Oregon Health & Science University's (OHSU's) Center for Health & Healing medical office building is located in the South Waterfront District of Portland on a 38-acre site along the Willamette River. The ground floor houses retail space including a pharmacy, optical shop and café. OHSU anticipates a LEED Platinum rating from the U.S. Green Building Council for this project.

## The Oregon Health and Science University's (OHSU's) Center for Health and Healing

**Developer: Gerding Edlin Development Company**

OHSU's center is a public/private partnership between the developers, the City of Portland, the Portland Development Commission and Oregon Health & Science University. As the first building in OHSU's new River Campus, the building serves as an example to both its students and the general community of OHSU's environmental commitment and the partnership of all who contributed their time, design creativity, effort and funding to ensure its success. The South Waterfront District will use state-of-the-art sustainable building techniques, reducing its immediate and future impact on the land and environment.

### A Comprehensive State-of-the-Art Health Facility

A three-story underground parking garage provides approximately 500 parking spaces for patients, with eight levels devoted to physician practices, surgery and imaging across a wide range of specialties and programs. Four levels are dedicated to educational and research activities, including laboratory space for the biomedical engineering program. Three floors house a comprehensive health and wellness center which includes a full gym, four-lane lap pool, therapy pool, cardio and weight training areas, multi-purpose studios and a day spa.

## GREEN FEATURES

### SUSTAINABLE SITES

- The Portland Streetcar, an aerial tram that was completed in November 2006, Tri-Met buses, bikeways, walking paths and Flexcar are all options for residents, workers and visitors.
- Bicycle parking for employees and retail tenants. Willamette River Greenway provides pedestrian and bicycle access along the riverfront.
- Employee changing rooms equipped with lockers and showers.
- Environmentally appropriate landscaping including native and drought tolerant species.
- Rainwater and groundwater collection and treatment for irrigation; water closet-urinal flushing, cooling tower makeup water and high pressure for microturbine inlet cooling.
- 20,000-square-foot green roof (more than 50 percent of total roof area) for stormwater management, rainwater harvesting and temperature moderation, also providing some wildlife habitat in a dense urban environment.

## INDOOR ENVIRONMENTAL QUALITY

- Building flush-out prior to completion to eliminate contaminants in the air stream.
- Carbon dioxide monitoring throughout the building.
- Use of low-toxicity materials including low-VOC paints, adhesives and sealants, carpets and interior finishes, to prevent persistent off-gassing.
- Janitorial closets are independently ventilated and isolated.
- Walk-off mats at building entries reduce indoor air pollutants.

## WATER EFFICIENCY

- Water conserving low-flow/ultra low-flow fixtures, sinks and showerheads that contribute to 40 percent less water than a base building.
- On-site wastewater treatment system with treated water used for non-potable needs— 100 percent of building wastewater treated onsite with a Membrane Bio-reactor that uses membrane cartridges instead of gravity as a physical barrier to separate the effluent from the biomass or remaining sludge material. Once treated, the effluent will be used as grey water for toilet flushing, cooling tower make-up water in the central utility plant and on site irrigation.
- The bio-swale and the building's eco-roofs treat all of the stormwater runoff for the site, alleviating the need for any storm sewer connection. Metering occurs at various points in the water reclamation system to provide feedback on quantities used.

## ENERGY AND ATMOSPHERE

- Central utility plant with five 60kW natural gas microturbines and heat recovery provides onsite power generation and domestic water pre-heat and a high-efficiency, variable flow, primary chilled-water system.
- All building heating and domestic water pre-heat is provided from a solar collector/trombe wall located on the two upper floors of the building.
- Variable air volume (VAV) air handlers and variable frequency drives (VFDs).
- Radiant heating/cooling with decoupled displacement ventilation at atrium and lobby, using rain/ground water and high quality microturbine recovered heat. (The first floor radiant slab stores as much heat as a 3,000 gallon storage tank.)
- Passive heating and natural ventilation/cooling of stair enclosures.
- Added wall and floor insulation and high-efficiency glazing.
- Pool air/water dehumidification heat recovery.
- CFC reduction in HVAC&R equipment.
- Energy-efficient lighting fixtures and controls; daylighting of waiting areas, medical offices, exam rooms and research labs and occupancy sensor based lab hood exhaust/ make-up air control for unoccupied energy reduction.
- Multi-lamp high bays in the athletic club tied to daylighting controls switch down lighting levels as natural lighting becomes sufficient.
- Perimeter offices with occupancy sensors have a daylighting control which keeps room lighting off whenever there is sufficient natural light.
- Occupancy sensors in stairwells switch lighting on and off to follow an occupant up or down allowing the lighting to stay on for the minimum time needed for egress.

- 60kW photovoltaic panels integrated into sunshades on building's south-facing façade. The sunshades that support the array save roughly as much electricity as the PV panels produce.

