

Spotlight on Superior Stormwater Programs

Santa Monica, California: Sustainable Stormwater in an Ultra Urban Environment

Santa Monica at a Glance

<i>Population:</i>	86,391
<i>Land Area:</i>	8.3 mi ²
<i>Average Annual Rainfall:</i>	12 inches
<i>Number of Outfalls:</i>	Approximately 2,200 catch basins (about 640 City owned, balance County-owned) and 64 storm drain lines running to 5 outfalls (90% County-owned; 10% City-owned)
<i>Water Quality Issues:</i>	Bacteria, toxics, metals, trash
<i>NPDES Permit Status:</i>	Phase I co-permittee under the primary permit for Los Angeles County
<i>Smart Watershed Score:</i>	83

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Locator Map



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Why is Santa Monica Unique?

The City of Santa Monica is located on the western edge of the Los Angeles Basin in southern California, facing Santa Monica Bay and the Pacific Ocean to the west. The Santa Monica Pier and beaches are famous visitor destinations, with the city population growing 2-3 times every day to accommodate tourists. Due to its popularity, the city is completely built out, and has 75% impervious cover. Sustaining good water quality in such an ultra urban environment presents a unique challenge.

The City Council and residents are committed to promoting sustainable programs that reflect an environmentally-progressive ethic. The city promotes the concept of sustainability, and enacted a Sustainable City Plan to encourage all city departments to develop and implement practices that protect natural resources and reduce environmental impacts. Progress toward meeting plan goals is carefully measured to define indicators of success.

Sustainability also drives innovation in Santa Monica's Urban Runoff Management Program, which is needed since runoff from the city drains to waters with multiple Total Maximum Daily Load (TMDL) requirements. Santa Monica has no streams or rivers; instead, runoff is conveyed through underground storm drain pipes, most of which discharge onto the beaches. A few hundred acres of the city drains to Ballona Creek in the City of Los Angeles. These receiving waters are impaired for bacteria, trash, metals, and toxics. The city developed pollution reduction plans for these parameters for dry and wet weather conditions.

Why is Santa Monica an Outstanding Phase I Community?

Santa Monica, along with 85 other jurisdictions, is a co-permittee under the National Pollutant Discharge Elimination System (NPDES) Phase I stormwater permit for Los Angeles County. This permit requires that all permittees coordinate and implement a stormwater quality management program that includes measures to reduce the discharge of pollutants from the storm drain system to the maximum extent practicable, to protect receiving waters and their beneficial uses. The development of a monitoring and reporting program is also an essential component of the NPDES permit.

The permit enabled Santa Monica to invest in a comprehensive stormwater program that involves almost all city agencies. As a co-permittee, Santa Monica also leverages resources and knowledge in larger multi-jurisdictional projects to help curb runoff pollution and meet Phase I permit requirements. The City Council has heavily invested in Santa Monica's Urban Runoff Management Program, and annually spends about \$14 per resident to finance the program. Despite its small size, the city has hired an urban runoff program coordinator to coordinate environmental policies that meet and exceed stormwater permit conditions.

Santa Monica is facing stricter local runoff regulations as a result of recent amendments to Los Angeles County's municipal stormwater permit and new TMDL limits for pollutants. Meeting stringent pollutant reduction goals in such a dense, urban environment is not easy, and the major goal of the Urban Runoff Management Program is to treat urban runoff to remove pollutants

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of concern, store runoff for reuse and reduce potable water consumption, or infiltrate as much runoff when possible. The city has responded to the stricter requirements by shifting to a watershed-focused stormwater management approach.

