

# This presentation premiered at WaterSmart Innovations

[watersmartinnovations.com](http://watersmartinnovations.com)





## WaterSmart From the Start: Water-Efficiency Requirements for New Water Services



Richard W. Harris - Water Conservation Manager

WaterSmart Innovations Conference

October 2008

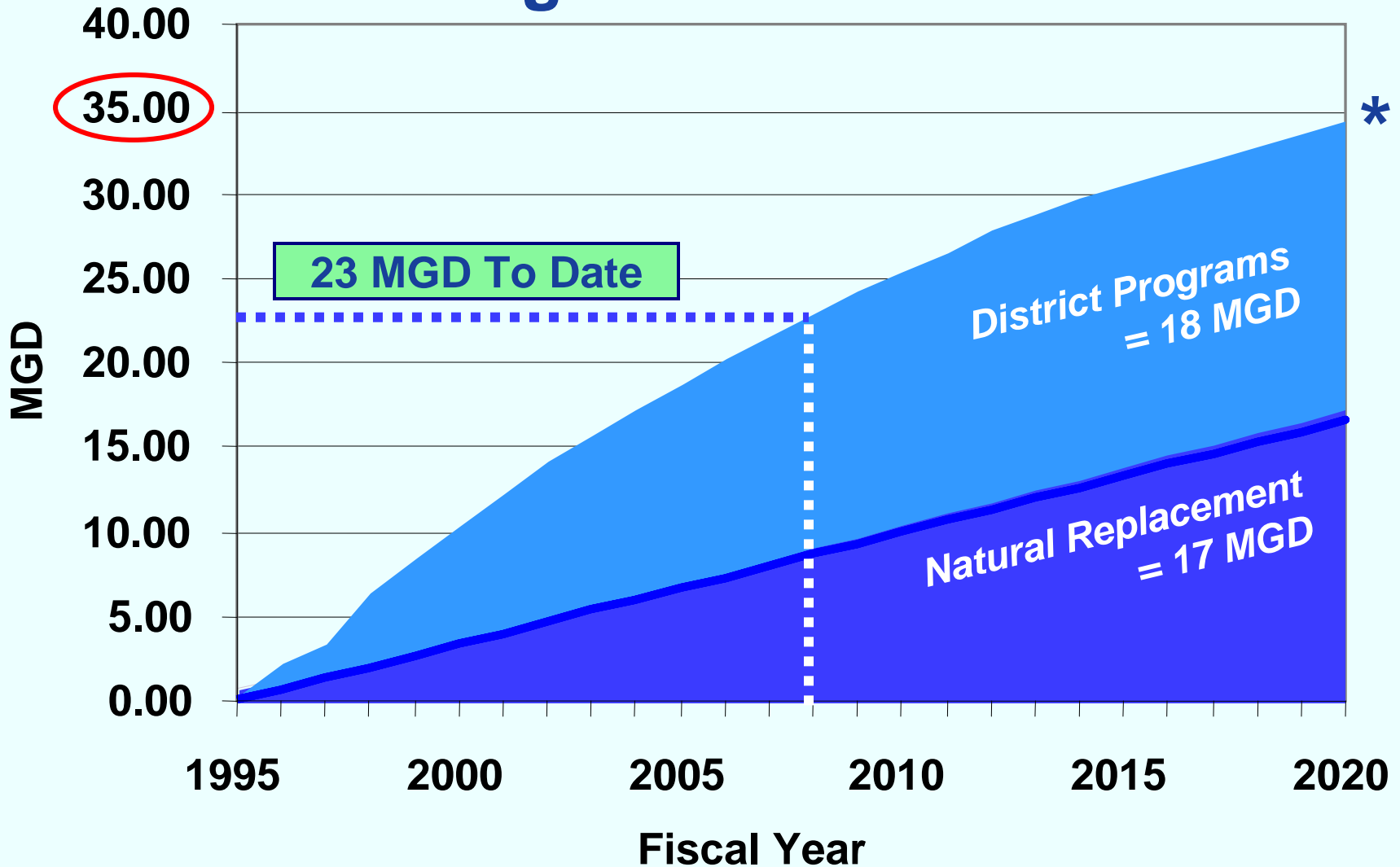
# Overview

- 💧 Need for Regulations
- 💧 EBMUD Water Service Regulations
  - Authority
  - Water efficiency requirements
  - Individual metering of new multi-family and businesses
- 💧 Water service review and approval process
- 💧 One Year Later – Lessons Learned
- 💧 Next Steps

