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## Castle Square Apartments energy savings and green design retrofit

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Castle Square Apartments is an existing 500-unit 100% low-income apartment complex located in the city's South End. The property is owned by Castle Square Tenants Organization (CSTO), a 501c3. WinnDevelopment (Winn) is a minority partner. The property includes 450 HUD Section 8 units. The development is one of the most critical affordable housing resources in the city.

**ENERGY SAVINGS:** Although energy efficiency improvements are being planned property-wide, a deep energy retrofit will focus on the property's highly visible 192 unit midrise building, which is located on Tremont St. Whereas typical energy efficiency improvements only save on average between 20-30%, the proposed Deep Energy Retrofit strategy on the mid-rise is anticipated to reach 70 to 80% energy savings, a ground breaking achievement in existing multifamily housing.

Although similar energy savings are currently being achieved in Europe, this project would be the first existing multifamily building in the U.S. to achieve this level of energy savings. Such a deep energy retrofit approach satisfies the need for a bold and far reaching energy efficiency strategy in existing multifamily affordable housing. Groundbreaking savings will be accomplished through exterior super insulation and air sealing, as well as high efficiency mechanical improvements, to substantially decrease heating and cooling loads. High efficiency lighting, including LEDs, and appliances will also be installed, drastically cutting electric consumption. Additionally, a new super insulated exterior shell on Tremont St. and other streetscape improvements will change the entire look of the property, transforming it into an architectural asset.

While the deep energy retrofit focuses on the Tremont St. midrise, the total energy savings resulting from this 500 unit renovation is 23,000 MMBTU per year. At the low rise buildings (308 units), energy savings will also be substantial. However, the super insulated shell proved infeasible there, so overall heating savings are 48%, as opposed to 71%.

**GREEN BUILDING GOALS:** Castle Square Apartments will be a LEED project. In addition to energy savings, this renovation will utilize green building materials, improve indoor air quality, and reduce water consumption. Green building goals have been a major component of the team's three year planning process for redevelopment of Castle Square Apartments. Hundreds of residents have participated in green design workshops to prioritize project goals. Castle Square Tenants Organization has facilitated resident involvement, a natural extension of its role of providing services to residents. The Castle Square Tenants Organization was founded in 1987 in response to the need to preserve affordable housing in our community. Residents are active in leading local initiatives and serve as board members of the organization and members of the construction committee for this project.

The design team has substantial expertise in the energy efficiency arena, and includes Building Science Corp. (a technical provider of U.S. Department of Energy's Building America Program),

Elton + Hampton Architects, and Petersen Engineering. Working with residents, the team has developed a strategy for how to achieve deep energy savings throughout the property.

U.S. Department of Energy's Building America Program: This project leverages the resources of the U.S. Department of Energy's Building America Program. Building Science Corp. is a Building America Partner. As a technical provider of the Building America program, Building Science provides technical assistance, including indoor air quality analysis, envelope design, and air flow analysis.

A Tool for Education: The knowledge gained through the implementation of this proposal will be shared via publically accessible reports and education materials produced through the U.S. Department of Energy's Building America program and Building Science's internationally recognized education website [www.buildingscience.com](http://www.buildingscience.com). Such educational tools will assist other low-income housing owners and help train a green jobs workforce composed of designers and contractors qualified to implement deep energy retrofits on a large scale. A toolkit will be created and shared with the public.

Planned energy efficiency sources include: U.S. Housing and Urban Development (HUD) - Green Retrofit Program (an ARRA funded program), MA Dept. of Energy Resources - High Performance Buildings Grant (also ARRA funding), NGRID efficiency incentives and NSTAR efficiency incentives.

#### Team Qualifications

WinnDevelopment, Castle Square Tenants Organization, Building Science Corp., Elton + Hampton Architects, Petersen Engineering, and Pinck & Co. are ideally suited to implement a proposal of this magnitude.

Castle Square Tenants Organization - The Castle Square Tenants Organization, Inc. (CSTO) is a nonprofit, 501-c-3 organization, founded in 1987 in response to the need to save affordable housing in the Castle Square Community. Since its founding, CSTO has worked to maintain affordable housing in their community. Its mission is to preserve Castle Square Apartments as affordable housing for low- and moderate-income residents into perpetuity and provide comprehensive community and social supports for residents of Castle Square Apartments and the surrounding community.

WinnDevelopment is one of the largest affordable housing developers and property managers in the U.S., managing approximately 85,000 units of housing. Since 2007, Winn has executed energy and water conservation improvements at existing properties that have saved 2,003,213 kwh of electricity, 78,628 therms of gas, and 85 million gallons of water. In 2008, Winn installed over one megawatt of solar photovoltaics, likely one of the largest portfolio-scale solar installations on affordable properties in the U.S. Winn is developing historic mill conversions that demonstrate how to successfully integrate energy efficiency and historic preservation goals.

Pinck & Co. Inc. provides owner representation for non-profits and institutional owners undertaking design and construction projects. They have extensive expertise in green affordable housing. At Castle Square they are acting as the owner's representative for CSTO and construction project manager for the CSTO/Winn partnership, including tracking LEED and workforce reporting requirements.

Building Science Corp. is a building science consulting firm with offices in Boston and Waterloo, Ontario with clients throughout North America. Building Science Corp. specializes in building technology consulting. Building Science is on the leading edge of the design of sustainable communities and buildings. Building Science believes in promoting energy efficiency and

environmental responsibility within the constraints of marketable and affordable building technology. Building Science Corp. is a technical provider for U.S. Dept. of Energy's Building America program. Elton + Hampton Architects is dedicated to serving those who live and work in Boston's urban areas, and in urban areas throughout Mass. Elton + Hampton has worked on innovative projects such as the first green affordable housing project in Boston (Erie Ellington Homes), the first large scale residential ground source heat pump system (Cambridge Cohousing), the first residential centrally distributed bio-diesel cogeneration (Everett Hano), the first Lawrence PV installation for home ownership (Scarito Homes), and well water cooling at Our House for Design and Technology. Petersen Engineering, Inc. - Established in 1992, Petersen Engineering has provided design services for energy efficiency commercial and residential applications. As a mechanical engineering consulting firm, Petersen Engineering, specializes in mechanical systems, energy efficiency, integrated design, sustainable and green design.

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