#### **MATERIALS AND RESOURCES**

- Locally and regionally sources for materials to reduce the environmental impact of transportation. The materials include concrete, masonry, paint and wood products, among others.
- Use of high percentages of recycled content and more than 50 percent use of certified wood products from Forest Stewardship Council (FSC) certified forests.
- Overall construction waste recycling of approximately 95 percent achieved throughout the project.
- Interior recycling and sorting facilities for occupants.

#### **RETURN ON INVESTMENT ANALYSIS**

- Initial MEP budget reduction of \$4.5 million (net), allowing some of the budget to be transferred to architectural uses.



“In addition to being the *right* thing to do, incorporating green building principles can also be profitable. Whether in the form of decreased operating costs or increased leasing and sales demand, green building equals good business.”

Kevin P. Fitzpatrick, President  
AIG Global Real Estate

## FAST FACTS

**Address:** Atlanta, GA

**Company/Developer:** AIG Global Real Estate Investment Corp. and Jacoby Development

**General Contractor:** multiple contractors

**Property Type:** Mixed-Use

**Square Feet:** 15 million square feet when completed

**Building Description:** A 138-acre environmental redevelopment and reclamation of the former Atlantic Steel Mill in Midtown Atlanta that is projected to include 15 million square feet of retail, office, residential and hotel space as well as 11 acres of public parks.

## Atlantic Station Developer: AIG Global Real Estate Investment Corp. and Jacoby Development

Built on a brownfield site of a 100-year-old steel mill, this 138-acre redevelopment project in Midtown Atlanta will be home to retail, office, residential and hotel space, as well as 11 acres of public parks.

The developers note that creating a mix and maintaining a balance of employment opportunities and housing options is key to successful sustainable development. It is anticipated that 30,000 people will work in Atlantic Station and 10,000 will live there.

### A Model for Smart Growth and New Urbanism

As the largest urban brownfield redevelopment in the United States, Atlantic Station offers an energy-efficient, pedestrian-friendly alternative to Atlanta’s community. The redevelopment was one of the first of its kind to be approved under the EPA’s Project XL, a national initiative that tests innovative ways of achieving better and more cost-effective public health and environmental protection. The project also served as the framework for Georgia’s Brownfield Program.

Atlantic Station has drawn intense media attention from around the globe, including *The Financial Times (UK)*, *The New York Times*, *The Wall Street Journal* and *CNBC*, as international design and development teams seek to learn more about how brownfields can become viable parts of the economy and the community.

The bottomline for Atlanta? A site that once generated only \$300,000 for the city (property tax) will contribute \$30 million annually when the project is completed, not counting additional income from sales tax generated by \$500 million in retail sales.

## GREEN FEATURES

### SUSTAINABLE SITES

- Remediation of 165,000 tons of contaminated soil, soil barriers and a groundwater extraction and treatment system.
- Public/private partnership between Atlantic Station, the city and state to construct a 130-foot wide bridge that includes more transit, pedestrian and bicycle lanes than auto lanes and reconnects east and west Midtown.
- An incentive program to encourage alternative transportation that offers access to electric vehicles and mass transit discounts.

- An 11-acre urban oasis that has reestablished biodiversity in the area.
- Storm water management that includes 2.5 miles of new public water mains, 5.5 miles of storm sewer and two lakes that reduce storm water runoff by 30 percent.
- Underground or in-garage parking to reduce heat islands.
- High albedo and heat reflecting roofs to reduce heat islands.
- Planting of 3,100 new trees.

#### INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring systems that include indoor pollutant source control systems and a permanent carbon dioxide monitoring system.
- Permanent walk-off grates and mats at entries.
- Use of low-emitting materials.
- High performance glass and lights.

#### WATER EFFICIENCY

- Drought resistant and native plants require no potable water.
- A landscaping irrigation system that employs sophisticated controls and other special equipment to use 50 percent less water than required by most systems.
- Low-flow fixtures and dual flush toilets to reduce water use by 37 percent compared with typical buildings.

#### ENERGY AND ATMOSPHERE

- An environmentally-friendly central cooling system that is 25 percent more efficient than traditional systems and includes a two-mile-long network of pipes that deliver chilled water from a 50,000-square-foot cooling plant.
- Zero use of CFC-based refrigerants.
- An HVAC system that includes cooling towers and pumps at the roof level, with a self-contained air-handling unit on each floor.

#### MATERIALS AND RESOURCES

- Waste recycling program for concrete, metal/rebar and wood and use of fly ash in concrete and recycled metals in curtain wall systems.
- Use of locally produced/recycled materials.
- More than doubled LEED Core and Shell requirements for both recycled content and local/regional materials and achieved three innovation credits for exemplary performance in regard to those credits.



*Residential development*



*Retail development*



WINNER

## 318 Sentinel Drive Developer: Corporate Office Properties Trust

This Gold LEED certified project shows how green building can be profitable for developers and smart for tenants. Completed in March 2005, this four-story, 125,000-square-foot speculative office building was fully leased to a large, credit worthy tenant during construction.