# The Problem...

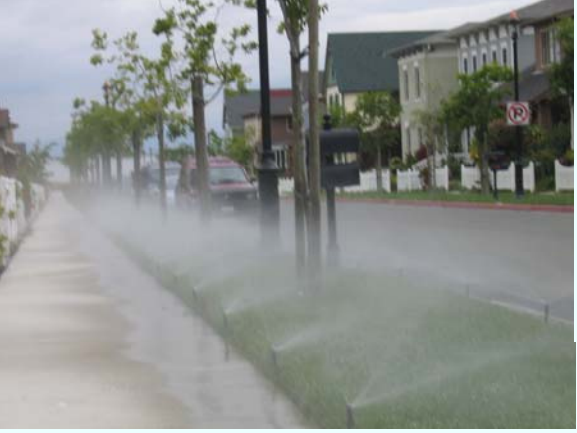
- 💧 Need for dry-year water supply reliability
- 💧 Aging water and sewer infrastructure
- 💧 Need more coordination among utilities and planners
  - Little water use efficiency review in new construction
  - Inconsistent regulations and their implementation
- 💧 Water waste at first operation
- 💧 Higher retrofit costs later

# Water Conservation Master Plan Savings Goal 1995-2020

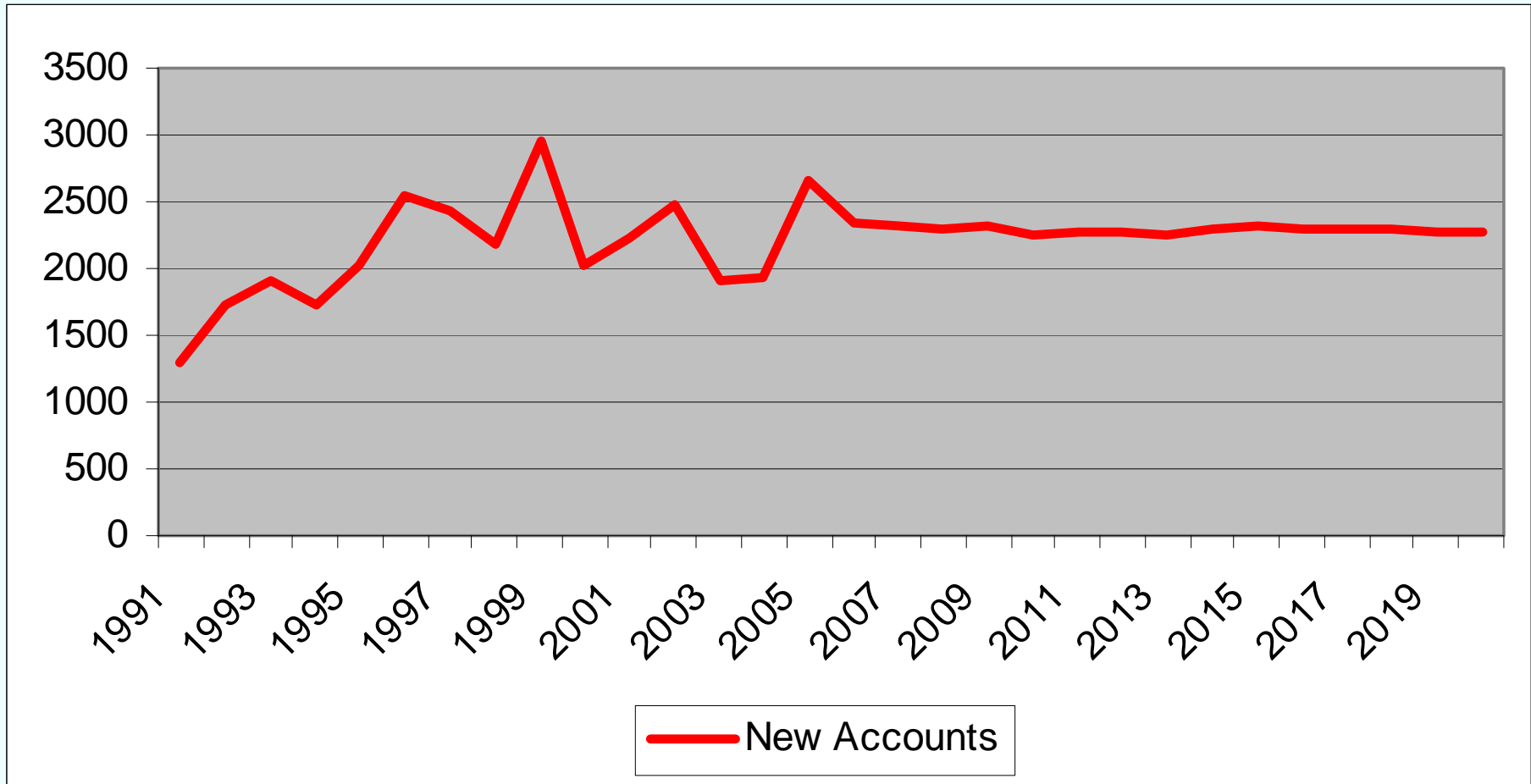




# Inefficient Landscape Designs



# Annual New Service Orders



# EBMUD Regulation-Setting Authority

California Water Code 375-377	authorizes District to require water conserving devices and enforce a water conservation program upon appropriate findings of necessity
CA Water Code 1009	authorizes District to prepare water conservation plans that can require retrofit conservation devices be installed as a condition of service
CA Water Code 350-359	water shortage emergency conditions authorizing District to restrict consumption to conserve



# Water Efficiency Requirements

- 💧 Required written findings and public hearing
- 💧 Applies to all new water services and meter upsizing
- 💧 Requires EBMUD-approved plan review
- 💧 Nonpotable water service requirements
- 💧 Individual metering of MF residential and business

# Water Efficiency Regulation Details

- Residential Indoor – toilets, showerheads (flow and number), faucets and clothes washers
- Non Residential Indoor – same as residential plus requirements for cooling towers, food service and vehicle washing
- Outdoor – landscaping (type and turf limits), irrigation system (type of spray heads, valves, and controller), separate irrigation meter for >5,000 sq ft of irrigated landscaped area, covers for pools and spas





# Water Efficiency Requirements

## Applies to all new applicants & meter upsizing

- By **customer** type (residential, commercial, industrial, etc.)
- By **use** type (indoor, outdoor)
- By **technology** (fixtures, appliances, equipment, etc.)

## Application process

- Varies by number of units
- Varies by size of landscaping
- Integrated into existing process

