

The project was initiated not only to introduce green building to the Town of Morristown but also to provide expanded office space and offer additional parking options to the residents of Morristown. 14 Maple Avenue gives the organizations a renewed public face as a part of the first LEED Certified building in Morristown.



Minno &amp; Wasko Architects



Halkin Photography, LLC



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## 14 Maple Avenue Morristown, NJ



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*"14 Maple Avenue was one of the first LEED projects that Minno & Wasko completed, and there was a tremendous learning curve. The success of the project is completely attributed to the owner and the entire team of consultants, design professionals, tenants, and contractors who were 100% behind the sustainable concept. We all shared a common vision for 14 Maple Avenue, and in the end, we attained our goal."*





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**Location of Project:** Morristown, NJ

## Overview

Completed in December of 2008, 14 Maple Avenue is an office building and parking garage, with the Morristown Parking Authority as the owner and a tenant. The Geraldine R. Dodge Foundation occupies the top 2 floors of the building and was the impetus for constructing a green building. The remainder of the office is occupied by non-profit tenants: The Seeing Eye, Fannie E. Rippel Foundation, Morristown Partnership, and The Arts Council of the Morris Area. 14 Maple Avenue is a part of a community-adapted rehabilitation plan created to enhance the central business district of Morristown with new commercial, retail, and residential development.

## Transportation

In order to enhance choices for getting around, many innovative design elements were introduced into the planning and construction of 14 Maple Avenue. Foremost, the design of the parking garage promotes public open space by incorporating a high density design, rather than surface lots, to efficiently provide 800 parking spaces for office employees, residents in the adjacent buildings, and open parking for the public. Bicycle racks and changing rooms were also added to promote healthy commuting options, neighborhood interaction, and a reduction of vehicle-related emissions that contribute to smog and air pollution. Also, the building is strategically located within walking distance to an existing mass transit network that provides a forum for alternative transportation choices. There are three New Jersey Transit bus stops within one-quarter mile of the site, and a commuter train line within one-half mile that connect 14 Maple Avenue to a broader mass transit network. These different transportation approaches are all connected through pedestrian walkways and directional signage that strengthen the existing downtown network and promote community interaction.

## Water and Energy

Utilizing green principles in the design and construction of 14 Maple Avenue has favorably impacted the water and energy use for the building. The water use reduction in the building is reduced by 43% according the project LEED-NC v2.1.

Energy savings is also accomplished by the highly-efficient geothermal mechanical system combined with the high-performance

## Project Team

**Architecture, Structure & Interior Design:** *Minno & Wasko Architects and Planners*

**Interior Design & Landscape Architecture:** *Wallace Roberts & Todd – Geraldine R. Dodge/Fannie Rippel Interiors*

**Garage Architect:** *Desman Associates*

**MEP Engineer:** *Martin T. Lawler*

**Civil Engineer:** *Omland Engineering Associates, Inc.*

**LEED Consultant:** *Rocky Mountain Institute*

**Commissioning Agent:** *Dome-Tech, Inc.*

**General Contractor:** *William Blanchard Co.*

**Legal:** *Greenbaum, Rowe, Smith, Ravin, Davis & Himmel, LLP*

building envelope. The renewable energy source in place at 14 Maple Avenue—the garage-roof mounted solar-harnessing photovoltaic panels—contributes 24% of the buildings electrical usage. The building is also estimated to save 45% percent of its energy costs due to measures such as daylighting, lighting motion sensors, the use of ENERGY STAR appliances, and compact fluorescent lamps. Atop the office building, a multi-functional green or vegetative roof reduces the solar heat load absorbed through the roof and provides a tenant-community gathering space. The landscaped green roof system also retains and distributes rainwater to reduce the impact of the building on the existing storm water retention system. Plantings selected for the roof are native to the region and are drought-resistant. No permanent irrigation system is required.

