State Water Board Measure W-4 Workshop: Urban Water Use and Reuse

Wisely Managing Our Urban Water Resources

Neal Shapiro, City of Santa Monica

June 17, Sacramento

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Water Resources Management

Conserve Today Preserve Tomorrow Santa Monica

OBJECTIVES

Harvest urban runoff (dry/wet weather) for reuse (recharge or direct use) and pollution treatment

Treat all dry weather and some wet weather urban runoff leaving the City

Connect land use/design to the Hydrologic Cycle, reducing the disconnect and disruption of water flow

Mimic nature; blend into the land

Take proactive, watershed approach to reducing urban runoff problems

Convert a perceived "waste" into a valuable resource for reuse – SMURRF, Cisterns

Hierarchy of Treatment

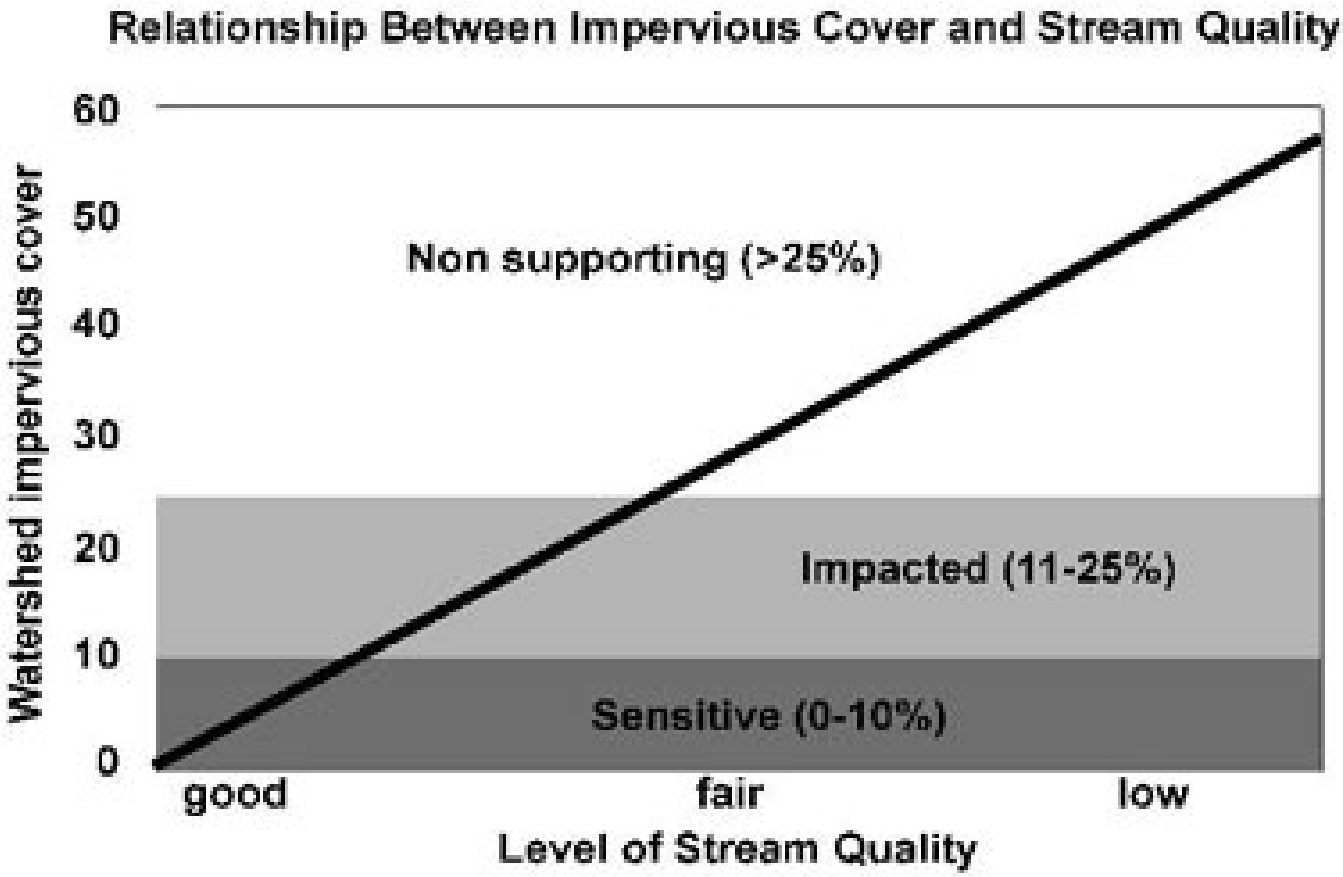
Collect, treat and **(RE)USE**

- Dry weather – **REUSE**; second time use since dry weather runoff is wasted water already used once, i.e. irrigation runoff, hosing of hardscapes, washing cars, draining pools, etc.
- Wet weather – **USE**; first time use of harvested rain water in place of potable water.

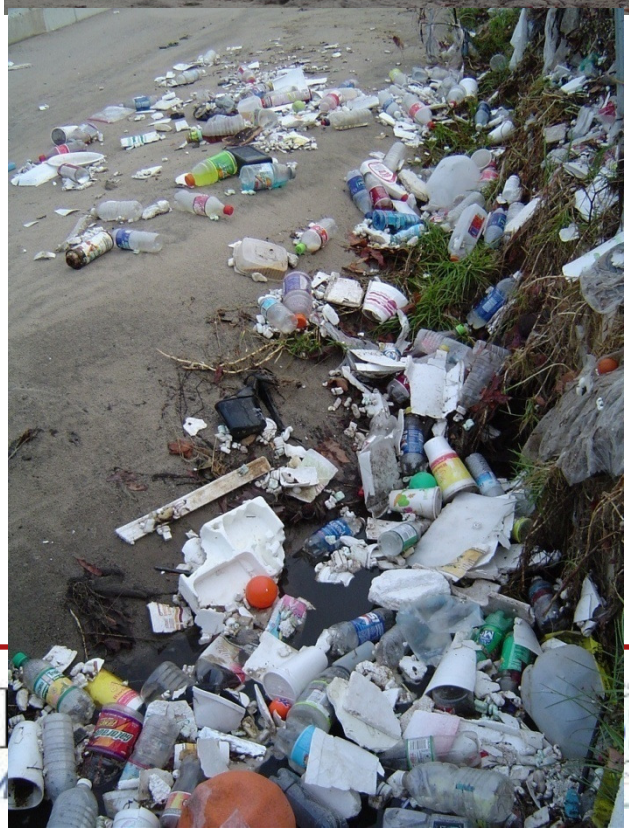
Collect, treat and infiltrate (latter polishes the treated runoff)

Water Quality

As hardscapes increase, water quality goes down.



Source: Schueler, T. 1994. The Importance of Imperviousness. In: Watershed Protection Techniques 1(3):100-111.



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THE
A COPLEY LOS ANGELES NEWSPAPER

Daily Breeze

May 26, 1991 $1.00
Torrance, California
97th year/Number 146
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OUTLOOK EDITION

Local tourism dampened by stream of bad news

Visitor industry threatened by L.A. image

Venice m
fund-rais
Art Walk set

NESS E3 LIFE/ART

rning: *Beach bacteria hazard often*

Report card grades 48 beaches in the South Bay, Westside./A9

vels frequently exceed
at some of the county's
beaches, but health offi-
arn swimmers or close
ted waters, the environ-
Heal the Bay charged

analysis of routine tests
ches along Santa Moni-
that bacteria levels ex-

end of Ballona Creek in Playa del Rey.

But the county Department of Health Services has no policy to warn the public of the routine violations unless the contamination can be linked to a sewage spill.

"Unless there is a known sewage release, they don't want to do anything

"They fail to tell people about the routine violations."

County officials issued health warnings or closed beaches just 13 times since the beginning of 1989, despite evidence that bacteria standards are violated almost every day somewhere in the county.

"It's the only protection the swimmer has," Gold said. "It's the only measuring stick we have to tell people whether there is a problem at their beach."

County officials, asked Friday to comment on an advance copy of the report, did not return telephone calls.

Study links drains, bay to sickness

Polluted runoff after storms can hike risk of illness for swimmers

y Susan Woodward
TAFF WRITER

Surfers have long suspected it, health officials have skirted it, and many ourists haven't even thought about it.

