



CITY COUNCIL AGENDA ITEM

December 1, 2010

To: The Honorable Mayor and City Council Members

From: John Szerlag, City Manager
John M. Lamerato, Assistant City Manager/Finance & Administration
Mark F. Miller, Acting Assistant City Manager/Economic Development Services
Carol Anderson, Parks & Recreation Director
Steve Burns, SAFEbuilt Building Official
Steve Pallotta, Building Operations Director

Subject: Contract to Transfer Ownership and Responsibility
ALOEterra Solar House

Lawrence Technological University (LTU) has presented the City of Troy with a contract to transfer ownership and financial responsibility for the solar house to the City of Troy. City Management hesitates to recommend approval of the contract because maintenance issues have plagued the house ever since it was placed on the foundation. Steve Pallotta, Building Operations Director, has summarized the history of the house, including repairs and improvements provided by the City of Troy (see attached).

Although the house was designed to function as a residence, it does not comply with the Michigan Building Code. Perhaps the most important issue is that the house does not function as designed, to be "off the grid". Because of the heating system failure the house was connected to the electrical grid, so that an electrical heating system could be installed to prevent pipes from freezing in the winter months.

The solar house has been classified by the Building Inspection Department for use as an exhibit facility, but the house still isn't in compliance with the appropriate building codes. Inspections have determined that prior to issuance of a certificate of occupancy the following items need to be resolved by LTU:

1. LTU shall provide written inspection verification from the City of Southfield or another Certified Building Official that all of the building components were inspected for compliance with the Michigan Building Code and other applicable codes for the electrical, mechanical and plumbing components. (Estimated cost unknown)
2. Plumbing requires a test report for backflow protection. (Estimated cost \$200).
3. The crawl space and foundation have standing water that needs to be pumped out and future water infiltration needs to be addressed by installing a perimeter drain system. (Estimated cost \$5,000.00)

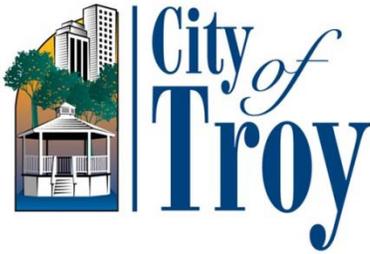


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4. The foundation requires that all gaps and holes be sealed. Interior crawlspace walls need to be insulated. Ground floor area throughout the crawl space requires pea stone and 6mil vapor barrier to be installed. Grade needs to be lowered next to foundation vent. (Estimated cost \$15,000 to \$22,000)
5. Operable (open/closeable) foundation vents need to be installed. (Estimated cost \$2,500)
6. Railing systems need to be installed at both sides of ramps. (Estimated cost \$2,000)
7. Broken deck boards need to be repaired or replaced in house. (Estimated cost \$750)
8. Install grate system over deep window well and planter box at seating area outside slider door. (Estimated cost \$500)
9. Repair broken/ rotten wood in planter boxes in house by replacing wood and line with rubber membrane. (Estimated cost \$1,500.00)

Based upon the incomplete status of the solar house, execution of the contract to take ownership and financial responsibility of the house is not recommended. City Management determined that City Council has three options for resolving the issue of ownership and responsibility of the solar house:

1. Require LTU to make repairs to the house prior to City Council executing the ownership agreement.
2. Require that LTU pay for the demolition of the solar house.
3. Require LTU to become responsible for the house and pay for the relocation of it off the Civic Center site.



November 2, 2010

TO: John Szerlag, City Manager

FROM: John M. Lamerato, Assistant City Manager/Finance & Administration
Mark F. Miller, Acting Assistant City Manager/Economic Development Services
Carol K. Anderson, Parks and Recreation Director
Steven A. Pallotta, Building Operations Director

SUBJECT: Solar House Analysis

BACKGROUND

The solar house was acquired through a discussion between former Assistant City Manager Brian Murphy, the Troy Chamber of Commerce, and Lawrence Technological University (LTU). The intent of the building was to serve as a demonstration project on sustainable building practices that could be used by students, designers, builders, and developers to incorporate those technologies into their projects. The building was donated to the Troy Chamber of Commerce, who in turn donated it to the City of Troy. The estimated cost of the project to LTU was around \$550,000.00. The solar house was moved to the northwest side of the Troy Community Center site in October of 2007.

CHRONOLOGY OF EVENTS

October 2007

- Lawrence Technological University students compete in solar decathlon in Washington, D.C.
- Unassembled house arrives on the Civic Center site.

Late Fall 2007

- Foundation completed by LTU.
- Students and LTU attempted to reassemble house on site. Assembly proved unfeasible and parts of the house were shrink wrapped and stored on site over winter.
- The City Water department installs water and sanitary sewer lines.
- Cost for the above services accrued by the City of Troy was \$6255.10(internal cost that was not reimbursed).
- City of Troy Streets department installed sidewalks, storm sewer, and final grading at an internal cost estimated at \$10,000.00.