## HVAC and Envelope

Heating and cooling for the office begins beneath the parking garage, where a series of geothermal wells reach depths of 400 feet below the garage surface. The closed-loop system takes advantage of the stable temperatures of the earth at this depth, using less energy to heat and cool than if outside air was utilized. A raised access floor system in the office offers flexibility to the air distribution as needs change over the life of the building. The exterior wall system consists of rigid insulation in the masonry cavity, as well as batt insulation between the metal stud framing, and a continuous fluid-applied air barrier to add to the building's efficiency. Operable, fiberglass casement windows include glazing with films and gas specifically designed for the project site,



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## Ratings and Awards

2009 New Jersey Smart Growth Award

2009 Green Success Stories - Real Estate & Construction Review

2009 NJ Golden Trowel Awards – Special Recognition Award

2009 New Jersey ULI Land Use Awards

USGBC LEED Gold Certification – Pending

orientation, and climatic needs. This glazing also allows a high level of visible light transmission while eliminating the heat gain, assisting in the reduction of cooling load and electricity usage. In order to take advantage of the high-performance windows, aluminum sunshades on the building exterior are provided to block summertime solar heat gain while allowing solar warmth in winter, with a size and layout calculated based on site orientation and sun angles. These devices reduce cooling demand in summer and heating demand in winter. Interior light shelves are used to reflect daylight from high transom windows deep into interior spaces, minimizing the need for electric lighting during daytime hours.

## Interior and Operations

Many environmentally friendly finish materials were installed—for example flooring made from materials such as cork and flaxseed. Also, FSC (Forest Stewardship Council) certified wood veneers were used in an effort to promote responsible management of the world's forests. Furthermore, the indoor air quality is improved by low or no-VOC paints used throughout the building that reduce toxic off-gassing. Daily building operation also supports a mandatory recycling program of all traditional materials such as paper, metal, plastic, and glass as well as a compact fluorescent lamp (or CFL) recycling program. Green cleaning products are encouraged by the building owner.

One main highlight of 14 Maple Avenue's design is the three-story Biowall in the Geraldine R. Dodge tenant space. This living wall extends from the third floor through the rooftop penthouse alongside an internal stair and consists of native plants that assist in purifying the interior air quality. As part of the mechanical design, airflow passes through the plant wall to maintain higher humidity levels in the building at times when the air may typically be too dry. At the time of design and construction, the Maple Avenue Biowall is the largest installation in the United States.

Central and high-profile to the Morristown community, the office

building and parking garage at 14 Maple Avenue has developed a series of educational signage to introduce green ideas to the community.

## Process

### Design

A two-day design charrette was held in July 2004 as a start to the project design. The brainstorming session included all the design professionals, as well as the known tenants and LEED consultant. Throughout the charrette, general green principles were discussed, as well as how to integrate some of these elements into the Maple Avenue project. The workshop generated a report, which included a to-do list and green strategies for further exploration during the next phase of the project.

Throughout the design development and construction document phase, weekly progress conference calls were held with the same attendees from the initial design charrette. Also, the general contractor joined the team, assisting in cost analysis and becoming familiar with the intricacies of the project's green elements. We were able to review all sustainable ideas from a design, as well as return on investment viewpoint. The commissioning agent reviewed the progress drawings and specifications during design development and provided their input toward the documents.

### Build

As construction was ongoing, the LEED consultant kept track of the overall LEED Checklist and responsibilities. All team members started to gather and upload the necessary documents to the LEED Online website for eventual review by the USGBC. The general contractor worked with subcontractors to gather necessary paperwork for documentation of the material LEED credits, while the design professionals reviewed submittals to verify compliance with the sustainable-based construction drawings and specifications. On-site coordination meetings assisted all team members in maintaining schedule and compliance with the LEED requirements of the project.

### Operate

The HVAC system for 14 Maple Avenue is on a Building Management System, centrally located for the Morristown Parking



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Authority to monitor and control all aspects of the heating and cooling. The building has been programmed based on the anticipated working hours to reduce energy use at off-hours when there is no occupancy. Employees were trained on the Building Management System by the commissioning agent and the general contractor. As previously stated, the building has a green cleaning program, as well as full recycling throughout. To assist with the recycling for the tenants, the interior architects integrated trash and recycling into the millwork design of the office spaces.