But finally there is an answer to the long-asked question: Can swimming Santa Monica Bay make you sick?

In short, yes.

According to a re-ort released Tues-ay, people who swim the ocean close to owing storm drains ave a 1 in 25 chance f developing a symp-om such as fever, astroenteritis, ear-che, nausea, vomit-ng, diarrhea, cough-ng, or a sore throat.

The epidemiologi-al report — under-aken by USC School f Medicine Professor obert Haile for the anta Monica Bay estoration Project — is the first to study he effects of urban unoff on human ealth.

Storm waters carry rash, fertilizers, gas-line and animal fe-es from city streets nto the Los Angeles County storm-drain ystem, which empties the untreated runoff into San umerous outlets.

The report relies on beach surveys conducted last su 5,400 people who swam near the Ashland Avenue st Monica Beach, the Santa Monica Canyon storm drain at nd at Surfrider Beach near Malibu Creek. All three loca

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TESTING THE WATERS

Health of region's shores threatened by urban runoff

By Harrison Sheppard

The coast along Big Sur. Some officials said while the results were troubling, the wat

Beach Closings Reach Record Levels in State

■ **Environment:** Survey finds 3,547 instances of pollution problems last year.

By SEEMA MEHTA
TIMES STAFF WRITER

California's fabled coastline is far more polluted than previously thought. From San Diego to San

Our Times Times Santa Monica

Danger of urban runoff noted

■ Assemblyman Nakano tells folks at Venice meeting bill would address pollution caused by older roads.

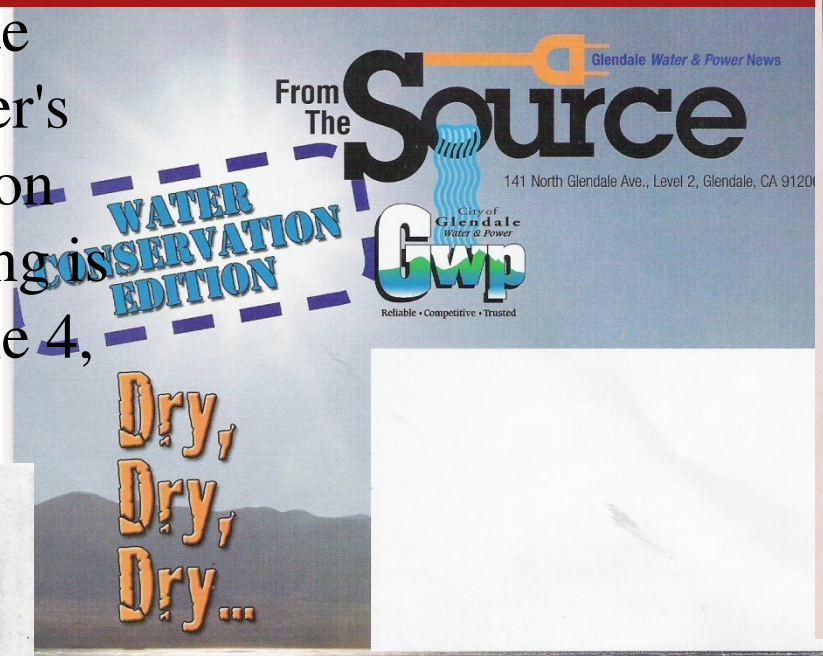
Laura Wides
OUR TIMES

VENICE — A panel of experts including state Assemblyman George Nakano alerted local residents Tuesday night to the dangers of polluted urban runoff and its effect on Los Angeles beaches.

The Democrat, who represents Venice and a number of South Bay communities, urged

Water Quantity

Gov. proclaims statewide drought; Schwarzenegger's move puts Californians on notice that water rationing is possible. LA Times June 4, 2008



A permanent drought seen for Southwest

A study says global warming threatens to create another Dust Bowl. Water politics could also get heated.

By Alan Zarembo and Bettina Boxall
Times Staff Writers

The driest periods of the last century — the Dust Bowl of the 1930s and the droughts of the 1950s — may become the norm in the Southwest United States within decades because of global warming, according to a study released Thursday.

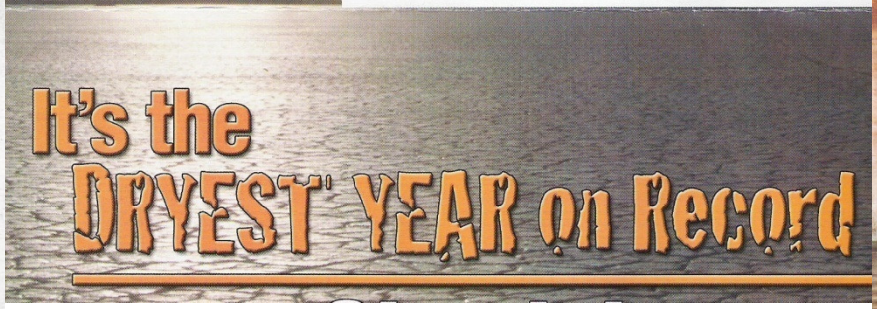
The research suggests that

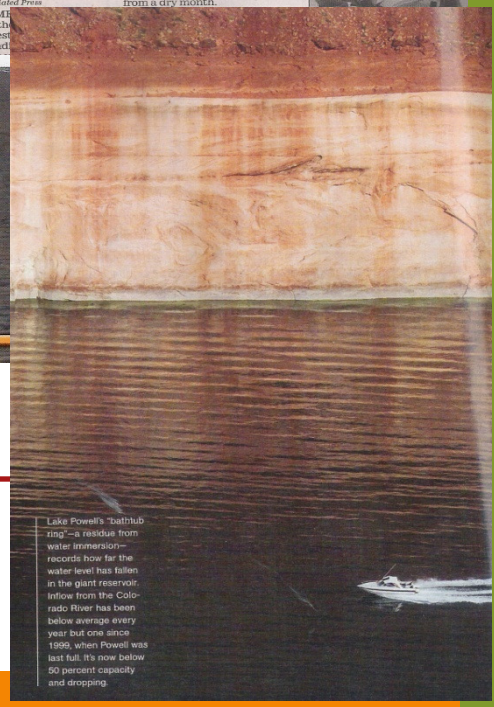
Philip Mote, an atmospheric scientist at the University of Washington who was not involved in the study, added, "There is a convergence of the models that is very strong and very worrisome."

The future effect of global warming is the subject of a United Nations report to be released today in Brussels, the second of four installments being unveiled this year.

The first report from the Intergovernmental Panel on Climate Change was released in February. It declared that global warming had become a "runaway train" and that human activities were "very likely" to blame.

[*See Drought, Page A17*]





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Paving Our Way to Water Shortages:

How Sprawl Aggravates Drought

American Rivers

NRDC

Smart Growth America
Better Choices for Our Communities

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Turning Impermeable to Permeable

LID Strategies

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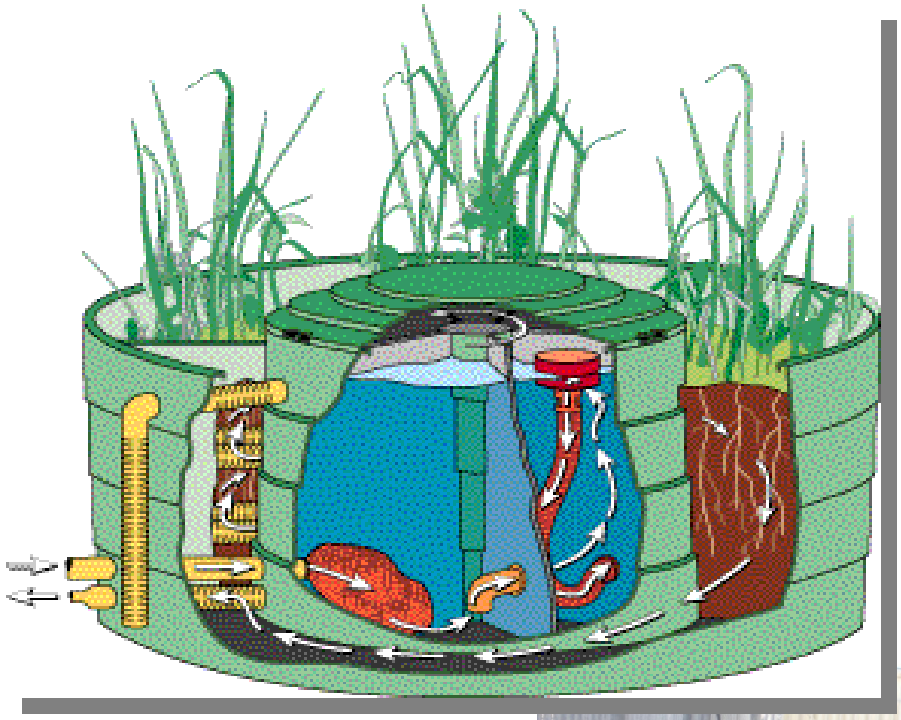
ORDINANCE

