EAST BAY MUNICIPAL UTILITY DISTRICT

EBMUD Water Efficient Landscape Requirements: Overview and Tips for Compliance

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Water Efficient Landscape Requirements

Contents

- EBMUD Overview
- Laws and Regulations
- Landscape Plan Requirements
- Tips for Compliance

Water Efficient Landscape Requirements

EBMUD Overview

Overview

Service Area

- **May 22, 1923** EBMUD organized under the MUD Act
- **18 cities** and unincorporated areas served across two counties (331-square miles)
- **4,200 miles** of pipeline maintained
- **1.4 million** East Bay residents (400,000 services) served

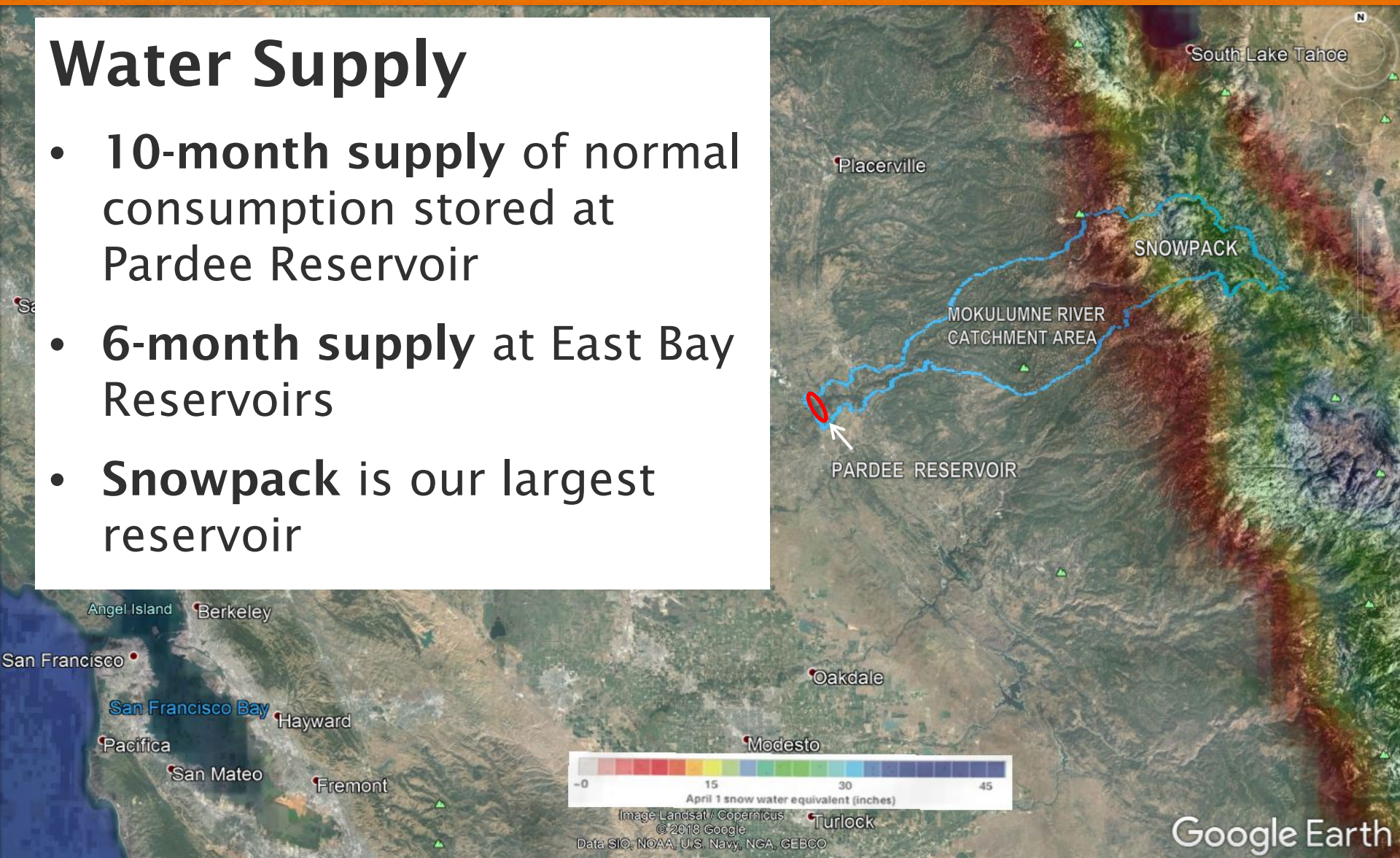
Overview


EBMUD WATER SUPPLY
N
AUBURN
SACRAMENTO
FREEPORT REGIONAL WATER FACILITY
SUPPLEMENTAL WATER SUPPLY FOR DRY YEARS
MOKELUMNE RIVER FISH HATCHERY
CAMANCHE RESERVOIR
FLOOD CONTROL
Lower Mokelumne River
PARDEE RESERVOIR
MUNICIPAL WATER SUPPLY
MOKELUMNE RIVER WATERSHED
575 SQUARE MILES
LAKE TAHOE
NEVADA
CALIFORNIA
FAIRFIELD
SACRAMENTO — SAN JOAQUIN DELTA
LODI
STOCKTON
CONCORD
SAN RAFAEL
SAN FRANCISCO
EBMUD SERVICE AREA
332 SQUARE MILES
EBMUD MOKELUMNE AQUEDUCTS
3 - 85 MILE LONG WATER SUPPLY PIPELINES
TRACY
DUBLIN
SFPUC Hetch
YOSEMITE NATIONAL PARK