The city approved a watershed management plan to coordinate implementation of runoff controls and further reduce water quality impacts. The plan, scheduled for implementation over 20 years, includes some \$200 million in capital improvement projects throughout the city designed to improve urban runoff quality, increase runoff reuse, reduce urban flooding, and increase water conservation. The watershed approach to stormwater management has many innovative ideas designed to meet the following specific quantifiable goals:

Reduce urban runoff pollution

- Infiltrate or treat the first ¾-inch of rainfall in a 24-hour period
- Achieve 100% diversion, infiltration, or treatment of dry weather flows within all Santa Monica storm drains
- Comply with pollutant reduction Total Maximum Daily Loads (TMDLs) adopted by the Los Angeles Regional Water Quality Control Board

Increase water conservation

- Maximize the infiltration of urban runoff
- Maximize permeable surfaces and minimize impermeable surfaces across the city
- Maximize reuse of runoff

Increase wildlife habitat

- Increase the number of species on a parcel
- Increase the ratio of native to non-native species on a parcel
- Increase the diversity of native habitat types

- Connect existing significant habitat areas to allow for intermixing and increased genetic diversity.

Recently, the Smart Watersheds Benchmarking Tool was used to evaluate Santa Monica’s program capability to treat stormwater runoff and restore urban watersheds (CWP, 2006). Santa Monica received a score of 83 out of 100 possible points based on a scoring system that took into account their lack of perennial surface streams. Table 1 highlights some of the programs that scored the highest on the Smart Watershed Benchmarking tool.

Table 1. Santa Monica’s High Scoring Smart Watersheds Program Areas

<ul style="list-style-type: none"> • <u>Subwatershed Restoration Planning</u>: The city has a full time urban runoff management coordinator and has developed a watershed management plan to reduce runoff and improve water quality. • <u>Detect and Eliminate Illicit Discharges</u>: The city maps illicit discharge incidences into a GIS system to track and identify possible sources. • <u>Watershed Education and Personal Stewardship</u>: The city has multiple programs to provide municipal services that encourage positive watershed behaviors. • <u>Promote Smart Site Practices during Redevelopment</u>: The city has a green building program that actively encourages the use of LEED® (Leadership in Energy & Environmental Design) principles. • <u>Pollution Prevention at Stormwater Hotspots</u>: The city recognizes businesses with a Sustainable Quality Awards Program • <u>Pollution Prevention at Municipal Operations</u>: The city has created stormwater pollution prevention plans for all municipal facilities.
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How is the Urban Runoff Management Program Funded?

The program is funded primarily through a stormwater management user fee that is assessed on all parcels, an enterprise fund in the city treasury. The program also receives

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some additional funds from grants, and in-lieu fees from projects that had specific issues and could not implement a post-construction stormwater practice. In-lieu fees are used to build stormwater practices somewhere else in the watershed to mitigate the required amount of runoff.

Santa Monica's Innovative Environmental Programs

Santa Monica has developed a number of environmental programs to meet the goals set forth by the Sustainable City Plan, the watershed management plan, and NPDES permit requirements. These progressive programs can provide a blueprint for other communities in their efforts to improve water quality and promote water conservation.

Green Building Program

The city developed a Green Building Program to help meet sustainability goals and reduce environmental impacts. The program consists of a set of requirements and incentives to encourage "green" buildings without forcing excessive costs or other burdens upon developers, building owners or occupants. Incentives such as expedited plan reviews and financial assistance are provided to developers of projects registered for the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED®) certification as a way to encourage more green development. Green building projects that qualify for expedited permit approvals are also eligible for grants of \$20,000 to \$35,000 (depending on the LEED® certification level). Grant funding comes from tax revenue set aside by the City Council in 2001, water efficiency program funds, and income generated by default on construction and demolition recycling requirements.

The city is a natural leader in green building and has three certified and nine registered LEED® buildings. Among those completed are one of the nation's few LEED® Platinum buildings and a LEED® Gold affordable housing complex that reduces residents' utility bills through solar energy and energy efficient design. The city leads by example, and uses the LEED® Green Building Rating System in the design of all new municipal construction. The Santa Monica Library and Public Safety Building are examples of innovative buildings that conserve energy, harvest rainwater, and increase permeability and infiltration (Figure 1).