Underscoring their commitment to green building, this property is among 14 other properties that Corporate Office Properties Trust (COPT) has registered in the LEED program.

### A Model of Economic Sustainability

COPT considered both short-term viability and their market position over the long term in evaluating just how profitable the project would be. But they note “shareholders today are arguably more concerned with the short-term issue of our ability to provide their expected returns.”

Construction costs of \$2.84 per square foot were offset by a \$0.70 per square foot annual energy savings. To achieve an 11 percent unleveraged cash yield on cost, COPT needed to get an additional \$0.31 per square foot in rent on an annual basis. The energy savings would produce a six-month return on investment.

Looking to the long term, the project is in a park that is a core COPT asset, so long-term ownership is all but guaranteed. The developer believes that green building will someday be the norm. Though the office market may not be entirely ready to make the leap to green, COPT sees an increased appreciation for the value that sustainable development brings.

COPT has developed an extensive set of guidelines for tenants, outlining not only the rationale behind green principles for interior improvements, but also offering recommendations, resources and definitions to help tenants create a healthy and comfortable environment.

### GREEN FEATURES

#### SUSTAINABLE SITES

- Bicycle storage and changing rooms.
- A storm water system that removes more than 80 percent of suspended solids and more than 50 percent of the average annual post-development total phosphorous.



“Green development practices are vital to our environment and, as our experience in the field shows, the result is both socially responsible and profitable.”

Randall M. Griffin, President and CEO,  
Corporate Office Properties Trust

### FAST FACTS

**Address:** Annapolis Junction, MD

**Company/Developer:** Corporate Office Properties Trust

**General Contractor:** Clark Construction

**Property Type:** Office

**Square Feet:** 125,000 square feet

**Height:** 4 stories

**Building Description:** This building includes 31,000-square-foot floor plates, a precast and high performance glass exterior, and 37-foot clear span leasing bays, three elevators, and custom wood and specialty lighting in the lobby.



- A white roof to reduce heat islands.
- Exterior lighting designed to prevent spillage beyond the site.
- Tenant guidelines explaining the LEED program and encouraging green practices.

#### INDOOR ENVIRONMENTAL QUALITY

- Air quality monitoring to ensure safe levels of CO2.
- Use of low VOC adhesives, sealants, paints and carpet and no urea formaldehyde used in the composite wood products.
- A built-in walk-off mat system at entry and negative pressure in janitor's closets to avoid dispersing chemical vapors.
- Air filtration to MERV 13 level.

#### WATER EFFICIENCY

- A landscaping irrigation system that employs sophisticated controls and other special equipment to use 50 percent less water than required by most systems.
- Low-flow fixtures and dual flush toilets to reduce water use by 40 percent compared with typical buildings.

#### ENERGY AND ATMOSPHERE

- Demand-controlled ventilation, 100 percent economizer cycles and other features to deliver energy performance that is 40 percent more efficient than the level required by code.
- Zero use of CFC-based refrigerants.

#### MATERIALS AND RESOURCES

- Diversion of 75 percent of construction debris from landfills to recyclers.
- Recycling of more than 10 percent of used materials.
- More than 50 percent of wood materials in construction grown in Forest Stewardship Council (FSC) certified, sustainable forests.

*Read more about NAIOP's 2005 award winner at [www.naiop.org/developmentmag/specialsections/200504indexb.cfm](http://www.naiop.org/developmentmag/specialsections/200504indexb.cfm)*



*Exterior views*





*Symphony Tower*

"We have experienced first hand the importance and economic viability of sustainable developments like 1180 Peachtree. Hines has had a longstanding commitment to sustainability, and we plan to have a heightened focus on this initiative going forward."

Jeff Hines, President, Hines

## FAST FACTS

**Address:** Atlanta, GA

**Company/Developer:** Hines

**Design/Builder:** Pickard-Chilton Architects

**Property Type:** Office

**Square Feet:** 670,000 square feet

**Height:** 41 stories

**Building Description:** This office tower with ground floor retail has more than one acre of the site devoted to public spaces, plazas, gardens and seating areas adjacent to the city's largest public park. The exterior finishes include articulated metal and glass curtain walls, 10-foot floor-to-ceiling glass on all office floors and up to 40-foot glass walls in the lobbies.



WINNER

## 1180 Peachtree Developer: Hines

Located within walking distance to a wide amenity base of hotels, restaurants, fine arts venues and Piedmont Park, 1180 Peachtree was the first high-rise office building in the world to earn pre-certified Silver status in the LEED Core and Shell Development program while still under construction. The building has since been certified at the Gold level.

Office tenants enjoy superior access to major arteries (I-75/I-85, Peachtree Street, 14th Street) and public transit via the Arts Center MARTA station located one block north. The building is 66 percent leased by law firm King & Spalding, features two upscale restaurants, high-end retail and seating areas adjacent to the new Symphony Hall.