Overview

Water Supply

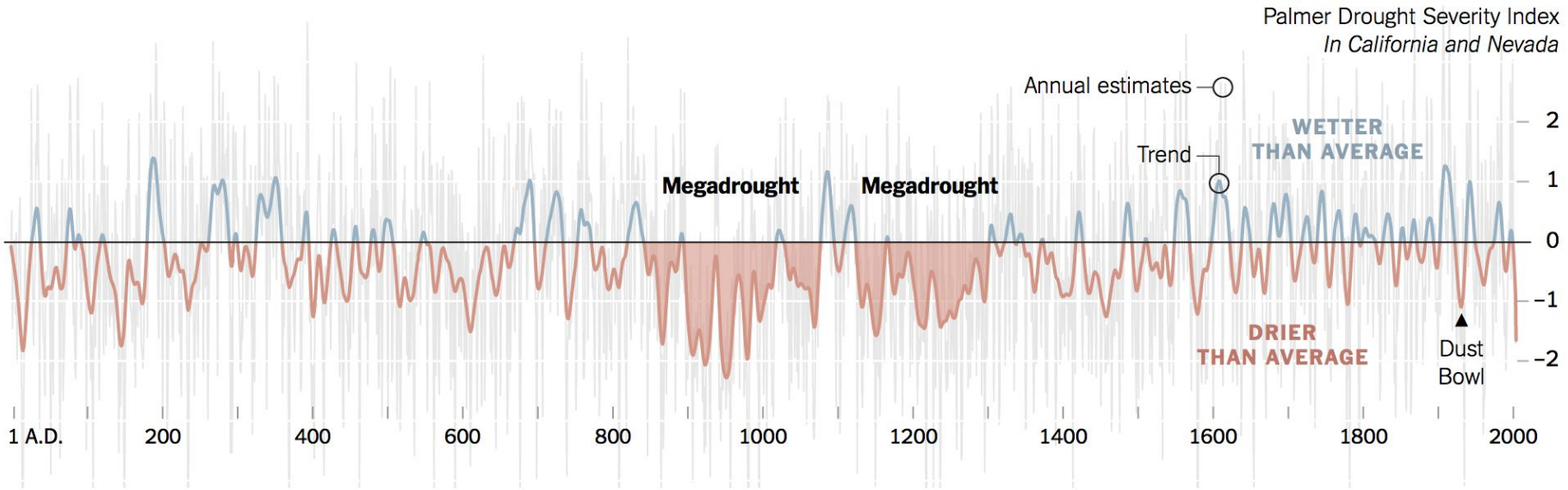
- **10-month supply** of normal consumption stored at Pardee Reservoir
- **6-month supply** at East Bay Reservoirs
- **Snowpack** is our largest reservoir



Overview

Water Supply

- **Naturally Reoccurring Droughts**
  (some lasting hundreds of years)



Sources: North American Drought Atlas, Lamont-Doherty Earth Observatory and the National Science Foundation; Journal of Quaternary Science

Water Efficient Landscape Requirements

EBMUD

Laws and Regulations

Laws and Regulations

State Constitution

Article 10, Sec. 2:

- Water be put to beneficial use to the fullest extent capable
- And that the waste or unreasonable use or method of use be prevented

Laws and Regulations

State Laws

- **AB1881**: MWELO
- **SBX7-7**: 20% by 2020
- **EO B-37-16** (Gov. Brown): Making water conservation a California way of life
- **AB1668**: New standards by 2022; 52.5 GPD by 2025
- **SB606**: Reporting requirements

Laws and Regulations

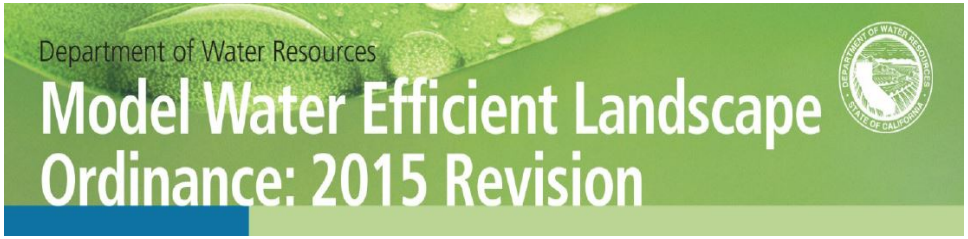
Water Code Sec. 375

- **Water suppliers may adopt** water conservation programs to reduce water consumption
- **And may require** installation of water saving devices

Laws and Regulations

Section 31 Regulations

- **Triggered** by an application for water service, change in classification (BCC) or meter sizing change
- **Indoor Water Efficiency Review** of plumbing fixtures and water using appliances for CALGreen compliance
- **Outdoor Water Efficiency Review** of landscape plans for compliance with the Model Water Efficient Landscape Ordinance (MWELO)

