

# This presentation premiered at WaterSmart Innovations

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# Performance-Based Irrigation Management Incentives: Take Two

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# Overview

1. WaterSmart Landscape Efficiency Program
2. Implementation Highlights
3. Early Observations



# WaterSmart Landscape Efficiency Program

## Acknowledgements



*This program is funded by California utility ratepayers and administered by San Diego Gas & Electric Company, under the auspices of the California Public Utilities Commission*

*This program is funded in part by a Proposition 50 grant administered by the California Department of Water Resources*



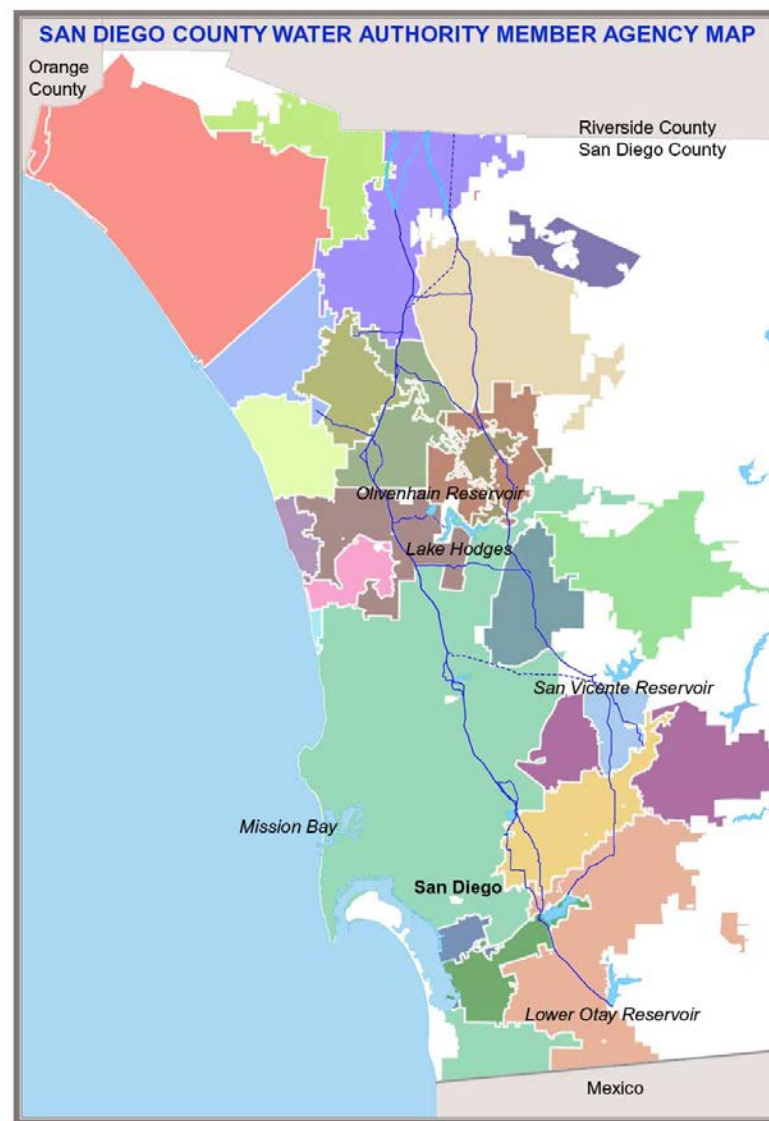
# WaterSmart Landscape Efficiency Program

## Partner Agencies and Collaborators



# San Diego County Water Authority

- Wholesale water agency
- 24 member agencies
- Service area
  - 3.1 million people (97% of county's population)
  - \$206 billion regional economy
  - 950,000 acres



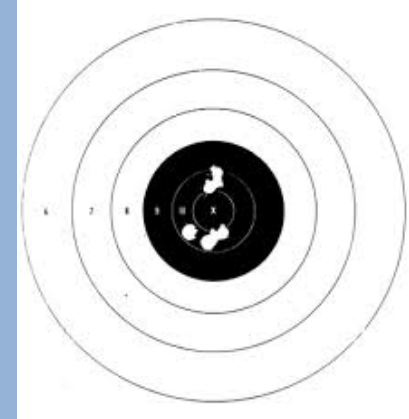
# **1. WSLEP Overview**



# Take Two: 2<sup>nd</sup> Generation Program

Based on Managed Landscapes Pilot Program\*

## Marksmanship Analogy



*\*See WSI 2010 proceedings for MLP highlights*





# Budget & Schedule

- ▶ BUDGET: \$360,000
  - SDCWA: \$100k DWR grant
  - SDGE: \$260k CPUC authorization
- ▶ SCHEDULE: Jan. 2013 – Dec. 2014 (extended to 2015)