Figure 1. Recycled runoff use at public safety facility

The city has also developed its green building guidelines to promote stormwater reduction, infiltration, and treatment during redevelopment projects. These guidelines outline required and recommended practices to reduce environmental impacts caused by construction and operation of both commercial and municipal redevelopment and remodeling projects in Santa Monica. The recommended practices reduce runoff through changes in building site and form, landscaping, and construction techniques.

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Aggressive Urban Runoff Ordinance for New Development & Redevelopment

The city has adopted an aggressive runoff control ordinance designed to reduce urban runoff pollution from new development and redevelopment and major remodeling projects. Each project must demonstrate a three-quarter-inch reduction in runoff generated by impermeable surfaces through capture and reuse, infiltration, or treat and release.

The ordinance also stipulates that development projects exceeding pre-established thresholds must prepare and submit an urban runoff mitigation plan. The plan must specify how each site will incorporate runoff control practices, such as infiltration trenches, permeable paving, biofilters, and other designs both during and after construction. In addition, designs must demonstrate that urban runoff will be reduced by maximizing the amount of permeable area and minimizing the amount of runoff flowing toward impermeable areas. By 2005, over 500 new single-family, multi-family, commercial, and municipal projects had met the runoff reduction requirements and are keeping over 1.2 million gallons of runoff out of Santa Monica Bay during rain events (Shapiro, 2006).

A Commitment to Keeping Pollutants Away from Runoff

The city strongly believes that the best method to prevent runoff pollution is to avoid contact between runoff and pollutants at the source. A pollution prevention ordinance was enacted that requires residents in existing buildings and properties to adopt “good housekeeping” guidelines that reduce the level of pollutants exposed to urban runoff. The city uses a multi-faceted approach to educating the public, municipal

employees, and businesses about stormwater pollution prevention techniques. Some of the innovative programs include:

- *Hotspot mapping* - The city has mapped critical hotspot businesses into a GIS database that is updated annually, and is consulted to trace potential sources of unidentified discharges.
- *Rapid illicit discharge detection and remediation* – City staff typically responds to reports of illicit discharges in less than one hour, and are trained to notice and report dry weather discharges and violations of water conservation requirements. The city also operates a 24/7 pollution prevention hotline for citizens to report incidents of illegal discharges.
- *Oil recycling and hazardous waste disposal facilities* –The city maintains a permanent household hazardous waste center to promote the proper disposal of oil and prevent discharges into the storm drain system. In addition, staff work with local businesses to recycle used oil and promote the use of re-refined motor oil.
- *Commercial and industrial business inspection and education* – The city NPDES stormwater permit requires that the city inspect and enforce pollution prevention at industrial and commercial facilities. The city tracks and inspects auto related businesses, food establishments, and manufacturing and commercial facilities. Although inspection frequencies vary, the city tries to inspect critical businesses annually, and issue enforcement actions on other

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facilities when they are assessed. Businesses are also offered free pollution prevention training classes through participation in the Los Angeles County pollution prevention program.

- *Storm drain marking and signage* - The city maintains signage on all city-owned storm drains warning people not to dump materials, and provides a phone number to report incidents of dumping or illicit discharges (Figure 2). The city also maintains signage on the Santa Monica Pier, and provides dispensers with bags to clean up after pets in some city parks and pet walk parks.



Figure 2. Stenciled storm drain

- *Municipal employee education* - The urban runoff management program coordinator conducts training sessions for city staff on a routine basis. The training occurs in a cyclical nature so that all staff is exposed to information on urban runoff concerns, the ordinance, NPDES permit, and pollution prevention practices.
- *Maintenance of clean streets and storm drains* – The city is a national leader in the frequency that it sweeps its streets (almost on a daily basis) and

cleans out catchbasins (nearly three times per year). Clean streets and storm drains prevent trash and pollutants from reaching Santa Monica Bay.