- Urban Runoff Pollution Mitigation Code. 7.10 SMMC
- Post-construction BMPs
- LID Focus
- Harvest up to ¾” storm event
- All land uses
- Retrofits, new and re-development

TREATMENT – Public Projects

- New & Retrofits in built out city, worse case
- Infiltration fields
- Porous surfaces
- Filtering
- Rainwater Harvesting & Use

Onsite Natural Infiltration/Filtration



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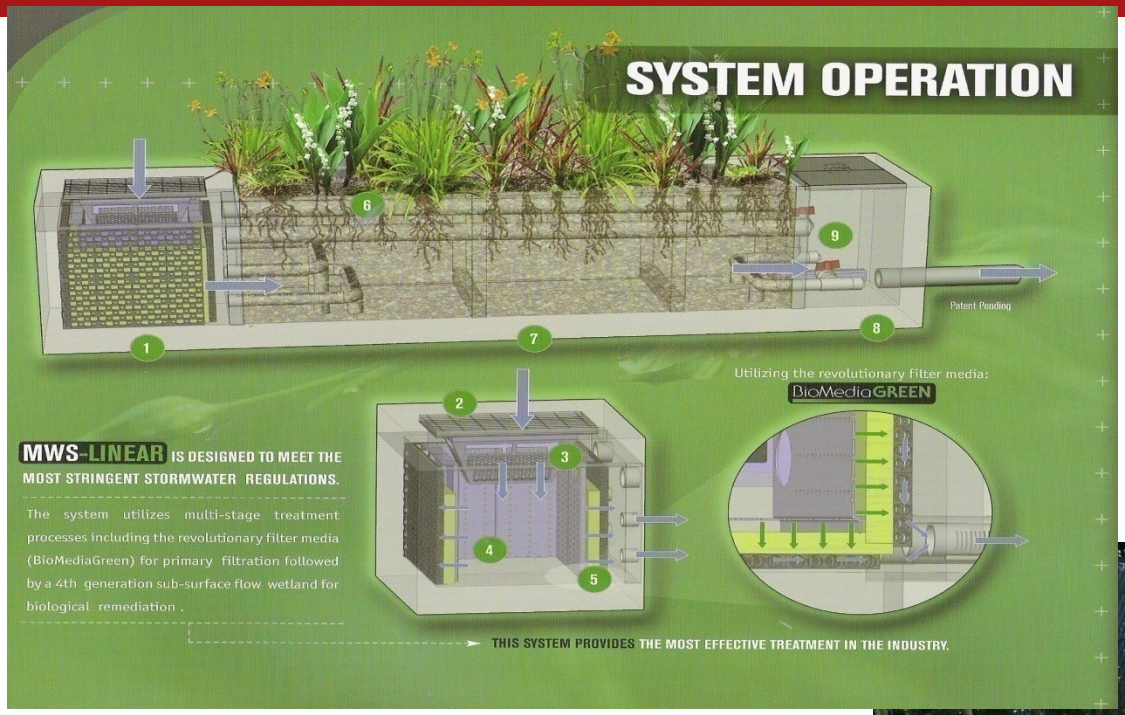
Onsite Natural Infiltration/Filtration



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Onsite Retention

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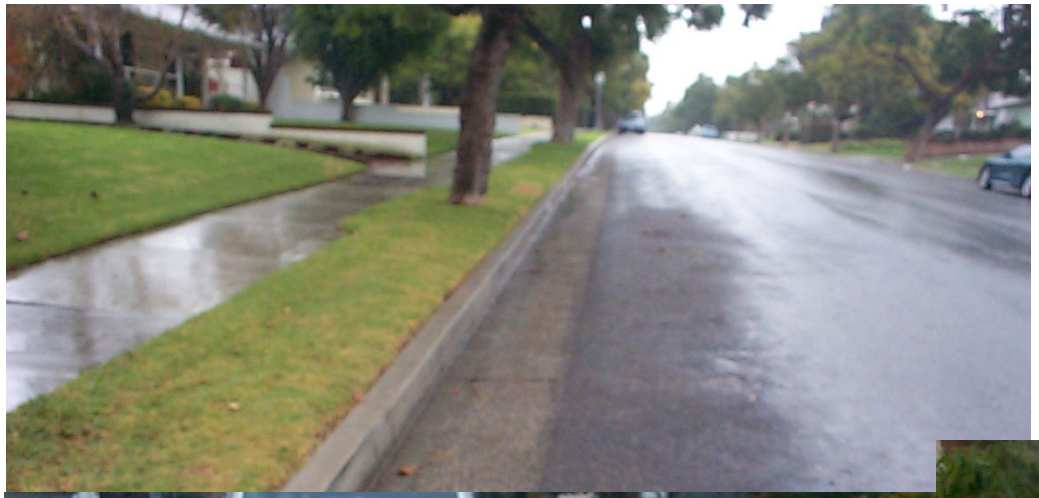
Permeable Paving

Permeable Paving



Virginia Avenue Park

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Virginia Avenue Park

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Airport Park

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Main Library

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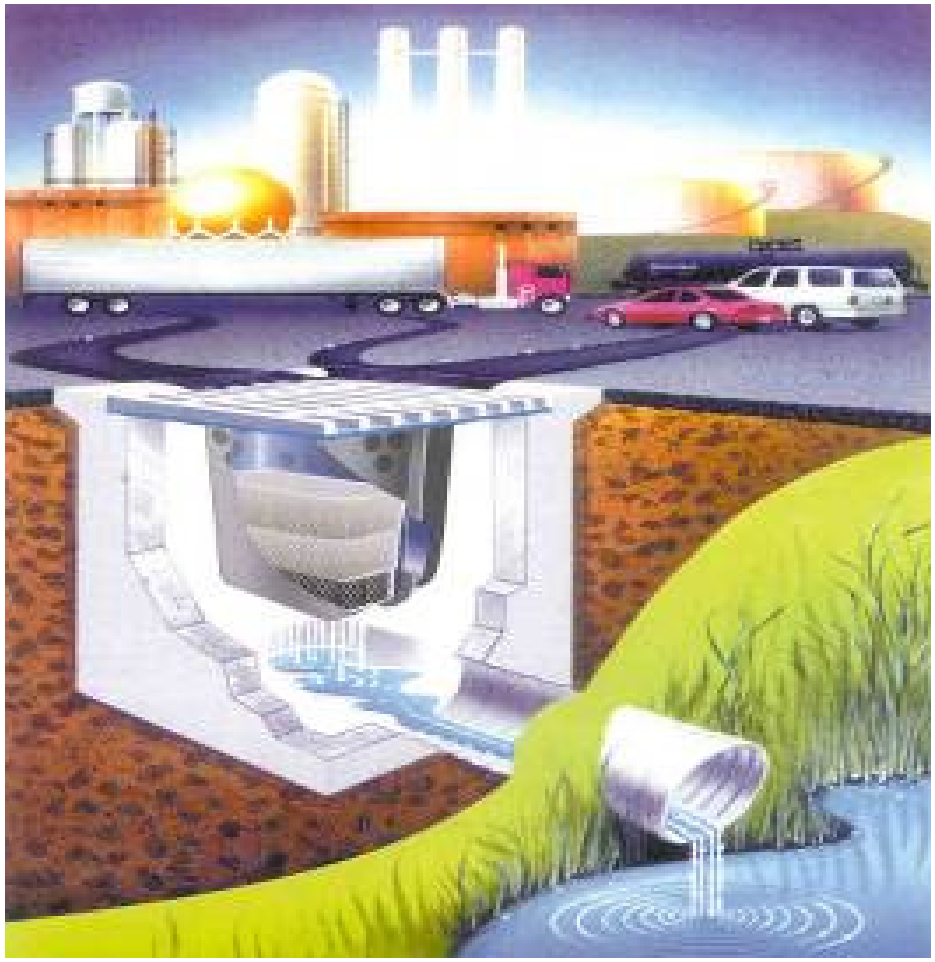
Use of Parkways