Evaluate/Commissioning

The commissioning agent was present throughout the design development and construction document phase to assist in preparation of the drawings and specifications, tailored to this specific LEED project. During the construction phase, the commissioning agent participated in shop drawing review and prepared installation checklists for the mechanical subcontractor’s use. After mechanical installations, the commissioning agent was involved in equipment testing, owner training, and final documentation for the prerequisite and enhanced commissioning points on the LEED Checklist.

As part of the enhanced commissioning of the project, there was a post-occupancy review of the systems. Throughout the first year of occupancy, the mechanical and building management system in place was constantly monitored and adjusted as necessary with the change of seasons. After a baseline of a full climatic year, we anticipate that the system has been adjusted for the coming years.

Finance

All potential sustainable design elements were reviewed for initial cost and payback before making any final decisions regarding inclusion into the project. The payback times estimate for elements that were selected for the project include:

Exterior Shading devices:	0 years
Fluid applied air barrier:	0 years
Daylighting/occupancy sensors:	0.79 years
Energy efficient lighting:	1.66 years
High performance glazing:	4.28 years
High efficiency HVAC system:	9.03 years

Regarding construction cost, the square foot cost was approximately 50% above a typical “Class A” office building, at a time when the economy was at its zenith. Two caveats to the construction cost are: 1) 14 Maple Avenue has three large sustainable elements, the Biowall, Green Roof, and Photovoltaic System, that contributed approximately 10% of the office construction cost; and 2) the owner, as previously stated, received multiple grants and funding towards some of the sustainable elements to offset this cost. The photovoltaic system is generating \$75,000 in SRECs (Solar Renewable Energy Credit) annually towards its payback for the Morristown Parking Authority.

## Performance

### Energy

Maple Avenue is performing to original design expectations. The building energy use is monitored through the Building Management System. The photovoltaic system, designed for 97kW, has peaked during the summer at 120 kW, meeting expected goals. There have been issues in finalizing the controls for the system during the first year of occupancy; however, now that a full climatic year has cycled, the system is expected to perform well in the future.

### Water

As part of the design program, the building has a minimal amount of plumbing fixtures, all of which are low-flow, therefore the anticipated water load was based on a need for The Seeing Eye foundation to bathe their dogs, and for any water used by the three-story Biowall. A separate system for dog washdown was designed into a private area of the parking garage; however, after occupancy, the foundation has determined there is minimal need to bathe the dogs on-site. The building is seeing less usage from the washdown than anticipated. The Biowall, however, has used more water than expected. Adjustments have been made throughout the first year of the living wall's function, reducing the usage by 90%; nevertheless, the wall still uses over 100,000 gallons of water per year.

## Lessons and Trade-offs

A sustainable project of this scope needs continuous communication and support from all parties involved. There is a need to keep all responsible parties on-track regarding LEED Certification requirements and schedule. During construction, it was often challenging to acquire the necessary paperwork from subcontractors and manufacturers, though this process may become easier with the proliferation of sustainable design in the years since construction of 14 Maple Avenue.

14 Maple Avenue had surprises, both positive and negative. Initial payback times calculated for the sustainable elements assumed an energy cost rate that has since been far exceeded, which lessens the actual return-on-investment times. The photovoltaic system, as previously stated, reaches peak summer loads 25% higher than the anticipated design. The Biowall system, while assisting in

air purification and “greening” of the interior space, has created issues regarding water usage and humidity control. In addition, the low-volume, specialized high-performance windows function very well from a heat gain/heat loss aspect, but have experienced functional operation issues. The lesson with both these design elements is to have caution regarding newer technology and the potential liabilities that may accompany the green qualities.

## List of Green Strategies

### Design

- Transit-Oriented Design (TOD)
- Water-efficient Landscape Design
- Vegetated Roof
- Cool Roof
- Daylighting
- Downlighting
- Properly-Sized HVAC
- Motion Sensors
- Use ENERGY STAR® Appliances
- Geothermal Mechanical System
- Variable Frequency Drive
- Biophilia

### Build

- Construction & Demolition Waste Recycling Plan
- IAQ Plan
- Building Flush

### Operate

- Alternative Transport
- Green Cleaning
- Composting
- Flexible Work Space
- Wire Management System

### Evaluate

- Building Performance Evaluation



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