Property Type – Outdoor Water Use	Check List	Detailed Plan *
<5,000 ft <sup>2</sup> landscaped area (e.g. owner occupied)		
2 or fewer properties/units		
3 or more properties (e.g. developer)		
Commercial properties		

*\* District reserves right to inspect and verify efficiency measures*

# Water Efficiency Criteria

- Products have been **performance rated** (3<sup>rd</sup> party)
- Achieve **measurable water savings**
- Product and technology **readily available**
- **Reasonable economic cost** to consumer
- **Compliance** at applicants expense

# Indoor Water Efficiency Requirements

Item	Residential	Non-Residential
Toilets	1.28 gal dual flush (HET)	1.28 gal dual flush (HET)
Urinals	---	0.5 gal per flush
Showerheads	2.5 gpm; individually plumbed; one head per 2,500 sq. in stall	2.5 gpm; individually plumbed; one head per 2,500 sq. in stall
Faucet Aerators	1.5 gpm bath; 2.2 gpm kitchen	1.5 gpm bath; 2.2 gpm kitchen
Clotheswasher	7.5 gal per cubic foot of laundry	7.5 gal per cubic foot of laundry
Pre-Rinse Spray Valves	---	1.6 gal. per minute
Ice Machines	---	Air cooled or $\leq 25$ gal/100 lbs
Food Steamers	---	Boiler-less; self contained*
Cooling Towers	---	$\geq 5$ cycle recirculating

\* Where applicable

# Outdoor Water Efficiency Requirements

Item	Water Efficiency Requirement
✓ Landscape Plan	detailed plan review; check List <5,000 ft <sup>2</sup>
✓ Turf Areas	< 25% of area; turf and sprinklers/spray heads not allowed in medians <8 ft.
✓ Dedicated Irrigation Meter	> 5,000 sq. ft. of landscape
✓ Irrigation Efficiency	80% of evapotranspiration; no runoff
✓ Irrigation Controller	weather-based self adjusting model
Plants	80% low water use; 20% other
Non-Turf Areas	drip, sub-surface and bubblers; no runoff
Valves and circuits	separately zoned by plants and water use

✓ *Exception for: (a) <5,000 ft<sup>2</sup> of irrigated landscaping and (b) < 3 residential properties*



# Consequences for Non-Compliance

- Applicant must resubmit water service application and water-efficiency plan at applicant's expense
- Account activation and meter installation refused until water-efficiency plan is approved