Late Spring/Summer 2008

- LTU provides students, plumbers and carpenters to complete reassembly of house. Students reassembled the house pieces and discovered moisture had penetrated the shrink wrap and the floor is damaged from winter weather.
- Plumbers replumb utility closet.

- Carpenters repair floor, wall cracks, trim, repaint, assemble deck, and construct battery storage unit.

Summer 2008

- LTU students and Harold Remlinger, LTU adjunct professor and architect, assemble evacuated tubes and solar panels.

October 2008

- Ribbon cutting ceremony.

Fall/Early Winter 2008

- Technical issues are discovered by Harold Remlinger, LTU adjunct professor, with the Solar House systems. A tank less hot water system is installed to back-up the heating system by Guardian Plumbing and paid by LTU. Lack of sun would not allow the original heating system to be fully energized by solar conversion only.
- Subsequently, it was found that the tank less hot water system could not generate enough heat either. The heat was turned off in the house by LTU representative. The Parks and Recreation staff monitors temperature. It is discovered that the power converters shut down several times per day. Power converters convert battery DC power, created by solar panels, to AC power battery for the house. When batteries are lowered to a certain level, converters go off line. Per instructions from LTU representative, the Parks and Recreation staff manually reset the converters several times per day.

November 2008

- Building Operations Director spoke with LTU representative to schedule formal training. No date set because the Solar House was not operating. LTU will contact City of Troy when ready.

December 2008

- A formal training date is set for Wednesday, December 3rd at 9:00 AM. The Building Operations department, along with members of Parks and Recreation, will meet at the Solar House with LTU representatives. The Solar House was not generating any electricity and no heat. The City of Troy was told that the main circulating pumps were not working properly and the pumps were draining the batteries. LTU was to look into the problem and get it corrected.
- On December 10, LTU requested the Director of Building Operations to provide a cost for 60 amps of power from the Community Center to the Solar House at an estimated cost of \$3100.00. All work to be done with the Building Operations staff. Building Operations was again asked to change the initial 60 amp service to 100 amps to power the entire house. The cost increased to \$3600.00 for the additional amperage needed.
- On December 18, the Building Operations Director and Harold Remlinger with LTU discussed the impact of the ground being frozen, and the potential for other damage that could occur. The final decision was to install power to the Solar House in the spring of 2009.

December 2008

- LTU representative informed Parks and Recreation staff that batteries were being damaged by frequent reset so the converters should be turned off. At this time, the utility closet was functioning, but there was no heat to the house. With the converters off, there was no power to the house.

December Holiday

- With freezing temperatures, the water lines within the house froze and burst, thus creating water damage.

December 29, 2009

- The water damage was discovered and water service to the house was shut off.

February 2009

- LTU, City, and Chamber representatives meet to review tasks necessary to turn house over to the City, repair house, fund repairs, etc. The cost of repairs was estimated to be \$16,500.00. Repairs were to include traditional electrical power back-up when solar power was inadequate to energize the house.

May 2009

- An Oakland County Green Summit was conducted at the Community Center with the intention of touring the solar home. Organizers were informed by Parks and Recreation staff that home could not be toured due to condition.
- Shawn Lewis, Detroit News reporter investigates and writes piece about the status of the house. Story is picked up by other media outlets.

CURRENT STATUS AND RESOLUTION

1. The City of Troy Building Operations department provided necessary repairs to the plumbing and heating systems at an estimated repair cost of \$8,700.00 which includes wages, benefits, and material cost.
2. The Parks and Recreation department staff time provided approximately 350 hours at an estimated cost of \$9,000.00.
3. The Solar House is energized by the Detroit Edison. This is the primary source of energy for the heating system, circulation pumps, and heat trace for the incoming water line.
4. Functions and tours are being scheduled with LTU students and the Parks and Recreation department.
5. Building Operations incorporated into the daily building checks, the physical monitoring of the solar house including internal temperatures.

FUTURE OUTCOME AND USAGE

1. The Parks and Recreation Department has indicated that the solar house will not be used for programming and events. This is based on the actual size of the building, and the amount people or students that can assemble inside at one time.
2. The intended future use of the Solar House is as a demonstration site to showcase the sustainable building practices that are incorporated in its design.
3. LTU will train students to serve as tour guides for the Solar House.
4. LTU and the Troy Chamber of Commerce are currently compiling the names of groups interested in taking tours. These tours will be conducted by LTU students.

FUTURE MAINTENANCE COST

1. Annual maintenance and operation cost \$3,000.00.
2. Battery life expectancy is 5 years with an estimated replacement cost of over \$25,000.00.

3. Complete demolition cost and site restoration estimated \$20,000.00.
4. Budget Reserve Capital \$5000.00 per year.
5. Solar House will be maintained by the Building Operations department and most work will be performed in house.

CONCLUSION

1. Total investment by Lawrence Technological University \$550,000.00.
2. City of Troy associated expenditures with site development, water and sewer service, operation, and repair costs \$50,455.00.
3. Facility will be used for educational purposes to demonstrate the working display of green technologies.
4. Removing and demolishing this facility could cause negative impact that could misrepresent the City of Troy policy on going green.