

Sustainable landscaping's success

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Gardeners' Guild partners with a major industrial client in an ambitious program of resource management

In 1996, Gardeners' Guild began its landscape management program at Agilent Technologies (formerly Hewlett-Packard) in Sonoma County, CA. The company's two major Sonoma County campuses, the Fountain Grove site in Santa Rosa and a facility in Rohnert Park, consist of approximately 70 acres of ornamental landscape, sports fields and less disturbed areas like wetlands, oak woodlands and open areas of mixed exotics. Bordered by agricultural lands with suburban interface, the campuses present wide expanses of land with buildings situated to blend into the natural setting.

A third campus in Sonoma County was brought on during late 2001; all three campuses have been part of the Gardeners' Guild and Agilent Technologies' Sustainable landscape Program. This article, however, will focus on the challenges and accomplishments of the Rohnert Park site.

Back in the day

In 1996, this site included 15 acres of turf and sports fields, 10 acres of ornamental landscape, several large areas with invasive perennial weeds and exotic vegetation, and a five-acre wetland refuge. The landscape presented a formal appearance with its large expanses of turf and traditional presentation and selection of trees, shrubs and ground cover.

The site was designed as an electronic manufacturing plant in 1984, and 15 acres of turf were selected for the landscape design with a purpose: to bio-filter the anticipated reclaimed water generated by the plant. This need was eliminated when a different application for the plant was chosen midway through construction. This required Agilent Technologies to purchase water from Rohnert Park to irrigate their landscape vs. generating much of its own landscape water from plant operations.

Rohnert Park at that time couldn't meet the water needs of Agilent Technologies, which was then forced to dig a well to supplement its water supply. As the drought of the 1985 progressed, the aquifer supplying water to Agilent Technologies' well dried up, and the company then purchased water from the city. Later, as Rohnert Park moved to recycled water, this water supply was provided to Agilent, which now uses approximately 130 acre ft. of recycled water annually on its landscape.

Vegetation Comparison Table

Plant cover	1996 sq. ft.	2002 sq. ft.	% Change
Turf	717,570	583,448	-19
Ivy	88,822	17,768	-80
Tall fescue	582,496	379,237	-35
Hypericum	16,192	774	-95
Pepper trees	30,000	0	-100
Eucalyptus trees	236,250	0	-100
Willow trees	10,800	0	-100
Strawberries	2,796	1803	-36
Butterfly garden	0	8,163	100
Boston ivy	10,000	5,000	-50
Rosemary & grasses	0	250,000	100
Pyrus trees	2,000	0	-100
Honey locust	16	0	-100
Undeveloped	4,189,666	4,420,693	-8

No stranger to efficiency

Agilent Technologies was no stranger to the concept of resource efficiency. In the early 90s, Agilent initiated a program with its landscape maintenance firm and a team from the University of California to study the effects of naturalizing red fescue in some areas. The result of the study established that red fescue berms, when not mowed, provided valuable, less disturbed habitats and were aesthetically pleasing. In addition, considerable labor and fuel resources were saved by no longer maintaining the berms as manicured areas.

In 1996, there was a clear opportunity for Gardeners' Guild and Agilent Technologies to combine landscape beauty and functionality with the appropriate

use of resources. This landscape management approach incorporates ecological guidelines, efficient use of resources and economic considerations.

But this kind of resource-efficient approach needs to be a gradual process. It requires cooperation and partnership among all interested parties - horticulturalists knowledgeable in sustainable landscape design and management techniques and property owners who understand the economic, environmental and social roles of the property. The landscape management program at Agilent Technologies' plant in Rohnert Park is a real life example of this process.

Traditional maintenance

A traditional maintenance plan for this landscape had been in place since the 1980s. This plan included application of pesticides at fixed intervals for weeds, disease and insect control (calendar spraying), ample use of highly synthetic fertilizers, and intense grass mowing. Green clippings were being managed with a more progressive program: they were stored on a designated portion of the property and periodically relocated and disked into fallow land areas, or chipped and used on open space areas.

By contrast, Gardeners' Guild envisioned a program that emphasized restoration of habitat and a more directed and efficient use of resources. Shortly after beginning its landscape maintenance work, the Guild asked FAS Technologies, a company dedicated to ecological design principles, to help develop a formal "sustainable landscape management" (SLM) program for consideration by Agilent Technologies. This program included a definition of this sustainable approach, an assessment of the sites, and a method of measuring inputs and outputs.

FAS Technologies explained the ecological methodology that includes energy flow analysis as a measure of sustainability. The company recommended that an appropriate method for evaluating the maintenance program, from a sustainability point of view, would ~ to include an estimation of the energy used in the program based on ecological methodology. This methodology would include determination of the energy demand (measured as calories or Joules) by the various plant communities in the landscape.

Agilent Technologies Facilities Management embraced this approach and quickly adopted the concept that sustainable management would protect and enhance the natural assets of the property.

FAS Technologies continued to serve as the technical sustainability advisor to Gardeners' Guild and to assist in defining and shaping goals for the program. The initial agreement with Agilent Technologies included guidelines that would measure the maintenance program's costs and results in terms of efficiency, resource use and environmental benefits. It was agreed that the management plan would be modified according to the following criteria: Vegetation that

demanded less calorie input for maintenance would be replaced by vegetation that demanded less calorie input, including native plants. In addition, vegetation management in less disturbed natural areas would be improved. Other ecologically-based management principles would also be included, such as Integrated Pest Management (IPM), water management, resource reuse and the measurement of all resources used for landscape maintenance.