Parkway Infiltration

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Big Blue Bus Retention - PhI

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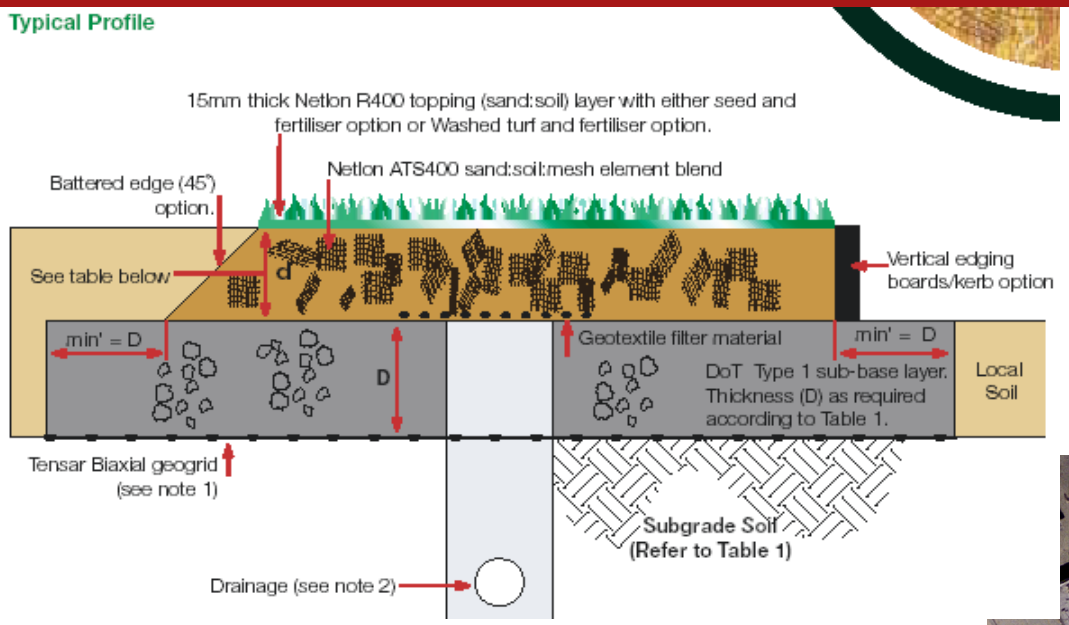
Big Blue Bus Retention: Phase II

415 Pacific Coast Highway - Retention

Green Beach Parking Lot Project



Netlon Advanced Turf System

Green Beach Parking Lot Project

Bicknell Avenue Green St. Project

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Bicknell Avenue Green St. Project

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TREATMENT –Private Properties

- Infiltration fields
- Permeable surfaces
- Rainwater storage and use

Onsite Natural Infiltration/Filtration

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Onsite Retention-private businesses

Infiltration BMPs – Onsite Storage

Multi-Family

Eco-Rain Boxes

Multi-Family

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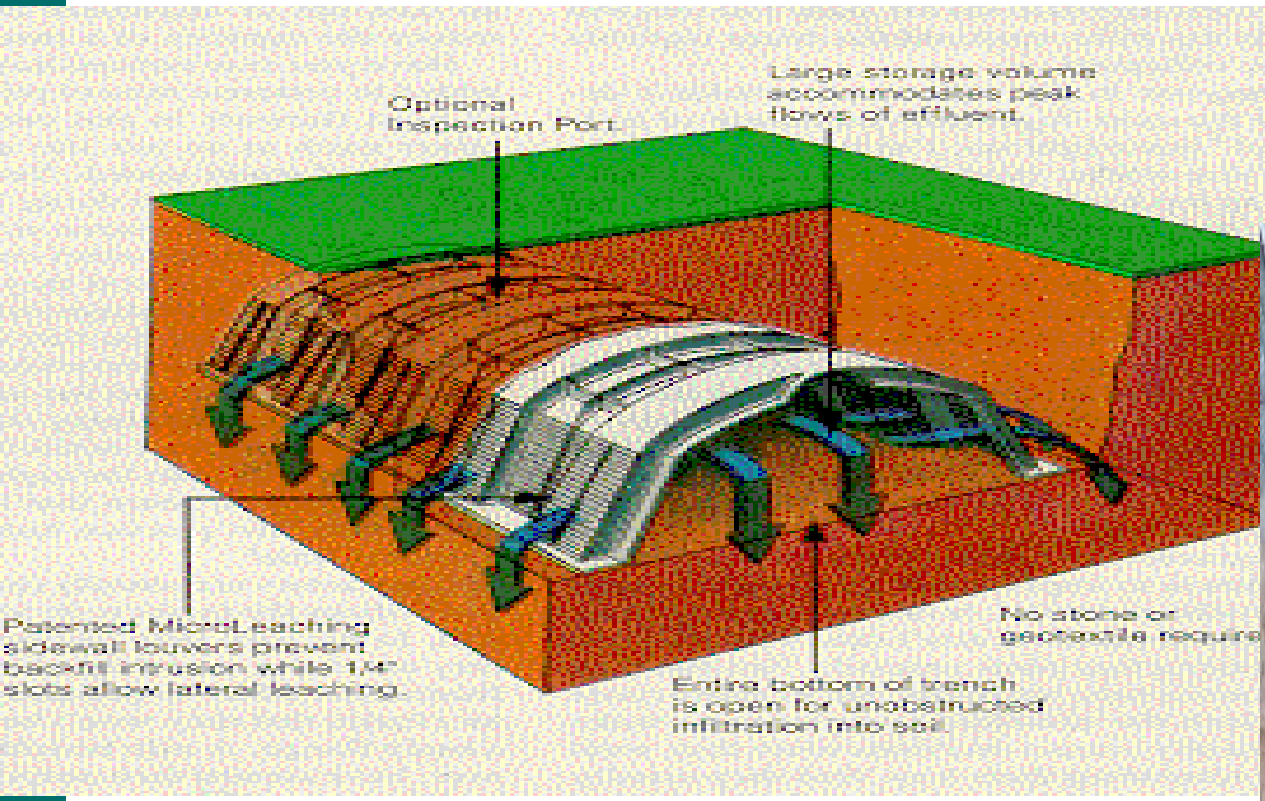
Infiltration Pits BMPs – Onsite Retention

