

**Innovative Recycling and Waste Reduction Grant
IG05-07**

**FINAL REPORT
SEPTEMBER 2007**

The Municipal Green Building Certification Voyage



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**City of Tallahassee IG05-07
Final Report
TABLE OF CONTENTS**

Section 1.0 Introduction	2
1.1 Genesis of the Project	2
1.2 Project Goals & Objectives.....	2
1.3 Innovative Features.....	2
1.4 Information Dissemination	2
Section 2.0 Project Implementation	2
2.1 Initial Project Activities & Timeline.....	2
2.2 Equipment and Services Procured	2
2.3 Problems Encountered	2
2.4 Modifications to Project Activities	2
Section 3.0 Project Results	2
3.1 Achievement of Goals and Objectives.....	2
3.2 Use of Innovative Features	2
3.3 Waste Reduction Achievements	2
3.4 Other Green Building Achievements.....	2
3.4.1 Sustainable Sites	2
3.4.2 Water Efficiency	2
3.4.3 Energy and Atmosphere.....	2
3.4.4 Indoor Environmental Quality	2
3.4.5 Innovation and Design Process.....	2
3.5 Improvements in Cost Effectiveness and Efficiency	2
3.5.1 Project Expenditures	2
3.5.2 Avoided Disposal Fees	2
3.5.3 Cost/Benefit Assessment	2
3.5.4 Recovery of Non-traditional Materials	2
3.6 Transferability.....	2

APPENDICES AND ATTACHMENT

<p>Appendix A – Green Building Team Materials</p> <p>Appendix B – LEED Scorecard</p> <p>Appendix C – Recycling Space Allocation and C&D Waste Reduction Program</p> <p>Appendix D – Green Building Materials and Waste Reduction Procurement</p> <p>Appendix E – Green Database Development and Database Report</p>	<p>Appendix F – FGBC Online Green Products, Professional Services, and Projects Database</p> <p>Appendix G – Educational Program</p> <p>Appendix H – Water Efficient Landscaping Program</p> <p>Appendix I – Green Housekeeping Program</p> <p>Appendix J – Project Photos</p>
<p>Attachment A – USGBC LEED Construction Project Submittal (Binder)</p>	

Section 1.0 Introduction

1.1 Genesis of the Project

In 2003 the City of Tallahassee (City) decided to expand and completely renovate its 30-year old Solid Waste Services (SWS) Administration building. During initial planning, the City decided that the renovated building should set a standard for environmentally responsible design and building practices. To this end, the City decided to seek Green Building (GB) Certification through the United States Green Building Coalition (USGBC) Leadership in Energy and Environmental Design (LEED®) first and then with the Florida Green Building Coalition (FGBC).

1.2 Project Goals & Objectives

The overarching goal of this project was to achieve GB certification for a municipal building, and to document the process so that the project can serve as a successful case study demonstrating the benefits of GB for other Florida municipalities.

In pursuing this goal, the project had a number of specific objectives:

- Establish a Green Building Team (GBT) to manage, support and document the project.
- Ensure the project achieves USGBC certification.
- Implement waste reduction and recycling throughout the deconstruction and construction phases of the project.
- Incorporate Green Building (GB) principles and practices into the design, engineering and physical systems of the building.
- Incorporate GB materials (reuse, recycled-content, and renewables) into construction specifications.
- Implement a multi-media educational program utilizing the building as a living model with tours, literature and signs.
- Develop an online database of green building products, service providers, and certified green buildings in Florida.

1.3 Innovative Features

At the time of this project was initially conceived, research indicated that no municipal building in the City limits or in the unincorporated portion of Leon County had obtained LEED certification. Not many local governments in Florida had attempted to certify a building as Green while at the same time creating educational materials and databases that would benefit Florida's GB industry. Additionally, there was no data source or database that allowed Florida Green builders a place to find information on Green products, professionals, or projects. The project has helped to establish a certified Green building in the State capital and develop a Green database for the building industry through the FGBC.

1.4 Information Dissemination

The audience that has and will continue to be impacted by projects deliverables includes the following: building occupants, other City employees, the building industry, members of the USGBC and FGBC in Florida, and the recycling and solid waste industry in Florida.

Information about the building has been and will continue to be disseminated in various ways. First, the building, situated in the State capital, is a living model of GB principles. The City SWS will make the building available for tours, and literature and signs in the building highlight key elements of GB's five components (energy, water, construction materials, waste minimization, and environmental quality) as well as the life cycle benefits achieved by the project. The project serves as a case study to promote the GB process for all municipalities and counties, as well as for state agencies. FGBC plans to provide a case study of the project on its website.