The efficiency of the maintenance program would be assessed yearly, based on the amount of resources used, as well as the amount of resources recycled and recaptured back into the landscape system. It was also agreed that FAS Technologies would eventually evaluate the ecological performance of the landscape program based on energy flow.

Let's go sustainable

The Agilent Technologies Facilities Management Department was interested in moving in this sustainable direction. The Company has a deep sense of environmental stewardship, and the SLM fit their ISO 9000 model as well as their inherent green business philosophy.

Company employees also take a vital interest in the environment (in particular, many had concerns about pesticide use). They were kept apprised of the SLM through "Brown Bag Lunch" talks so that they could support their company's investment in the program. In addition, Gardeners' Guild regularly reported to the Facilities Management Department, measuring its progress against the mutually established goals.

The Gardeners' Guild operations team was aware that its management contract with Agilent Technologies was priced competitively and that implementing the new sustainable landscape management plan would require additional

Therefore, to realize the long-term partnership they wanted with Agilent, a strategy was needed to implement capital projects that would move the program toward maintenance efficiencies and a reduction of labor and materials input over time.

For instance, the Guild team recognized that many of the traditional practices in place at the Rohnert Park site, like the calendar spraying for insects and diseases, could be phased out, thus immediately reducing these costs. Further savings could be realized by monitoring operational inputs into the project, which would inform the program which resource demands could first be modified to yield the greatest savings.

Strategies prove effective

Since the plan was initiated in 1996, these strategies have proven effective. Gardeners' Guild and Agilent Technologies are realizing a stabilization of maintenance costs and capital inputs. The specific changes made in the landscaping include:

- Reducing or eliminating excessive maintenance tasks. For example, by removing lawns under redwood trees and allowing this area to look more like areas under canopies of redwood forests in nature, the task of removing redwood duff from lawns is no longer needed.
- Replacing high-maintenance plants such as ivy, Hypericum and large lawn areas with plants that use fewer resources, such as Ceanothus, Carpenteria, ornamental and native grasses, and rosemary.
- Transforming small strips of turf with large trees and parking lot islands into pleasing and loose arrangements of ornamental and native grasses, and Mediterranean plants.
- Reducing the amount of organic material removed from the landscape through grass cycling. This practice has also significantly reduced the amount of fertilizers used on the turf.
- Chipping removed vegetation and using the chips for weed control in ornamental beds. This has been so successful that virtually no new mulch has been imported to the property except to the newly installed landscape area.
- Lowering water demand by reducing the amount of turf and improving irrigation management, and, in selected natural areas, turning off irrigation. The indigenous plants in these areas prefer little irrigation.

Resource Comparison Table

Site inputs	1997	2001	% Change
Herbicides	6,643 oz.	11,010 oz.	*65% increase
Insecticides	89 oz.	64 oz.	39% decrease
Mulched areas	275,000 sq. ft.	600,000 sq. ft.	118% increase
Fertilizer 21-7-14	1,274 lbs.	500 lbs.	61% decrease
Water (AF)	133	130	2% decrease

*65% increase is due to intensive scotch broom control and pre-emergent herbicide application in transitioning areas

Herbicide reduction

The sustainable plan called for a reduction in the use of herbicides. However, the transition from densely planted ivy and Hypericum beds to new plantings with shrubs and trees and no ground cover presented a challenge to this plan. After

trial and error, a weed barrier fabric was introduced to use with the mulch, as the new plantings became established and weed seeds became less viable. Rosemary and ornamental Pennisetum grasses occupy an area that once was turf.

Pesticide use was reduced over the six-year period. Management approaches, including beneficial insect releases (primarily green lacewings), were successful, and when these methods weren't appropriate, ecologically sensitive "soft" insecticides such as soaps and oils were employed.

Comparable success hasn't been achieved in herbicide reduction, although the use of weed barrier fabric with mulch and management of surrounding natural areas is reducing some of the weed pressure.

The demand for synthetic fertilizers was reduced by recognizing that the nutrient load in the recycled water and the incorporation of grass cycling to turf areas were maintaining healthy plant growth and good color in the turf. Throughout the site, no additional fertilizer is used in the ornamental beds and only a small amount was used on the sports fields, resulting in significant savings in maintenance costs and reducing potential impacts on ground water.

For a new 10-acre area, which in 2000 was converted from fallow land to parking lots and landscaping, Gardeners' Guild asked Environmental Technical Services of Petaluma, CA to recommend improvements to the adobe soil. This recommendation has served as a guideline for other planting areas. Sustane organic fertilizer, a 4-6-4 blend, is utilized in color containers.

Reducing the need to import mulch was supported by the team's efforts to remove dangerous and non-desirable tree species. These trees, mainly non-native Eucalyptus, willows and honey locust, were removed because of their potential for dangerous limb breakage, sidewalk upheaval and excessive debris. All the tree cuttings were chipped, and this mulch was used extensively throughout the grounds. This strategic step served many purposes: It suppressed weeds, improved water retention, dressed up the appearance of many beds and eliminated the need to purchase mulch or dispose of the cuttings.

Conservation of the site's ecologically important wetlands area has been emphasized. The five-acre seasonal wetland has weed pressure from the surrounding open areas. Yellow star thistle, the primary weed, was treated in 1997 with a release of Hairy Weevil as a biological control. Some measure of success was achieved, and the population is now considered minor. In addition, scotch and french broom are now removed by hand.

An integrated water management plan has resulted in the reduction of water use, even though the actual planted area increased by 10 acres. This was achieved primarily through hardware upgrades, increased clock programming frequency and the changes in plant palette.