Single-Family

RainStore, Storm Cell

Infiltrators



Cultec Rechargers

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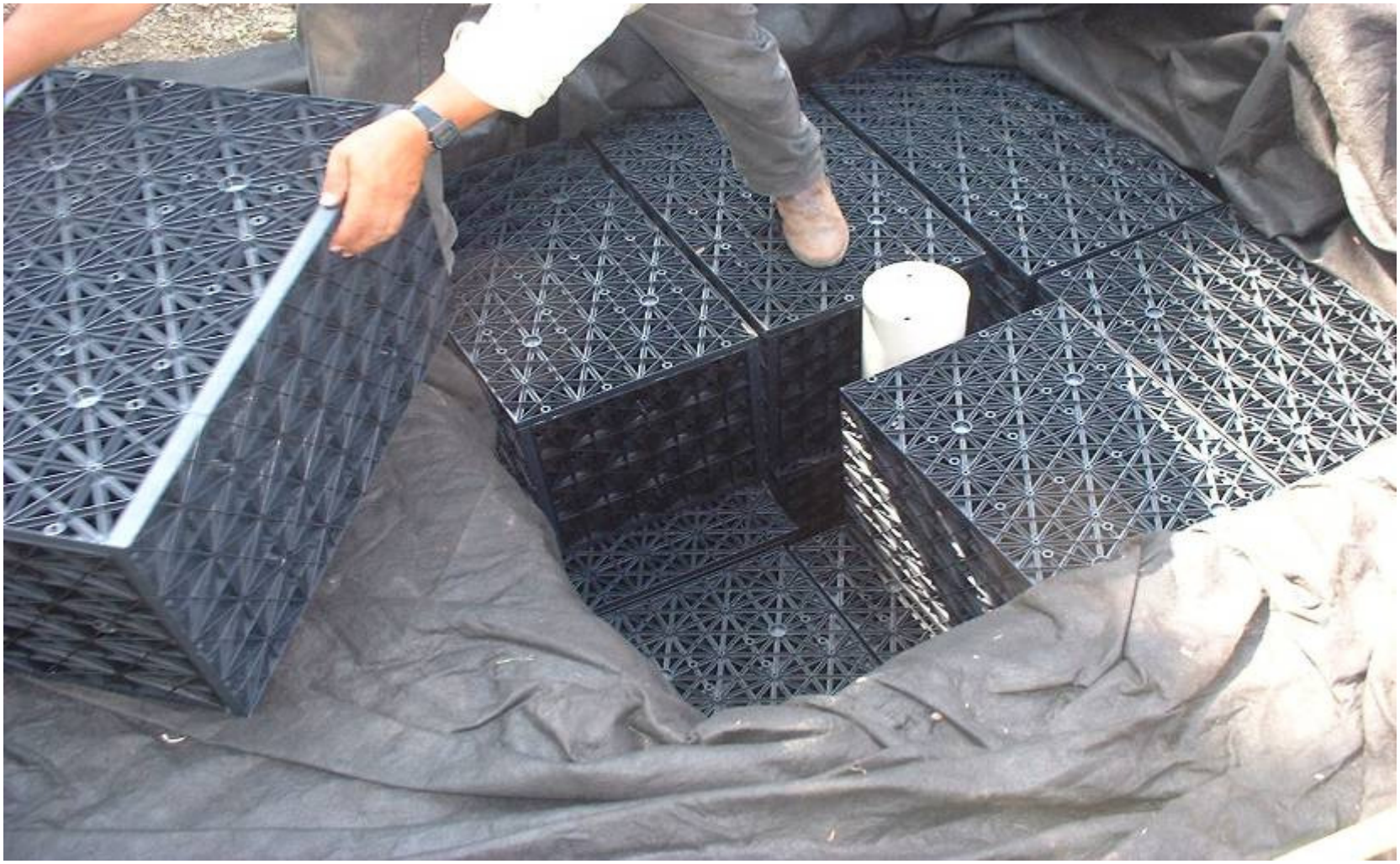
Atlantis tanks

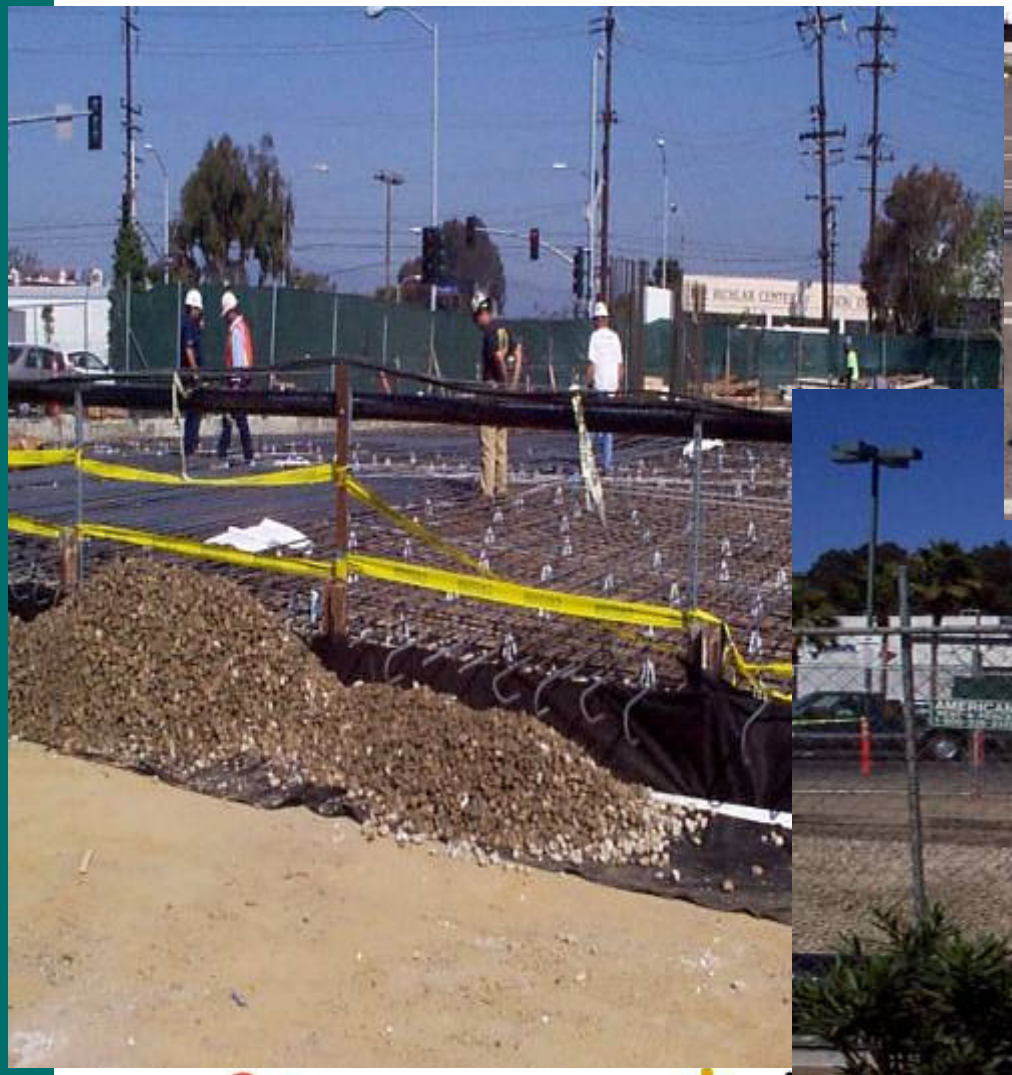


Other Plastic Storage Products

Above, CUDO Modular Tank, KriStar

Below, Storm Tank, Brentwood Industries

Big Projects



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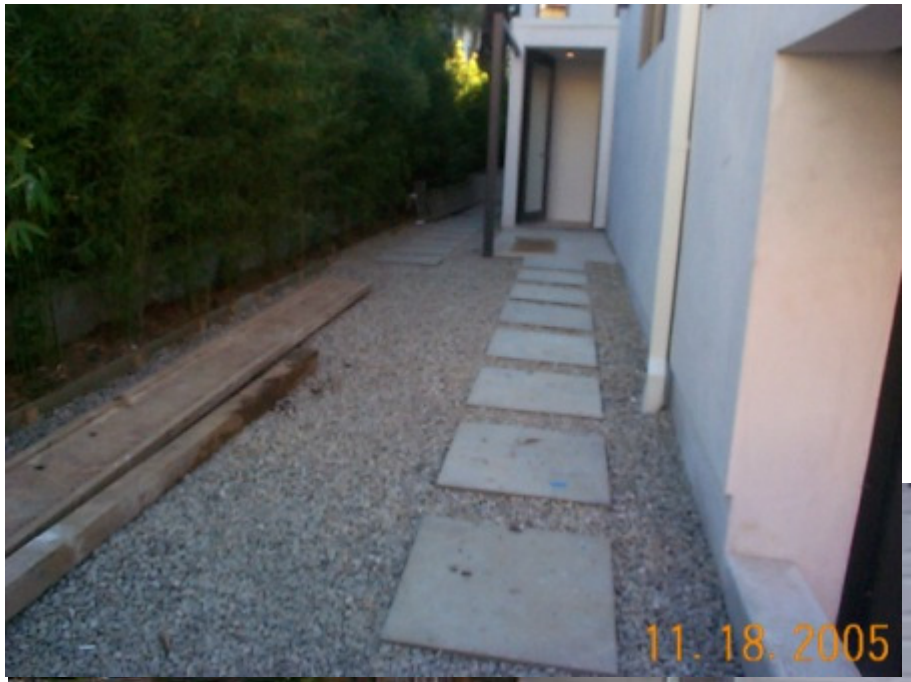
Driveways and Runoff – drains and paving