The Florida Green Building Material Supply, Vendor, and Certified Building Directory/Database developed as part of the project is available for access on the FGBC website and provides the following technical support:

- Promotes the use of Green materials and Green builders to other government agencies (state, county, city), as well as private contractors and building owners.
- Provides a list of GB material supplies.
- Provides a list of GB certified professionals.
- Provides a listing of Certified Green Buildings (private and public) in Florida.

GBT members continue to promote the project's results and the technologies demonstrated through presentations at various solid waste and building industry conferences and articles published in industry journals. The following list provides an overview of where the project was presented or featured:

1. *Public Works* magazine, 2007
2. Recycle Florida Today (RFT) Annual Conference, Presentation, 2006
3. RFT Newsletter, Summer/Fall 2007
4. Kessler Consulting, Inc. Newsletters, 2006 and 2007
5. Solid Waste Association of North America (SWANA) International, WASTECON Annual Conference, 2006
6. SWANA Florida Sunshine Chapter, Annual Conference, 2006

The City also received two awards for its Green Building project. The following organizations presented the City with awards:

1. RFT, Outstanding Waste Reduction Award, 2007 (see photo below)
2. Florida Planning and Zoning Association, Distinction Award, 2007



Section 2.0 Project Implementation

2.1 Initial Project Activities & Timeline

Project Schedule

The project schedule provided and the associated tasks within the initial scope of services were adhered to with one notable exception. The construction of the building completion was delayed for approximately one year due to typical construction delays. Construction was completed in August 2007. The following chart depicts the actual project schedule.

Scope of Services		QUARTER										
		6/2005	9/2005	12/2005	3/2006	6/2006	9/2006	12/2006	3/2007	6/2007	9/2007	
1	Identify and Establish a Working Green Building Team	X	X	X	X	X	X	X	X	X	X	X
2	Research and Evaluate Various Green Building Materials and/or Applications	X	X	X	X	X	X	X				
3	Research Waste Reduction Applications	X	X	X	X							
4	Procurement of Green Building Materials or Waste Reduction Activities for City Construction Project				X	X	X	X	X	X		
5	Research and Development of an Online Database/Directory of FL Green Building Resources and FL Certified Green Building Projects	X	X	X	X							
6	Development of Database/Directory from Task 5 Deliverable on FSEC/FGBC Website								X	X	X	
7	Staff, Building Contractors, & Subcontractors Implementation of and Participation in Green Building Activities listed in Tasks 1, 2, 3, and 4	X	X	X	X	X	X	X	X	X	X	X
8	Program Management and Administration	X	X	X	X	X	X	X	X	X	X	X
9	Progress and Final Reports	X	X	X	X	X	X	X	X	X	X	X

The information listed below details the scope of services, including the project tasks, a task description, and the deliverables for the project. The relative deliverables for each task are included in either the Appendices of this report or in the attached binder.

Scope of Services

Task 1 – Identify and Establish Green Building Team (GBT)

Description:

- Identify program partners, solicit participation and conduct meetings throughout grant period

Deliverables:

- 1) List of GBT members and affiliations (City SWS representatives, Building Services Project Manager, architect, contractors, consultant)
- 2) Quarterly meetings or conference calls as needed
- 3) Review and recommend Green Building (GB) related activities to implement

Appendix A provides the deliverables for this task, including the project team contact list, LEED checklist, and meeting notes to depict the type of discussions had by the project team to guide and implement the GB related activities. Each team member became a LEED “point guardian” and was assigned specific tasks to research and implement in order to obtain a point. The GBT met a total of nine times (7/18/05, 9/19/05, 11/29/05, 12/05/05, 12/19/05, 4/13/06, 9/29/06, 1/11/07, 7/18/07).

Task 2 – Research Green Building Materials and Applications

Description:

- Research GB products and activities to be incorporated into the SWS building project

Deliverables:

- 1) Cost-benefit and life cycle analysis of GB products utilized
- 2) Recommended GB action plan

Attachment A (LEED submittal binder) contains the USGBC LEED supporting documents for the SWS building. It details the cost-benefit and life cycle analysis performed for the entire project including the materials and products utilized in the building. Additionally, *Appendix B* includes the LEED scorecard that was utilized as the GB action plan for the LEED process.

Task 3 – Research Waste Reduction Applications

Description:

- Research Waste Reduction and Recycling (WRR) activities to be incorporated into the SWS building project

Deliverables:

- 1) WRR research to be incorporated into construction project
- 2) Recommended WRR action plan

Appendix C provides the deliverables for this task and includes the research that was performed as well as the action plan. It includes the LEED Materials and Resources (MR) Prerequisite 1: Storage and Collection of Recyclables, and the MR Construction Waste Management Credit 2 documents depicting the WRR incorporated into the project.