Pioneering Low Impact Design for the Urban Environment

Santa Monica seeks to increase permeable area or direct runoff from impermeable areas to permeable ones as an important goal in its Sustainable City Plan. To reach this goal, the city experiments with many innovative practices to help infiltrate/treat urban runoff in space- constrained areas of the urban landscape. Permeable paving, biofilters, porous concrete swales, and small infiltration pits are just a few of the practices that are applied to increase site permeability (Figures 3-4). The city also utilizes pervious concrete when street projects are part of the Green Streets Program.



Figure 3. Permeable paver parking area



Figure 4. Biofilter for driveway and rooftop

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Urban Runoff Recycling

It doesn't rain that often in Southern California, but the city's storm drains are often flowing during dry weather conditions. The dry weather flows originate from everyday activities such as car washing, landscape irrigation, power washing, and illicit discharges. These flows can contain or pick up pollutants.

The Santa Monica Urban Runoff Recycling Facility, alternately known as the SMURRF, was built in cooperation between the city and Los Angeles to treat dry-weather flows from about 4,800 acres (Figure 5). The SMURRF facility was designed to remove pollutants such as trash, sediment, oil, grease, and pathogens. Up to 100 gallons per acre of flows are diverted every day from Santa Monica's two main storm drains for treatment by the SMURRF facility. When in operation, the SMURRF facility treats an average of 320,000 gallons per day, which is then reused for activities such as irrigation and toilet flushing. During rainy periods, the SMURRF shuts down to allow the excess stormwater runoff to bypass the facility into Santa Monica Bay.



Figure 5. View of SMURRF facility

The treated water is used at city irrigation sites, including two parks, a cemetery, a middle school, several greenbelt roadway

medians, the civic center area, and two major office building complexes.

The SMURRF is open to the public, and functions as an educational tool about urban runoff and pollution prevention (Figure 6). It offers visitors a complete view of all of the equipment and processes that are used to purify the urban runoff, and is daylighted in five places so visitors can see the results of the purification process. Educational signs located along the SMURRF walkway explain how the facility works, describes the local urban watersheds, and presents information on how citizens can prevent pollution.



Figure 6. Educational panel at SMURRF

How does Santa Monica Integrate Monitoring into its Urban Runoff Program?

Santa Monica uses several measurable indicators to track progress toward sustainability in its urban runoff program. The main indicators are the percent of permeable land in the city and the number of beach health warnings. Progress reports on these indicators are routinely posted on the Web so residents can track current status and trends.

The beaches of Santa Monica Bay are subject to a bacterial TMDL that has been in

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effect since 2003. Water quality is monitored at over 50 sampling location by various Los Angeles agencies, and six of these sampling locations are within the limits of Santa Monica. Warning signs are posted within 100 to 200 yards of outfalls when sampling indicates that state ocean water standards for bacteria are exceeded, although greater distances can be posted for very high bacteria levels. Ocean water is analyzed for the following types of "indicator bacteria": total coliform, fecal coliform, E. coli and enterococcus. In addition to warning signs, beach advisories and ocean water quality reports are available on the web through Los Angeles County and the non-profit group Heal the Bay.

To date, Santa Monica's monitoring program is limited to monitoring at the SMURRF facility and at designated locations on the beaches for purposes of reporting ocean water quality. Efforts to determine the effectiveness of the Urban Runoff Management Program will commence soon and will incorporate monitoring at the major outfalls in subwatersheds (Shapiro, 2006). Currently, the city does not track the type and location of stormwater treatment practices (STPs) on an annual basis. Figure 7 depicts the impressive number of STPs installed in Santa Monica in recent years, with over 1,000 structural and dozens of nonstructural practices located across the city.