Driveways, Walkways and Runoff – drains and paving



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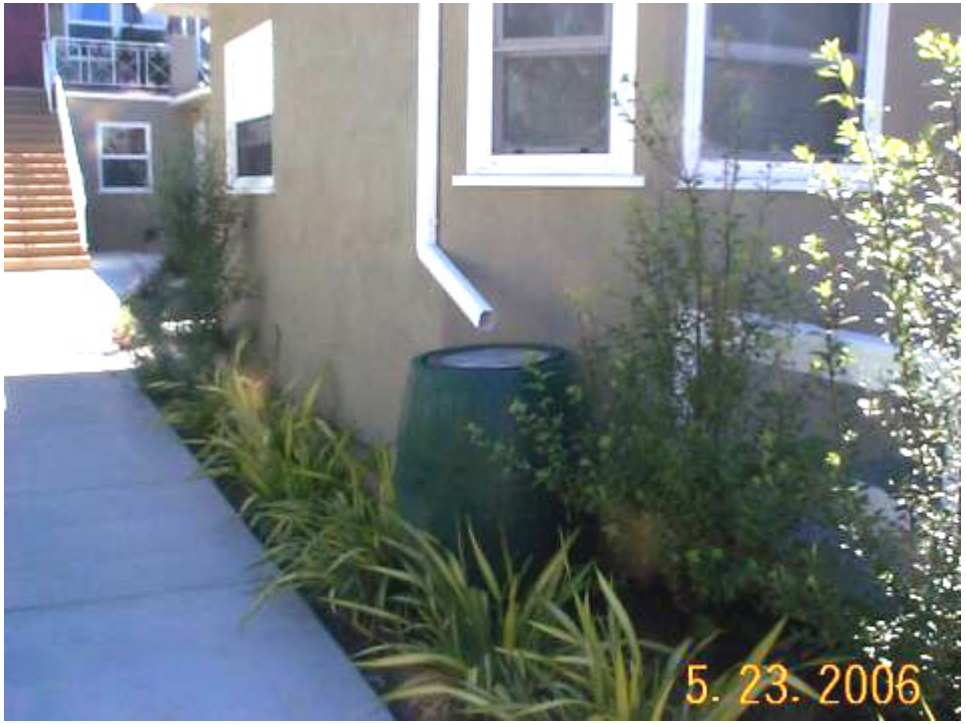
Rain Barrel Pilot Program –

Disconnect or Redirect

Multi-Family building



Multi-Family building

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Single Family project

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Single Family project

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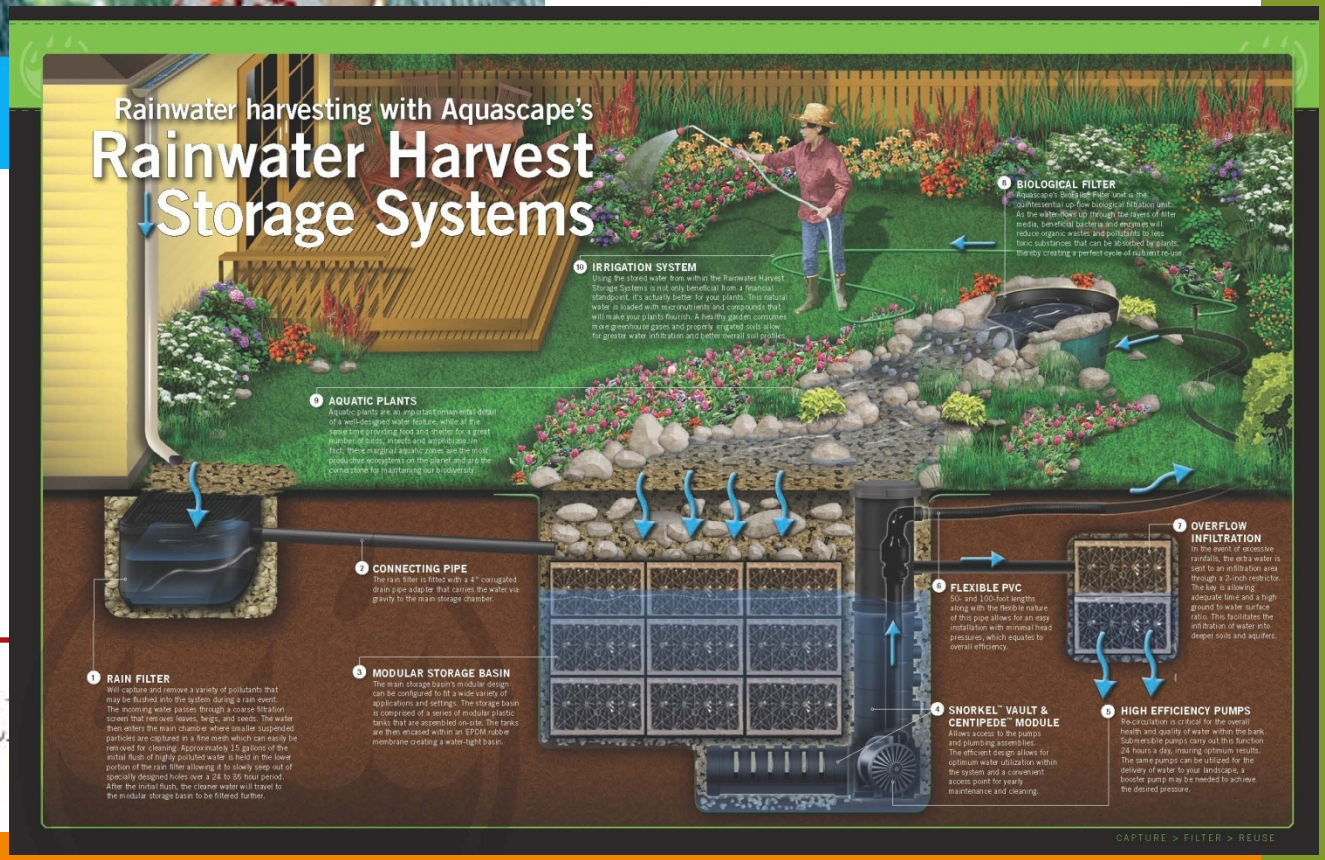
Single Family project

GRAF Residential Rainwater Harvesting Systems



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Green Roof & Pavers

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Green Roof & Porous Concrete

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Natural Resources Defense Council

offices

SMURRF

Santa Monica Urban Runoff Recycling Facility

Joint Santa Monica-Los Angeles Project

- Reuse a local water resource.
- Keep a pollution source out of Santa Monica Bay.
- Reduce imported water supplies & impacts on other watersheds.
- Open, walk-through facility to educate the public.
- Up to 500,000 gallons/day, ave. is 325,000
- 3% of City's daily water use.
- $12 Million
- $175,000 O&M

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Recommended Treatment for Reuse with Recycled Water