Task 4 – Procure Green Building Materials and Waste Reduction Services

Description:

- Procurement of GB materials based upon previous research

Deliverables:

- 1) List of GB materials or Waste Reduction activities to be incorporated into the SWS renovation
- 2) City of Tallahassee Model Case Study incorporating results from Task 1-4

Appendix D provides the deliverables for this task and includes the GB materials procured and utilized in the building as well as the WR activities incorporated into the renovation - MR Credit 4: Recycled Content and MR Credit 5: Regional Materials. Additionally, the Model Case Study is included in two formats – 1) a case study abstract/poster and, 2) a case study guide.

Task 5 – Research and Develop Online Database

Description:

- Research and Identify Florida GB vendors (suppliers) and develop a database – directory
- Research and identify certified Florida GB projects and develop a database of these projects (e.g. commercial and municipal)

Deliverables:

- 1) Database-directory of Florida GB Vendors (suppliers, contractors)
- 2) Database of Florida GB Certified Projects
- 3) Database of Florida GB Certified Professionals

Appendix E provides an overview of Kessler Consulting Inc.’s (KCI) methodology for initial database information gathering and uploading into Access. Additionally, a copy of the Access database report is provided in this Appendix.

Task 6 – Develop Online Database on FGBC Website

Description:

- Create web-based tool that will be running on a server (Dream Weaver – software; Oracle – Engine) and not a download on the FGBC website

Deliverables:

- 1) Create a user-friendly database/directory on the FGBC website of FL GB products, vendors, and FL certified GB projects.

Appendix F provides copies of FGBC database webpages as deliverables for this task. Additionally, the Green database has been uploaded onto the FGBC website and can be viewed under the “Find Green” section (left-hand-side) of the webpage at <http://www.floridagreenbuilding.org/db/>. This section provides information on the following: products, professional services, and projects.

Task 7 – City and Contractor Services

Description:

- Incorporation of GB research and materials into construction

Deliverables:

- 1) List of all GB materials utilized in the construction of the SWS Building included in the City Case Study and Letter Report (Task 4)

The binder that is being sent with the final report as ***Attachment A*** contains the USGBC LEED submittal for the SWS building. It details the Green Building materials utilized by the contractors to construct the building.

Task 8 – Program Management and Administration

Description:

- Coordinate and oversee all project tasks and ensure compliance with DEP agreement

Deliverables:

- 1) Coordinate and manage project (Tasks 1-9)

The project was coordinated and administered according to the guidelines of the DEP contract.

Task 9 – Progress and Final Reports

Description:

- Prepare and deliver quarterly and final reports as specified by Grant contract

Deliverables:

- 1) Quarterly Reports
- 2) Final Report

All quarterly and final reports were sent to the DEP on time. The quarterly reports are not included as an Appendix in this report since the DEP has already received and has them on file.

2.2 Equipment and Services Procured

1st Quarter:

- City executed contract for LEED and GB consulting services with Rolando J Gutierrez Architects and TLC Engineering for Architecture
- GB consulting & project management assistance with KCI

2nd Quarter:

- Project Team conducted Three LEED Design Charrettes
- GB consulting & project management assistance with KCI

3rd Quarter:

- Project Team conducted Two LEED Design Charrettes
- FGBC Board approved official partnership with the City and agreed to upload GB database to their website
- GB consulting & project management assistance with KCI

4th Quarter:

- City executed contract for construction management services with Allstate Construction, Inc.
- GBT secured markets for construction and demolition (C&D) debris reuse and recycling
- GB consulting & project management assistance with KCI

5th Quarter:

- City hired deconstruction and demolition contractors
- City rented containers for C&D debris recovery program
- Demolition and construction contractors are trained on C&D recycling
- Project Team conducted One LEED Design Charrette
- GB consulting & project management assistance with KCI

6th Quarter:

- City hired construction subcontractors
- Project Team conducted One LEED Design Charrette
- Deconstruction, reuse and recycling services performed
- City developed educational and outreach materials detailing LEED program activities
- GB consulting & project management assistance with KCI

7th Quarter:

- Container rental for C&D recycling program
- GB consulting & project management assistance with KCI

8th Quarter:

- Conducted One LEED Design Charrette
- Container rental for C&D recycling program
- Construction recycling continues
- GB consulting & project management assistance with KCI

9th Quarter:

- All furniture purchased and delivered to the facility was made of recycled content, had low or no volatile organic compounds, and is a “cradle to grave” product line
- Container rental for C&D recycling program
- Construction recycling program is completed
- GB consulting & project management assistance with KCI
- Project Team conducted One LEED Design Charrette

10th Quarter

- Construction is completed
- City moves into Green Building
- City submits LEED NC application to USGBC
- Final report completed

2.3 Problems Encountered

The only problem encountered during implementation of this innovative grant was a delay in the construction schedule.

2.4 Modifications to Project Activities

There were no modifications to project work activities other than schedule changes necessary to accommodate construction delays.