# WATER MANAGEMENT CERTIFICATION PROGRAM

*A WaterSense Labeled Program*

An elite performance-based landscape industry certification established in 2007

## Certification Requirements

- Classroom training
- Pass written test
- Irrigation audit training
- Enroll & manage a site to budget 12 mos.
- Maintain certification by continuing to manage a site to budget in lieu of CEUs

***Use CLCA database to create landscape water budgets and track irrigation***



## **2. Implementation Highlights**

# Program Participants

## Member Agency Service Areas (4)

- City of Carlsbad
- City of San Diego
- Helix Water District
- Olivenhain MWD

## Landscape Contractors (9)

- Benchmark Landscapes
- Coastal Pacific Landscapes
- Earthwise Industries
- Heritage Landscapes
- Landscapes USA
- Nissho
- Treebeard
- Tierra Verde Resources, Inc.
- Western Gardens



# WSLEP Incentives

1. Site enrollment..... \$100 per site
2. Calculation of water savings potential..... \$500 per site
3. Hardware procurement..... up to \$5,000 per site
4. Hardware installation..... up to \$5,000 per site
5. Irrigation management ..... \$1,200 per site
6. Performance fee (20% reduction)..... \$1,700 per site

**TOTAL up to \$13,500 per site**



# 1. Site Enrollment - Agreement

## \$100 per Site

### Homeowner Associations (12):

- Capri I & II
- Jockey Club
- Laguna Del Mar
- Pavoreal
- Fairway Pointe
- Genesee Highlands I & II
- La Jolla Park East
- Sunridge
- Lakeridge
- The Ranch

### Apartments (1):

- Villa Loma

### Industrial Park (1):

- Rancho Bernardo Corporate Ctr.

### Municipal Parks (4):

- Cypress Canyon Park I & II
- Jerabek Park
- Lakeview Park

### HOA Owned Parks (2):

- Blue Skies Park
- Lake Park





# Sample Site



Project Name: Pavoreal  
Property Type: HOA Community  
Location: Carlsbad, CA  
Water Agency: City of Carlsbad  
Project Size: 2.9 Acres\*  
Irrigated Turf: .06 Acres  
Irrigated Shrub: 2.84 Acre

