SMURRF – A Unique Collaboration Among Artists, Engineers and City Public Works

Project Goals

The primary objective of the Santa Monica Urban Runoff Recycling Facility (SMURRF) is to eliminate pollution of Santa Monica Bay caused by urban runoff during dry season (storm drain low flows).

Secondary project goals include:

- Providing cost-effective treatment and producing high quality water for reuse in landscape irrigation.
- Raising public awareness of Santa Monica Bay pollution and the role of each individual in the watershed through appropriate educational exhibits.
- Constructing an aesthetically pleasing and functional facility with an appropriate emphasis on art elements that attracts people while providing a new access to the beach.

Public Education and Artistic Allure

Placing a water treatment facility at such a prominent tourist site is not the usual choice for most communities. The City's mandate for the SMURRF stipulated that it includes a significant public education component and that it is responsive to its immediate neighborhood.

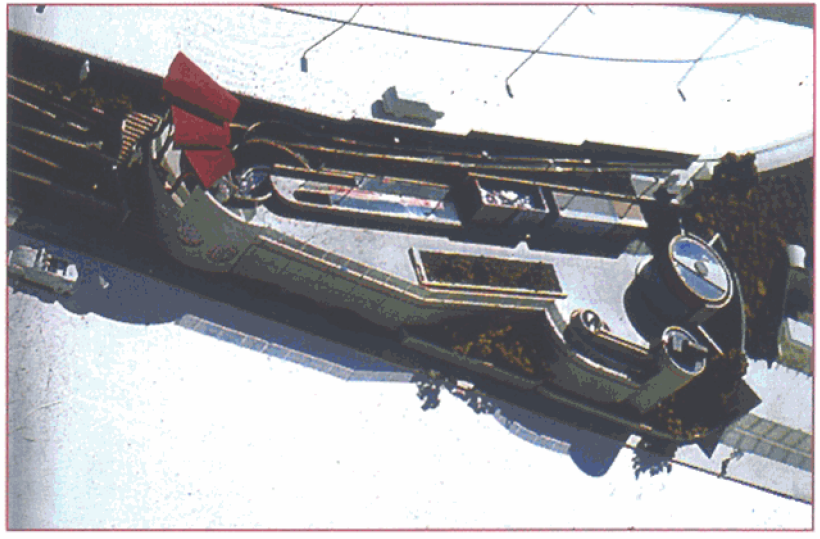
The intense colors of the tile works, the intriguing water features, the innovative architecture, and the dramatic lighting of the SMURRF integrate the facility with the lively atmosphere of the adjacent Santa Monica Pier. A trio of abstract tile mosaics at the foot of the stairs announces the function of the facility to pedestrians and motorists. The equipment was laid out in a fashion that would be logical to visitors, emphasizing each piece of equipment with a prominent base, dramatic lighting, or colorful tile work. The water, as it moves through the facility, is daylighted in five places so visitors will be able to see the results of the purification process. At two points, there are overlooks from which visitors can see the array of equipment. A photomural presents images of the trees that had to be removed from the site to accommodate the new construction. In a city like Santa Monica, known for its interest in "urban forestry," a work such as this can ease the concerns of citizen activists. Educational material about the workings of the facility, the local urban watershed, and each citizen's role in preventing pollution is also available.

Investing this potentially mundane facility with carefully considered architecture, landscape, and art can have a positive effect on the reception of a project by both the community and the governing bureaucracy. In addition to providing a valuable alternative source of water for Southern California residents, the project is a showcase of how a public facility can be used to educate the public and enhance community pride.

Printed on Recycled Paper.