- Trash
- Grit
- Suspended Solids

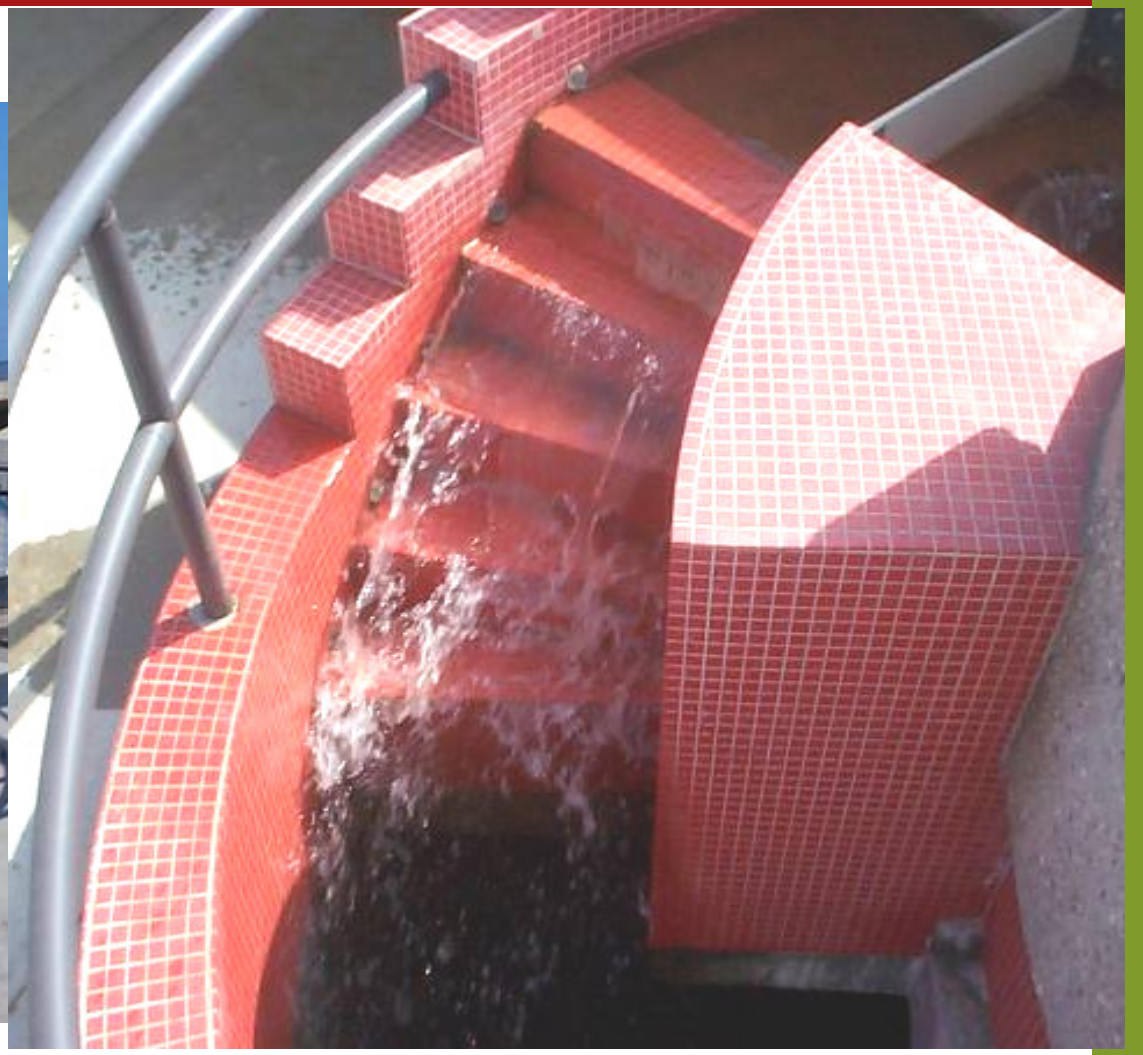
- Oil/Grease

- Turbidity

- Pathogens

Rotating Drum Screen

Grit Chamber



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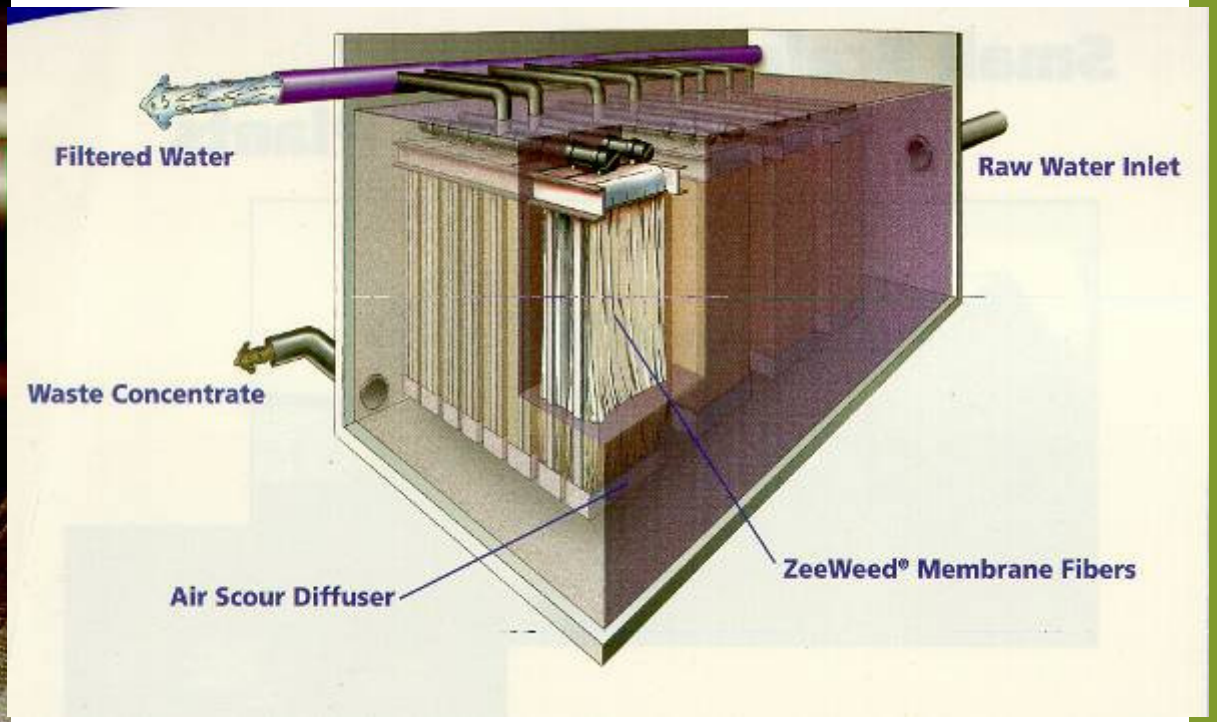
Dissolved Air Floatation

Microfiltration



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UV Radiation Channel

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Water Quality and Nomenclature –

Lack of adequate legal guidelines

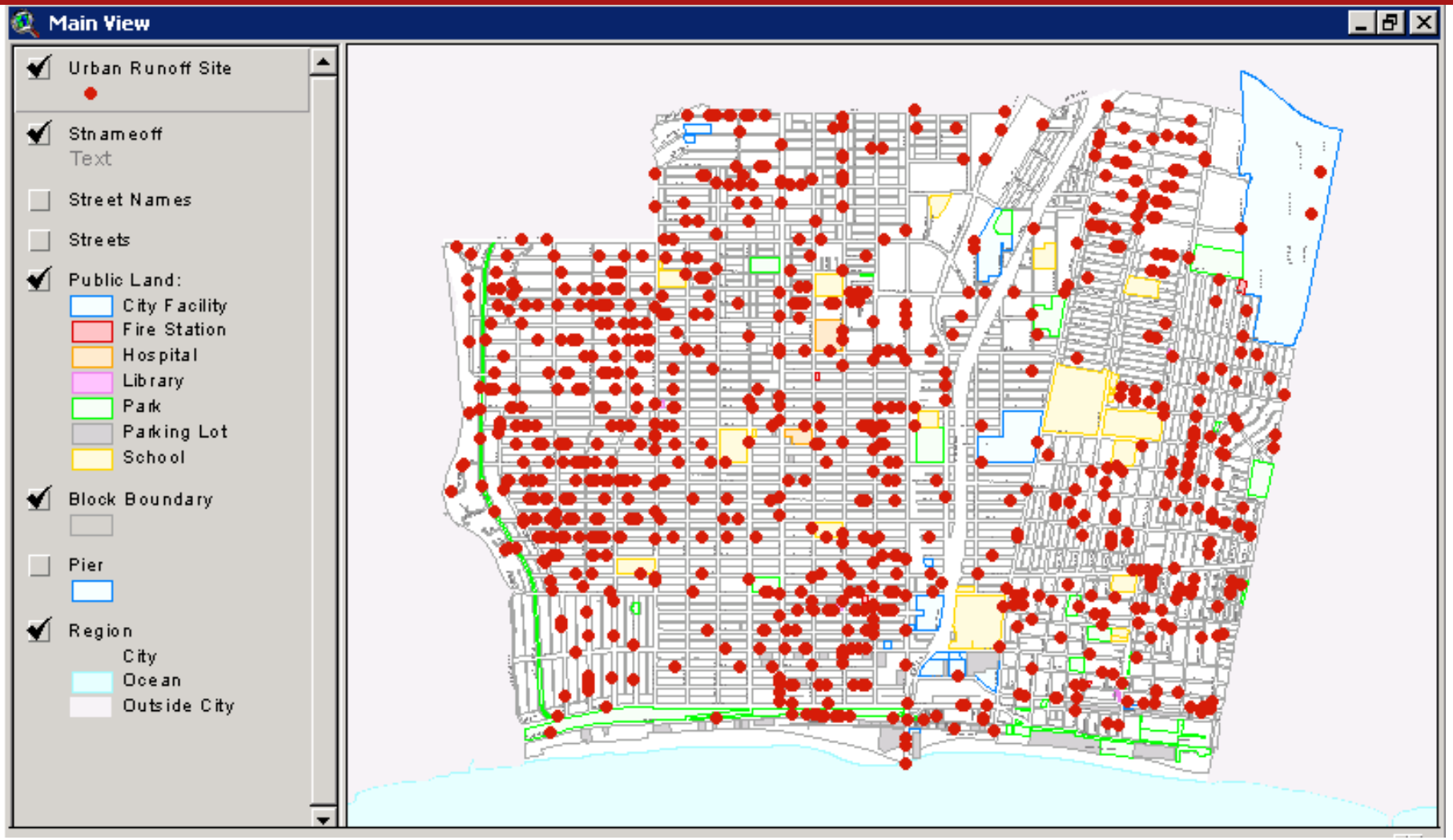
Rainwater & Dry Weather Runoff Harvesting for Outdoor and Indoor Non-Potable Uses