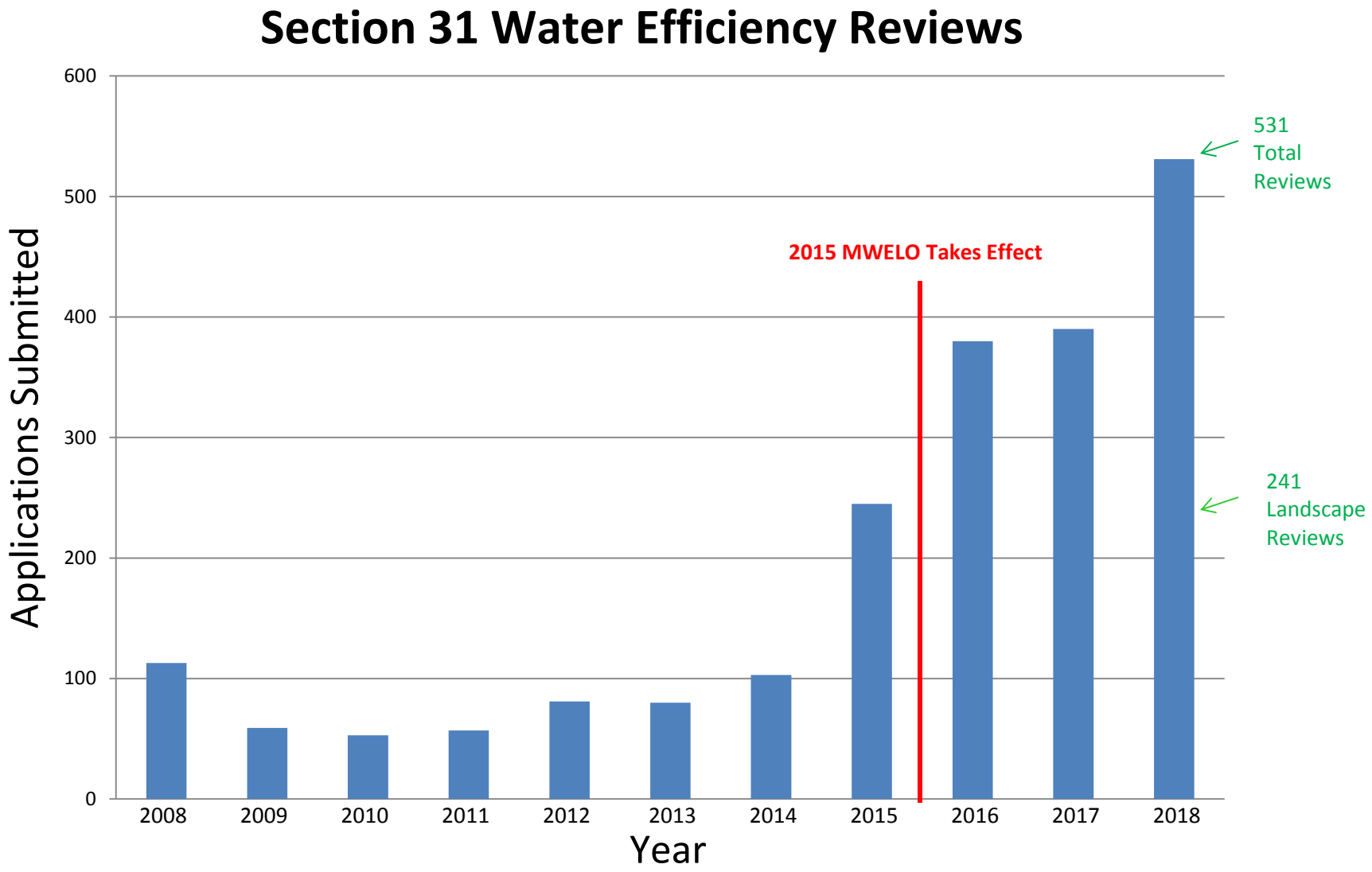


Water Efficient Landscape Requirements

EBMUD

Landscape Plan Review

Landscape Plan Review

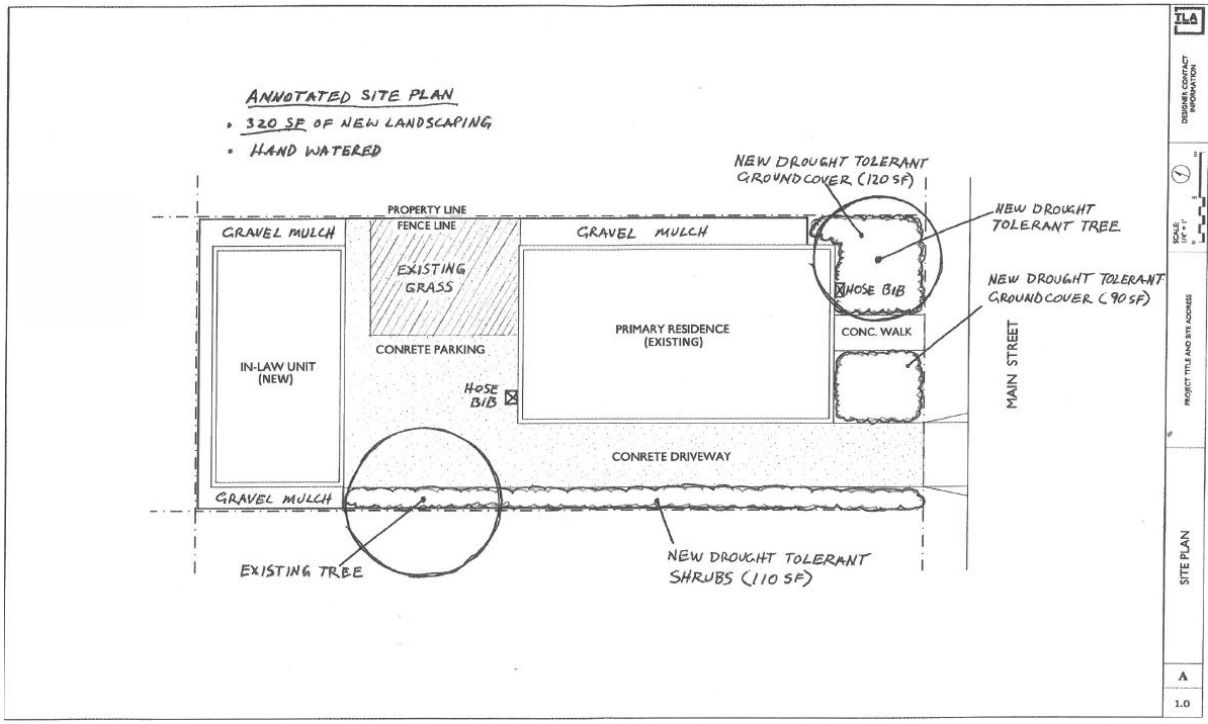


Landscape Plan Review

Projects Less than 500 SF or No Landscaping

Require an annotate site plan with the following info:

- Parcel boundaries
- Building footprints
- Hardscape
- Existing and proposed landscaping
