

**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.

Municipal Contact:

Joe Teresi
City of Palo Alto
(650) 329-2129
Joe.teresi@cityofpaloalto.org

Designer Contact:

Bill Southard, ASLA
DES Architects and Engineers
(650) 364-6453
bsouthard@des-ae.com

Environmental Site Contact:

Janice Nakao
Agilent Technologies
(408) 553-7817

Site Facility Contacts:

Joy Curl
Agilent Technologies
(650) 752-5226
and
Tom Flores
Agilent Technologies
(650) 752-5409

**Pacific Shores Center
CO-2**



Site Location:

1500 Seaport Boulevard
Redwood City, CA

Features:

- Multi-purpose detention basin and playing fields
- Second detention basin with cobble bottom
- Parking lot vegetated swales
- 3 miles of paved trails that are an extension of the Bay Trail

Stormwater Benefits:

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



This athletic field also serves as a detention basin. The basin is designed to fill up to a four-foot depth and drain within eight (8) hours.

**Pacific Shores Center
CO-2 (cont.)**



Photograph taken from: <http://www.pacificshores.com/>

This photograph offers an aerial view of baseball fields and detention basin.



Photograph taken from: <http://www.pacificshores.com/>

The multi-story buildings allow for vast landscaping that helps reduce the amount of runoff from the site.



Photograph taken from: <http://www.pacificshores.com/>

Aerial view of Pacific Shores Center shows an ideal area to enjoy the Bay Trail.



Parking lot dividers are used as infiltration areas with vegetated swales and trees. Boulders are used to prevent automobile encroachment across the swale.



The parking lot is graded to drain to these vegetated swales, planted with vegetation and trees. The swales were excavated and backfilled with imported sandy loam soil to increase porosity, and constructed with perforated sub-drains. The concrete strip protects the asphalt from water damage. This image was taken prior to grass establishment.

**Pacific Shores Center
CO-2 (cont.)**



Photograph courtesy of Bill Southard (DES, Architects and Engineers)

Cobbles along this detention basin run for several hundred feet to prevent channeling during high runoff.



Photograph courtesy of Bill Southard (DES, Architects and Engineers)

This photo shows the vegetated swale after the native vegetation has grown in.

Lessons Learned:

- Trees planted with only two (2) stakes for support in sandy loam soil within the vegetated swales blew over during a windstorm prior to root establishment. Using three (3) stakes per tree are now recommended.

Site Contact:

Jay Paul Company
pacificshores@jaypaul.com
(415) 263-7400 V
(415) 362-0698 F

Designer Contact:

Bill Southard, ASLA
DES Architects and Engineers
(650) 364-6453
bsouthard@des-ae.com

**SGI/Google
CO-4**

Site Location:

1600 Amphitheater Parkway
Mountain View, CA

Features:

- Green roof – entire ground level of complex including landscaped area is built above an underground parking lot
- Permeable pavement
- Native vegetation
- Multi-story buildings reduce building footprint
- Bike racks promote bicycle commuting

Stormwater Features:

- Reduced building footprint
- Natural treatment of runoff
- Transportation-related pollutant reduction
- Reduced velocity of runoff
- Reduced impervious surface area



The parking lot can be seen below the turf on the level above.



This tree in the parking lot grows up through an opening in the roof garden area. Trees and other vegetation help reduce the volume and velocity of rainwater.



This grassy rooftop area planted with trees reduces and provides some natural treatment of runoff.

**SGI/Google
CO-4 (cont.)**



Permeable pavement is used in this courtyard.



Permeable pavement and landscaped areas fill the courtyard on top of the parking structure.



Bike racks promote alternative transportation, perhaps providing easy access to other buildings on the campus.



Turf and gravel surrounds this pathway, providing an area for infiltration to occur.

**SGI/Google
CO-4 (cont.)**



Municipal Contact:
Eric Anderson
City of Mountain View
(650) 903-6225
Eric.Anderson@ci.mtnview.ca.us

Site Contact:
Goldman Sachs Group, Inc.
(212) 902-4014

Permeable pavement and native vegetation surround this multi-story complex.

**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)



Runoff from rooftop drains into landscaping reducing the 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.



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.

Municipal Contact:

Kristy McCumby Hyland

City of Sunnyvale

(408) 730-7274

KMcumby@ci.sunnyvale.ca.us

Site Contact:

Barbara Rigden

Juniper Networks

(408) 745-2000

Saratoga Trails PA-9

Site Locations:
Saratoga, CA

Features:

- Pedestrian and bike access trails created as part of subdivisions

Stormwater Benefits:

- Reduces transportation-related pollutants (promotes alternative transportation)
- Reduced impervious surface area
- Open space benefits



Photograph courtesy of Ann Welsh (City of Saratoga)

This trail is located on Prospect Road between Beauchamp Lane and Parker Ranch Road and provides open areas for pedestrians to enjoy.



Photograph courtesy of Ann Welsh (City of Saratoga)

This pathway located on Villa Oaks land east of the intersection with Deer Trail Court, provides access for people to hike or bike into the hills beyond the houses.