# Water Service Regulations

## Section 2: Applying for Service

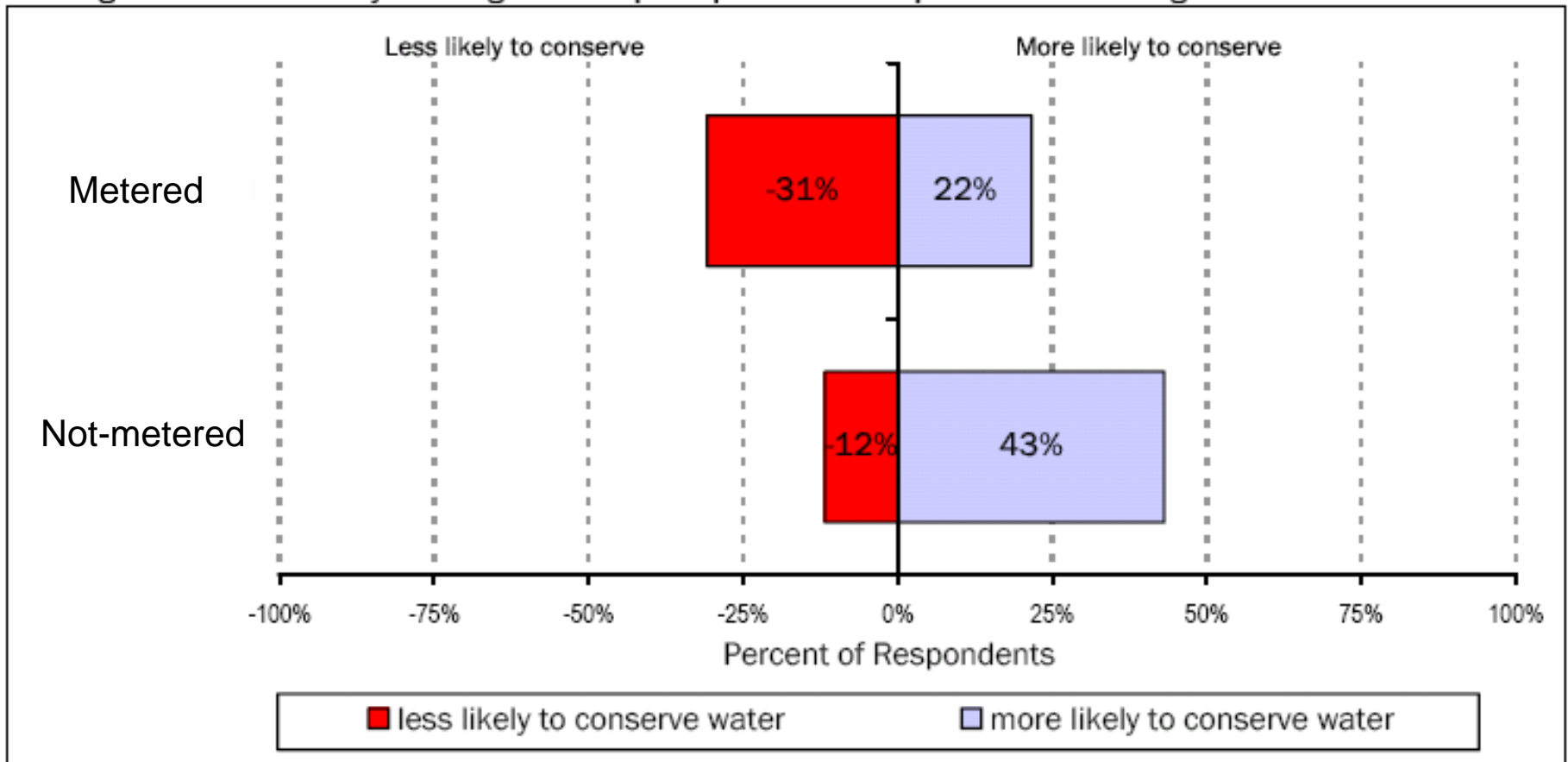
- Effective on January 1, 2009, each new multi-family residential or multi-occupancy commercial / industrial unit in a structure of three stories in height or less shall be individually metered.
- The determination of feasibility is made by the District to meter each unit individually when reasonably possible to do so. (e.g. sufficient space for meters, room to work, etc.)

# Individual Metering

- 💧 Applies to all multi-family and multi-space occupancy applicants.
- 💧 Sub-metering is not an acceptable alternative.
- 💧 Additional District charges of \$300-\$500 per dwelling unit/commercial space.
- 💧 Added plumbing cost to developer.

