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Guiding Principles for Existing High-Performance Sustainable Buildings Outdoor Water

Sandia National Laboratories/New Mexico

by Jim Corcoran, Org. 4821

Sandia National Laboratories (Sandia) will use Option 1 to meet this Guiding Principle (GP) requirement because Sandia does not separately meter potable indoor and outdoor water. Option 1states that the building must reduce potable irrigation water use by 50 percent, compared to conventional methods. Option 1 allows a site or location option to be used.

In New Mexico, the conventional irrigation method is broadcast spray irrigation on turf. The Sandia/NM location uses a combination of no irrigation for undeveloped mesa land, drip or point irrigation for xeriscape areas, and spray irrigation for cool season and warm season turf areas. Sandia has minimal turf area, located primarily in Technical Area 1.

Sandia requires efficient and effective plant selection, landscaping design, and irrigation systems that conserve water. Sandia's design, construction, and operational requirements are communicated by the following documents:

- Design Manual, Chapter 4, Landscape Standards
- Campus Design Guidelines
- Landscape Master Plan
- SNL Standard Specification 02812, *Landscape Irrigation Systems*
- Gardeners Maintenance Manual

In 2005, Sandia installed a Central Irrigation Control System (CICS) with zone water meters and soil moisture sensors. The CICS showed a 59 percent savings in water use, compared to previous years.

Sandia's irrigation and water conservation strategy can be summarized as follows:

- Use xeriscape principles to minimize maintenance and promote low water usage.
- Select water-efficient plants.
- Minimize or eliminate turf area.
- Require Irrigation Association (IA) designers to design irrigation systems. Require minimum distribution uniformities for all types of irrigation-emission devices (fixed spray, rotary, bubblers, and drip). Capture stormwater from roofs in storage tanks and site water infiltrated into the ground as assets to reduce site drainage runoff and storm drain costs and liabilities.
- Deliver water directly to the plants.
- Use mulches appropriately.
- For remnant dirt areas, drill-seed with native grasses, wildflowers, or both, and cover with a minimal layer of rock mulch. Install a temporary irrigation system to support grasses and wildflowers until they are established.
- Use application rates, scheduling practices, or both, that avoid runoff and permit uniform water application. Consider land slope, soil hydraulic properties, vegetative ground cover, peak use demand, and prevailing winds when specifying application rates.

- Divide the irrigation system into zones based on the following considerations:
    - Consistency with hydrozone concepts
    - Sprinkler heads with matched precipitation rates
    - Type of vegetation irrigated, such as turf, trees, or shrubs
    - Consistency with microclimates, such as buildings, shaded areas, and reflective heat
    - Elimination of mixed head types, such as bubblers and rotaries on the same zone
    - Cultural use of the area, such as pedestrian walks and seating areas
- Select equipment, when available, that is labeled WaterSense® by the EPA.
- Design sprinkler and bubbler irrigation systems to meet water requirements for individual plants at maturity.
- Develop an irrigation schedule that accounts for the effects of temperature, plant species, soil types, precipitation rates, and microclimates.

Using this strategy, Sandia meets or exceeds the 50 percent requirement for most of the buildings at the New Mexico site.