

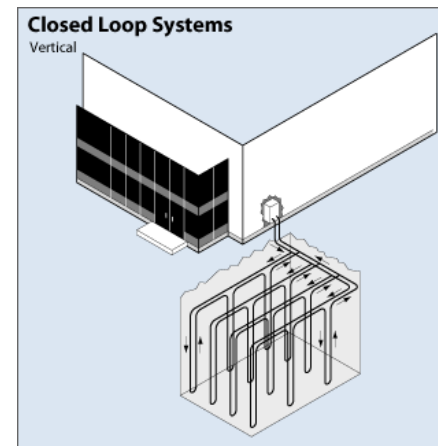
- **Sustainable Strategies**
 - **Optimize Thermal Utility Production Energy**
 - **Geothermal Heating/Cooling Systems**
 - **Refrigerant Management**
 - **Wind Energy Systems**
 - **Photovoltaic Systems**
 - **Biofuel Systems**

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Optimize Thermal Utility Production Energy

- Reduce the amount of chillers, pumps, cooling towers at buildings by building central plants.
- Install larger/more efficient equipment at a central plant to reduce electricity use on campus.
- One location of equipment allows for better maintenance to maintain system efficiency over time.

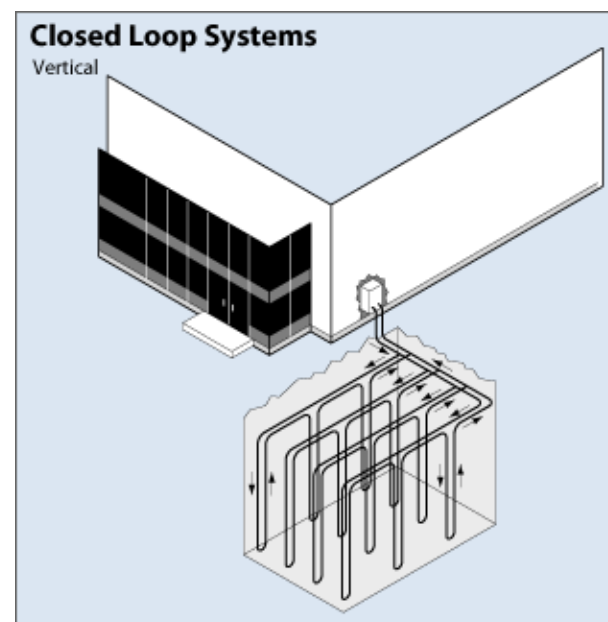
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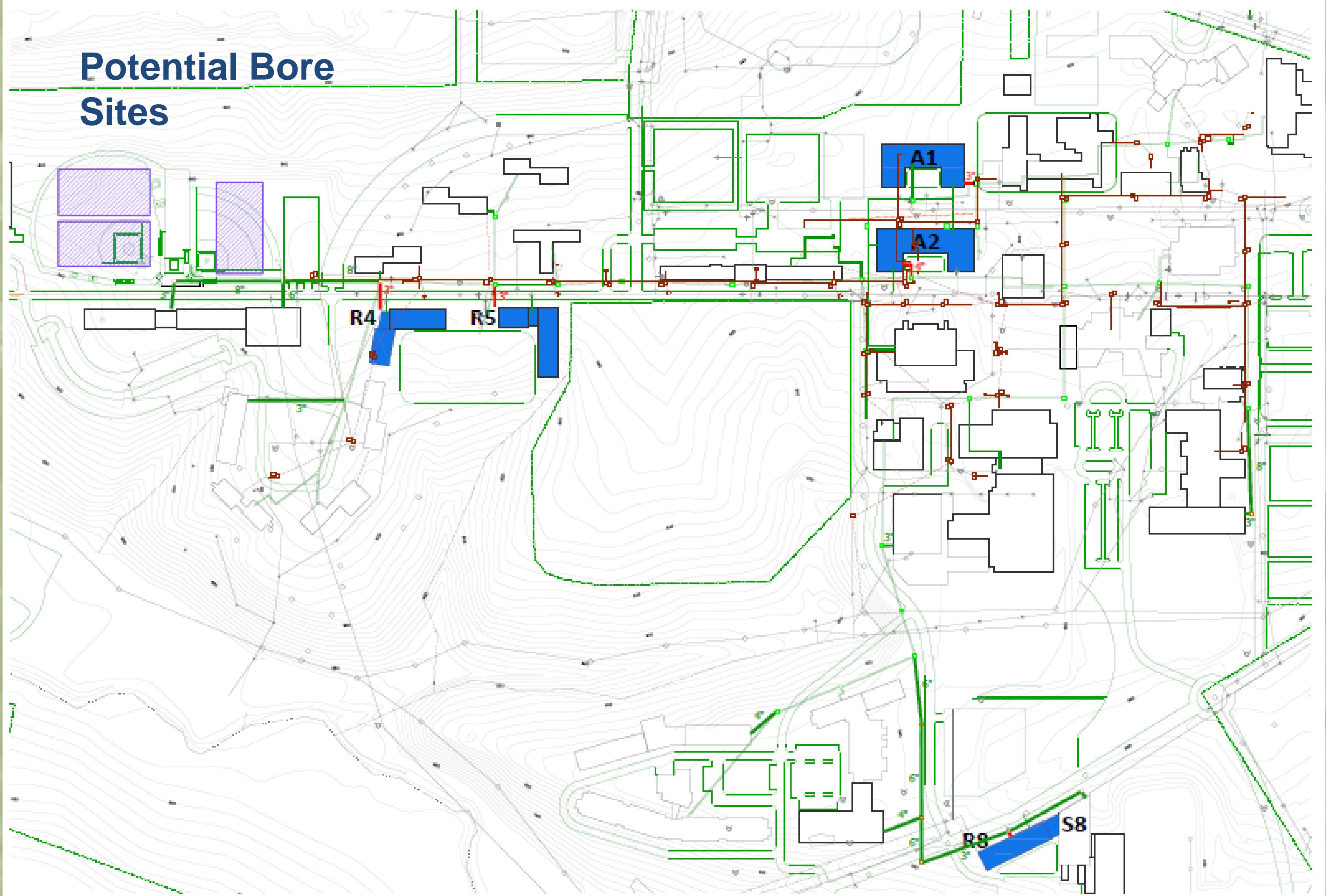
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Geothermal Heating/Cooling Systems

