HONORABLE MENTION
BEST USE OF WOOD PRODUCTS

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APA CARBON CHALLENGE: PROVIDENCE, RI
ENTRY #P115
MARCH 4, 2013

RENDERED MODEL
DESIGN CONCEPT

This Habitat for Humanity home is designed to fit comfortably within this Providence neighborhood and create a warm, welcoming atmosphere from the moment a visitor steps onto the front walk. Wide porch stairs create a vantage point for watching passersby while enjoying a warm summer evening. A covered porch shelters inhabitants as they enter the house, and interior entryways, both front and back, provide a transition zone and storage, organizing belongings conveniently. These additionally reduce the potential for pollutants to track through the interior.

The open-concept first level layout suits current lifestyles and can be adaptable to many different living arrangements. Generous windows bring in ample natural daylight, brightening the interior living space and reducing the need for artificial lighting. Operable windows allow cross ventilation, which creates natural cooling in the summer, while the open stairwell on the North side acts as a riser for exhausting hot air. The kitchen at the rear of the home has an expansive window facing onto the backyard from where a parent can easily supervise children playing. The simple row of cabinetry and appliances can be supplemented by the owner’s own furniture to provide additional workspace.

The three bedroom second level can be easily expanded into four bedrooms by filling in the fourth corner of the upper floor and extending the main roof. The basement can be used as is or further finished to create bonus living space. These features make this house a home that can grow to suit a family’s changing needs.
BASEMENT PLAN
(670 SF usable)

SECOND FLOOR (THREE BEDROOM) PLAN
(573 SF usable)

FIRST FLOOR PLAN
(707 SF usable)

SECOND FLOOR (FOUR BEDROOM) PLAN
(673 SF usable)
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SECTIONS
10'-6" 1'-10" 2'-0" 5'-0" 1'-0" 1'-0" 5'-0" 2'-0" 1'-0"
4'-8" 4" 4'-2" 9'-0" 8'-0"
29'-11"

Roof:
- 30 year architectural asphalt roof shingles
- 30 lb roofing felt
- 3/4" plywood decking
- Engineered (wood) roof trusses
- 18" (R63) blown-in cellulose insulation
- 1/2" GWB ceiling
- Fascia
- Soffit vent

Sides:
- Size engineered wood headers to suit openings
- Vinyl clad Wood windows, Low-E II coating
- Sealed cellular PVC trim
- 3/4" plywood box
- Sill plate on sill gasket

Above:
- All-weather barrier (tape and sealed joints)
- 11 1/4" (R42) dense-pack cellulose insulation @ 3.4 lbs/cu.ft
- 2x6 studs @ 24" o.c. structural wall (advanced framing)
- Vapour barrier
- 3/4" plywood @ floor to break vertical wall cavity
- Moisture-resistant GWB @ basement & other potentially wet areas

Below:
- Waterproof membrane
- 8" concrete foundation wall
- 16" Concrete footing
- 4" Foundation drain
- Equipment flue
- 2" rigid, fire-resistant insulation
- Vapor barrier
- 2x6 @ all joists on all piers
- 4" Concrete slab
- Underlayment
- 1/2" GWB (moisture-resistant @ potentially wet areas)
- Roof finish
ENVIRONMENTAL DESIGN INTENT

Our intent is to deliver a project with a minimized carbon footprint for both construction and operation. The exterior wall uses a vertical wood truss construction similar to a Larsen truss, which is super-insulated with dense-pack cellulose insulation, while the attic has 18 inches of blown-in cellulose. This will significantly improve the thermal performance and reduce air leakage of the building envelope over traditional construction and will reduce the house’s lifetime carbon footprint. APA Advanced Framing Techniques combined with the wood truss wall optimize the wood needed for framing as well as reduce thermal bridging to the exterior. The basement lifts out of the ground to the extent possible, reducing the amount of concrete used and improving thermal performance. The open concept living space reduces the amount of wall construction needed while providing flexibility.

IMPACT MODEL ASSUMPTIONS

- The exterior wall was modeled as two separate wall assemblies with the same openings to account for the total assembly.
- The actual door sizes throughout the house vary from the model standard and are often smaller.
- The cellulose insulation in the exterior wall assemblies is interpolated to a greater thickness than the actual wall because standard blown-in cellulose insulation has a density of 1.4 LBS/SF but we want to use dense-pack cellulose with a density of 3.6 LBS/SF. This interpolates to a larger thickness than the program permits, so it was broken into two parts between the interior component and the exterior component of the combined exterior wall assembly.

GLOBAL WARMING POTENTIAL SUMMARY MEASURE TABLE BY LIFE CYCLE STAGES

<table>
<thead>
<tr>
<th>Summary Measures</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Maintenance</th>
<th>End - Of - Life</th>
<th>Operating Energy</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Material</td>
<td>Transportation</td>
<td>Total</td>
<td>Material</td>
<td>Transportation</td>
<td>Total</td>
</tr>
<tr>
<td>Global Warming Potential (kg CO2 eq)</td>
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<td>8.29e+02</td>
<td>1.80e+04</td>
<td>9.47e+02</td>
<td>1.56e+03</td>
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GLOBE