- Hose bibs
- Scale bar

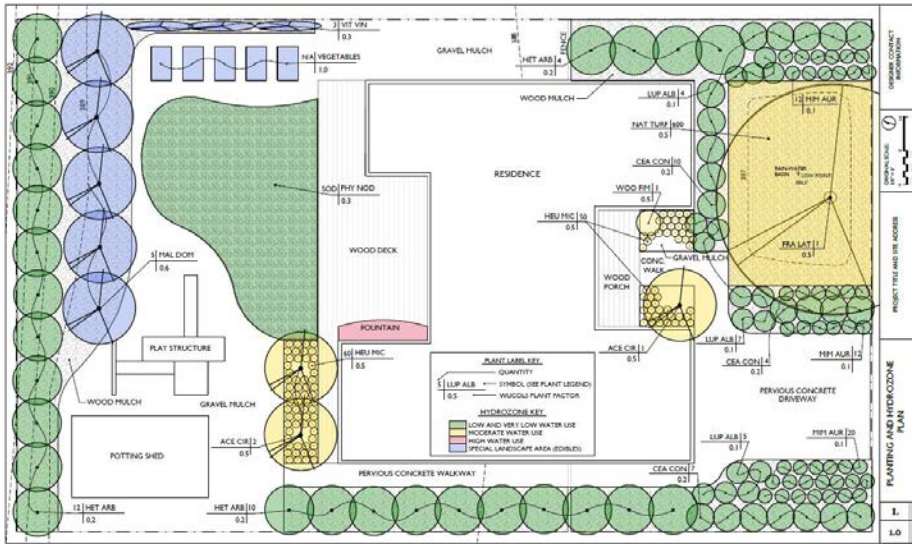


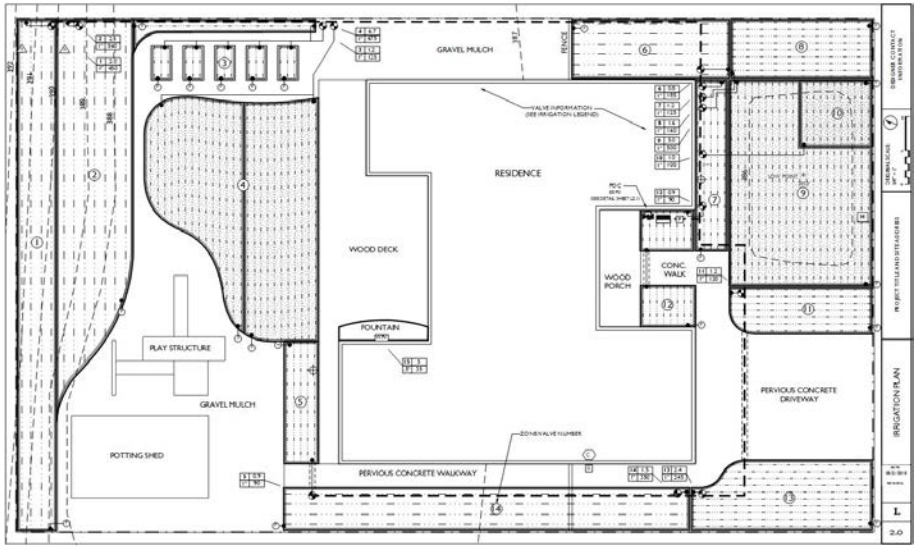
Landscape Plan Review

Projects 500 SF or More

Requires MWELO compliance:

- Planting plan
- Irrigation plan
- Water budget





Estimated Total Water Use (ETWU) = (ETo)(APF)(Area)(0.62) where 0.62 is the coefficient that converts inches/sf to gallons/sf