## GREEN FEATURES

### SUSTAINABLE SITES

- Changing rooms equipped with showering facilities and bicycle storage facilities in a prominent location easily accessible for cyclists.
- A storm water management design that includes a storage/retention/detention vault and a 50 percent vegetated roof.
- Chemical use areas and copy room have been physically separated with deck-to-deck partitions.
- In spaces where water and chemical concentrate mixing occurs, drains are plumbed for environmentally appropriate disposal of liquid waste.
- A high efficiency variable flow chiller plant, outdoor air pre-conditioning units with heat recovery and high efficiency variable speed motors on the air handling units and the series fan-powered boxes.
- Chillers have real-time monitoring to assure optimal performance and efficiency of each chiller per their design standards.
- Special structure to accommodate tree "troughs" that are 4' deep, 5' wide and 30' long with a 2' deep horizontal zone between the troughs to allow tree roots to grow horizontally and vertically with minimal confinement.
- A 50,000+ gallon tank that collects and stores both stormwater and condensation from the HVAC system, resulting in a 50 percent net decrease of storm water runoff from this site.
- Water treatment equipment and program incorporates corrosion coupon racks to identify any corrosive environment within the piping.
- Outside air system filters the air with high efficiency electronic air filtration.

- Customized air handling units have stainless steel coil supports and condensation pans to eliminate corrosion for added life expectancy, reduced maintenance costs and improved air quality standards.
- UVc emitters that kill mold and bacteria in the air stream and keep the coil system clean were utilized, thereby reducing maintenance costs.

#### INDOOR ENVIRONMENTAL QUALITY

- Zero exposure of non-smokers to environmental tobacco smoke.
- A carbon dioxide monitoring system capable of measuring CO2 differentials for all types of occupancy.
- All carpet systems meet or exceed the current Carpet and Rug Institute's Green Label Indoor Air Quality Test Program requirements.
- Building occupants in 90 percent of regularly occupied spaces will have direct site lines to perimeter glazing.
- Minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks.

#### WATER EFFICIENCY

- Fluid velocities in piping have been designed to minimize friction loss (thereby reducing horsepower requirements) and to minimize erosion of the piping inner wall (thereby extending the service life of the piping systems, coils and chillers).

#### ENERGY AND ATMOSPHERE

- High-end automatic filter washing system has been incorporated on the outside air units, eliminating the requirement to change out filter media.

#### INNOVATION AND DESIGN PROCESS

- Implementation of Hines' standard maintenance practices that are managed via a customized preventive maintenance and work order system called AWARE. Proper access and installation of the equipment was taken into account during the design process.
- Tenant design manual provided to tenant prospects educating them on LEED efforts of the base building core and shell; LEED points achievable to tenants as a result of the base building LEED efforts; numerous links to Web sites offering more information on a variety of sustainable subjects; specifications on a wide variety of materials typically used in interior projects such as drywall, carpet, wall and floor coverings, lighting, etc.
- Photo documentary of the construction of tree troughs will chart and record tree growth over several years to assist Trees Atlanta, the City of Atlanta's Arborist and Midtown Alliance in establishing a best management practice for the planting and care of trees on site.

#### RETURN ON INVESTMENT ANALYSIS

- Annual operating cost savings of \$500,000 minimum.
- Payback of three-five years, based on conservative energy savings projections.



*Lobby fountains*



*Navy League Building*

## FAST FACTS

**Address:** Arlington, VA

**Company/Developer:** The Keech Co., LLC

**Design/Builder:** PageSoutherlandPage, LLP

**Property Type:** Corporate Headquarters

**Square Feet:** 220,000 square feet

**Height:** 7 stories

**Building Description:** The office building with ground floor retail and four below-grade floors of underground parking consists of a precast cladding and glass curtain-wall envelope with a steel and concrete structure. The first pilot project under Arlington County's Green Building Incentive Program, the building has a LEED Silver rating. Documentation for consideration as a LEED Gold rated facility has been submitted.

## Navy League Building Developer: The Keech Company, LLC

The building is located within a mixed-use urban community just outside the Washington, DC, city limits. Two bus lines are located within a ¼ mile radius, with commuter rail located within a ½ mile radius, encouraging building occupants and visitors to take advantage of public transportation.

The special significance of this development is that the building was fully designed with only 10 percent of the end-user tenants identified during the design stage. It is now occupied by the Navy League.