# Tenant Surveys

Figure 17: Multi-family housing tenants' perception of the impact of water billing on their water habits



# Apartment Building





# Commercial Complex





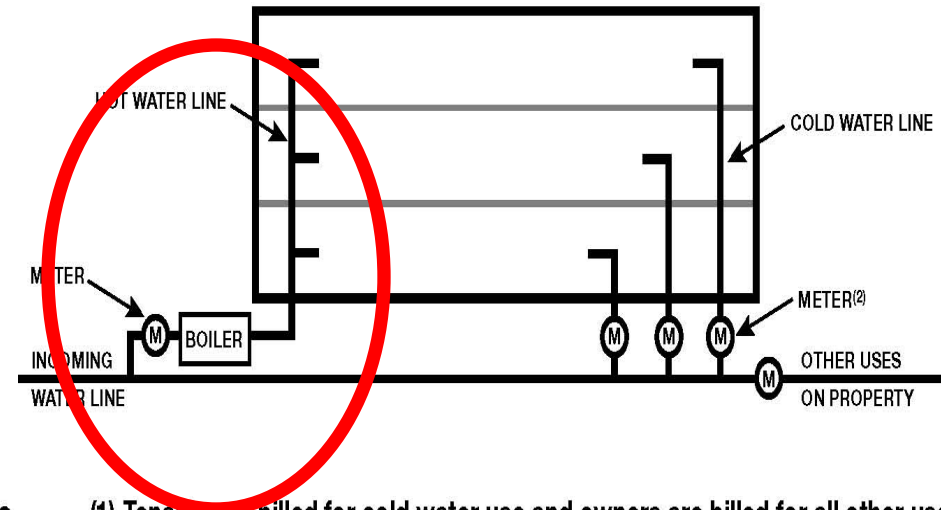
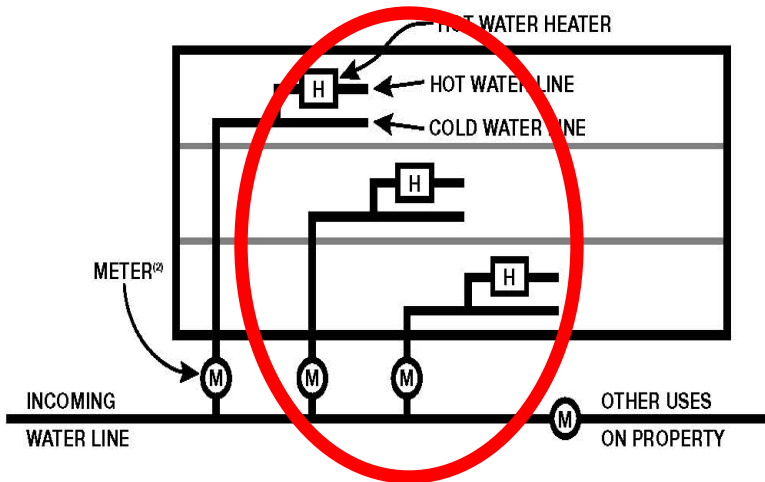
# Plumbing Configuration Metering Options

## A

## B

Recommended metering configurations for 3-story or less buildings with water heater in each unit<sup>(1)</sup>

Recommended Metering Configurations for 3-story or less buildings with common water heater (boiler)<sup>(1)</sup>



- (1) Tenants are billed for all indoor use and owners are billed for all other use
- (2) Meters on ground level outside building

- (1) Tenants are billed for cold water use and owners are billed for all other use
- (2) Meters on ground level outside building

