

**Swampscott Town Hall Renovation Project  
Geothermal Heating System Evaluation Report  
Questions and Answers**

**2/15/07**

Reinhardt Associates submitted a report on the financial feasibility of installing a geothermal heating system as part of the Town Hall Renovation Project, as an alternative to a conventional heating system.

There were a number of questions raised on the contents on the report, which I collected and brought to Reinhardt. I spoke on the phone with Mr. Ned Trumbull who wrote the report, on Monday February 12<sup>th</sup>.

Our questions are in plain text; Mr. Trumbull's responses are in italics.

1. Where is the information on the soil borings that Reinhardt did over the summer? Shouldn't that be included in the report?

*The three soil borings that Reinhardt conducted were not meant to support the Geothermal investigation. They were actually conducted to collect structural information on the nature of the soil and its ability to sustain the load of the proposed building addition. Regardless, Mr. Trumbull is to forward me the borings for our files. Of note, he said that groundwater was encountered at ~25' bgs, and that they did not encounter any bedrock.*

2. Regarding the two cost analyses, why is the annual cost for lights more with the geothermal heating system than with the conventional? It seems to me they should be the same.

*They should be the same – the error does not have an impact on the cost analysis, though, since the cost in question is a “non-HVAC” cost.*

3. Also why is the non-HVAC electric equipment cost more for the geothermal system than the conventional? Again they should be the same.

*Again they should be the same, and there is no change in the cost analysis.*

4. Why did Reinhardt assume a horizontal loop system rather than a vertical loop system?

*Horizontal systems are significantly less expensive to install than vertical systems. Vertical systems are only used when there is a shortage of space for the loop system. The proposed Town Hall lawn location is large enough to hold a horizontal system.*

5. How deep does the loop system have to be? Are we likely to encounter bedrock (increased installation costs)?

*The system has to go below the frost line, which is generally ~5' bgs. According to the borings, we are not likely to encounter bedrock.*

6. What maintenance is required on the ground surface above the loop system? Does deep-rooted vegetation (trees) have to be eliminated?

*Reinhardt considered this when deciding where to locate the loop system. The proposed location does not have any trees.*

Other notes:

In order for the Geothermal system to be included in the bid as an alternate, a preliminary design must be completed. Reinhardt can do the design, but it will increase the cost of bid preparation by \$7000. Also it will delay the bid going out on the street by about two weeks. Finally the alternate will be the fourth alternate on the job, and the alternates must be taken in order. The likelihood of the job getting to the fourth alternate is not good.

Mr. Trumbull is to give me the name and phone number of a reference on a geothermal system Reinhardt installed about two years ago. When I get that I will call the contact and get information on how their system is running and if they are happy with it.

Installing a Geothermal Heating System vs. a Conventional Heating system is estimated to cost an additional \$63,500. That additional cost includes all additional equipment, and installation of the horizontal ground loops providing there is no ledge present. Installation of the geothermal heat pumps and conventional heating equipment was not included in the comparison. The payback period on the system was estimated at around 12 years.