

**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.)**



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

**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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## Porter Drive CO-9

*Site Location:*

3150 Porter Drive  
Palo Alto, CA

*Features:*

- Vegetated swale
- Native vegetation

*Stormwater Benefits:*

- Natural treatment of runoff
- Reduced volume of runoff
- Reduced velocity of runoff
- Reduced pesticide requirements
- Reduced directly-connected impervious area (DCIA)



Photograph courtesy of Joe Teresi (City of Palo Alto)

The bioswale, shown before landscaping had fully matured, was planted using native vegetation along the banks. Check dams extend the retention time, allowing for additional infiltration (see arrows).



Photograph courtesy of Joe Teresi (City of Palo Alto)

The same bioswale, after landscaping has become established, appears natural and aesthetically pleasing.

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Brian Kangas Foulk  
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## Porter Drive CO-9 (cont.)

*Site Location:*

3170 Porter Drive  
Palo Alto, CA

*Features:*

- Pervious pavement
- Vegetated swale

*Stormwater Benefits:*

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



Photograph courtesy of Joe Teresi (City of Palo Alto)

The parking area, adjacent to heritage oak trees, is made of permeable pavement which decreases the amount of impervious surface area at the site.



Photograph courtesy of Joe Teresi (City of Palo Alto)

The edges of the vegetated swale are flush with the parking lot, so that runoff can drain into the swale.



Photograph courtesy of Joe Teresi (City of Palo Alto)

This is a close-up photograph of the permeable pavers in the parking stalls.

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**Porter Drive  
CO-9 (cont.)**

*Site Location:*

3180 Porter Drive  
Palo Alto, CA

*Cost of Ecostone Pavement:*

- \$9-15/s.f. for installation

*Features:*

- Unit pavers of Ecostone on sand
- Vegetated swale

*Stormwater Benefits:*

- Reduced impervious surface area



*Photograph courtesy of Joe Teresi (City of Palo Alto)*

This photo shows the construction of the permeable pavement in the parking area. The spaces between pavers are filled with sand instead of grouted, allowing infiltration through the pavement. The concrete border (see arrow) protects the asphalt from water damage.

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**Hillview  
CO-10**

*Site Location:*

3300 Hillview  
Palo Alto, CA

*Features:*

- Parking lot biofilters
- Commercial building courtyard with pervious pavement
- Courtyard also serves a buffer between multi-story building and the creek behind
- Section of parking lot drains to swale of native plants between courtyard and riparian area
- Buildings set back from riparian corridor

*Stormwater Benefits:*

- Reduced impervious surface area
- Natural treatment of runoff
- Reduced runoff velocity
- Setback from riparian corridor
- Reduced directly-connected impervious area (DCIA)



Pervious pathway placed through the courtyard allows easy access for visitors as well as drainage areas for stormwater. The creek runs behind the trees towards the back. Between the trees and the benches is a swale of native vegetation that treats water from the parking lot.



The parking lot design incorporates biofilters to filter and infiltrate runoff before entering the storm drain. Concrete edging protects the asphalt parking lot from water damage.

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**Middlebrook Gardens  
CO-14**

*Site Location:*

SE corner of W. Julian Street and  
Pleasant Street  
San Jose, CA

*Features:*

- Office complex redeveloped from relocated and restored turn-of-the century homes from the surrounding neighborhood
- Project objective was to create zero runoff
- Multiple types of pervious pavements

*Stormwater Benefits:*

- Reduced impervious surface area
- Reduced volume of runoff



*Photograph courtesy of Mike Campbell (RBF Consulting)*

This walkway is constructed of decomposed granite, which promotes infiltration.



*Photograph courtesy of Mike Campbell (RBF Consulting)*

Brick courtyard is not grouted to allow runoff to seep through the bricks.



*Photograph courtesy of Mike Campbell (RBF Consulting)*

The parking lot is made completely of Gravel-Pave porous pavement, minimizing the amount of impervious surface onsite.

## Middlebrook Gardens CO-14 (cont.)



*Photograph courtesy of Mike Campbell (RBF Consulting)*

This is a close-up view of the Gravel-Pave driveway made up of a plastic framework of open cells (circles) filled with gravel.