Hydro-zone #	Planting Description (E.g. Small trees, large shrub, groundcover, turf, pool, etc.)	Plant Factor (PF) Watering requirements as a % of ETo	Irrigation Efficiency [b] (IE) Percent of applied water that reaches its target (e.g. root zone or water feature) by irrigation method	Adjusted Plant Factor (APF) (PF/IE) = APF Watering requirements adjusted for irrigation efficiency as a % of ETo	Hydrozone Area (Area) Square Feet	Conversion Factor (0.62) The coefficient that converts inches/sf to gallons/sf	ETWU per Hydrozone (ETo)(APF)(Area)(0.62) = Annual gallons required to irrigate this landscape
Landscape Areas (LA)							
2	Large shrubs	20%	90%	22%	560	0.62	3565
4	Kurapia	30%	90%	33%	675	0.62	6445
5	Trees/ground cover	50%	90%	56%	90	0.62	1432
6	Large shrubs	20%	90%	22%	185	0.62	1178
7	Small shrubs	20%	90%	22%	125	0.62	796
8	Small shrubs	20%	90%	22%	160	0.62	1018
9	Trees/ground cover	50%	90%	56%	600	0.62	9548
10	Small shrubs	20%	90%	22%	120	0.62	764
11	Trees/ground cover	50%	90%	56%	90	0.62	1432
12	Small shrubs	20%	90%	22%	245	0.62	1560
13	Large shrubs	20%	90%	22%	350	0.62	2228
14	Fountain	100%	100%	100%	35	0.62	1003
				Totals:	3235	0.62	30967
Special Landscape Areas (SLA)							
1	Edibles - fruit trees	[redacted]		100%	450	0.62	12890
3	Edibles - vegetables			100%	125	0.62	3581
				Totals:	575	0.62	16470
						ETWU Grand Total:	47438

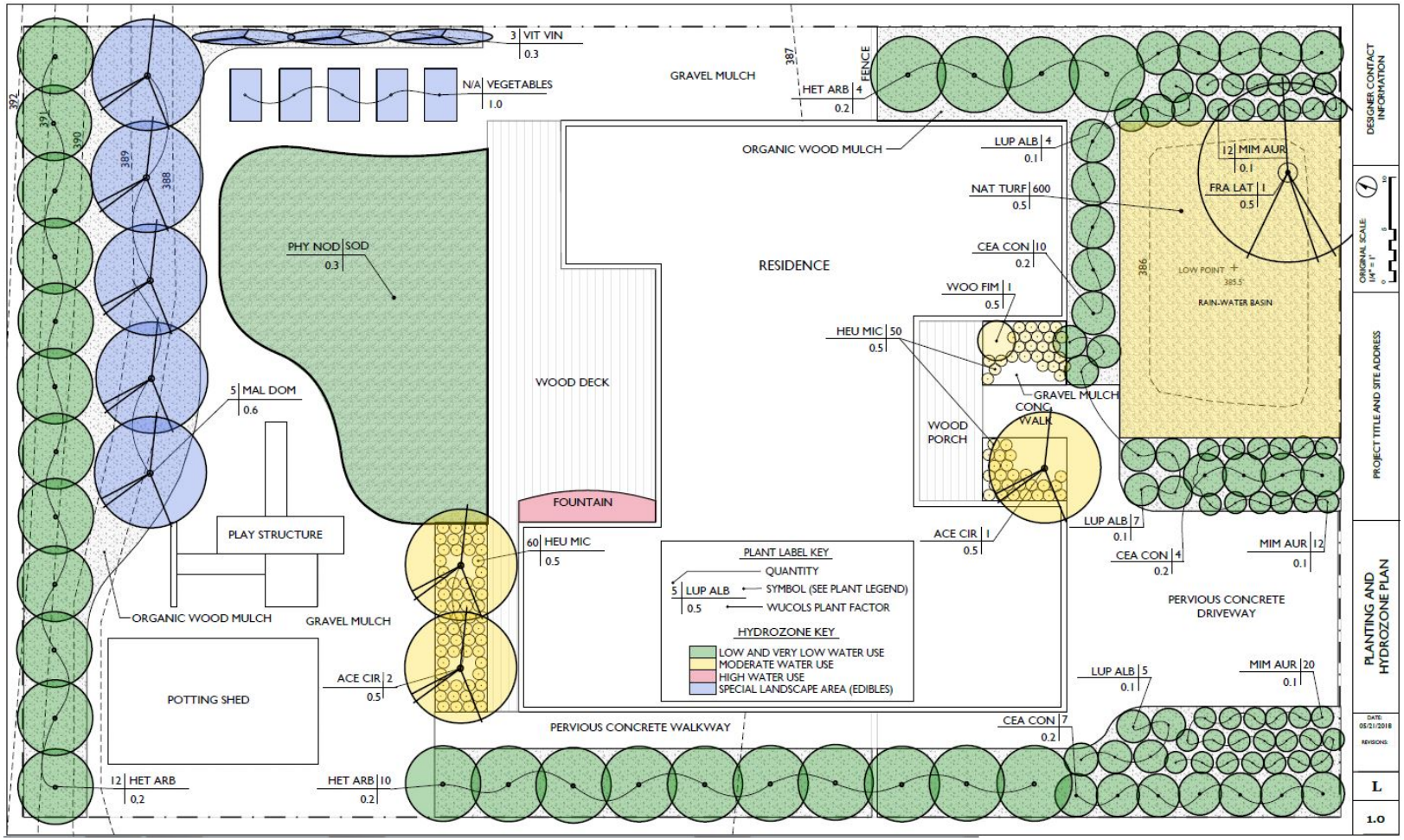
Maximum Applied Water Allowance (MAWA) MAWA represents the annual water budget for this landscape. It is the maximum amount of water allowed per year for irrigation.	
	LA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for LA:	50965
	SLA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for SLA:	16470
MAWA Grand Total:	67435
Pass:	Yes
	ETWU shall not exceed MAWA

