Agilent – Palo Alto
CO-1

Site Location:

395 Page Mill Road
Palo Alto, CA

Features:

- Detention basin with native vegetation along banks
- Parking lot vegetated swales
- Roof downspouts draining to landscaping
- Promotes alternative transportation by providing bike racks and lockers, an onsite bus stop, and carpool/vanpool parking
- Structured parking lot (2 levels with top level draining to rock filter bed).

The detention basin, known as "The Swale" by Agilent employees, provides stormwater collection and treatment for the parking areas, visual amenities for employees, and a visual buffer for the neighboring residential community.

Stormwater Benefits:

- Reduced impervious surface area
- Natural treatment of runoff
- Reduced volume and velocity of runoff
- Reduced transportation related pollutants
- Reduced directly-connected impervious area (DCIA)

The parking lot is graded to drain into vegetated swales, shown here, and the detention basin.

Storm drains from the parking lot enter the detention basin through drains like this one.

The detention basin has two outlets to protect against localized flooding and to ensure that the basin drains within 72 hours for vector control.

Bike racks and showers encourage employees to bike to work. Additional bike lockers and a bus stop are located at the Page Mill Road entrance.

Agilent encourages employees to carpool by providing designated car/van pool areas. Reducing vehicle trips traveled reduces the amount of pollutants such as hydrocarbons and brake pad dust released to the environment.

Runoff from this parking structure drains to the filter bed, described below. The two-story parking structure allows for roughly twice the number of vehicles for the same area of a typical surface parking lot, while allowing enough room on-site for the detention basin.

The runoff drains from the top of the parking structure to this rock filter bed for treatment and then to the storm drain system via the detention basin.

This rocky swale is used to slow and treat rooftop runoff before draining to the storm drain. A minimum two percent (2%) slope away from the building protects the building foundation from water damage.

Storm drains are clearly labeled with an educational "no dumping" message.

The detention basin collects water from the parking lot. The concrete edging protects the asphalt from water damage while the bumper stops help prevent cars from traveling over the vegetated swales.

Agilent – Palo Alto
CO-1 (cont.)

Lessons Learned:

- The irrigation heads originally installed for the retention basin caused some ponding for greater than 72 hours until they were modified to target areas requiring water. The local vector control agency brought mosquito fish for mosquito control while the irrigation challenge was being diagnosed and addressed.
- During the rainy cloudy days, the water in the parking lot catch basins may take longer than 72 hours to drain. Maintenance staff must periodically clean debris from catch basins.
- The detention basin has also served as a useful indicator for irrigation leaks for sprinklers within the parking lot biofilter landscaping. When maintenance staff sees ponded water in the detention basin during a dry spell, they investigate for potential leaks.
- The landscape service provider must carefully control the scheduling of irrigation system to prevent overwatering and water build up in the detention basin.
- Shredded bark was installed initially along the detention basin banks to hold the soils without clogging the system until vegetation became established.
- The site designer highly recommends checking after the first rain to make sure the entire system is working correctly. For the roof downspouts, the rainwater initially started pooling behind the header boards at the bottom of the roof downspouts. Notches cut in the header board ensure proper drainage away from building with a minimum 2% slope.
- Maintenance costs and effort are comparable to that for typical landscaping according to Agilent maintenance staff.

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Yahoo! Inc.
CO-7

Site Location:

701 First Avenue
Sunnyvale, CA

Features:

- Rocky swales
- Multi-story buildings reduce building footprint
- Access to the Bay Trail open space area including parking available for visitors
- Permeable walkways

Stormwater Benefits:

- Natural treatment of runoff
- Reduced impervious surface area
- Reduced directly-connected impervious area (DCIA)

This rocky swale has a storm drain for excess flows.

Rocky swale with curb cuts allows for infiltration to occur.

Rectangular stones are used to create a rocky swale.

Yahoo! Inc.
CO-7 (cont.)

Pervious walkways used to minimize impervious surfaces.

On-site parking is provided for visitors to the Bay Trail (located behind the Yahoo! Campus).

This walkway slopes toward landscaped vegetation; with multi-story buildings in background.

Pervious walkways used between concrete sidewalks.

Yahoo! Inc.
CO-7 (cont.)

Curb cuts (see arrow) allow runoff to drain off parking lot into the vegetation.

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Juniper Networks
CO-8

Site Location:
1194 N. Mathilda Avenue
Sunnyvale, CA

Features:
- Multi-story buildings reduce building footprint
- Rocky swales and trees in parking lot
- Rooftop runoff drains to landscaping
- Promotes alternative transportation
- Permeable pavement
- Located buildings to protect existing heritage tree

Stormwater Benefits:
- Reduced impervious surface area
- Reduced transportation-related pollutants
- Natural treatment of runoff
- Reduced volume and velocity of runoff
- Reduced directly-connected impervious area (DCIA)

This pathway made of pervious pavers allows infiltration through the sand filled crevices. Also, these benches are provided on pervious surfaces.

Runoff from rooftop drains into landscaping reducing the directly-connected impervious area (DCIA).

Parking lot runoff drains through curb cuts and then filters through the rocky swale. Trees provide visual amenities as well as reduce the volume and velocity of runoff.

Juniper Networks
CO-8 (cont.)

The convenience of the Light Rail Station across the street encourages employees to take public transportation to work.

Charging stations allow employees with electric vehicles, like the Sparrow pictured here, to charge-up while at work.

Plenty of carpool parking encourages employees to share rides to work.

Covered bike racks are provided for employees who prefer to ride their bicycles to work.

Juniper Networks
CO-8 (cont.)

An existing oak tree was preserved in the development of this project.

Lessons Learned:

- During storms, ponding does occur in parking lots. This can be prevented through better design and construction of the rocky swales to ensure that the infiltration rate of the swale is fast enough to prevent ponding, or by adding a perforated drainage pipe for runoff overflow. It is also important that the site is graded properly to direct water toward the swale.

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Blossom River Apartments
MF-5

Site Location:
1000 Blossom River Way
San Jose, CA

Features:
- High density residential area
- Rocky swale

Stormwater Benefits:
- Reduced impervious surface
- Natural treatment of runoff
- Reduced velocity of runoff
- Reduced directly-connected impervious area (DCIA)

Photograph courtesy of Mike Campbell (RBF Consulting)

Runoff enters the rocky swale from the parking lot and is filtered before entering the storm drain.

Photograph courtesy of Mike Campbell (RBF Consulting)

Turf landscaping around the rocky swale provides an area for infiltration Multi-story buildings reduce the building footprint.

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Baylands Parking Lot
PA-7

Site Location:

East end of Embarcadero Road
(Adjacent to PA Sailing Station)
Palo Alto, CA

Features:

- Bioswales
- Non-petroleum paving materials

Stormwater Benefits:

- Natural treatment of runoff
- Reduced directly-connected impervious area (DCIA)

Note:

- The bioswale was under construction at the time these photographs were taken (November 13, 2003).

The filtered runoff drains into this storm drain at the downstream end of the swale.

The bioswale surrounds the parking lot, providing runoff treatment before it drains to the storm drain.

Parking lot is graded so that runoff drains into the swale.

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