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**Intel  
CO-16**

*Site Locations:*

2200 Mission College Boulevard  
Santa Clara, CA

*Features:*

- Reserved landscaped parking
- Gravel reserved parking areas allow for infiltration to occur.
- Multi-story buildings and parking garages reduce building footprint

*Stormwater Benefits:*

- Reduced impervious surface area



A section of a 1996 Site Map shows area in which landscaping was used in a parking area being reserved for future potential growth.



The area indicated in the map (shown at left) has since been converted into these parking spaces that were developed when parking area renovations were required for terrorism safety precautions.

**Intel  
CO-16 (cont.)**



This off-site gravel lot is designated for overflow parking and allows infiltration to occur during the rainy season.

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*Lessons Learned:*

- Reserved landscaped areas can be used as a mitigating tool to help assuage fiscal lender fears when proposing site designs with reduced parking ratios. Although this reserved area was ultimately converted to pavement, temporary benefits occurred while the area was landscaped, and might still be occurring if not for extenuating circumstances.

*Opportunities Missed:*

- When the parking area was renovated, permeable pavement could have been used for the outlying parking stalls.

**Santa Clara Valley Water District Headquarters  
PA-1**

*Site Location:*

5700 Almaden Expressway  
San Jose, CA

*Features:*

- Parking lot swales
- Rooftop downspouts drain to landscaping
- Multi-story building allows reduced building footprint

*Stormwater Benefits:*

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



*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Rooftop runoff drains to landscaping, breaking up directly-connected impervious area (DCIA).

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*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Multi-story building allows room for ample landscaping onsite for rooftop drainage and aesthetics.



*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Vegetative swales within the parking lot collect drainage through curbside gaps. Concrete curb protects asphalt.

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**West Valley Branch Library  
Green Building  
PA-2**

*Site Location:*

1243 San Tomas Aquino Road  
San Jose, CA

*Features:*

- Green building based on United States Green Building Council and Leadership in Energy and Environmental Design rating
- Decomposed granite used for pedestrian paved areas

*Stormwater Benefits:*

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



*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Ample landscaping onsite allows for infiltration of rooftop drainage.



*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Rooftop runoff drains to downspouts that drain to landscaping reducing directly-connected impervious areas (DCIA).



*Photograph courtesy of Jenny Nusbaum (City of San Jose)*

Pedestrian walkway created with decomposed granite.

**Valley Branch Library  
Green Building  
PA-2 (cont.)**



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This artichoke fountain serves as an aesthetic drainage conduit for rooftop runoff to the storm drain system.

*Other Opportunities:*

- Instead of leading directly to the storm drain system, fountains could be designed to recirculate the water, or to drain to landscaping surrounding the fountain to disconnect impervious surface areas.

**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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Starbucks / Taco Del Mar  
CO-17

Site Location:

361-365 California Ave.  
Palo Alto, CA

Features:

- Disconnected downspouts drain to pervious area
- Permeable pavers used for front dining area and rear parking area
- Covered dumpster



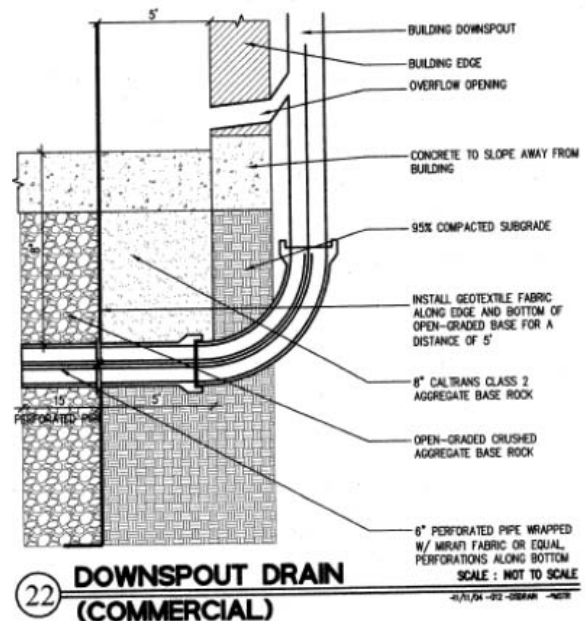
Permeable pavers were installed in the seating plaza in front of the restaurants. Permeable pavers allow storm runoff to infiltrate into the soil and reduce the amount of impervious surface.