[a] **Plant Factor Ranges**
0-10% = Very low; 10-30% = Low; 40-60% = Moderate; 70-100% = High
Water Requirements cited in this ordinance are derived from the publication "Water Use Classification of Landscape Species" (ucanr.edu/sites/WUCOLS/)

[b] **Irrigatin Methods and Efficiencies**
Spray = 70%; Rotating nozzle = 75%; Bubblers = 80%; Point-source drip = 85%; In-line drip = 90%; Water feature = 100%

Landscape Plan Review

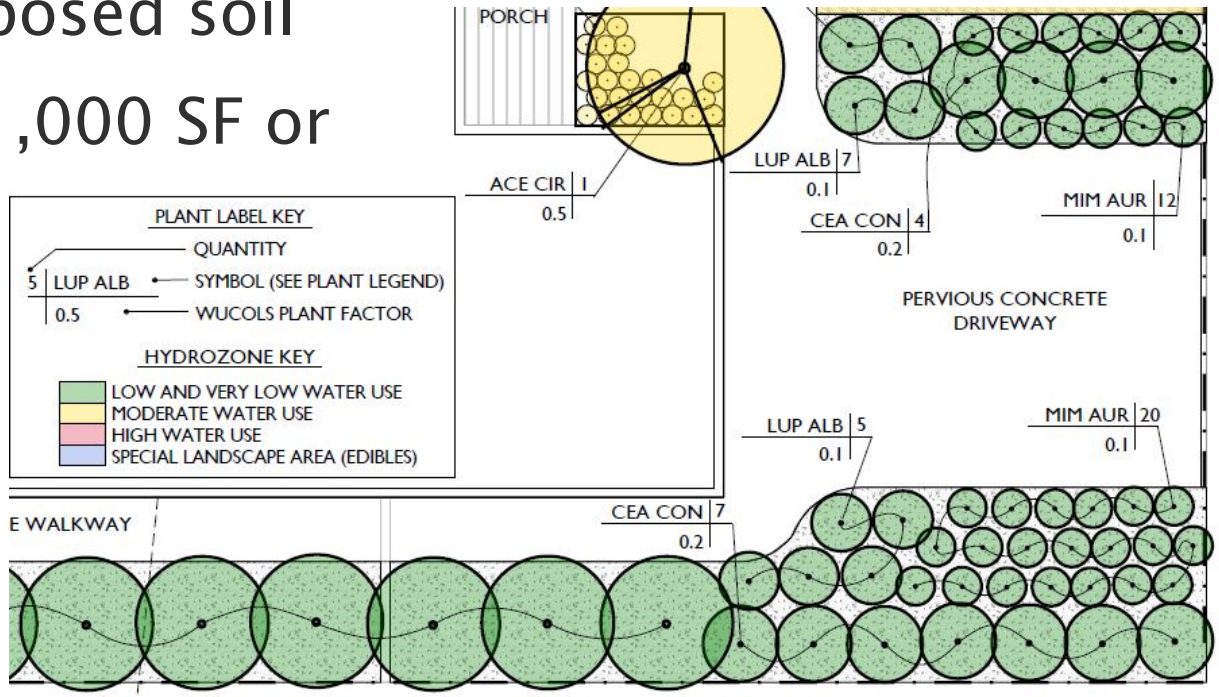
Planting Plan



Landscape Plan Review

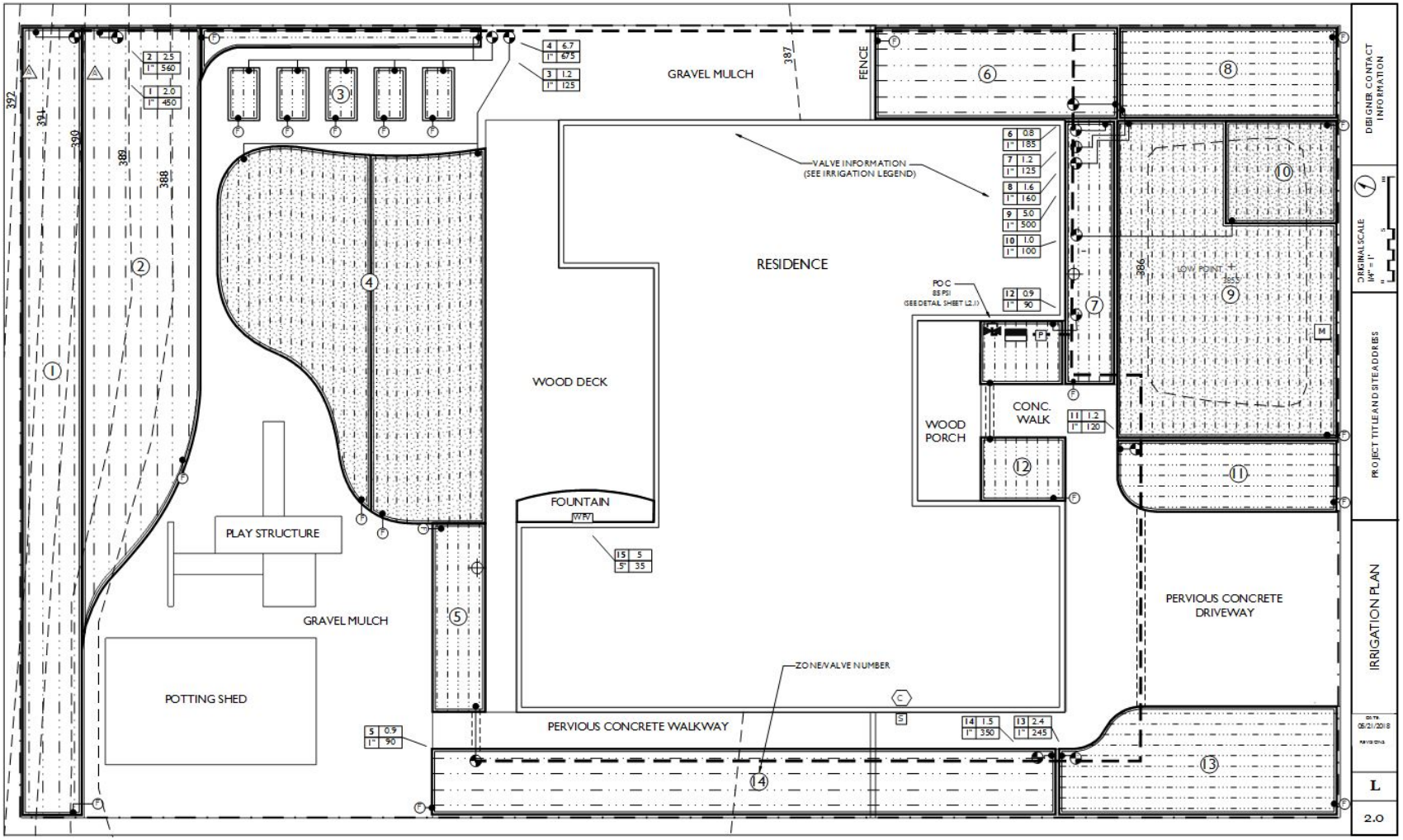
Planting Plan Basics

- Botanical name and water needs of each species
- Color coded or shaded hydrozones
- 3” of mulch on exposed soil
- 4 CY of compost/1,000 SF or per soil report
- Turf restrictions
- Overhead spray restrictions