## GREEN FEATURES

### SUSTAINABLE SITES

- Bicycle racks and cages for storage provided for 103 spaces on levels B1 and B2 of the building.
- Two ADA compliant locker/changing rooms with showering facilities on level B1, accommodating 5 percent of building occupants.
- Reserved parking spaces for carpool participants and electric charging stations for electric vehicles in the Arlington community.
- Storm water management system designed to remove 80 percent of the average annual post-development total suspended solids (TSS) and 40 percent of the average post-development total phosphorous (TP), based on the average annual loadings from all storms less than or equal to the two-year/24-hour storm.
- Energy Star roofing system consists of a highly reflective and highly emissive membrane that covers over 75 percent of the total roof area.
- The Navy League is contracted with a green cleaning company to reduce overall hazardous solutions used in the building. The contractor provides periodic training sessions for all staff members to ensure that they are up to date on sustainable cleaning procedures.

### INDOOR ENVIRONMENTAL QUALITY

- Outdoor air sensors located on the building roof.
- Management System (BMS) to compare outdoor levels to the individual space sensors. When a significant CO2 differential exists, the BMS will increase the percentage of ventilation to meet preset CO2 levels.
- Thermal comfort standards, including humidity control within established ranges per climate zone, met the requirements of ASHRAE 55-1992. Retail spaces were constructed with separate HVAC systems and tenants were given the option of installing thermal comfort devices with the aid of building engineers.
- Carpet systems exceed the Carpet Rug Institute Green Label Indoor Air Quality Test Program.

- Adhesives are less than the VOC limits of South Coast Air Quality Management (District Rule #1168).
- All filler sealants (perimeter precast sealants) exceed the Bay Area Air Resources Board (Reg. 8, Rule 51).
- Exterior metal paints and coatings are less than the VOC and chemical component of Green Seal requirements.
- All composite wood and bonding agents are urea-formaldehyde free.
- All public entrances are equipped with overhangs and entrance mat systems.
- All janitorial spaces and copy rooms were designed with structural deck-to-deck partitions and independent ventilation systems.

#### WATER EFFICIENCY

- Stormwater collected from the building roof and terrace is filtered and diverted to a subsurface storage system. The collected rainwater is used as the sole source of water for irrigation onsite.
- A 57,344-gallon detention tank resides in the bottom level of the four-story underground parking garage. 100 percent of collected rainwater will be re-used before water is extracted from the municipality.
- Water efficient fixtures including toilets, urinals, showerheads, faucets, replacement aerators and metering faucets.
- Lavatories are provided with infrared sensors (sensor activated faucets) and highly aerated spray. Toilet fixtures have dual flush capability and use only 1.1 gallons per flush (GPF) and 0.8 GPF as necessary.

#### ENERGY AND ATMOSPHERE

- High performance envelope construction materials (roof, walls and fenestration), ventilation monitoring systems, and reduction of lighting and electric loads by use of day lighting and lighting control systems.
- Two centrifugal water cooled water chillers that utilize R-134a refrigerant (HFC) serving the needs of the tenant spaces. Refrigerant cooling units serving the elevator machine room, penthouse elevator lobby are installed in the building.
- Building mechanical systems are HCFC-free, with the exception of a few smaller, non-base building systems that were not available without HCFC refrigerants at the time of construction. Overall HCFC systems, retail spaces included, make up less than 15 percent of all building HVAC systems.

#### MATERIALS AND RESOURCES

- Onsite sorting of all waste production by the construction team—over 75 percent of all construction, demolition and land clearing debris had been diverted from landfills into recycling facilities by project completion.
- Preference was given to products containing high amounts of recycled content during the design development and procurement stages. Upon project completion, 25 percent of all building products contained a portion of recycled material.



*Front entrance*

- More than 20 percent local and regional source materials to reduce the environmental impact of transportation. More than 50 percent of the building's wooden materials were procured from manufacturers supporting sustainable harvesting practices outlined by the Forest Stewardship Council (FSC), including structural framing, flooring finishes, furnishings and non-rented temporary construction.

#### **INNOVATION AND DESIGN PROCESS**

- The Navy League hired two third-party companies to perform commissioning activities: CH2M Hill (fundamental building systems) and MTF Architecture, Inc. (additional commissioning of LEED documentation).
- Each discipline of the project team required to have a LEED Accredited Professional.
- Construction Indoor Air Quality Management Plan was developed in the preconstruction phase to ensure the protection of onsite materials from mold growth and air pollutants.
- Project team developed an educational system involving interior and exterior signage, identifying sustainable features throughout the building, an informational brochure for visitors and tour participants and an education manual included in the tenant leasing package.

#### **RETURN ON INVESTMENT ANALYSIS**

- Initial premium in design costs and special measures taken to achieve a 38 LEED point rating will be recovered in less than 10 years by a combination of reduced energy and water costs and revenue from the bonus density granted the developer as an incentive by Arlington County.
- The installed energy and water systems are estimated to provide 25 percent and 67 percent savings respectively, and a total annual cost savings of over \$93,000.



Photography by Tom Crane Photography

"Electricity usage is exceptionally low and that reduces our operating costs. The high quality of the indoor air contributes to a healthy and productive work force. And the amount of natural light is incredible. It's soothing and gives almost every employee a window seat. This building is strong evidence of our company's commitment to the environment."