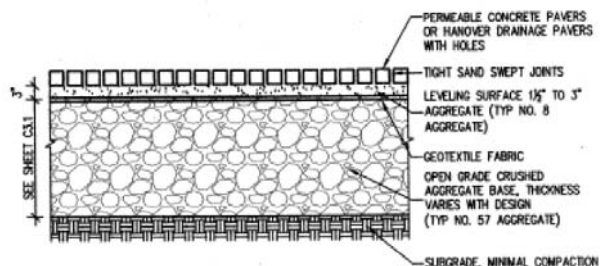
Close-up of permeable pavers.

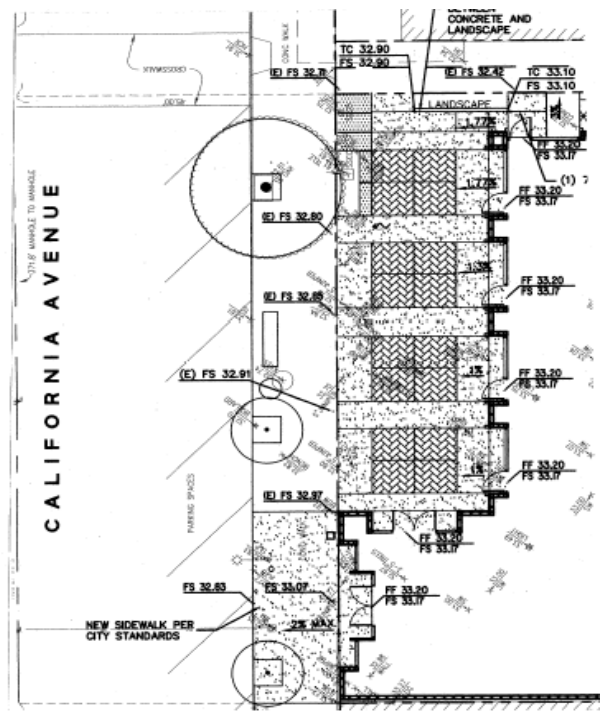
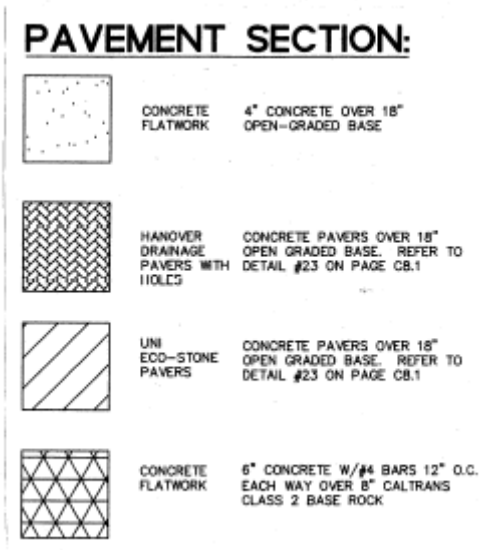
Stormwater Benefits:

- Natural treatment of runoff
- Reduced directly-connected impervious area (DCIA)
- Reduced impervious surface area
- Prevent stormwater from coming into contact with pollutants



The rainwater leaders from the building roof are routed directly into the reservoir of open-graded rock beneath the permeable pavers to allow for further infiltration of site runoff. There is an overflow to the gutter to drain the reservoir during larger storm events.





Site plan of 361 California Avenue



Covered trash enclosure reduces the potential for stormwater to come into contact with pollutants.

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**Hewlett Packard Garage  
CO-18**

*Site Location:*  
367-369 Addison Ave.  
Palo Alto, CA

*Stormwater Benefits:*  
Natural treatment of runoff  
Reduced impervious surface area

*Features:*

- Pervious concrete driveway



Pervious concrete allows stormwater to infiltrate into soil and reduces impervious area.