Landscape Plan Review

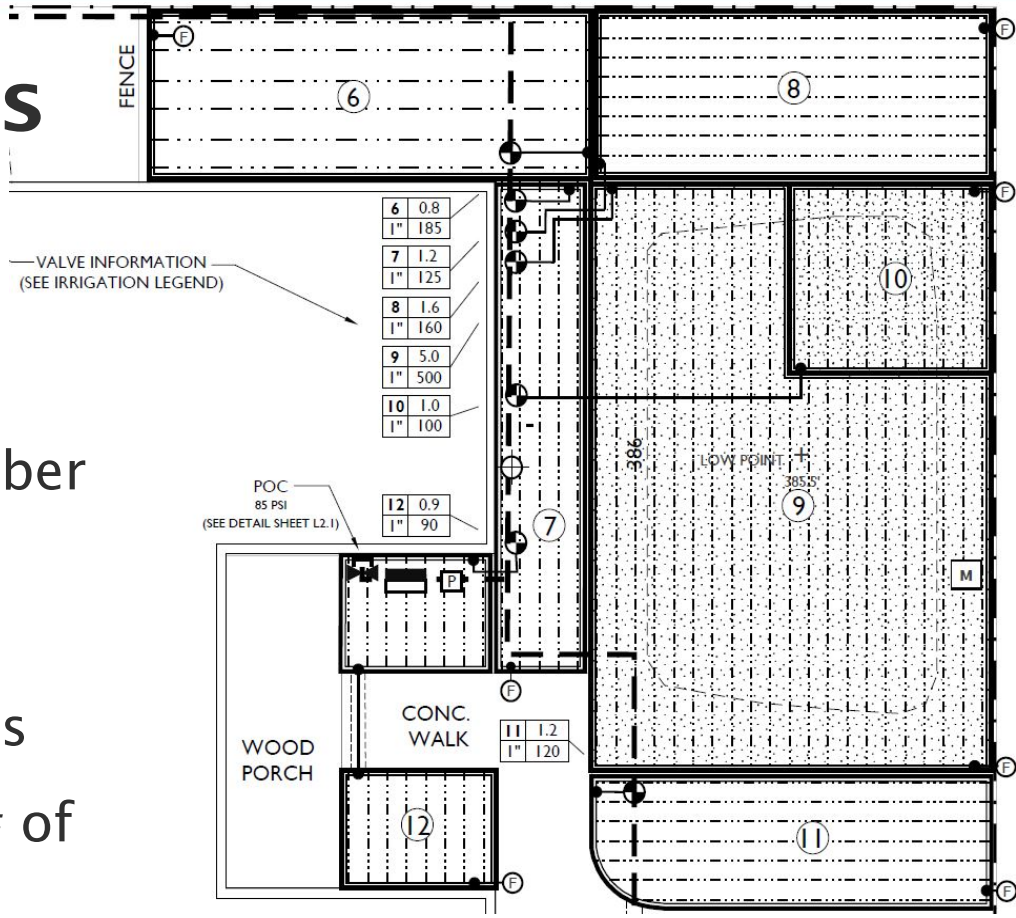
Irrigation Plan



Landscape Plan Review

Irrigation Plan Basics

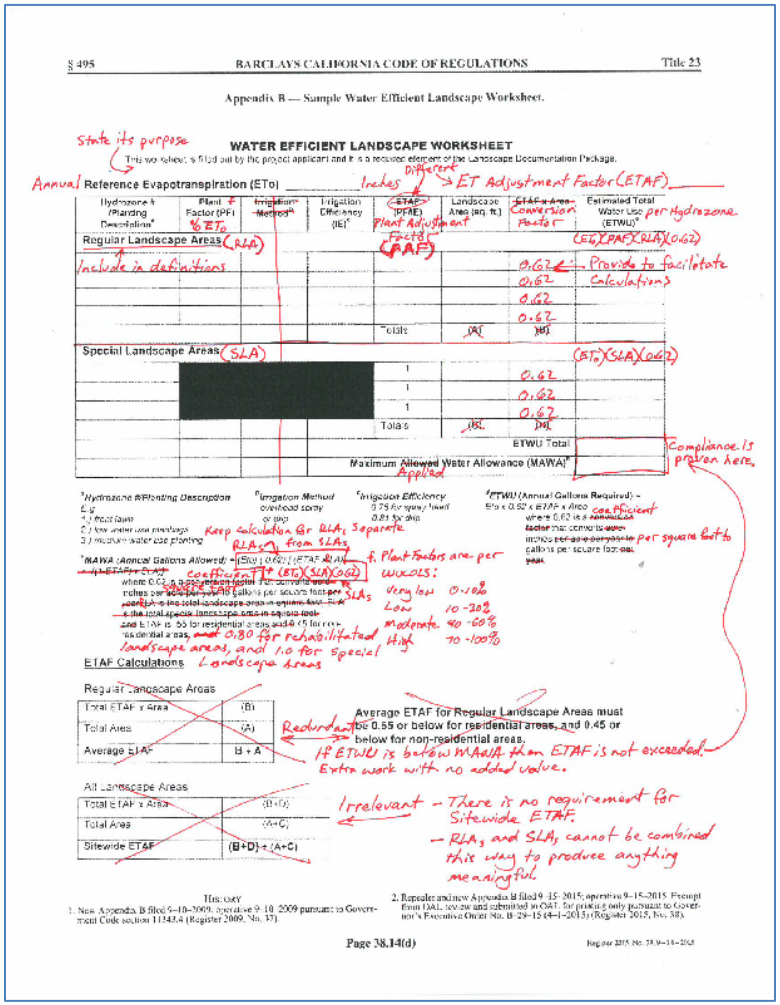
- Valve/Zone numbers and flow rates
- Zone boundaries and areas
- Include emitter flow rates, number per zone and/or spacing
- Mainline and lateral lines
- Point of connection components
- Legend with make and model # of each component



Landscape Plan Review

Water Budget Worksheet

- Should be self explanatory
- Use less jargon/acronyms
- Be consistent in the use of terms and units of measure
- Eliminate redundant and erroneous calculations
- Reduced formulas to their simplest forms
- Incentivize efficient emitters



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Appendix B — Sample Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET

Regular Landscape Areas (RLA)

Special Landscape Areas (SLA)

ETWU Total

Maximum Allowed Water Allowance (MAWA)

ETAF Calculations

Regular Landscape Areas

All Landscape Areas

Page 38.14(d)

Landscape Plan Review

EBMUD

Water Budget Worksheet

Irrigation information

Controller ID

C

Associated Meter(s)