# Water Service Review Process

# Customer Application Check List



## Water Service Regulations - Section 31 Water Efficiency Requirements Checklist

TO BE COMPLETED BY APPLICANT					
I certify the subject project meets the specified water-efficiency requirements for plumbing and landscaping.					
Signature _____			Date _____		
CUSTOMER ACCOUNT INFORMATION					
Applicant Name (print)		Contact		Phone #	
Site Address					
Average Sq. Footage		# of Units	# of Fixtures	# of Meters	
<input type="checkbox"/> Single Family <input type="checkbox"/> Multi-Family <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional <input type="checkbox"/> Irrigation only <input type="checkbox"/> Industrial <input type="checkbox"/> Other:					
Indoor Water Use	Requirements (No more restrictive of all state, federal and EBMUD codes apply)	No. Devices and Values	Util. Measure	Pass/Fail	DISTRICT USE ONLY
Attach Site Plan, Equipment List (see definitions on reverse side)					
Toilets	≤ 1.29 gal/flush; > 350 gram rated		Flow Rate		<input type="checkbox"/> Check List (see plan required) <input type="checkbox"/> Check List of required plan check review
Urinals	≤ 0.5 gal/flush		Flow Rate		AUDITOR:
Showerheads	≤ 2.5 gpm, one per 2,500 in. <sup>2</sup>		Flow Rate		DATE REVIEWED:
Kitchen Faucets	≤ 2.2 gpm		Flow Rate		<input type="checkbox"/> Follow-Up Required (Explain):
Bath Faucets	≤ 0.5 gpm; ≤ 1.5 gpm		Flow Rate		DATE RE-SUBMITTED:
Clotheswashers	≤ 7.5 Water Factor or ≤ 7.5 gallons per cu. ft. capacity		Water Factor		DATE APPROVED:
Pre-rinse spray valves	≤ 1.6 gpm		Flow Rate		Meter Sizing:
Cooling towers	≤ 5 Cycles of concentration		Cycles		Dedicated Irrigation Meter Required <input type="checkbox"/> Yes <input type="checkbox"/> No
Food Steamers	Boiler-less, self-contained				<b>MATERIAL DISTRIBUTED</b>
Ice machines	Air-cooled or ≤ 25 gallons/100 lbs.		Air-cooled Water-cooled		<input type="checkbox"/> Water Service Application <input type="checkbox"/> Section 31 Regulations <input type="checkbox"/> Plant List <input type="checkbox"/> Residential Washer List
Commercial Refrigeration	Air-cooled or water-cooled welded system; no single phase permitted.		Air-cooled Water-cooled		<input type="checkbox"/> Toilet List <input type="checkbox"/> Commercial Washer List
Vehicle Wash Facilities	≥ 93 % recycled		% recycled		<b>RECOMMENDED MEASURES</b>
Outdoor Water Use	Requirements (No more restrictive of all state, federal and EBMUD codes apply)	No. Devices and Values	Util. Measure	Pass/Fail	<input type="checkbox"/> Drip Irrigation <input type="checkbox"/> Plant Palette <input type="checkbox"/> Self-adj. Controller <input type="checkbox"/> Mulching <input type="checkbox"/> Soil Amendment <input type="checkbox"/> Other:
Attach Landscape Plan with the following (see definitions)					
Total Landscape Area			sq. ft.		COMMENT:
Total Irrigated Area			sq. ft.		
Total Turf Area	≤ 25% of irrigated		sq. ft. & %		
Non-Turf Areas	80% water or low water use		sq. ft. & %		
Automatic Self Adjusting Irrigation controller	For all commercial and 3 or more residential > 5000 ft <sup>2</sup> landscaping		Manufacturer		
Irrigation Efficiency	80% Efs - Reference evapotranspiration; no overspray, no runoff		% Efs		
Valves and Circuits	Group plants by type/Hydrant/zone		# of Zones		
Pool and Spas	Covers Required		#		
Sprayheads	Not allowed in ≤ 3 ft. wide area		See Regulations		

### SECTION 31 CHECKLIST DEFINITIONS

These definitions are intended to help applicants in completing the Section 31 Checklist and completing project plans. They do not replace the text included within the Section 31 Regulations themselves.

#### 1. Indoor Water Use

- High-Efficiency Toilet: Dual-flush gravity type model rated at a maximum average flush volume of 1.28 gallons per flush (gpf). All toilets must be certified as passing a 350 gram or higher flush test as established by the Uniform North American Requirements or other District-accepted third party testing entity. Pressure-assisted or flushometer type toilets with a maximum 1.0 gpf. Does not include flush or conversion devices.
- Urinals: Manual, sensor-operated flush or zero water consumption urinal.
- Showerhead: Individually plumbed water saving device.
- Lavatory faucet: Faucet with an aerator or laminar flow control device.
- Kitchen faucet: Faucet with an aerator or laminar flow control device (i.e. orifices).
- Clothes washing machine: Front loading horizontal axis or top loading model with: (1) a water factor rating of 7.5; or (2) a maximum average water use of 7.5 gallons per cubic foot of laundry or less.
- Cooling towers: Equipped with recirculating systems, conductivity controllers, as well as make up and blowdown meters, and operate at a minimum of five (5) cycles of concentration.
- Food steamers: Boiler less or self-contained models where applicable.
- Ice machines: Air-cooled or water-cooled with a recirculating cooling unit.
- Commercial refrigeration: Air-cooled or water-cooled with a closed looped system.
- Pre-Rinse Dishwashing Spray Valves: Hand dishwashing spray emitter.