Municipal Contact:

Iveta Harvancik
City of Saratoga
(408) 868-1274

iharvancik@saratoga.ca.us

**San Tomas Aquino-Saratoga Creek Trail
PA-10**

Site Location:

Sterling Boulevard at Barnhart
Cupertino, CA

Features:

- Pedestrian and bike bridge allows access

Stormwater Benefit:

- Reduced transportation-related pollutants

Notes:

- This section of the creek trail will eventually connect to the regional trail system.



The San Tomas Aquino-Saratoga Creek Trail allows for people to go for a walk or run near the creek.



The pathway provides access for locals to take advantage of the creek trail in their neighborhood. The trail promotes alternative transportation by providing convenient access for pedestrians and bicyclists.



Pathway leads to bridge that crosses creek to the San Tomas Aquino-Saratoga Creek Trail.

Municipal Contact:
Carmen Lynaugh
City of Cupertino
(408) 777-3354
carmenl@cupertino.org

**Santa Cruz Avenue
PA-11**

Site Location:

Santa Cruz Avenue
Los Gatos, CA

Features:

- Pedestrian activity
- Bike activity
- Bulbouts at crosswalks
- Street trees

Stormwater Benefits:

- Reduced transportation-related pollutant
- Reduced volume and velocity of runoff

Lessons Learned:

- Pedestrian vehicle accident rate has dropped significantly since the road was narrowed.



Bulbouts at crosswalks encourage pedestrian activity by resulting in slower traffic speeds and by providing shorter distances across traffic lanes for improved pedestrian safety.



Among the many benefits of street trees are the reduction of the volume and velocity of stormwater runoff and aesthetic value.



Bike lanes on streets adjacent to Santa Cruz Avenue help promote alternative transportation to the downtown area.

Municipal Contact:

Trish Duarte

Town of Los Gatos

(408) 399-5771

tduarte@losgatosca.gov

Bike Station Project PA-12

Site Location:

Palo Alto Caltrain Station
95 University Avenue
Palo Alto, CA

Features:

- Promotes several modes of alternative transportation including bicycles, the Caltrain commuter rail, Santa Clara County and San Mateo County bus lines (SamTrans and VTA), Dumbarton Express, the Palo Alto Free Shuttle and Stanford University Marguerite shuttle lines.
- Attended bicycle parking– Free during regular business hours.
- Bicycle lockers for after-hours parking
- Bicycle repairs and sales
- Bicycles rentals – Offered by the hour for short commute trips or leisure rides.

Stormwater Benefits:

- Reduced transportation-related pollutants.



Photograph courtesy of Amanda Jones (City of Palo Alto)

Bike lockers store bikes, a service that is free during regular business hours. The Bike Station project currently serves about 50 commuters per day.



Photograph courtesy of Amanda Jones (City of Palo Alto)

The Bike Station provides not only free valet parking, but also coffee and bikes for sale.

**Bike Station Project
PA-12 (cont.)**



Photograph courtesy of Amanda Jones (City of Palo Alto)

The City of Palo Alto and its sponsors provide this service to local commuters.



Photograph courtesy of Amanda Jones (City of Palo Alto)

This Bike Station employee tags the bicycle for storage in the bike lockers, while the commuter takes an alternate mode of transportation to her destination.



Photograph courtesy of Amanda Jones (City of Palo Alto)

Commuters can take their bicycles on the Caltrain and bike from the Caltrain station to and from work and/or home.

Municipal Contact:

Amanda Jones
City of Palo Alto
(650) 329-2568

amanda.jones@cityofpaloalto.org

Site Contact:

Bike Station
(650) 327-9636 (Tel)
(650) 328-0323 (Fax)

<http://www.bikestation.org>

**Bike Station Project
PA-12 (cont.)**

Other:

- The City of Palo Alto also provides a \$20/month benefit to encourage City of Palo Alto employees to ride bicycles to work, and provides bicycle education classes to the public.
- The City of Palo Alto Alternative Transportation Coordinator is available to consult, free of charge, with local employers and residents for all transportation demand management programs.

**Tully Community Branch Library and Ball Fields
PA-14**

Site Location:

880 Tully Road
San Jose, CA

Features:

- Vegetated Bioswales
- Water-conserving Irrigation System
- Connects with Coyote Creek Trail, Allowing Bicycle and Pedestrian Access

Stormwater Benefits:

- Natural treatment of runoff
- Reduced Volume and Velocity of Runoff
- Reduced Directly-connected Impervious Area (DCIA)
- Reduced Dry Weather Flows



Runoff from surrounding impervious areas flows to vegetated bioswale.



Vegetated bioswale collects runoff from building



Walkway and roof runoff drain to vegetated bioswale



Runoff from parking lot drains to vegetated bioswale



Carex grasses in vegetated bioswale



Vegetated bioswale collects runoff from walkways (above and right)



Site plan of Tully Community Branch Library



Municipal Contact:

Domenic Onorato

City of San Jose

(408) 535-8407

Domenic.onorato@sanjoseca.gov