Rainwater Harvesting (RWH) System	Type of Use	Minimum WQ	Treatment Process	Permit Requirement
Rain Barrel (onsite collection)				
• Must be certified by the National Sanitation Foundation (NSF) for use with potable water. • Shall consist of a sealed lid with screen opening, spigot and/or hose bib, screened air vent, and overflow pipe or equivalent. • Shall be labeled to indicate non-potable water • May not be connected to indoor/ outdoor municipal potable plumbing, pressurized or sprayed. • All rain barrels shall be installed in accordance with the manufacturer's installation instruction.	Landscape irrigation, gravity, hose	N/A	• Pre-screening	N/A
	Car Washing	N/A	• Pre-screening	
Cistern (onsite collection)				
• Must be certified by the National Sanitation Foundation (NSF) for use with potable water. • All cisterns shall be installed in accordance with the manufacturer's installation instruction and be equipped with an overflow device • I don't think you need these last 4 bullets below as this is a matrix for treatment only. The plumbing will come later after Public Health signs off on treatment, end-use matrix. I think we are all in agreement on the stuff below though I don't want to be beholden to Public Health. • Piping system: shall be identified by continuous	Landscape Spray Irrigation	• Total coliforms < XXXX • Fecal coliforms < XXXX • No Mini WQ	• Pre-screening • Detention/ sedimentation • Disinfection – chlorination (tablet)	• Plumbing • Electrical • Building/Grading
	Sub-surface irrigation		• Pre-screening • Detention/ sedimentation •	

Water Quality and Nomenclature –

Lack of adequate legal guidelines

Dry Weather Runoff Harvesting System	Type of Use	• Minimum WQ	• Treatment Process	Permit Requirement
		•	•	
SMURRF-like Treatment system or equivalent	Landscape spray irrigation	• Total coliforms < XXX • Fecal coliforms < XXX • No mini WQ	• Pre-screening • Detention/ sedimentation • Disinfection – chlorination, UV or ozone	
	Landscape sub-surface irrigation		• Pre-screening • Detention/ sedimentation • Disinfection – chlorination (tablet)???? Maybe no disinfection for sub-surface	
	Water closet/urinal	• Total coliforms < XXX • Fecal coliforms < XXX •	• Pre-screening • Detention/ sedimentation • Disinfection – chlorination, UV or ozone or chlorine tablets ONLY •	
	Clothes Washer	• Total coliforms <	• Pre-screening • Detention/	



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Summary of BMP Types & Totals

LID BMP Type	Totals
Biofilters	96
Cisterns - Use	4
Depression Basins	79
French Drains	18
Gravel Beds/Trenches	11
Infiltration Pits - Rock	803
Infiltration Pits - Plastic	57
Permeable Paving	22
StormTreat	2
Water Treatment - Reuse	1
Total	1,093
Non-LID BMPs	191
% LID BMPs/Total	85%

Summary of BMPs by Watershed

BMP Totals Per City Sub-Watersheds

11-Mar-2009

Watershed		Total # of BMPs	Total # of Parcels	%
16th Street		61	940	6.5%
Airport		93	1,514	6.1%
Ashland		51	1,564	3.3%
Centinela		47	913	5.1%
Georgina		47	306	15.4%
Kenter Canyon		353	5,591	6.3%
Lincoln		144	2,487	5.8%
Montana		297	2,923	10.2%
Pico-4th		24	590	4.1%
Pico-Caltrans		32	912	3.5%
Pier		19	189	10.1%
San Vicente		27	611	4.4%
Wilshire		105	4,382	2.4%
	Total	**1,300**	**22,922**	**5.7%**

Summary of Permeability by Land Use

Impervious Areas Without BMPs V. With BMPs

11-Mar-2009

	----- Without BMPS -----		----- With BMPS -----	
Land Use	EIA*	Perm	EIA*	Perm + IIA**
Commercial	92.7%	7.3%	16.2%	83.8%
Government	65.2%	34.8%	1.2%	98.8%
Mixed-Use	97.3%	2.7%	24.3%	75.7%
Multi-Family	80.1%	19.9%	13.0%	87.0%
Single-Family	52.1%	47.9%	2.5%	97.5%
Unknown	0.0%	0.0%	0.0%	0.0%
Total	69.9%	30.1%	8.1%	91.9%

Summary of BMPs Costs by BMP

BMP Type	Total # of Projects	Average BMP Cost/Project	Avg Project Cost	Avg Cost Per Gallon	% BMP Cost/Project
Biofilter - Gutters	39	$2,202	$285,026	$2.56	0.77
Biofilter - No Gutters	67	$11,325	$126,987	$1.56	8.92
Diversion - 2 Stage	1	$1,135,700	$1,135,700	$17.52	100.00
Diversion - Only	2	$2,050,000	$2,050,000	$129.46	100.00
Filtering - Catch Basin Insert	26	$21,986	$2,951,173	$2.79	0.74
Filtering - CDS	8	$77,372	$6,325,497	$10.37	1.22
Filtering - Downspout Insert	4	$14,525	$718,750	$1.10	2.02
Filtering - Sand Filter	1	$193,300	$24,153,900	$11.04	0.80
Filtering - StormFilter	8	$248,734	$9,162,125	$4.35	2.71
Filtering - Vortechs	1	$60,000	$29,000,000	$2.38	0.21
Filtering - Vortex (general)	1	$0	$1,400,000	$0.00	0.00
Green Roof	2	$16,375	$115,000	$12.62	14.24
Infiltration - Concrete Vault	1	$250,000	$58,000,000	$1.59	0.43
Infiltration - Depression Basin	82	$3,465	$132,354	$1.19	2.62
Infiltration - French Drain	20	$3,830	$2,392,200	$3.02	0.16
Infiltration - Gravel Bed	5	$8,090	$284,000	$4.55	2.85
Infiltration - Perforated CMP	1	$5,300	$800,000	$0.42	0.66
Infiltration - Pit (Gold Chamber)	7	$42,392	$4,877,571	$6.46	0.87
Infiltration - Pit (Misc pipe)	1	$60,000	$9,450,000	$5.65	0.63
Infiltration - Pit (Plastic Box Modu	118	$11,854	$818,689	$4.76	1.45
Infiltration - Pit (RainStore)	15	$29,030	$1,116,200	$4.34	2.60
Infiltration - Pit (Recharger)	3	$8,603	$5,166,667	$1.67	0.17
Infiltration - Pit (Rock)	836	$6,348	$896,591	$2.86	0.71
Infiltration - Pit (StormCell)	3	$6,977	$530,667	$4.35	1.31
Infiltration - StormTreat	2	$37,500	$37,500	$1.44	100.00
Permeable Paving - Pavers	22	$9,163	$536,481	$2.68	1.71
Permeable Paving - Porous Con	9	$6,307	$189,084	$3.03	3.34
Reuse - SMURRF	1	$12,000,000	$12,000,000	$37.05	100.00
Use - Cistern	5	$152,800	$12,092,800	$4.13	1.26
Total	**1,291**	**$23,938**	**$1,093,489**	**$3.20**	**2.19**

Thank You

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310.458.8223

Neal.Shapiro@smgov.net

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