#### 2. Outdoor Water Use

- Total Landscape Area: Area, in square feet, that is designed for planting and irrigation; may include areas available for future landscaping.
  - Turf areas: Percent of total irrigated area to be planted with lawn or turf.
  - Non-turf areas: Percent of total irrigated area to be planted with plants and groundcover (no lawn or turf).
- Irrigation
  - Irrigation Efficiency: Includes a landscape (water budget design) to apply water at 80% of evapotranspiration or the amount of water required to maintain a healthy landscape accounting for the evaporation of water from the soil surface and the transpiration of water through the plant foliage.
  - Automatic, self-adjusting irrigation controllers: Controllers that automatically activate and deactivate the irrigation system based on changes in the weather and include a moisture sensor and/or rain sensor shutoff.
  - Non-turf landscaped areas: Must include a pressure regulated drip irrigation system, designed by a landscape architect or other competent person.
  - Sprinklers and spray heads: All overhead spray or other sprinkler emitters not including bubblers or drip irrigation equipment.
  - Valves and circuits: Electronic and manually operated.
  - Dedicated Irrigation Meter: A separate water meter for the landscape irrigation portion of the parcel is required at ≥ 5,000 sq. ft..
- Swimming Pools and Spas.
  - Covers: Any cover material to reduce the amount of evaporation off pools and spas.
- Vehicle wash facilities: Manual or automated commercial car washing stations.

# On-line Plan Review Tracking Forms



## Section 31 Water Efficiency Requirements

### NBO Forms

#### NBO Entry Form

#### NBO Look-up Form

Project Name	Address	City	State	Zip	County	District	Sub-District	Parcel No.	Parcel Area	Parcel Type	Parcel Use	Parcel Status	Parcel Date	Parcel Description	Water Conservation Measures
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

### Water Conservation Forms

#### Water Conservation Entry Form

#### WC Look-up Form

Project Name	Address	City	State	Zip	County	District	Sub-District	Parcel No.	Parcel Area	Parcel Type	Parcel Use	Parcel Status	Parcel Date	Parcel Description	Water Conservation Measures
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...



### SECTION 31 WATER CONSERVATION ENTRY FORM



[Assign to WC Rep](#)  WER #

WER No: <input type="text" value="100209"/>	Request Date:(mm/dd/yyyy) <input type="text" value="08/12/2008"/>	Estimated Due Date:(mm/dd/yyyy) <input type="text" value="08/29/2008"/>
NBO Rep: <input type="text" value="Kathi Shew"/>	WC Rep Assigned: <input type="text" value="Miira J Wirth"/>	

**Contact Information:**

First Name <input type="text" value="Sky"/>	Last Name <input type="text" value="Dufaux"/>	Company Name <input type="text"/>
Address No. <input type="text" value="3367"/>	Street <input type="text" value="Crane Way"/>	Apt./Suite <input type="text"/>
City <input type="text" value="Oakland"/>	Zip <input type="text" value="94609"/>	E-Mail <input type="text" value="azuredevelopment@comc"/>
Business Phone <input type="text" value="510 417-5918"/>	Home Phone <input type="text" value="510 482-1140"/>	Fax <input type="text"/>

**Design contact:**

	Contact Name	Position	Phone No.	Email
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Property Information**

Property Name <input type="text" value="4831 Shattuck, LLC"/>	Address No. <input type="text" value="4831"/>	Street Name <input type="text" value="Shattuck Avenue"/>
City <input type="text" value="OAK"/>	Zip <input type="text" value="94609"/>	Property Type <input type="text" value="MFD"/>
Project Name File <input type="text" value="Dufaux, Sky"/>	Dwelling Units <input type="text" value="10"/>	

**NBO Comments:**

Customer is building 10 unit condo complex with irrigation meter

# On-line Plan Review Tracking Forms

# Database Query Tool



## SECTION 31 TRACKING: WATER CONSERVATION

for city:

and/or street:

and/or request #:



and/or Status:

and/or applicant Last Name

and/or NBO REP

and/or WC REP:

Status	WER request No.	Project Name	Applicant Name	Property Location	NBO Rep	WC Rep	WC Assigned Date	WC Estimated Due date	WC Completion Date
COMPLETE	<a href="#">100010</a>		Gary Bankhead Kaiser	Kaiser 3701 Broadway OAK	KSHEW	CBOHLIG	11/27/2007	12/04/2007	02/08/2008





# One Year Later – Lessons Learned

- 140 plans received to date
  - 35 Multi-family developments = (350 units)
  - 10 sub-divisions = 450 Single family residential
  - 60 commercial
  - 12 institutional
  - 3 industrial
  - 10 irrigation only



# Lessons Learned

- 💧 HET's – less than 5% of the plans sent to EBMUD had HET's specified
- 💧 Landscaping –more than 50% had specified too much turf and or turf in areas of less than 8 feet wide
- 💧 Water savings also due the bathroom aerators