*\* 1 Acre (approx.) lost to May 2014 Poinsettia Fire*





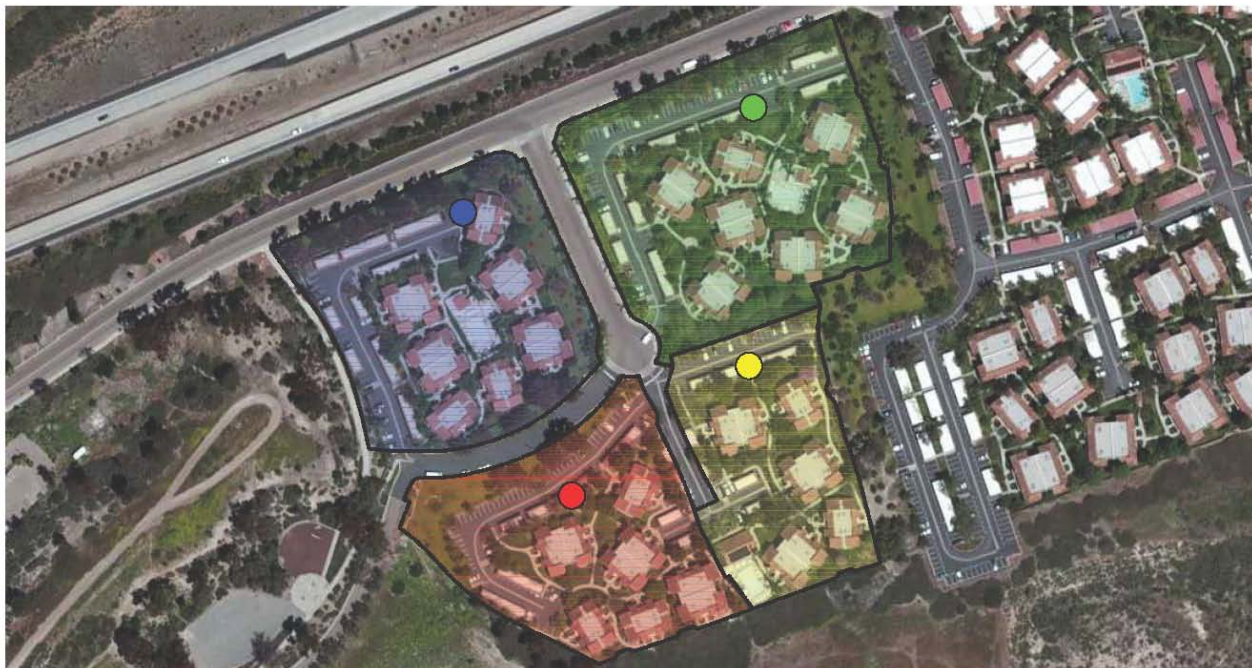
## 2. Verify 20% Savings Potential

### \$500 per Site

- ▶ Obtain water use history (avg. 3-year baseline)
- ▶ Measure irrigated area per meter
- ▶ Produce a site map identifying hydrozones
- ▶ Perform water budget calculations (MAWA and ETWU)
- ▶ Register for landscape audit - *CWA WaterSmart Checkup Service*
- ▶ Calculate avg. historical applied water (inches)
- ▶ **Verify minimum 20% savings potential**



# Sample Map



## WATER METER LEGEND

●	SERIAL: 89896308
	TURF AREA: 19,120 SQ FT (0.44 ACRES)
	SHRUB AREA 41,040 SQ FT (0.94 ACRES)
●	SERIAL: 09160218
	TURF AREA: 26,460 SQ FT (0.61 ACRES)
	SHRUB AREA 36,530 SQ FT (0.84 ACRES)
●	SERIAL: 18000022
	TURF AREA: 30,090 SQ FT (0.69 ACRES)
	SHRUB AREA 45,090 SQ FT (1.03 ACRES)
●	SERIAL: 18003897
	TURF AREA: 19,490 SQ FT (0.48ACRES)
	SHRUB AREA 21,700 SQ FT (0.50 ACRES)

## SUNRIDGE

TOTAL IRRIGATED TURF: 95,160 SQ FT (2.18 ACRES)  
 TOTAL IRRIGATED SHRUB: 144,360 FT (3.31 ACRES)

3-YEAR HISTORICAL AVERAGE	7,661 H.C.F.
MAWA (ETAF=.7, ET <sub>o</sub> =45.73)	6,355 H.C.F.
WATER SAVINGS POTENTIAL	1,306 H.C.F.



# Sample Calculations

Site Name:  
Address:  
CIMIS Station:  
Stage:  
ET<sub>o</sub> =  
Turf HA=  
Shrub HA=  
LA=  
Turf IE=  
Shrub IE=  
Historical=  
Turf PF=  
Shrub PF=

Pavoreal
Final
45.73
2,515
123,921
126,436
0.55
0.7
3,460
0.8
0.5

3-Year Historical	3,460
MAWA	3,355
Water Savings (gallons)	78,727
Water Savings (hundred cubic feet)	105
Water Savings (acre feet)	0.24
Savings %	3%
Historical Inches Irrigated Annual	33.02
MAWA Inches Irrigated Annually	32.01

WRITE GREY BOXES ONLY

$$\text{MAWA} = \frac{(\text{ET}_o) (0.6) (0.7 \times \text{LA})}{748}$$

$$3,355 = \frac{(45.73) (0.62) (0.7 \times 126,436)}{748}$$

$$\text{ETWU} = \frac{(\text{ET}_o) (0.6) (\text{PF} \times \text{HA})}{\text{IE}}$$

$$\text{Turf HA} \quad 103,719 = \frac{(45.73) (0.62) (0.8 \times 2,515)}{0.55}$$

$$\text{Shrub HA} \quad 2,509,630 = \frac{(45.73) (0.62) (0.5 \times 123,921)}{0.7}$$

$$\frac{\text{Turf HA} + \text{Shrub HA}}{748} = \text{ETWU}$$

$$\frac{103,719 + 2,509,630}{748} = 3,494$$

# 3. Specify Recommended Hardware

Up to **\$5,000** per Site

- ▶ **Quote:** Contractor recommends hardware upgrades
  - Priorities: Leak repair, pressure regulation, and DU upgrades
- ▶ **1<sup>st</sup> Review:** Administrator screens for compliance
- ▶ **2<sup>nd</sup> Review:** Agency program manager authorization
- ▶ **Fulfillment:** Program supplier releases approved equipment to contractor