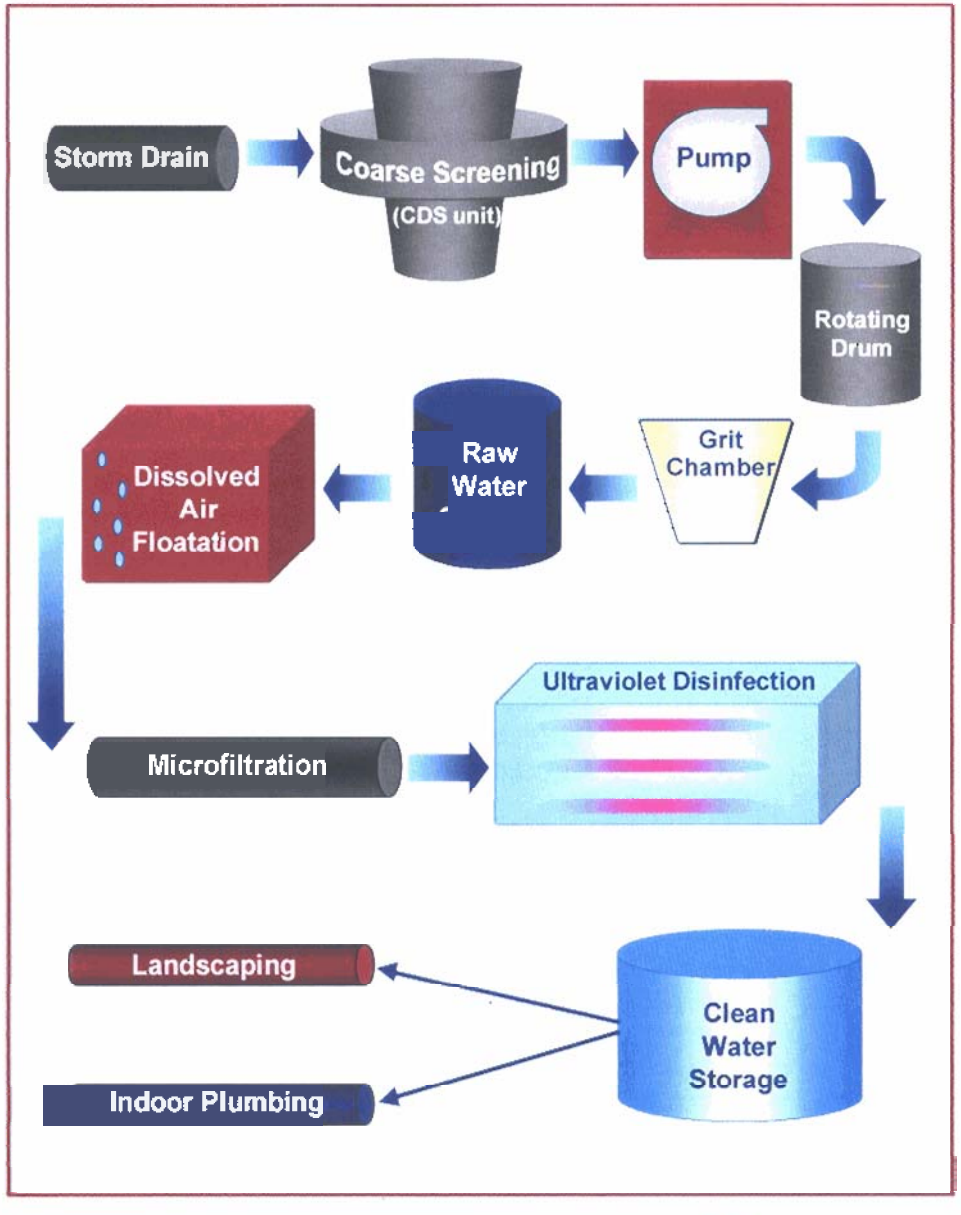
Santa Monica Urban Runoff Recycling Facility (SMURRF)

A Blend of Technology, Art and Education



A project of the Cities of Santa Monica and Los Angeles

SMURRF Process Flow



CH2MHILL

SMURRF Process Flow Description

Dry Weather Runoff is first "coarse" screened in a Continuous Deflective Separation (CDS) unit. Coarse screening removes large floating debris and trash (such a bottles, twigs, etc.) that typically flows down open drains in streets. "Coarse" screened flows are then pumped about ½ mile to the recycling facility, which can process up to 500,000 gallons per day of runoff.

The first process unit at the recycling is the rotating drum screen. The rotating drum screen removes the fine floating particles (that escaped the coarse screening) greater than 0.04 inches in size.

From the rotating drum (fine) screen the water flows to the cyclone-type grit chamber. This unit removes the grit and sand. Screening and de-gritting systems remove inorganic settleable material that may damage the downstream treatment processes and reduce the treatment efficiency.

From the grit unit the preliminary treated water is stored in the raw water storage tank. The raw water storage tank dampens the fluctuations in the influent flows, thereby allowing downstream filtration and disinfection processes to operate at a steady rate, and more efficiently.

From the raw water storage tank the water is pumped to the dissolved air flotation (DAF) unit. In this unit, compressed air is injected into the water at the unit inlet. As the water reaches the open tank surface, it reaches atmospheric pressure whereby fine air bubbles are released in the water. The air bubbles rise to the top and carry with it the oil and grease. The oil and grease blanket formed on the DAF unit open surface is then skimmed off the top.