Close-up of pervious concrete

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*Project Architect:*

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**Congregation Sinai  
CO-19**

*Site Location:*

1532 Willowbrae Avenue  
San Jose, CA

*Features:*

- Landscaped Infiltration Areas
- Disconnected Downspouts
- Pervious Concrete Parking Lot

*Stormwater Benefits:*

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



Runoff from roof drains to landscaped areas.



Pervious concrete parking lot reduces impervious surface and treats stormwater.



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Mayfield (Stanford) Playing Fields  
PA-15

Site Location:

2700 El Camino Real  
Palo Alto, CA

Stormwater Benefits:

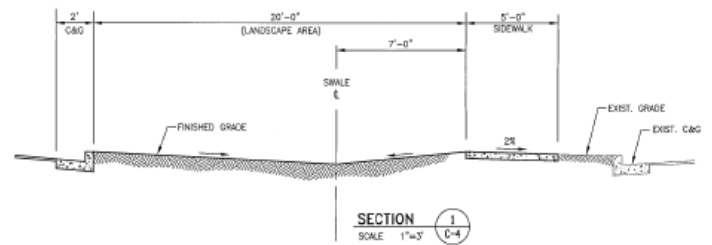
- Natural treatment of runoff
- Reduced impervious surface area

Features:

- Vegetated Swale
- Permeable Pavers
- Stormwater Infiltration System



Close-up of curb cut leading to vegetated bioswale.



Vegetated Bioswale section

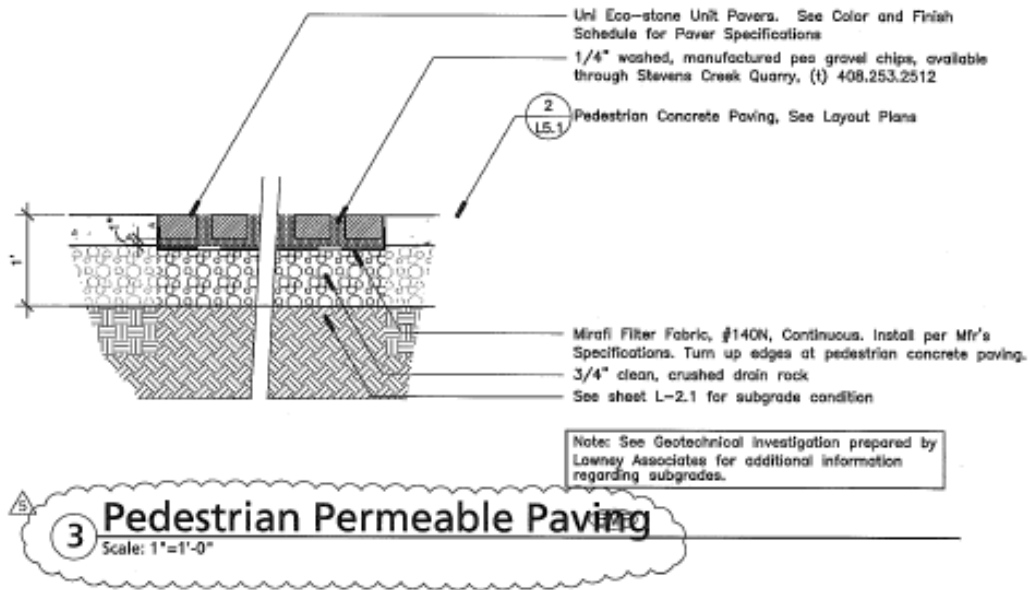
Parking lot runoff is routed through curb cuts into a vegetated bioswale which filters the runoff prior to discharge and promotes infiltration into underlying soils during smaller storms.



Underdrain system under synthetic playing field collects runoff and conveys it to a large, rock-filled sump where it slowly infiltrates into the underling soils. Sump contains an overflow to storm drain to handle runoff from larger storm events.



Permeable pavers allow stormwater to infiltrate into soil and reduce the amount of impervious surface.



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