# Irrigation Hardware Priorities



Leak Repair



Pressure Regulation



DU Improvements



# Sample Materials List

ORDER DATE: 07/18/14

SHIPPED DATE: 08/06/14

SHIP VIA: Will Call

TEF

Line	Product Code	Description	Ordered	Shipped Back
1	MP100090	HUNTER MP ROTATOR NOZZ 90-210 DEG MAROON	60	60
2	MPSS530	HUNTER MP ROTATOR NOZZ SIDE STRIP 5x30 BRWN	10	10
3	MP1000360	HUNTER MP ROTATOR NOZZ 360 DEG OLIVE	6	6
4	MP80090	HUNTER MP ROTATOR NOZZ 90-210 ORANGE	10	10
5	150PESB	RAIN BIRD 1.5" RCV SCRUB PLAS	13	13
6	1812SAMPRS	RAIN BIRD 12" SAM PRS POP UP BODY ONLY	55	55
7	PGP-12-CV	HUNTER ULTRA 12" P/U ADJ CK VLV	20	20
8	PN-205120	PVC NIPPLE .5x12 SCH 80	25	25
9	436-005	PVC SCH40 .5" MALE ADPT MIPTxS	25	25
10	PCSS	RB SLV PRES COMP SCRN .30GPM	15	15
11	PP-S40007	SCH40 .75" PVC PIPE SW	100	100
12	PP-S40010	SCH40 1" PVC PIPE SW	40	40
13	PP-S40005	SCH40 .5" PVC PIPE SW	40	40
14	850-05	TORO POLY PIPE 100' COIL	1	1
15	ND-118-07	PRO SPAN .75" EXPANSION REPAIR COUPLING NO UNION	1	1
16	850-31	TORO .5" ELL POLY	100	100
17	M412-005	MARLEX STR 90 .5"	200	200



## 4. Install Hardware

1:1 match up to \$5,000/site\*

- ▶ Install hardware onsite
- ▶ File notice of completion
- ▶ Coordinate verification inspection

*\* Direct installation costs covered by SDGE*





## 5. Manage Irrigation

- ▶ Irrigation scheduling
  - ▶ Meter reading & reporting online (1 yr.)
  - ▶ Performance Fee
    - If 20% target reduction is met
- \$1,200/site**
- \$1,700/site**