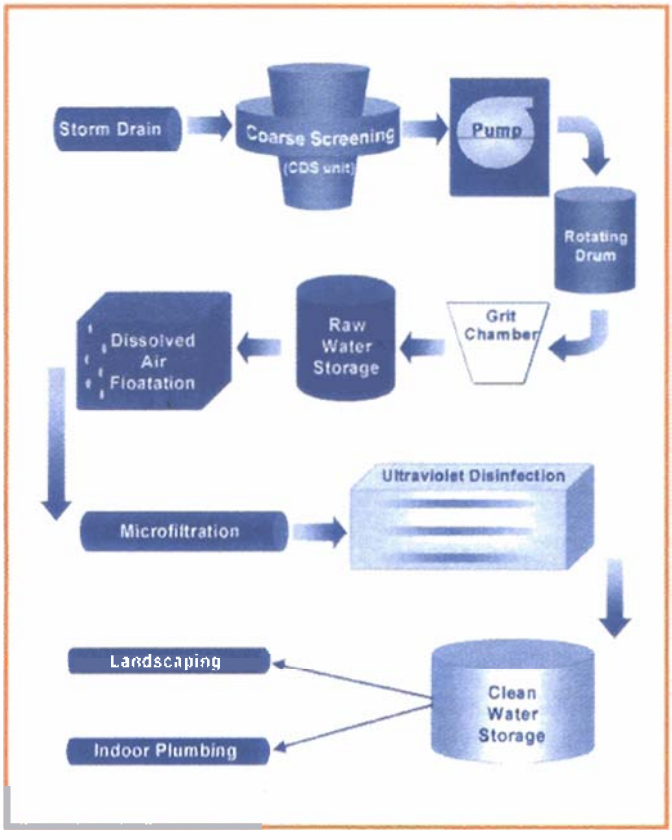
From the DAF unit the water flows to the microfiltration treatment units. Here, the vacuum applied on membranes forces the water through the membrane thereby "filtering" out the turbidity. The membranes have to be periodically cleaned of the pollutant "buildup."

From the microfiltration unit the water flows to the disinfection process. Ultraviolet (UV) radiation disinfects the water. As the water passes by the UV lamps in series, UV light kills bacteria and viruses. The UV bulbs have to be periodically cleaned of the scale "buildup," or they will lose efficiency. Finally, treated water is stored in the "clean water tank," from where it is pumped into the distribution system for reuse.

How the SMURRF works...

Coarse screening: Dry weather runoff is first "coarse" screened to remove large floating debris and trash (such as bottles and twigs, etc.) that typically flow down open drains in the streets. "Coarse" screened flows are then pumped one-half mile to the SMURRF. The SMURRF can process up to 500,000 gallons per day of runoff.

Fine screening: The first process at the SMURRF is the rotating drum screen. This rotating screen removes the fine floating particles that escaped the coarse screening and are greater than 0.04 inches in size.



Grit and sand removal: The water then flows to a chamber that removes grit and sand. Screening and de-gritting systems remove inorganic settleable material that could damage the downstream treatment processes and reduce their efficiency.

Raw water storage: Water that has been screened and de-gritted is stored in the raw water storage tank. This tank evens out the fluctuations in the influent flows, thereby allowing downstream filtration and disinfection processes to operate at a steady rate, and more efficiently.

Oil and grease removal: The water is pumped from the storage tank to the dissolved air flotation (DAF) unit. In this unit, compressed air is injected into the water. As the water approaches the open tank surface, it reaches atmospheric pressure whereby fine air bubbles are released in the water. The air bubbles rise to the top and carry oil and grease along with them. A blanket of oil and grease is then skimmed off the top of the tank.

Micro-filtration: The water flows to the micro-filtration treatment units. Here a vacuum forces water through membranes thereby filtering out the turbidity (cloudiness in the water). The membranes have to be periodically cleaned of the pollutant "buildup."

Disinfection: The water finally flows to the disinfection process. Ultraviolet (UV) radiation disinfects the water. As the water passes by the UV lamps in series, UV light kills bacteria and viruses. The UV bulbs have to be periodically cleaned of the scale "buildup" or they will lose efficiency.

End project – Clean Water: Finally, treated water is stored in the clean water tank. From this tank, water is pumped into the distribution system for reuse.

