

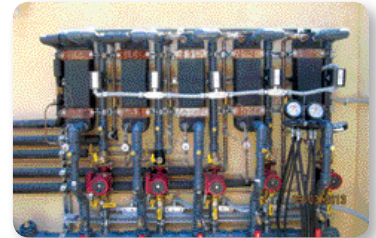
Located in Silicon Valley, the town of Los Altos Hills, CA, has a population of about 8,000 residents. The town is only 9-sq. miles making it one of the smallest towns in Santa Clara County. A unique feature of Los Altos Hills is that the town is strictly residential—there are no commercial or industrial zones. The zoning regulations are among the strictest in California, helping the town keep its residential-rural lifestyle. Residents are drawn to the area because its rolling hills and scenic valleys are a welcome escape from the high tech world of Silicon Valley. One family in particular decided it was time for a higher standard of living and took on the project of building a 13,387 sq. ft. home in Los Altos Hills.

because they're so elaborate and very detailed. "It's a very large home and everything is custom made." His company was perfect for the custom job because they do all of their own engineering, fabrication and installation. "We have a boiler, electrical and mechanical licenses. We do our own piping and hydronics, and we do it in-house so that we can control it better."

Hybrid Heating

The home is heated and cooled through a hybrid system. The primary source of heat is an in-floor radiant heating system embedded

in 2-in. gypcrete with 25 individual zones. There are six fan coils that use chilled water for cooling and low temperature (140F max) hot water as a backup heat source. There are 21 individual cooling zones in the home. "This level of zoning provides the ultimate in comfort and efficiency," Donnici says.



Chilled water pumps help operate the custom made chilled water plant.

A Higher Standard

Some major concerns of the homeowner were comfort and superior indoor air quality as they started this two-year endeavor. The family chose Russ Donnici and his team at Mechanical Air Service, Inc., a repeat Quality Home Comfort Award winner, to help them achieve their goals because they came highly recommended in their circle of friends and co-workers.

"The homeowner is a venture capitalist," Donnici explains. "The venture capital community is very close knit and we have many clients in that community. The homeowner happens to know a lot of those clients."

Mechanical Air Service, Inc., is based in San Jose, CA, and is a second-generation business that's been servicing the San Jose area for 37 years. Donnici started the business and now his son Matt, VP of construction, daughter Danielle Larson, VP/CFO and son-in-law Scott Larson, VP of service, run the day-to-day operations.

Donnici refers to homes like these as 'homes of distinction,'



This 13,387 sq. ft. home achieves superior IAQ with the help of two Bryant heat recovery ventilators that run 24/7.

PHOTOGRAPHY BY RUSS DONNICI

The heating system is comprised of two Lochinvar wall hung boilers rated at 96% AFUE. The boilers are cascaded together to even out the run hours on both units. This system is a dual water temperature system: one temperature for the radiant floor heat and one temperature for the hydronic hot water heat. Both water temperatures use an outdoor reset, so the heat output is matched to the load inside the home based

BY KATE KELLY, ASSOCIATE EDITOR

on outside air temperature.

The radiant floor heating system operates at a maximum temperature of 104F at the coldest designed outside air temperature so that we can use the efficiency of the 96% AFUE boilers to their maximum. The hydronic heat is the second stage heat source with a five-degree differential between the radiant primary heat source stage and the hydronic heat. It's for backup purposes or for when the homeowners have been away for an extended period of time, to improve the heat recovery time," Donnici says.

To help keep the indoor air quality in top-notch form, each fan coil is equipped with an Aspen Air electronic air cleaner and an Ultravation UV light system to kill mold spores, bacteria and viruses. Each fan coil brings a dedicated amount of outside air to help freshen the air inside the home. Each fan coil includes a Honeywell steam humidifier to maintain a healthy humidity level in the home. "The reason we use steam is because it's more reliable and it can be used all year round, versus other types of flow-through humidifiers that are only ef-

Energy savings is achieved thanks to the Bryant condensing units (pictured below). The zone panel (right) helps heat and cool 21 zones.

PRODUCTS KEY TO SUCCESS

- Lochinvar wall hung boilers
- Lochinvar Squire indirect hot water heater
- Grundfos Magna variable speed pump
- Wilo variable speed pump
- Honeywell steam humidifiers
- Multiaqua chilled water/hot water fan coils
- Uponor radiant manifolds
- Uponor PEX tubing
- Aspen Air electronic air cleaners
- Ultravation UV light systems
- Aprilaire 8800 dedicated humidistats
- Aprilaire 8800 thermostats
- Aprilaire distribution panels
- Aprilaire zone panels
- Aprilaire zone dampers
- Taco zone valves
- Caleffi flow meters
- Bryant 187B060 5-ton condensing units
- Grundfos chilled water pumps
- Flat plate heat exchangers
- Alco thermal expansion valves
- McDonnell Miller flow switches
- Johnson Controls C450 control system
- 140 gal. State chilled water buffer tank
- HDPE 3-in. underground chilled water piping
- Dwyer velocity meter and magnehelic

fective when the system is in heating mode," Donnici explains.

Customized Chillers

The Mechanical Air Service team built five custom chillers to maximize energy efficiency and reliability in the home. "The chill water plant is a custom made system for maximum energy savings under part-load conditions which is approximately 95% of the time," Donnici says. The system is comprised of five Bryant 187B two-speed, five-ton condensing units that are connected to five flat plate heat exchangers that each have its own dedicated chill water pump. "The SEER rating is 18 to 20 and the approximate EER is 14.5. The system is controlled by a custom control panel that uses a Johnson Control C450 control system with ten stages of cooling. It uses an outdoor air reset schedule to vary the chill water temperature, save energy and match the chiller system output to the homes needs. Each chiller operates as an independent circuit so that if one system has a problem, it doesn't affect the others. This system provides, with ten steps of capacity, the ultimate in high efficiency part-load operation."

Thoroughly Tested

The system received extensive commissioning during the startup process. Temporary chemical absorbers were installed to help with the off gassing of some furniture in the house. The contractor performed a boiler combustion analysis, air balancing with an Alnor flow hood, and all electronic air cleaners were tested with a laser particle counter. "The home was tested for carbon dioxide using a YES IAQ meter,

particulate levels were testing using a TSI DustTrak monitor, TVOC levels were tested with a RAE system PPB RAE meter capable of measuring total VOC levels down to one part per billion. Formaldehyde levels were also tested using an Interscan 4160 meter capable of detecting formaldehyde to one part per billion," Donnici explains.

The homeowners have been in the home for about four months at the time of publication. "They're happy that the house is comfortable and they're learning to operate this very sophisticated system," Donnici says. "We are proud of this project because of the extensive energy conservation measure and indoor air quality measures implemented

and engineered for comfort. We've never performed testing to this level in a residence, and the commissioning process for indoor air quality was second to none."

California sets trends that often expand to other regions of the U.S. Mechanical Air Service sets trends of its own with home comfort contracting that should make other HVAC contractors take notice, and want to apply to their businesses. Congrats to this team from the Golden State! 🏠