# Sample Performance Report



Site Manager

Site Location

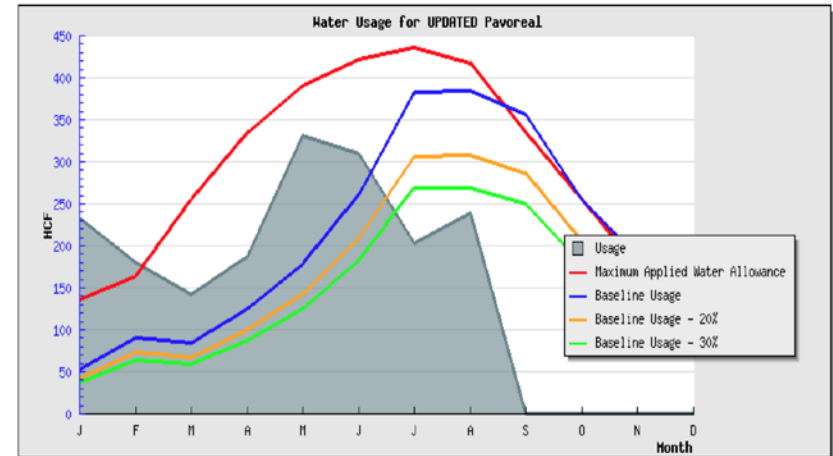
Landscaped Area

126435 square feet

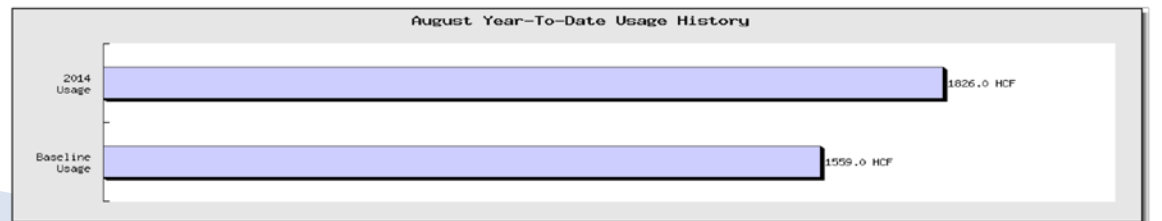
WSLEP Contractor Goal

Total Baseline Usage: 2,514.00 HCF  
Baseline Usage 80% Goal : 2,011.20 HCF

Year-to-Date Site Usage : 1,826.00 HCF  
Year-to-Date Usage = 90.79% of 80% Goal

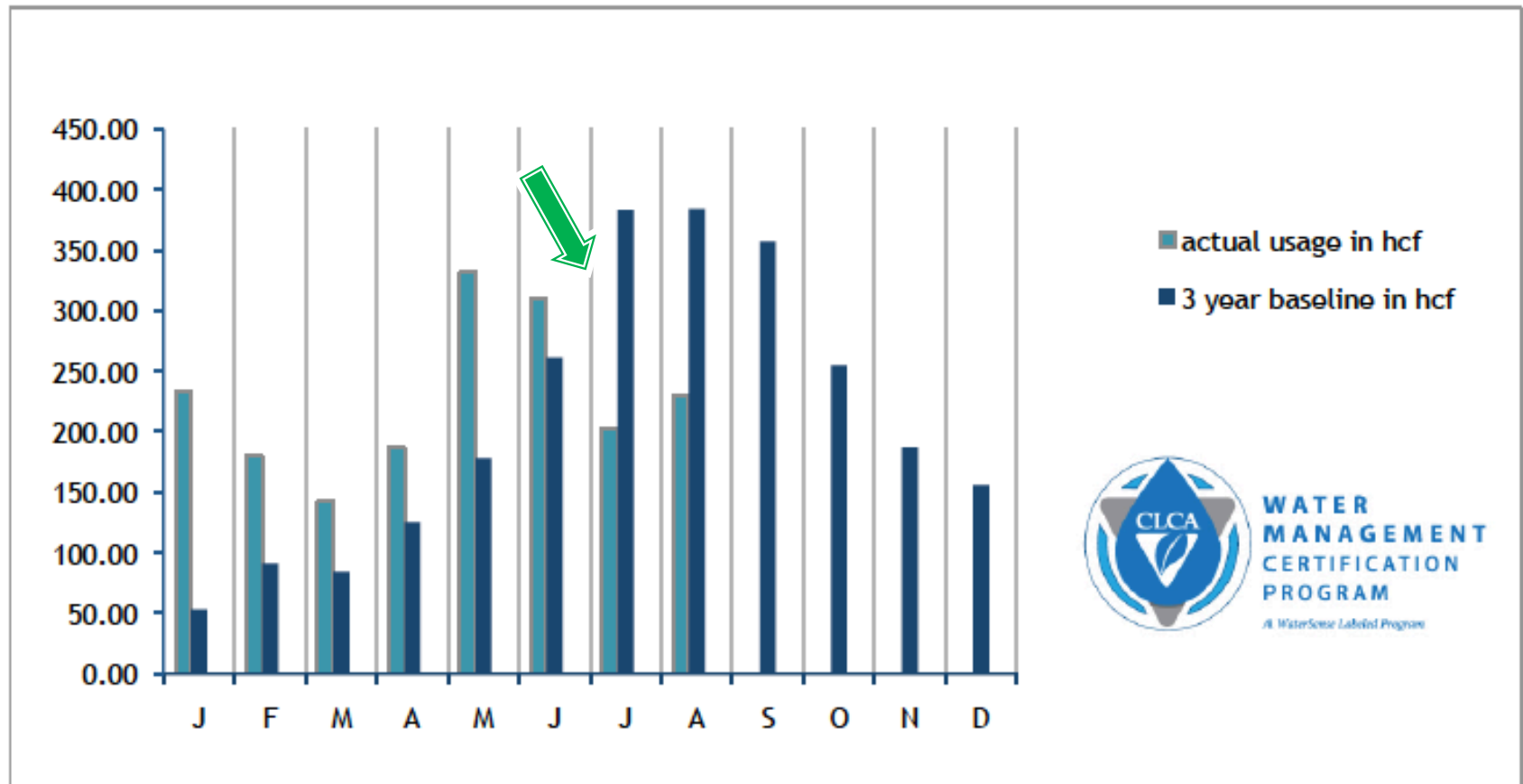


2014 Water Use History									
Month	ETo (inches)	Water Usage (HCF)	% ETo	Maximum Applied Water Allowance			Baseline Usage		
				(HCF)	Over/ Under	%	(HCF)	Over/ Under	%
jan	1.83	233.00	120.84%	136.17	+96.83	171.11%	53.00	+180.00	439.62%
feb	2.20	180.00	77.65%	163.70	+16.30	109.96%	91.00	+89.00	197.80%
mar	3.42	142.00	39.41%	254.47	-112.47	55.80%	84.00	+58.00	169.05%