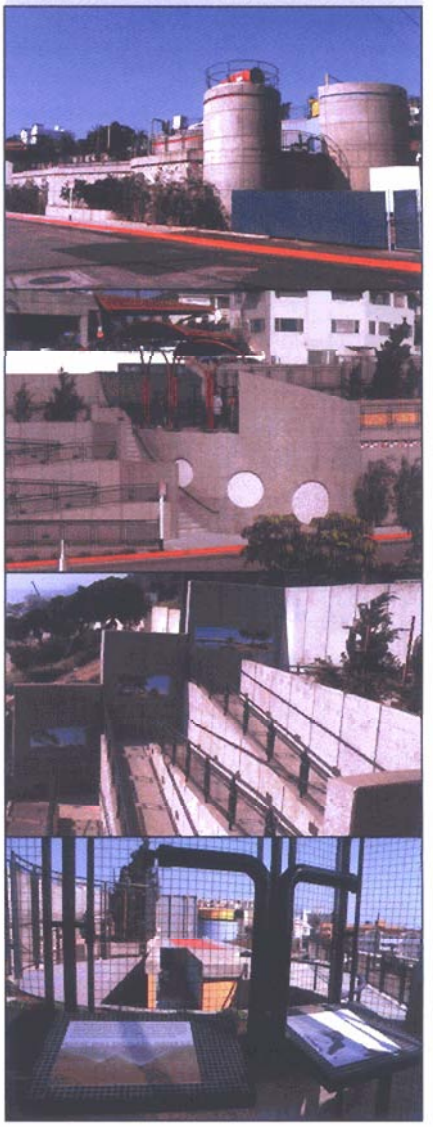
THE SANTA MONICA URBAN RUNOFF RECYCLING FACILITY

A project of the Cities of Santa Monica and Los Angeles

A Unique Collaboration Among Artists, Engineers and City Public Works...

Blending Technology, Art and Education

Placing a water treatment facility at such a prominent tourist site is not the usual choice for most communities. The City's mandate for the SMURRF stipulated that it includes a significant public education component and that it is responsive to its immediate neighborhood.



Public Education and Artistic Allure

The intense colors of the tile works, the intriguing water features, the innovative architecture, and the dramatic lighting of the SMURRF integrate the facility with the lively atmosphere of the adjacent Santa Monica Pier. A trio of abstract tile mosaics at the foot of the stairs announces the function of the facility to pedestrians and motorists. The equipment was laid out in a fashion that would be logical to visitors, emphasizing each piece of equipment with a prominent base, dramatic lighting, or colorful tile work. The water, as it moves through the facility, is daylighted in five places so visitors will be able to see the results of the purification process. At two points, there are overlooks from which visitors can see the array of equipment. A photomural presents images of the trees that had to be removed from the site to accommodate the new construction. In a city like Santa Monica, known for its interest in "urban forestry," a work such as this can ease the concerns of citizen activists. Educational material about the workings of the facility, the local urban watershed, and each citizen's role in preventing pollution is also available. Investing this potentially mundane facility with carefully considered architecture, landscape, and art can have a positive effect on the reception of a project by both the community and the governing bureaucracy. In addition to providing a valuable alternative source of water for Southern California residents, the project is a showcase of how a public facility can be used to educate the public and enhance community pride.

The **PRIMARY OBJECTIVE** of the Santa Monica Urban Runoff Recycling Facility (SMURRF) is to eliminate pollution of Santa Monica Bay caused by urban runoff during dry season (storm drain low flows).

Secondary project goals include:

Providing cost-effective treatment and producing high quality water for reuse in landscape irrigation.

Raising public awareness of Santa Monica Bay pollution and the role of each individual in the watershed through appropriate educational exhibits.

Constructing an aesthetically pleasing and functional facility with an appropriate emphasis on art elements that attracts people while providing a new access to the beach.

S.M.U.R.R.F.

SANTA MONICA URBAN RUNOFF RECYCLING FACILITY

FAQs & FACT SHEET

City of Santa Monica

WHAT IS THE SMURRF?

The Santa Monica Urban Runoff Recycling Facility (SMURRF) is a state-of-the-art, first-of-its-kind water recycling plant that treats dry weather urban runoff by conventional and advanced treatment systems to remove pollutants such as sediment, oil, grease, and pathogens. Basically, the SMURRF recycles polluted runoff so it can be reused for beneficial purposes.

The SMURRF is one of the finest examples of the future of dealing with polluted urban runoff to the maximum extent possible protecting coastal waters for future generations.

HOW MUCH WATER CAN IT TREAT?

The Santa Monica Urban Runoff Recycling Facility will treat, clean, and reuse up to 500,000 gallons of runoff per day which is about 4 percent of the City of Santa Monica's daily water use.

FROM WHERE DOES THIS WATER COME?

The SMURRF cleans urban runoff from the City of Santa Monica's two largest flows, the Pico-Kenter and Pier Storm Drains, which drain 4,200 and 900 acres respectfully. These two storm drains contribute about 90 percent of the City's total daily dry weather runoff. The Pico-Kenter drainage area includes parts of the City of Los Angeles and the Santa Monica Mountains.