Pete Cleff, PPL Project Manager, The Plaza at PPL Center

## FAST FACTS

**Address:** Allentown, Pennsylvania

**Company/Developer:** Liberty Property Trust

**General Contractor:** L.D. Driscoll Company

**Property Type:** Office

**Square Feet:** 252,193 square feet

**Height:** 8 stories

**Building Description:** Liberty Property Trust's office development for PPL Corporation, designed by Robert A. M. Stern Architects, showcases environmental features that save water and energy, minimize the impact on the environment and provide an inspiring, healthy workplace for PPL's 600 employees.

## The Plaza at PPL Center Developer: Liberty Property Trust

Winner of the AIA/COTE Top Ten Green Projects in 2004, NESEA's 2004 Green Building Award for Large Buildings and the Urban Land Institute's 2004 Award for Excellence, this urban redevelopment project makes good on the concept "Build tall instead of sprawl." It uses only 1.7 acres for 252,193 square feet of rentable space.

This LEED Gold certified building is the first privately owned building in Pennsylvania to achieve that status. The building's green design elements include a dramatic eight-story central glass atrium to bring natural light deep into the core of the building, a transparent south facade with two two-story winter gardens to bring additional light into the floor plates, CO2 sensors to ensure fresh air throughout the building and a public plaza with fountains and reflecting pool that have become a community gathering center.

The Plaza at PPL Center is the new headquarters to Allentown's largest business, PPL Corporation. PPL Corporation commissioned Liberty Property Trust to develop the project on a site designated as a Keystone Opportunity Zone. Since opening, the Plaza has been a catalyst for economic development in Allentown's business district.

### Urban Redevelopment as a Win-Win Option

The City of Allentown was delighted to keep its largest business in the city and see revitalization of its west end. PPL Corporation and other tenants in the building receive tax incentives for their site selection. And Liberty Property Trust is earning an initial development yield of 11.3 percent on development costs of \$60,686,000. At full occupancy, the stabilized yield is projected to be 12 percent. Building green costs about \$104 per rentable square foot for the building core and shell construction—a 1.5 percent premium over traditional construction.

## GREEN FEATURES

### SUSTAINABLE SITES

- Accessibility to major public transportation.
- Existing parking garage retrofitted with electric vehicle recharge stations.
- Bicycle storage and changing rooms for five percent of building occupants.
- Vegetated roof and filtered storm water that removes 80 percent of suspended solids.
- Highly reflective roofing and shading of more than 30 percent of hardscape surfaces reduces heat islands.

## INDOOR ENVIRONMENTAL QUALITY

- CO2 sensors in every room and an enthalpy recovery wheel supplemented by humidification control to ensure high thermal comfort levels.
- Low-emitting materials used for paints, carpets, adhesives, sealants and composite wood paneling.
- Use of green cleaning products.
- Eight-story central glass atrium brings in natural light.
- More than 90 percent of all regularly occupied space on office floors has direct line of sight to an outside window.
- Indoor gardens bring in daylight, control glare and improve indoor air quality.
- Individual temperature and light controls for individual offices.

## WATER EFFICIENCY

- Landscape vegetation selected to thrive on rainwater only.
- Vegetated roof and landscape reduce site permeability by just over 15 percent.
- Low-flow fixtures and waterless urinals to reduce water use by 45 percent, compared with typical buildings.

## ENERGY AND ATMOSPHERE

- Energy system designed to exceed standard by more than 30 percent.
- HCFC- and halon-free HVAC equipment.
- Solar control through Bris Soleils and canopies.
- Ice storage tanks that reduce chiller sizes by nearly 50 percent.
- Photometric sensors and occupancy sensors.
- An environmentally-friendly central cooling system that is 25 percent more efficient than traditional systems and includes a two-mile-long network of pipes that deliver chilled water from a 50,000-square-foot cooling plant.
- Zero use of CFC-based refrigerants.
- An HVAC system that includes cooling towers and pumps at the roof level, with a self-contained air-handling unit on each floor.

## MATERIALS AND RESOURCES

- More than 20 percent of building material recycled.
- More than 90 percent of construction, demolition and land clearing debris recycled.
- About 25 percent of building materials manufactured within 500 miles of the building.
- More than 85 percent of wood-based material from sustainably managed forests.



*Lobby*

Photography by Peter Aaron-Esto



*Winter garden*





*Jefferson Green*

“To deliver better product to the market place is fundamental to our industry. To deliver product that contributes to our planet is fundamental to our future. The LEED criteria is a tool by which we can measure how our product did both.”