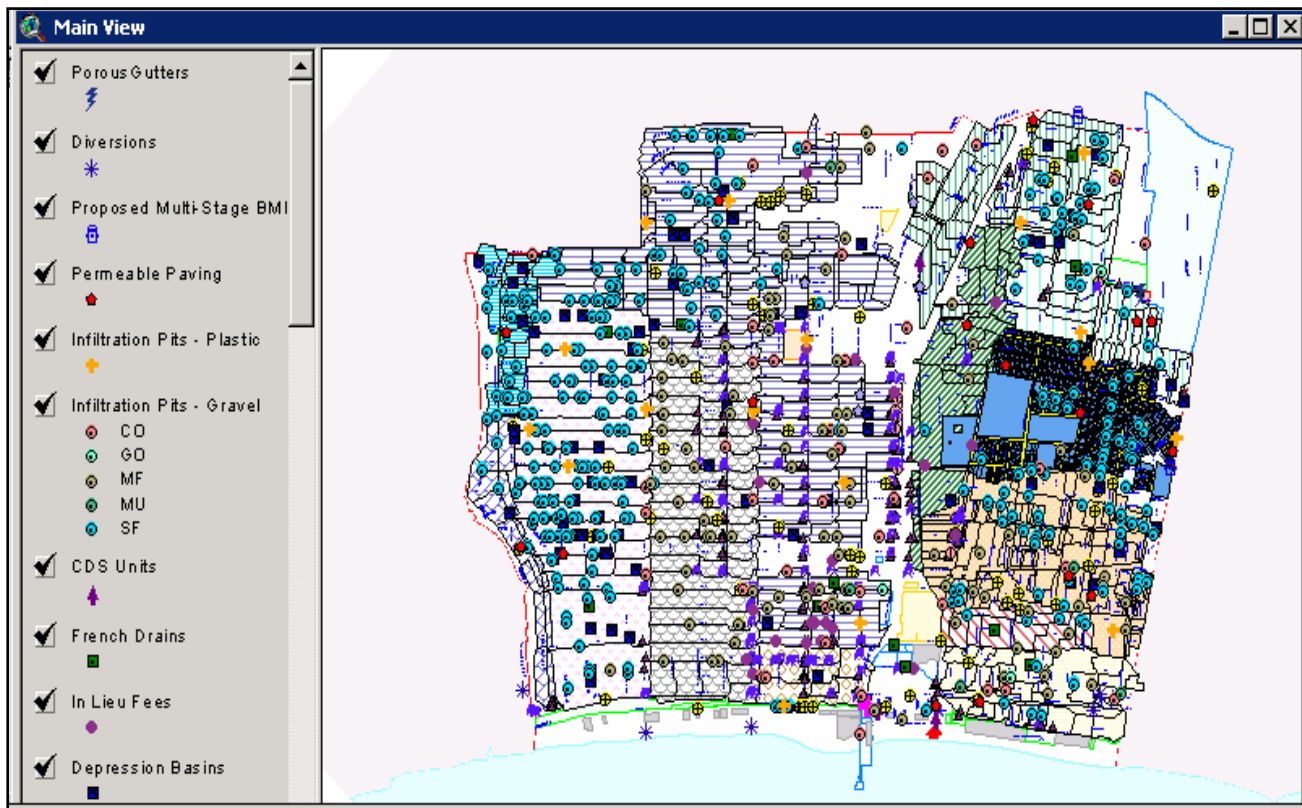


Figure 7. Runoff control practices implemented in Santa Monica city limits.

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Resources

City of Santa Monica Urban Runoff Management Program
http://santa-monica.org/epd/residents/Urban_Runoff/urban.htm

City of Santa Monica Urban Runoff Recycling Facility (SMURRF)
<http://santa-monica.org/epwm/smurrf/smurrf.html>

City of Santa Monica Sustainable City Plan.
<http://santa-monica.org/epd/scp/index.htm>

City of Santa Monica Green Building Program
<http://www.smgreen.org/index.html>

City of Santa Monica Urban Runoff Ordinance, SMCC Chapter 7.10 URBAN RUNOFF POLLUTION
<http://www.qcode.us/codes/santamonica/>

Heal the Bay Beach Report Card
<http://www.healthebay.org/brc/>

Los Angeles County Beach Advisories
<http://lapublichealth.org/phcommon/public/eh/rechlth/ehrecocdata.cfm>

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