Dry weather runoff is created from excess irrigation, spills, construction sites, pool draining, car washing, washing down paved areas, and residual wet weather runoff.

HOW DOES THE SMURRF WORK?

The treatment processes include coarse and fine screening to remove trash, plant material and debris, degritting systems to remove sand and grit, dissolved air floatation (DAF) to remove oil and grease, microfiltration to remove turbidity, and ultraviolet (UV) radiation to kill pathogens.

WHAT IS THE TREATED WATER USED FOR?

The highly-treated SMURRF water will be used for landscape irrigation and for indoor commercial building use. Once purified, the water is safe for all landscape irrigation and dual-plumbing systems as prescribed by the California Department of Health Services and meets all of California's Title 22 requirements.

Landscape irrigation customers include the Olympic Boulevard center median, City of Santa Monica parks, and the Woodlawn Cemetery. Dual-plumbed customers will include the City of Santa Monica's Public Safety Facility and the Water Garden located at Olympic and Cloverfield.

HOW MUCH DID IT COST?

The SMURRF cost approximately $12 million including the distribution system for recycled water. The SMURRF is a multi-agency partnership built upon the regional benefits of the facility. Funding sources include the City of Santa Monica, the City of Los Angeles, the State Water Resources Control Board, the Metropolitan Water District, Federal ISTEA Grant Funds, and the Los Angeles County Proposition "A" Grant.

continued...

continued...

City of Santa Monica

WHAT ARE THE EXPECTED BENEFITS?

By treating urban runoff during dry weather, the SMURRF is reducing pollution reaching Santa Monica Bay. Not only is this improvement in water quality beneficial to aquatic life and beach goers, it may also increase the economic value of the Bay and reduces the regions need for imported water.

WILL THE SMURRF SOLVE THE POLLUTION PROBLEM IN THE SANTA MONICA BAY?

No, but it will help. Although the SMURRF can treat 500,000 gallons of water per day, 100 million gallons of urban runoff flow through storm drains in Los Angeles County and into the ocean on a dry weather day. Wet weather flows can increase to 10 billion gallons of urban runoff each day.

While the SMURRF is helping to curb pollution in the Santa Monica Bay, residents and businesses are still strongly encouraged to join the effort by adopting simple pollution prevention practices. Residents and businesses are the number one source of pollution, through their collective misbehaviors such as littering, not picking up after their pets, over applying pesticides, and illegal dumping of used motor oil and other toxins.

WHAT IS URBAN RUNOFF?

Urban runoff is the single greatest source of water pollutants, contributing from 50-60 percent of the pollutant load in a receiving water body. Urban runoff includes all water draining from streets, parking lots, driveways, lawns, etc. and flowing through the storm drain system. In most cases, urban runoff receives no treatment before draining to the ocean.

Urban runoff picks up oil and grease, litter, trash, bacteria and viruses, debris, sediments, organic chemicals like pesticides, fungicides, insecticides, and heavy metals like copper, cadmium, and zinc.

WHY IS URBAN RUNOFF A PROBLEM?

A recent study determined that there is an increased risk of illness associated with swimming near flowing storm drain outlets in the Santa Monica Bay. Improving water quality in the Santa Monica Bay will provide a healthier recreation area benefiting residents, marine life, businesses, and visitors to the Los Angeles area.

WHAT CAN RESIDENTS DO TO HELP PREVENT POLLUTION?

- Do not litter.
- Always pick up after your dog.
- Recycle used motor oil and transmission fluid.
- Use fertilizers and pesticides sparingly.
- Sweep dirt and debris from pavement and dispose of it in the trash.
- Pick up litter and dispose of it in the trash.
- Dispose of household toxins through your local household hazardous waste collection program.
- Check out the following websites:
  http://pen.ci.santa-monica.ca.us/cm/index.htm http://www.LAstormwater.org/

WHY DOES THE SMURRF LOOK SO UNIQUE?

The SMURRF is a walk-through facility providing educational information and serving as an access way for the public to reach the beach and adjacent businesses.

The intense colors of the tile works, the intriguing water features, the innovative architecture, and the dramatic lighting of the SMURRF integrate the facility with the lively atmosphere of the adjacent Santa Monica Pier. The equipment is arranged in sequential order and oriented towards the viewer so that visitors can follow the technology and the process visually. The water daylights in five places as it moves through the facility so visitors will be able to see the results of the purification process.

In addition to providing a valuable alternative source of water for Southern California residents, the project is a showcase of how a public facility can be used to educate the public and enhance community pride.