apr	4.49	187.00	39.53%	334.09	-147.09	55.97%	125.00	+62.00	149.60%
may	5.25	332.00	60.02%	390.64	-58.64	84.99%	178.00	+154.00	186.52%
jun	5.67	310.00	51.89%	421.89	-111.89	73.48%	261.00	+49.00	118.77%
jul	5.86	203.00	32.88%	436.03	-233.03	46.56%	383.00	-180.00	53.00%
aug	5.61	239.00	40.43%	417.43	-178.43	57.26%	384.00	-145.00	62.24%
sep	4.49	0	-	334.09	-	-	357.00	-	-
oct	3.42	0	-	254.47	-	-	255.00	-	-
nov	2.36	0	-	175.60	-	-	187.00	-	-
dec	1.83	0	-	136.17	-	-	156.00	-	-
total	46.43	1,826.00	37.33%	3,454.75	-1,628.75	52.85%	2,514.00	-688.00	72.63%
ytd	34.33	1,826.00	50.48%	2,554.42	-728.42	71.48%	1,559.00	+267.00	117.13%



# Sample Performance Report

## Post-Installation Savings



## 6. Customer Satisfaction

- ▶ Positive customer satisfaction survey **\$100/site**



## **3. Observations**

# Early Observations

## SUCSESSES

- Public-private partnerships