Section 3.0 Project Results

3.1 Achievement of Goals and Objectives

The objectives stated in Section 1.2 were met specifically with the following project achievements:

Establish a Green Building Team (GBT) to manage, support and document the project:

1. A GBT was assembled at the beginning of the project and met regularly throughout the design, specification and construction phases of the project to identify Green Building (GB) measures, agree on how they will be achieved, and oversee their implementation.
2. The GBT consisted of the following:
 - a. City (Solid Waste Services, Administration, Facilities Management, and Energy Management)
 - b. Rolando J Gutierrez Architect (lead architect)
 - c. TLC Engineering for Architecture (green building consultant)
 - d. Allstate Construction, Inc. (construction general contractor)
 - e. Rosenbaum Engineering, Inc.
 - f. Kessler Consulting, Inc. (recycling consulting & project management)
1. The GBT conducted nine LEED design charrettes during the course of the project.
2. The City also held regular construction management meetings to ensure GB principles and practices were smoothly integrated into the project.

Appendix A (LEED submittal binder) provides the results for this objective.

Ensure the project achieves USGBC/FGBC certification:

1. The GBT identified GB criteria, strategies to meet the standards, integrated measures into the project, and handled documentation and submittal to U.S. Green Building Council (USGBC) and Florida Green Building Coalition (FGBC) for certification. The building construction project was submitted on September 14th, 2007.
2. The project will achieve LEED certification at a minimum. It may achieve silver level certification.
3. The project is expected to achieve FGBC certification.

Attachment A (LEED submittal binder) provides the results for this objective.

Implement waste reduction and recycling throughout the deconstruction and construction(C&D) phases of the project:

1. The project team members diverted over 78% of C&D debris from disposal.
2. The total amount of material generated equaled 710,310 pounds, with 73% of the material being generated during the demolition phase of the project and the remaining 27% during construction.
3. Materials that were salvaged or reused included metal lockers, furniture, lighting and hardware furnishings, and dimensional lumber.
4. Materials that were recycled for beneficial use included concrete, brick, gravel, wood, carpet, corrugate cardboard, metal and ceiling tiles.

Appendix C provides the results for this objective as does section 3.5.2 of the report.

Incorporate GB principles and practices into the design, engineering and physical systems of the building:

1. The project was on budget and is Green.
2. The new building is expected to utilize at least 19.1% overall less energy as compared to a “standard” building.
3. The new building is expected to reduce domestic water usage by more than 56.5% with the installation of innovative water fixtures (ultra low flow faucets, waterless urinals, dual flush toilets).
4. The new building is expected to reduce irrigation domestic water usage by more than 50% through the landscaping and since no irrigation was utilized.
5. Savings are also anticipated through lower operations and maintenance costs.
6. Also expected are increased employee productivity, employee retention, and reduced absenteeism because of the indoor environmental quality benefits of a Green Building.

Attachment A (LEED submittal binder) provides the results for this objective – see the Water Efficiency and Energy and Atmosphere sections of the binder.

Incorporate GB materials into construction specifications:

1. GB materials incorporated into the project included low VOC finishes, carpet and carpet padding with recycled content, and “cradle to grave” office furnishings.

2. Project was constrained by budget in its efforts to incorporate more materials with recycled content.

Attachment A (LEED submittal binder) provides the results for this objective – see the Materials and Resources and Indoor Environmental Quality sections of the binder.

Implement a multi-media educational program utilizing the building as a living model with tours, literature and signs:

1. Educational materials developed as part of this project include the following: two brochures, poster/flyer, building signage, project website, and educational guide.
2. A public “Go Green” media event was held on October 23rd, 2006.
3. As of June 2007, two official tours of the building project had been conducted.
4. Signs will be installed in the building detailing the LEED GB attributes and the cost or environmental benefits.

Appendix G provides the results for this objective.

Develop an online database of GB products, service providers, and certified green buildings in Florida:

1. The database was completed and an agreement established with the FGBC to maintain the database and make it publicly available through its website.
2. The database as initially developed listed 299 products, 203 product vendors/suppliers, 37 Florida projects, and 123 LEED accredited professionals in Florida.

Appendix F provides the results for this objective.

3.2 Use of Innovative Features

The GB movement is by nature an innovative confluence of environmental initiatives: waste reuse and recycling, use of renewable and recycled content materials, water conservation, energy conservation, sustainable land use, toxics reduction, and healthy indoor environments. The City’s commitment to greening local government provides leadership for both the public and private sector, demonstrating many successful strategies and documenting their benefits.

