The courtyard was in-filled to create a new entryway to the building, allowing the installation of the “slinky piping” for the Hybrid Groundsource Heat Pump System at an extremely economical cost. The work to infill the site was already included in the project budget, and only the cost of installing the plastic piping was required—a premium of 0.3% of the total project cost. The piping was distributed as a “flat slinky” to maximize surface area for heat exchange between the building and the earth. Some 13,000 linear feet (over two miles) of HDPE plastic pipe was distributed on the site, 5 ft. below the finished grade. At this depth, the temperature of the earth is nearly constant year-round.

This system acts as a giant heat exchanger and provides a means of heating and cooling Bowman Hall using water source heat pump equipment. Heat removed from the building during the summer air conditioning season is stored in the earth, like a giant thermal battery, and re-used to heat the space during the winter.
SUNY Potsdam’s Bowman Hall heat pump system uses an earth heat exchanger to deliver heating and air conditioning to the building. Water is pumped through 13,000 ft. of buried coiled pipe under the courtyard, and distributed to heat pump equipment in the facility. The buried piping acts as a large heat exchanger, transferring energy between the building’s HVAC system and the relatively constant temperature of the earth. The result is a nearly self-sustaining source of heating and cooling, with very little need for outside sources of energy, (such as boilers or cooling towers).

Inside the basement mechanical room, the slinky pipes are connected to a common manifold. The water is then circulated to various heat pump equipment in the building.

Superior indoor air quality is maintained and stale air is continuously replaced by fresh outdoor air through the use of a central energy recovery ventilation heat exchanger. Energy from the exhaust airstream is transferred to the fresh airstream, minimizing the amount of additional heating or air conditioning required to maintain space temperatures.

Heat and air conditioning is delivered from the heat pumps to the space using traditional ducted systems.

Heat pump equipment uses the tempered water from the buried slinky heat exchanger to transfer heat or air conditioning to the building spaces. For most of the year, no additional means of heating or cooling (boilers or cooling towers) are required. The thermal storage of the earth is all that is needed to keep the building comfortable for the occupants.
Balanced Load
When heating and cooling loads in the building are balanced, heat can be transferred via the water loop to areas of the building that need it. No external means of heating or cooling are required.

Cooling Mode
When the building is in cooling mode, heat is rejected into the earth heat exchanger via the water loop. The heat is stored in the earth and will be used to heat the building during the Winter.

Heating Mode
During the winter season, heat from the ground is absorbed by the earth heat exchanger and delivered to the building via the water loop.