- Participation targets met
- Workforce development
- Hardware installations on track
- High interest in program
- CPUC priorities at end use levels

## CHALLENGES

- Delays and *Firenados!*
- Efficacy of targeting
- Levels of expertise
- GIGO / QC on self-reported data
- Execution to public sector stds.
- Drought & demand hardening
- Weather-normalization





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# Water Budgeting Methodology

Based on AB 1881 – Water-Efficient Landscape Ordinance

$$\text{MAWA} = (\text{ETo}) \times (.62) \times ((\text{ETAF } 0.7) \times (\text{Landscape Area}) + (0.3) \times (\text{SLA}))$$

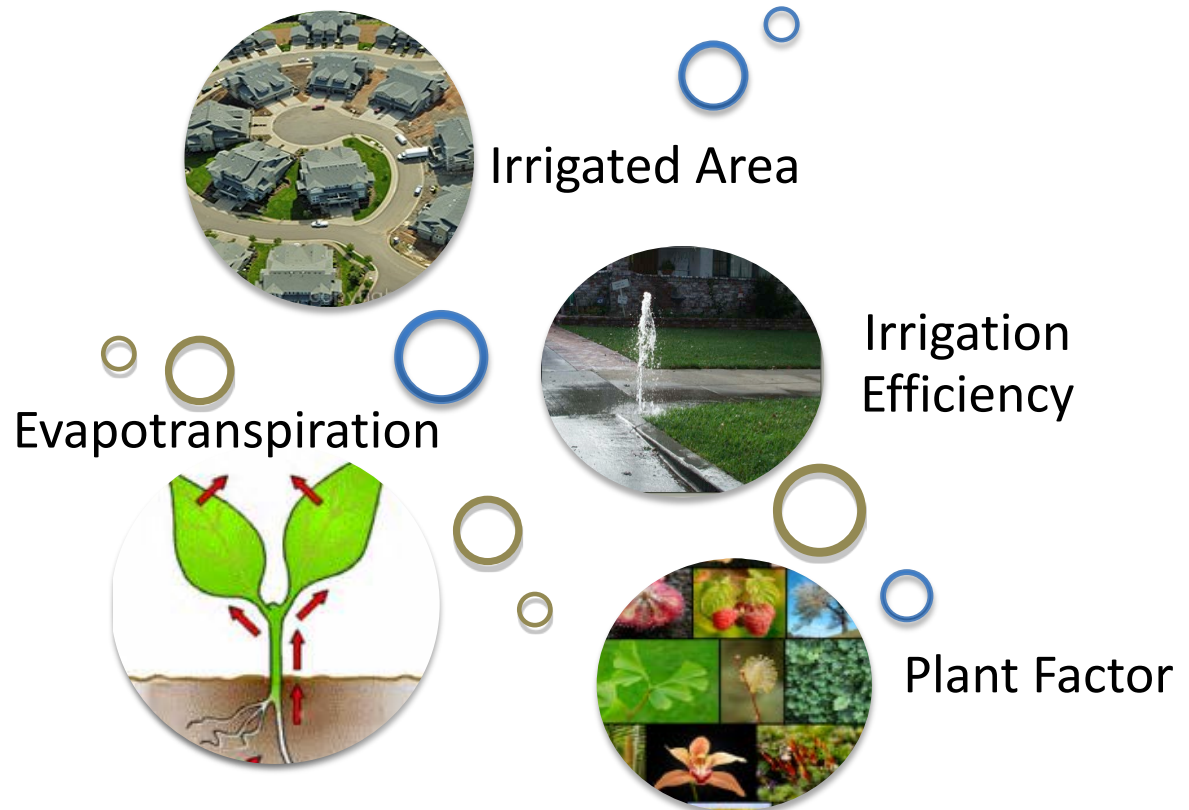
$$\text{ETWU} = (\text{ETo}) \times (.62) \times \text{PF} \times \text{HA/IE}$$