One specific example of an innovative feature incorporated into this project is how the project integrated water conservation and usage of recycled content materials. The landscape design for the project employed xeriscaping principles, using native and drought tolerant species that will need no irrigation once established. The landscape design also employs mulches, which can be derived from yard trash or recycled wood, that help moderate soil temperatures and reduce soil moisture loss. The GBT was able secure additional grant money from the Florida Organics Recycling Center for Excellence (FORCE) to implement the xeriscaping project.

A second innovative feature is the gathering of Green product, supplier, service provider, and project information specific to Florida and it being uploaded on the FGBC website for use by the Florida GB industry.

3.3 Waste Reduction Achievements

LEED contains an environmental section that relates to waste reduction and recycling activities. In LEED waste reduction activities are titled Materials & Resources. Some of the items incorporated into the building are listed below.

Intent: The goal of the Materials and Resources criteria is to minimize the use of non-renewable construction materials and other resources such as energy and water through efficient engineering, design, planning and construction, and effective recycling of construction debris. This is achieved by maximizing the use of recycled content materials, modern resource efficient engineered materials, and resource efficient composite type structural systems wherever possible. It is also obtained by maximizing the use of re-usable, renewable, sustainably managed, and bio-based materials.

Storage and Collection of Recyclables

- Provided indoor and outdoor containers for ease of recycling office waste by building occupants.

Building Reuse

- Approximately 89.7% (20,017 sf) of the building square footage (22,297 sf) was reused.
 - The building shell was maintained as part of the new building
 - Altered the “concrete tees” from their original use as the roof structure for reuse as the floor structure

Construction Waste Management

- Diverted approximately 78% of all the demolition and construction materials from the landfill, including but not limited to recycled wood, concrete, brick, pea gravel, carpet, ceiling tiles and scrap metal.
- The recycling of the padding and carpet material was written into specs for the carpet installer (N. FL Contract Carpets, Inc.) with 1,202 pounds recovered.

Materials Reuse

- The following materials were salvaged for either reuse in the new building or resale by a local salvage store, Resources Unlimited: operation crew lockers (89 units at 4,200 lbs), untreated scrap lumber, bathroom mirrors, lights, furniture, electrical panel box, some doors and windows.
- Reusing doors, and wood studs back on the job.
- Reused existing furniture and purchased new low VOC furniture, in addition to "cradle to grave" chairs.

Recycled Content Materials

- Approximately 10% of the material used in the construction of the building was made from recycled content – a total value of \$26,526.46.

Regional Materials

- Approximately 15% of the materials used in the construction of the building was manufactured and extracted locally – a total value of \$ 59,823.82.

3.4 Other Green Building Achievements

In addition to the waste reduction achievements, listed below are other achievements the City building made in the following five LEED environmental areas:

3.4.1 *Sustainable Sites*

Intent: The goal of the Sustainable Sites criteria is to reduce negative environmental impacts of development and construction on undeveloped lands, agricultural areas, and open spaces. Stormwater runoff from developed areas degrades water quality in local waterways. This can disrupt local ecology as well as impact navigation and recreation. Rehabilitating contaminated sites and redirecting development to existing brownfields, urban infill, and other non-greenfield sites can reduce urban sprawl and automobile use.

Developing areas with existing infrastructures are cost effective and promotes reuse. When selecting a location, it is important to consider the major ecological features of that site, including the geology, hydrology, vegetation, wildlife, and prior site history. The overall purpose of sustainable development is to reduce the ecological footprint. Listed below are examples of actual actions implemented by the City.

Construction Activity Pollution Prevention

- The Erosion and Sedimentation Control Plan (ESC) conforms to the 2003 EPA Construction General Permit, which outlines the provisions necessary to comply with Phase I and Phase II of the National Pollutant Discharge Elimination System (NPDES) program. The site is essentially flat. Stilt fencing was placed only where there was a potential for storm water runoff. The construction effort required very little soil disturbance around the existing building. The erosion control measures were not removed until new sod and planting were established.

Site Selection

- The project has not been developed on prime farmland; has not been developed on land whose pre-development elevation was less than 5 feet above the 100-year FEMA designated flood level; has not been developed on land which is specifically identified as habitat for any threatened or endangered species; has not been developed within 100 feet of any wetlands; has not been developed on any previously developed land within 50 feet of a water body which supports fishing/recreation/industrial use; has not been developed on land which was public parkland, etc.

Alternative Transportation

- Bicycle storage and changing rooms: the City reused the existing bicycle racks that were still in good, useable condition for the building and has secured them. There are four bicycle racks and each rack has eleven spaces. They are made from a composite wood and plastic product and still in good working condition. Therefore, the City was able to provide secure bicycle racks or storage for 5% of building users and provide showers and changing facilities for 0.5% of full-time equivalent occupants.
- Low-emitting and fuel-efficient vehicles: commitment by City fleet manager to permanently assign a compressed natural gas (CNG) alternative fuel vehicle to the SWS department and designated parking space for alternative fuel vehicle.