# Lessons Learned

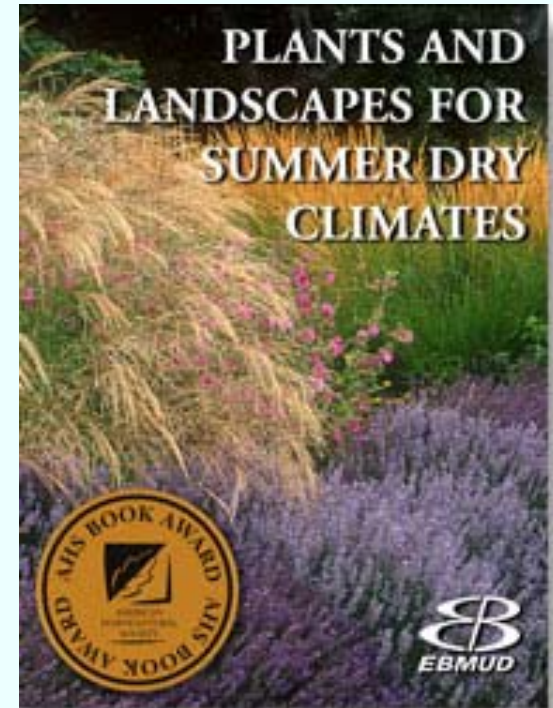
- Have lists prepared for applicants to assist them in specifying pre-approved fixtures and landscaping (HET's, clothes washers, plant lists, etc.)
- Reach out to city planning departments so that they are aware requirements to avoid "...well the city already approved this"

# Successes...

- 💧 The first group to embrace and implement Section 31 were landscape architects
- 💧 Plans are now coming in with little or no changes
- 💧 Helping change builders perceptions about HET's
- 💧 Have eliminated un-necessary turf

# Supplemental Information

- 💧 Referral product lists
  - High-efficiency toilets
  - High-efficiency clotheswashers
  - CA-native, low water plants
  
- 💧 Guidebook for New Business





# Supporting Initiatives

Water Efficient Product Rating and Labeling



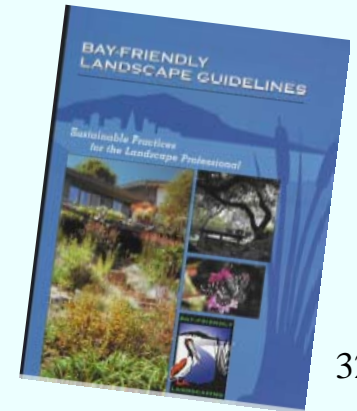
WaterSmart Certification and Recognition Program

WaterSmart Development Best Practices Guidebook

LEED, Build it Green, NAHB GBI



Nursery Partnering/Bay Friendly Landscaping



# Benefits of New Regulations

## 💧 Water-efficiency requirements

- Estimated 10% - 30% demand reduction
- 100,000 gpd savings (36.5 million gallons annually)

## 💧 Individual metering

- 9,177 dwelling units built 2003 to 2007
- 6,000 could have fallen under this regulation (based on 66% being  $\leq$  3 stories)
- 74,000 gpd savings (27 million gallons annually)

# Benefits from Individual Metering

- 💧 Capture additional water savings toward future goal of 39 MGD by 2040
- 💧 Improved water shortage response due to direct pricing signal
- 💧 Improved communication with end user

Higher residential densities



Compact commercial development



# Camino Tassajarra Integrated Project

- 1,400 home community, 0.45 MGD
  - Water-efficient sprinkler and drip irrigation systems
  - High-efficiency clotheswashers (by developer)
  - Submetering of multi-family residential
  - Weather-based irrigation controllers
  - Drought-tolerant landscaping
  - Artificial field grass on soccer fields
  - Installation of recycled water pipelines





# Alamo Creek Project



## Developer Meets Water Challenges with Sustainable Design

To achieve optimum efficiency of water use, new Alamo Creek community pushes landscape architecture envelope.

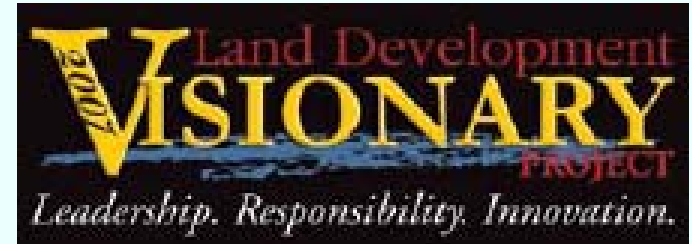


**“It forced us to think creatively about landscape design, yet at the same time meet market acceptance from homebuyers.”**

— **Jim Gold**, *Shapel Homes Inc. president and manager of landscape development*



# Alamo Creek Project





# Next Steps

- Continue outreach to planners, developers and architects
- Launch new Customer Information System and conservation database
- Implement automated meter reading systems on select new accounts
- Track water consumption for new accounts and control group

# *Questions?*

Richard W. Harris  
Water Conservation Manager  
rharris@ebmud.com  
(510) 287-1675