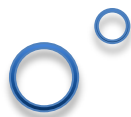
**Maximum Applied  
Water Allowance**

*Gallons per year  
depends on ...*

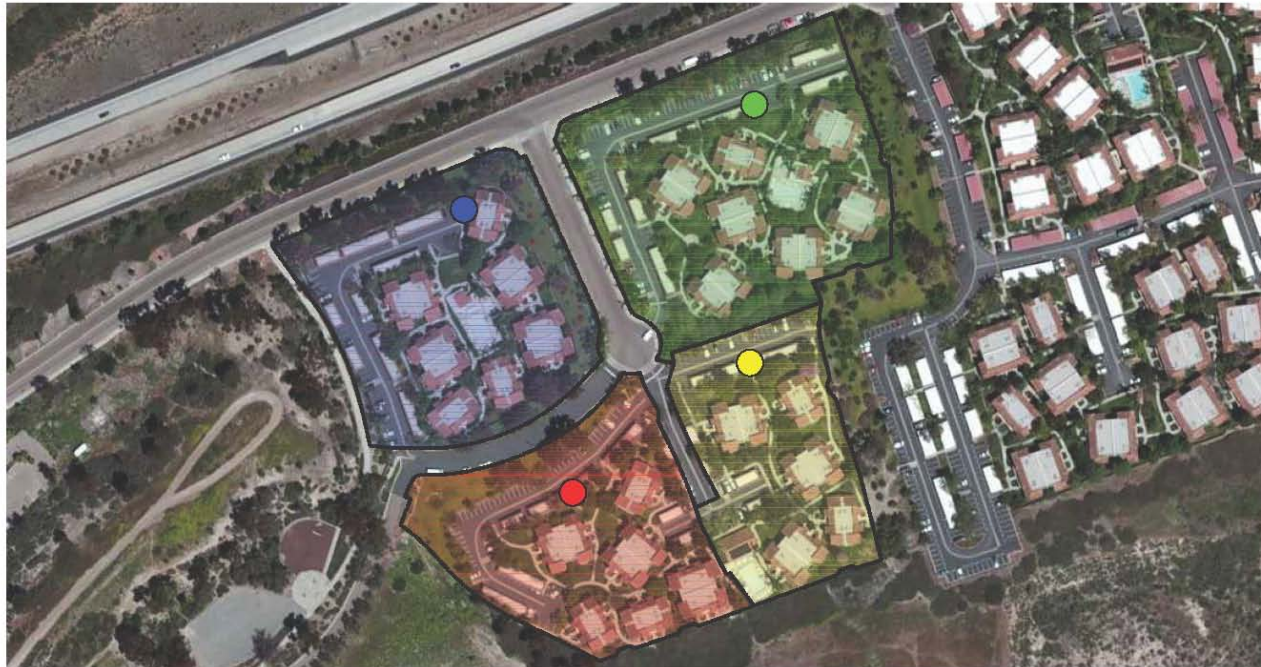
**Estimated Total  
Water Usage**

Sum of zones must be  
less than MAWA





# Irrigated Area Per Meter



## WATER METER LEGEND

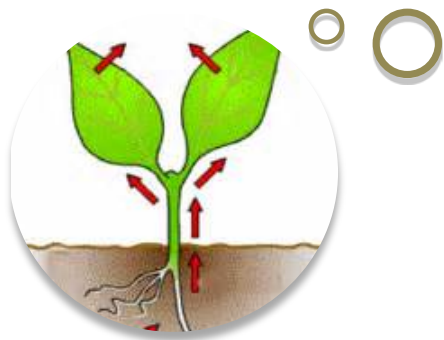
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TURF AREA: 19,490 SQ FT (0.48 ACRES)  
SHRUB AREA 21,700 SQ FT (0.50 ACRES)

, SAN DIEGO, CA 92129

WATER MANAGER: RYAN HOOVER  
COMPANY: HERITAGE LANDSCAPE SERVICES  
TOTAL IRRIGATED TURF: 95,160 SQ FT (2.18 ACRES)  
TOTAL IRRIGATED SHRUB: 144,360 SQ FT (3.31 ACRES)

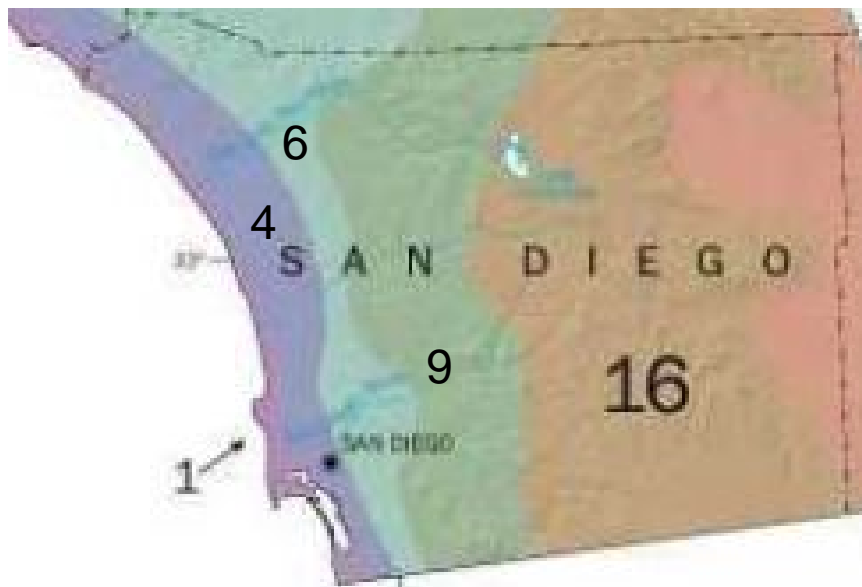
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WATER SAVINGS POTENTIAL	1,306 H.C.F.





# Reference Evapotranspiration

## San Diego County Avg. $ET_0$ (per CIMIS)



- Zone 1 (33")
- Zone 4 (47")
- Zone 6 (50")
- Zone 9 (55")

Monthly Average Reference Evapotranspiration by  $ET_0$  Zone (inches/month)

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	0.93	1.40	2.48	3.30	4.03	4.50	4.65	4.03	3.30	2.48	1.20	0.62	33.0
2	1.24	1.68	3.10	3.90	4.65	5.10	4.96	4.65	3.90	2.79	1.80	1.24	39.0
3	1.86	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.86	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.86	46.6
5	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7
7	0.62	1.40	2.48	3.90	5.27	6.30	7.44	6.51	4.80	2.79	1.20	0.62	43.4
8	1.24	1.68	3.41	4.80	6.20	6.90	7.44	6.51	5.10	3.41	1.80	0.93	49.4
9	2.17	2.80	4.03	5.10	5.89	6.60	7.44	6.82	5.70	4.03	2.70	1.86	55.1







# Irrigation Efficiency

## Based on System Characteristics

Irrigation Type	Irrigation Efficiency (assumed worst case for use with these guidelines)
Drip/ Micro Spray	0.80
Bubblers	0.80
Stream Rotators	0.70
Rotors	0.70
Traditional Spray	0.55





# Plant Factor

## Based on WUCOLS

Plant Water Use Type	Plant Factor (average for use with these guidelines)
Very Low	0.1
Low	0.2
Medium	0.5
High	0.8
SLA	1.0



SL-Active Recreation Areas



VL-Ceanothus



L-Aeonium



M-Star Jasmine



H-Cool Season Turf