- Parking capacity: no new parking spaces were added to this non-residential project; and preferred parking was provided for a carpooling vehicle.

Site Development

- Maximize open space: the project exceeded local open space zoning requirements by 25% - the City achieved a percent increase in vegetated open space from code requirements by 33%.

Heat Island Effect

- The City used a spray polyurethane foam roof system for a reflective roof system to reflect heat and be more energy efficient.

3.4.2 *Water Efficiency*

Intent: The goal of the Water Efficiency criteria is to preserve the existing natural water cycle. Design site and building improvements should be implemented so that the water cycle closely emulates that of the site's natural "pre-development" hydrological systems. Emphasis should be placed on the retention of storm water and on-site infiltration and ground water recharge using methods that closely emulate natural systems. This is achieved by minimizing the unnecessary and inefficient use of potable water on the site while maximizing the recycling and reuse of water, including harvested rainwater, storm water, and gray water. Listed below are examples of actual actions implemented by the City.

Water Efficient Landscaping

- Landscape Irrigation: the landscaping installed did not require a permanent irrigation system.
- Landscape: Only indigenous plants were planted, mulch use was maximized, recycled material was used for mulch, existing established and desired shrubs and trees were maximized, and existing shrub and tree removal was minimized.

Appendix H provides an overview of this application.

Innovative Wastewater Technologies

- Using low flow toilets and waterless urinals contributed to a 56.4% water savings of gallons used per year.

3.4.3 Energy and Atmosphere

Intent: The goal of the energy criteria is to minimize energy necessary for the day to day operations of the building. This is achieved by implementing a combination of optimal building siting, optimized building design, material selection, and aggressive use of energy conservation measures. The overall building performance should exceed the minimum International Energy Code (IEC) compliance level by 30 to 40% or more, and maximize the use of renewable energy and other low impact energy sources. Listed below are examples of actual actions implemented by the City.

Fundamental Commissioning

- The following systems were commissioned: HVAC, heat pumps, outdoor air units, exhaust fans, automation system, lighting controls, and domestic hot water.

Minimum Energy Performance

- Reinsulated the existing exterior wall for a more energy efficient building.
- Monitoring and control system provided on HVAC system to maintain maximum efficiency of units.

Fundamental Refrigerant Management

- The “base building” HVAC&R systems do not use Chlorofluorocarbons (CFC) based refrigerants.

Enhanced Commissioning

- Through the enhanced commissioning process a systems manual was developed and preliminary training has been completed for basic building operations. The enhanced commissioning the City performed provides benefits such as reduced energy use and owner operating costs because commissioning ensures verification that the building systems are operating and performing as they were intended and in operating in accordance with the owner’s project requirements. Other benefits include reduced contractor callbacks, better building documentation, and improved occupant productivity.

3.4.4 Indoor Environmental Quality

Intent: The goal of the Indoor Environmental Quality criteria is to provide a healthy, comfortable and productive indoor environment for building occupants and visitors. This

can be achieved by providing a building design which affords the best possible conditions in terms of indoor air quality, ventilation, thermal comfort, access to natural ventilation and daylighting, and effective control of the acoustical environment.

Minimum Indoor Air Quality (IAQ) Performance

- The building is using dedicated 100% outside air (OA) split direct expansion (DX) units to provide ventilation. Two outside air units deliver dehumidified outside air to six air handling units, which deliver the require ventilation to the spaces by a ducted supply air system with a combination of ceiling diffusers and side wall registers. The return system is fully ducted with combination of ceiling mounted and sidewall return grills.

Environmental Tobacco Smoke Control

- The building is a non-smoking building and any designated exterior smoking areas have been located 25 feet away from entries, outdoor air intakes and operable windows.

Construction IAQ Management Plan

- By utilizing and IAQ Management Plan, the project was kept very clean throughout the duration. There was very little earthwork and the earth exposed for foundation work was kept wet eliminating potential dust. The construction debris was cleaned on a daily basis keeping the site clean and dry. The ductwork was closed off and drywall was stored and covered. The AHU filters were cleaned several times during the startup process and new filters were installed prior to occupancy.

Low-emitting Materials

- Adhesives and Sealants: The City used water-based adhesives, primers, solvents and foam that had a Volatile Organic Compound (VOC) content that is less than the limits set by the South Coast Air Quality Management District.
- Paints and Coatings: The City used low emitting materials inside the building resulting in no toxic chemicals in the air that exceed the VOC and chemical component limits of Green Seal Standard GS-11 requirements.
- Carpet: The City used carpet systems that meet or exceeded the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program.

Indoor Chemical & Pollutant Source Control

- The City installed permanent entryway systems at all regular entry points to the building to reduce chemical and pollutant sources typically brought into the building.

