



# Zero by Degrees LLC

*Energy Independence in Affordable Steps*

March 13, 2014

Dean Bloch  
Charlotte Town Library  
Charlotte, VT  
[dean@townofcharlotte.com](mailto:dean@townofcharlotte.com)

cc: Jennifer Chiodo

Re: Roof Assessment and Energy Audit for the Charlotte Town Library

Dear Dean,

Thank you for your request for a revised proposal to perform an energy audit and roof assessment on the Charlotte Town Library in Charlotte, VT. Based on the RFP dated 2-17-14 and the plans provided we propose the following:

## **Roof Structure Energy Assessment:**

### Data Collection:

1. Interview the librarian and the building operator to understand any past roof failures such as water leaks, ice dams, mildew, sheetrock failures or condensation.
2. Review any photographs of past snow/ice patterns on the roof.
3. Inspect the existing conditions on site and review the building drawings to determine the functional R-value in each part of the roof and assess the existing roof ventilation.
4. Depressurize the building with a blower door to determine the air leakage pathways to the roof. Depending on the weather this may be done in conjunction with fog or infrared camera. Fire alarms will have to be disabled if fog is used.

### Report:

1. A written report of the findings and recommendations and a follow up meeting with stakeholders on site.

## **Envelope Audit:**

### Data Collection:

1. Conduct an infrared scan and blower door test of the building to determine the continuity of the thermal and air barrier and to benchmark the building against other buildings of similar type.
2. Locate air leaks under normal pressure and determine the functional R-value in each part of the building including windows and doors.
3. Collect and review the present fuel and kWh consumption data. We will need at least 1 year of fuel and electricity bills, 3 years preferred.
4. Obtain measurements of the building from plans and site measurements.
5. Conduct all Building Performance Institute (BPI) required health and safety tests.

**Energy Model:**

1. Construct an energy model of the library and reconcile the model against the present energy use.
2. Run improvement scenarios in the model to find the operation and maintenance measures (O&Ms) and energy conservation measures (ECMs) with the highest energy savings.
3. Prioritize the improvements by return on investment and feasibility of implementation.

**Report:**

1. Report on O&Ms and ECMs with associated cost savings.
2. Detailed description of findings and recommendations.
3. Report on Efficiency VT (EVT) rebates that may be available for capital improvements. Note that rebates through EVTs Building Performance Program require that the improvements be completed by a certified home performance contractor and ZBD, as an independent auditor, will not be performing the upgrades but ZBD can recommend experienced home performance contractors.
4. A digital reference set of the infrared images taken at the building.
5. A follow up meeting with stakeholders on site.

**Price:**

Roof Structure Energy Assessment.....	\$1550.00
Envelope Audit.....	\$1760.00

**Notes:**

1. All heating systems, AC, and ventilation systems will have to be turned off during blower door testing. On the day of the depressurization test we will need a representative from the library with us for access to all rooms and for building security.
2. Fog testing can set off fire alarms. They will need to be disabled if fog testing is required and the local fire dept may need to be notified.

**Alternates:**

The following alternates are priced assuming we are on site for the envelope audit already.

**HVAC/DHW Audit**

1. Interview the librarian and the building operator to understand the building schedule and temperature set points.
2. Assess the efficiency of the heating and cooling systems including distribution.
3. Assess the efficiency of the water heating system including distribution.
4. Incorporate findings into the energy model.

Add.....\$440.00

**Lighting Audit**

1. Inventory the present lighting loads and incorporate them into the energy model.

Add.....\$220.00

**Terms:**

30% down payment, balance due within 15 days of the final invoice. Additional scope beyond what is described above requires prior authorization and will be billed at standard rates (\$100/ hour).

Please don't hesitate to call if you have any questions regarding these services.

Sincerely,



Jon Haehnel  
Zero by Degrees, LLC

### **Appendix A - Personal Bios and Rates**

#### Jon Haehnel – Owner ZBD

Jon has been testing and inspecting institutional and commercial buildings for over 11 years. Mr. Haehnel has tested buildings as large as a city block in downtown Manhattan and as small as an 81 square foot automated weather station slated for Antarctica. Jon's expertise is in building envelope testing and design. Most of his work focuses on new and retrofit commercial and institutional construction but He also does forensic testing to determine the root cause of high energy costs, mold, ice dams, and pipe freeze-ups. Jon is a certified Building Performance Institute (BPI) Building Analyst and Envelope Specialist. Jon is currently the blower door and energy auditor instructor for Vermont Technical College and the coauthor of the paper "Setting Airtightness Standards" in the ASHRAE Journal. He has also presented on building envelope commissioning at the Better Buildings by Design Conference in 2013 and 2014.

Jon will be the lead on the roof inspection and his hourly rate is \$100/hr.

#### Michael LaCrosse – Operations

Mike graduated from Keene State College in Keene, NH with a Bachelor of Science in Architecture and a particular focus on building science. His background has given him the understanding that building function coincides with building architecture, and not only from a design standpoint, but from an energy standpoint as well. In addition, his amalgam of courses and work experiences gives him the ability to effectively understand and communicate with all members on a job site, from architects to engineers to contractors and installers. After interning 5 months for ZBD Mike worked as an energy auditor for HB Energy in Springfield, VT for a year and then returned to ZBD.

Mike has performed many energy audits both on his own and alongside with Jon. Mike currently holds his certification as a "Professional Building Analyst" through the Building Performance Institute (BPI).

Mike will be the lead on the energy audit with Jon in a supporting role. Mike's hourly rate is \$70/hr.

**Appendix B - References for Past Energy Audits**

School, Brick and wood frame  
Jeff Valance-Principal  
603-795-2125  
[JValance@LymeSchool.org](mailto:JValance@LymeSchool.org)

Town Offices, brick  
Ed Wendell – Bradford Energy Committee  
802-222-4657  
[hills510@gmail.com](mailto:hills510@gmail.com)

Town Hall and Theater, brick  
Chris Miller – Woodstock Energy Committee  
802-291-4584  
[cbmiller55@gmail.com](mailto:cbmiller55@gmail.com)

**Appendix C – Project Schedule**

- On or about April 15- Site visit to test/inspect roof.
- May 15<sup>th</sup> – Report on the roof assessment complete.
- On or about May 20<sup>th</sup> – Follow up meeting on the roof.
- On September 1 – Contact library to collect electricity and fuel bills.
- On or about October 1- Site visit to perform energy audit. We will be wait to get back into good conditions for IR imaging.
- November 1 – Audit report complete.
- On or about November 15<sup>th</sup> - Follow up meeting on the audit.