- An option for heating and cooling a portion of the west campus dorms
- Bore fields require large area (1 acre per 60,000 gsf dorm equivalent to R3 or 2 acres gsf for dorm equivalent to R1)
- Ideal space for bore field on campus is very limited
- Beginning to look at cost of geothermal vs conventional plant steam and chilled water

Potential Bore Sites



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Refrigerant Management

- Recommend specifying chillers with low refrigerant leakage that operate with low ozone depleting and global warming potentials.
- Limit the amount of refrigerant on campus by serving building cooling loads from a central chilled water plant and in turn limit refrigerant leakage by reducing the amount of chiller maintenance.

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Wind Energy Systems

- Currently there is potential for wind power generation at the Pioneer Farm due to available space to serve loads at the Farm.
- There is not adequate space on the central campus for substantial wind power generation to offset the campus electric load.
- The cost to install transmission lines to the central campus is approx. \$1M/mile.
- Wind power generation could be installed on the central campus as an educational tool.

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Photovoltaic Systems

- The central campus lacks adequate space to install an array to serve a significant portion of the campus electric demand.
- Smaller arrays could be installed on individual building roofs to serve small electric loads and for educational purposes.

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Biofuel Systems

- The UW Systems Heating Plant Study consultant is currently investigating fuel options for the Central Heating Plant.
- Installing a methane gas line from the campus sanitary sewer plant to the heating plant is being investigated.