Controllability of Systems

- Lighting: Each individual work area was provided with independent lighting controls to meet their preference.
- Thermal Comfort: Each office was provided an operable window and thermostats to control the temperature in their work area.

Thermal Comfort

- The City designed an occupant survey that will be distributed six months after building occupancy. The survey includes a seven point satisfaction scale for temperature and humidity comfort in the space. Follow-up will occur with those survey respondents not satisfied to identify the specific issue/problem. If more than 20% respond with discomfort complaints, a more in-depth analysis will occur and a corrective action plan will be implemented.

Daylight and Views

- The City was able to provide daylighting to 75% of occupied spaces through some of the following features: insulated clear glass, the use of existing glazing on windows, and adding the maximum number of windows that could be structurally safe were added in appropriate rooms.

3.4.5 Innovation and Design Process

Intent: The goal of the innovation & design process criteria is to recognize projects for innovative and sustainable building design. Some buildings may have exceeded LEED requirements or others may have utilized innovative strategies that may not be addressed by LEED but could possibly be acknowledged for their sustainable practices. A sustainable building expert is a key factor in the design and construction process, and projects who utilize such expertise are awarded as such.

Sustainable Education

- The City provided occupant and local community educational awareness describing the LEED project in various formats. The approach taken was one that would allow for the general introduction of LEED to occupants and the general public and also provide for more in-depth educational training using signage located throughout the building for self and guided tours for occupants and the general public. Items developed for the educational awareness program included:
 - Green Building Brochure (during construction)
 - Green Building Brochure (when built)
 - Green Building Training and Tour Guide
 - Green Building Signage: Poster/Flyer
 - Green Building Signage: LEED Specific Action and Environmental Impacts

Appendix G provides an overview of this application.

Green Housekeeping

- The City adopted a Green Cleaning Policy that:
 - Use of cleaning procedures in conformance with ASTM E1975-05 Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
 - Use of Green Seal approved cleaning products
 - Use of chemical concentrates and appropriate dilution equipment
- The City developed and issued a Invitation to Bid for a Green Cleaning/Housekeeping contractor.

Appendix I provides an overview of this application.

Reduced Mercury in Bulbs

- The City minimized the use of mercury on the project by providing low mercury lamps that meet the requirements of LEED Existing Building (EB), which requires less than 80 picograms of mercury per lumen-hour.

Exemplary Performance – Water Efficiency 50%

- The City showed exemplary performance by exceeding the requirements of LEED Water Efficiency credits 3.1 and 3.2 (20% and 30%) by achieving at least a 40% water use reduction compared to the baseline calculations.

LEED Accredited Professional (AP)

- The City utilized a LEED AP to provide technical support on the project.

3.5 Improvements in Cost Effectiveness and Efficiency

The information below details the project expenditures, cost avoidance, cost-benefit assessment, and recovery of non-traditional material. It is intended to depict the financial overview for the project and related activities as well as the actual expenditures paid to project vendors and in-kind contributions from the project partners.

3.5.1 *Project Expenditures*

The table below provides a breakdown of the total in-kind contributions provided by City staff and project partners not directly paid for their services or time on the project. The total in-kind contributions equaled \$ 656,622.92 for the grant duration. The City exceeded its in-kind contribution commitment.

In-Kind Contributions	
Quarter End	Contribution
6/30/2005	\$ 7,536.28
9/30/2005	\$ 19,930.16
12/31/2005	\$ 33,393.92
3/31/2006	\$ 245.64
6/30/2006	\$ 196,734.95
9/30/2006	\$ 183,438.46
12/31/2006	\$ 113,383.62
3/31/2007	\$ 101,959.89
6/30/2007	\$ -
9/30/2007	\$ -
Total	\$ 656,622.92

The table below provides a breakdown of the total cost of this innovative grant project by task and type of expense and depicts the amount by category and vendor paid. The total grant funds expended equaled \$ 150,000.00.

Innovative Grant Expenditures	
Expenditure Type	Total Amount Per Vendor
Professional Services	
Kessler Consulting, Inc./FGBC	\$ 69,996.60
Subtotal	\$ 69,996.60
Equipment/Furniture	
DOCS (furniture)	\$ 45,242.90
Marpan Supply (container rental)	\$ 2,791.92
Subtotal	\$ 48,034.82
Supplies	
Arlyn Scales (scale)	\$ 838.00
Subtotal	\$ 838.00
Construction or Construction Related Costs	
Allstate Construction	\$ 31,130.58
Subtotal	\$ 31,130.58
TOTAL	\$ 150,000.00

3.5.2 Avoided Disposal Fees

From a waste management perspective the primary objective of the GB project was to reuse and recycle C&D debris. In that regard, the project was very successful. Quantities and expenditures were carefully tracked throughout the project and the table data and information details the results achieved.

