Durham Public Library

Durham, New Hampshire

This 10,500 square foot facility is a combination of new construction and renovation of an existing brick home on a 2.8 acre parcel near the center of Durham. While the building is not formally certified under any sustainable design and construction program, it was designed for energy efficiency, durability, easy maintenance, and environmental sensitivity. Construction began in July 2012 and was completed on time and under budget in July 2013.

SUSTAINABILITY FEATURES

SITE:

- Site is close to downtown, the middle school, and several neighborhoods. It is within ½ mile of existing public transportation, including buses and trains.
- Used existing site and building instead of an undisturbed parcel, and existing trees were protected to the greatest degree possible.
- Storm water runoff is treated by promoting infiltration through the use of a rain garden.
- Existing wetlands were not disturbed and the Town's wetland buffer was maintained.
- Covered bike parking has been provided.
- Exterior lighting design utilized LED fixtures with full cut off to minimize light pollution.
- Electric vehicle charging station was provided.
- Landscaping is drought resistant with no irrigation system.

WATER EFFICIENCY:

- Water efficient plumbing fixtures were used throughout.

ENERGY:

- A thorough energy model was done during design that is consistent with LEED and other sustainable design and construction standards.
- The building has tight and well insulated exterior walls (R-30.8). The roofs exceed the design of R-49 due to additional spray foam thickness – nearly double in some area. The existing house had a major insulation upgrade as well. Floor slab (R-10, thickened to R-15 at edges) and foundations (R-10) exceed code.
- A blower door test was performed to ensure a tight envelope. The 2009 International Building Code requires a building be under 7 air changes per hour and the 2012 IBC has reduced that to 5. Energy Star certification requires 3.5. This building is at 2.28!
- During construction, the windows were significantly improved by using to Alpen triple glazed fiberglass windows with an R value of 5.
- Day lighting supplements artificial lighting throughout with most seating having views to the outside.
- Occupancy sensors in all public spaces improve the electrical lighting efficiency. Lighting is typically T5 fluorescent or LED.

- High efficiency heating & cooling system is 30% better than required by the energy code. The heating plant is slightly smaller and more efficient than originally designed. Radiant heat floors provide better comfort and thermal stability. There are 5 radiant zones and 3 air handlers that serve 17 variable air volume control boxes that provide greater efficiency and better control. Natural gas is being used as the energy source.
- Energy recovery is provided by plate type units in each of the three AHU's (one serves the upper level, one serves the lower level and one serves the original house) where outside fresh air is brought into the building.
- A 15.6 Kw array of solar panels have been installed as part of a Power Purchase Agreement between the Town and ReVision Energy that is installing arrays on three town buildings, including the library.
- The building is located and designed for increased passive solar gain due to south facing glass and courtyard. Overhangs and sunshade limit direct summer sun, while allowing more solar gain during other times of the year.
- Full building commissioning verified that energy related systems were installed and calibrated to perform with maximum efficiency.
- Operable windows allow for fresh air and comfort seasonally.

MATERIALS:

- Reused the house to the greatest extent possible.
- Construction and demolition waste were recycled.
- Exterior is brick and fiber glass siding to minimize maintenance and upkeep. Most trim is fiberglass or recycled composite material that will not decay like wood. Porch columns are fiberglass.
- Windows are fiberglass for durability and easy maintenance.
- Entry has an exterior grate and interior walk off mat to reduce the amount of salts, sand, and dirt from getting into the building – reducing the amount of cleaning and air borne dust.
- Cork flooring in the Oyster River Rooms, and linoleum around the desk and in the Children's Craft and Story Room are durable, easy to maintain, comfortable for standing, and acoustically absorbent. Reused wood floors in the house. Slate tile is in the lobby and restrooms.
- Wood was sourced regionally.

AIR QUALITY:

- No smoking in the building, including during construction.
- Provided a construction air quality plan.
- A high efficiency mechanical ventilation system includes energy recovery ventilators that use the air being exhausted to either pre-heat or pre-cool the intake air, depending on the time of year.
- Low-emitting building materials were used throughout including non-VOC paints and finishes.
- Operable windows for swing seasons.