Rick Davis, President,  
R. Davis Companies

## FAST FACTS

**Address:** Albuquerque, New Mexico

**Company/Developer:** R. Davis Companies

**Design/Builder:** Dekker/Perich/Sabatini

**Property Type:** Office

**Square Feet:** 85,000 square feet

**Height:** 3 stories

**Completed:** September 2006

**Building Description:** As the first building in New Mexico to be Pre-Certified under LEED-CS, this three-story office building blends local traditions with high-tech performance by combining a thick stucco wall perforated by deeply recessed windows with a sleek curtain wall system, varying the glazing and shading strategies according to the orientation of each façade. Operable windows provide additional fresh air and individual control over the environment.

## Jefferson Green Developer: R. Davis Companies

This three-story, 85,000 square-foot office building focused on incorporating meaningful sustainable features into a market-rate speculative office building in order to use 30 percent less water and 45 percent less energy than a typical local office building. This is a private project without grant funding or any requirement to pursue LEED certification, so the team focused on selecting design strategies that would enhance the daily experience of building occupants, support local businesses and make financial sense in terms of initial investment and operational savings. The largest areas of investment for this project were in the façade, for the glazing and shading devices, and in the mechanical/electrical systems, including the underfloor air system and lighting upgrades. These features are expected to have a large positive impact on occupant satisfaction as well as building performance.

This is the first LEED-CS project and one of the first LEED-CI projects in New Mexico. Jefferson Green has been Pre-Certified under LEED-CS at the Silver level, and is currently under review for final certification. The Dekker/Perich/Sabatini tenant space within the building is also pursuing Silver certification under LEED-CI. In addition to taking advantage of the sustainable features of the building’s core and shell, this tenant space includes many low-emitting, recycled, renewable and regional materials and furniture systems.

## GREEN FEATURES

### SUSTAINABLE SITES

- An Energy Star, high-emissivity roof was installed to reduce cooling load and heat island effects.
- The building was sited to preserve existing mature pine and cottonwood trees to the south of the building.
- Cutoff light fixtures were selected for exterior parking lot and building lights to minimize light pollution and its effects on night sky access and nocturnal habitats.
- The building is located along a street served by two bus routes, and bike racks and showers were provided, to enable alternative means of commuting.

### WATER EFFICIENCY

- Plumbing fixtures were selected to use 30 percent less water inside the building, while allowing for ease of use and maintenance.
- Low-flow urinals and faucet sensors reduce water use in restrooms.
- Flow restrictors reduce water use at kitchen faucets.
- The site and parking areas are designed to direct run off to planted areas for passive water harvesting.

- All new landscaping is based on xeric principles and all irrigation is provided by the city's industrial wastewater/nonpotable line.

#### ENERGY AND ATMOSPHERE

- The building is designed to use 45 percent less energy, according to energy comparison models based on ASHRAE 90.1
- An evaporative cooling system provides efficient cooling most of the year, with a backup refrigerated cooling system for humid days.
- This system can run on 100 percent outside air for free cooling.
- Air is distributed by an underfloor air system, which provides additional efficiency by allowing warmer temperature air to be used for cooling.
- The exterior design blends local traditions with high-tech performance by combining a thick stucco wall perforated by deeply recessed windows with a sleek curtain wall system.
- The amount of glazing and type of shading devices vary to respond to solar orientation.
- External horizontal shades on the SE and SW facades help balance good daylighting with energy efficiency.
- The building was commissioned to ensure proper operation of systems.
- Energy Star appliances (computers, kitchen, etc.) were selected for the DPS TI space to reduce electrical use.

#### MATERIALS AND RESOURCES

- Over 80 percent of the construction waste was recycled (over 4,000 tons recycled).
- Many of the building materials were selected to have high recycled content or be harvested and fabricated regionally.
- Aluminum window/storefront/curtain wall frames contain at least 40% recycled content.
- Structural steel has over 90 percent recycled content.
- Concrete contains flyash (replacing 20 percent of the cement).
- Rooms for collection and storage of recyclables are located on each floor and a recycling service has been contracted.
- The carpet in the DPS tenant space has over 30 percent recycled content, and renewable materials such as marmoleum flooring, countertops and tackable wall coverings were used.
- 67 percent of the existing furniture was reused in the DPS tenant space.

#### INDOOR ENVIRONMENTAL QUALITY

- Smoking is banned in the building and a designated smoking area was created at the west side of the building.
- Underfloor air system for increased ventilation and individual control of temperature.
- Floor air diffusers are in movable tiles and can be relocated as needed.
- Designed to daylight over 75 percent of the floorplate.
- High efficiency, high transmittance glazing for daylight and solar performance.



*Staircase*



*Lobby seating area*

- Over 150 operable windows are located throughout the building to allow individual control over ventilation and additional fresh air.
- Low-emitting paints, coatings, adhesives, sealants, carpets and composite wood were used in the core and shell and the DPS tenant space to prevent the offgassing of harmful chemicals.
- Construction Indoor Air Quality Management Plan protected ductwork and porous materials from contamination during construction.
- Furniture in the DPS tenant space is Green Guard Certified and contains recycled material. Any reused furniture that was refurbished uses low-emitting materials as well.