C&D Debris Analysis					
Description	Pounds	Disposal Cost	Revenue	Collection Cost	Avoided Disposal
Total C&D Debris Generated	710,310				
Total Reused & Recycled	559,290				
Total Landfilled	151,020	\$ 2,527.74		\$ 2,975.00	
Total Recycled	550,674	\$ 641.21	\$ 449.21	\$ 7,350.00	
Total Reused	8,616				
Avoided Disposal	559,290				\$ 8,355.35
Waste Reduction Percentage	78.74%				
	Total	\$ 3,168.95	\$ 449.21	\$ 10,325.00	\$ 8,355.35

Listed below is a summary of the data from the C&D waste reduction program.

- 355 tons of C&D debris generated
- 275 tons recycled (77.4%)
- 4.4 tons reused (1.2%)
- 76 tons disposed (21.4%)
- Disposal charges = \$ 3,168.95
- Collection charges = \$10,325.00
- Avoided disposal costs = \$8,355.35
- Recycling revenue = \$449.21
- Recycling and Reuse Rate= 78.74%
- Total C&D Costs: \$13,493.95 – 8,804.56 = \$ 4,689.29
- Total C&D Savings = \$8,804.56

Appendix C provides the supporting documentation for this outcome. And by recycling over 78% of the C&D debris, the LEED project was able to obtain two credit points in the Materials and Resources category.

3.5.3 *Cost/Benefit Assessment*

GB projects are often considered to be more costly and that perception often occurs because people focus on the immediate and not the long-term cost savings that can occur. The information provided below,¹ describes the cost impacts and savings, or what LEED calls the economic viability and security of the project, that the City will achieve through the construction of the building using LEED planning, design, construction, and maintenance principles.

1. The Guaranteed Maximum Price (GMP) for construction was \$ 1,711,000 and the project remained within budget. By utilizing a delivery process of Construction Management allowed the general contractor (Allstate Construction) to be brought in early in the planning stage to help control costs and be educated on the GB concepts.
2. The City diverted over 78% of the C&D debris generated during the renovation. By recycling these materials, the City avoided disposal costs and received revenue that attributed to a savings of \$8,804.56.

3. The City has reduced the heating and cooling of office spaces through a reduction of energy used due to better performing walls and roof insulation and through a more efficient HVAC system design. Overall energy use (electrical and natural gas) is being reduced by 19.1% compared to the baseline Florida Minimum Energy Code. The anticipated overall savings will be 107,600 kbtu's per year equaling a cost savings of \$ 5,273 annually.
4. Domestic water usage in the facility will be reduced by more than 56.5% through the installation of innovative technology (ultra low flow faucets, waterless urinals, and dual flush toilets). This equates to a cost savings of \$103.28 per year. Additionally, but no less important is that this reduces the impact on the sanitary sewer systems and consequently to Florida's natural water system.

These impacts will be monitored with the building's occupancy and usage in the future.

3.5.4 *Recovery of Non-traditional Materials*

Traditional building renovation practices do not often include deconstruction– the recovery of valuable building materials and fixtures during demolition. This project took steps and achieved results as follows:

- A local salvage company specializing in used building materials (Resources Limited) conducted a thorough inventory of the building prior to deconstruction, and identified specific building components and fixtures to be recovered.
- The GBT provided the forum for coordinating deconstruction and recovery work with the building general contractor.
- The following items were salvaged by Resources Limited: metal lockers, light fixtures, and bathroom mirrors.
- In addition, the general contractor recovered the following materials and reused them in construction: dimensional lumber (wall studs), doors, windows, furniture, electrical panel box, and pre-formed concrete tees.

¹ 2007 LEED Submittal Document by TLC Engineering for Architecture.

3.6 Transferability

The items developed in this project have transferability in the following ways:

1. Model or “living” building featuring GB applications utilizing LEED for tours to the local community, City employees, students, and building community.
2. C&D recycling vendor information for builders and contractors located in the City, Leon County, and regional area.
3. C&D LEED recycling program plan for builders and contractors located in the City, Leon County, and regional area.
4. Sample Green Housekeeping Policy and ITB for local governments.
5. Sample GB educational materials (e.g. brochures, training guides, poster/flyer, and signs) to be used by other local governments as a guide to obtain LEED innovative design credit points.
6. Sample water efficiency landscape design, plan, and installation program for use by building owners and landscape architects.
7. LEED NC submittal information for local governments in the environmental areas of site sustainability, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovative design – ***Attachment A (LEED submittal binder)***.
8. GB database on the FGBC website to be used by the public and private sector building industry.

The project photos contained in ***Appendix J*** also help to tell the story of the project and give readers and overview of the GB activities throughout the project’s duration.