#### INNOVATION AND DESIGN PROCESS

- An innovation point was earned for implementing a public education program, consisting of signage explaining the sustainable features of the project, and a written case study that was provided to the USGBC for public distribution.
- Two innovation points were earned for Exemplary Performance in Recycled Content and Regional Materials. The project achieved 32 percent recycled content and 67 percent regionally manufactured materials.
- A LEED Accredited Professional was involved in the project from the earliest stages, and remained involved throughout construction. Her involvement in the project included:
  - Initial feasibility discussions using the LEED scorecard.
  - Design feedback and evaluation of alternative systems, strategies and materials throughout the design process.
  - Coordination with the engineers and consultants.
  - Specification of LEED products and methods.
  - Review of LEED submittals and management of LEED documentation.

#### RETURN ON INVESTMENT ANALYSIS

- Since the project was completed in September 2006, ROI analysis is not yet available.



*View of workstations and conference rooms*



Photography by Brian Gassel of Thompson, Ventulett, Stainback & Associates, Inc.

“Careful preplanning and coordination by the owner, designers and contractor during the design development phase was critical in maximizing the green building attributes and qualities that were incorporated into the College of Management Building. Green building goals were set and their achievement closely monitored, which resulted in the building achieving a higher certification than originally anticipated.”

The Holder/Hardin Team

## FAST FACTS

**Address:** Atlanta, GA

**Owner:** Georgia Institute of Technology

**Development Manager:** Jones Lang LaSalle

**General Contractor:** Holder/Hardin, a joint venture between Holder Construction Company and Hardin Construction Company, LLC

**Property Type:** University

**Square Feet:** 1.1 million square feet

**Building Description:** The development includes three academic buildings, a 252-room hotel and conference center and a 1,500-car parking deck. The exterior features brick and stucco-clad reinforced concrete structures.

## Technology Square Development Manager: Jones Lang LaSalle

In 1996, the Georgia Institute of Technology began developing its vision to expand their campus eastward across 14 lanes of Interstate and into the adjacent Midtown of Atlanta.

Begun in the fall of 2001 and completed in the summer of 2003, this \$180 million, eight-acre, 1.1 million-square-foot complex includes three academic buildings, a 252-room hotel and conference center and a 1,500-car parking deck and retail space.

### An Urban Village Revitalizes Midtown Atlanta

What distinguishes Technology Square from the typical campus plan is that the building components adjoin one another to create an urban street grid—a place for students and the community to socially interact. Once a four-lane artery, it is now a two-lane retail corridor with on-street parking and tree-lined pedestrian sidewalks.

As a leading model of sustainable development on the campus, this complex serves as an educational tool for the community. Educational tours, with the help of signage and an interactive computer system in the lobby, allow visitors to learn about the project’s unique sustainable design and technological features.

Since the announcement of Technology Square, more than four million square feet of new development has been completed or is under construction, sparking a revitalization of the Midtown area.

With the help of the Epstein Group, a LEED consultant, the College of Management Building earned Silver certification.

## GREEN FEATURES

### SUSTAINABLE SITES

- Accessible to public transportation.
- Bicycle storage and changing rooms.
- Tree removal and replanting.
- Storm water management.
- Light-colored material to reduce heat islands used on most exterior horizontal surfaces, paving and parking deck.
- White heat-reflecting roof on management building.
- Erosion control and management.

## INDOOR ENVIRONMENTAL QUALITY

- Permanent walk-off grates and mats at entries.
- Janitors' closets and copiers located in separate, exhausted rooms.
- Air monitoring of CO2 levels.
- Use of low VOC adhesives, sealants, paints, carpet, composite wood and agrifiber and no urea formaldehyde used in composite wood products.
- Atriums, courtyards and glass bring in natural light.
- Sealed ducts and pollutants ventilated outside.

## WATER EFFICIENCY

- Drought resistant and native plants require no potable water.
- Water-efficient drip-irrigation system with moisture sensors that reduces water requirements by more than 50 percent.
- Water-saving lavatory fixtures reduce water use by more than 30 percent over requirements.

## ENERGY AND ATMOSPHERE

- Computerized energy management and control system that measures energy use in mechanical and electrical systems.
- 16.5 percent more energy efficiency than the national standard.
- Zero use of CFC-based refrigerants.
- CFC reduction in HVAC equipment.

## MATERIALS AND RESOURCES

- Recycling of most demolition and construction waste.
- Recycled materials used throughout, including recycled steel, carpet that is more than 50 percent recycled.
- Majority of products used were salvaged, recycled or harvested in Georgia and neighboring states.



Photography by Brian Gassel of Thompson, Ventulett, Stainback & Associates, Inc.

Photography by Brian Gassel of Thompson, Ventulett, Stainback & Associates, Inc.