10471-B - Plan 4
10471-C - Plans 2 and 3
10471-D - Irrigation
10471-A - Plan 1

Zone/Valve #	Flow Rate (GPM)	Planting Description	Hydrozone Type	Irrigation Method	Area (Square Feet)	
1	1.0	Trees	Low water use plants:	Point Source [	60	
2	20.0	Shrubs	Low water use plants:	Point Source [	1386	
3	20.0	Shrubs	Special Landscape Are	In-Line Drip: 1	1560	

Landscape Plan Review

Water Budget Worksheet

Irrigation information

Controller ID

C

Associated Meter(s)

10471-B - Plan 4
10471-C - Plans 2 and 3
10471-D - Irrigation
10471-A - Plan 1

Zone/Valve #	Flow Rate (GPM)	Planting Description	Hydrozone Type	Irrigation Method	Area (Square Feet)	
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2	20.0	Shrubs	Low water use plants:	Point Source [	1386	
3	20.0	Shrubs	Special Landscape Are	In-Line Drip: 1	1560	

Landscape Plan Review

Water Budget Worksheet

Irrigation information

Controller ID: C

Associated Meter(s):
- 10471-B - Plan 4
- 10471-C - Plans 2 and 3
- 10471-D - Irrigation
- 10471-A - Plan 1

Zone/Valve #	Flow Rate (GPM)	Planting Description	Hydrozone Type	Irrigation Method	Area (Square Feet)	
1	1.0	Trees	Low water use plants:	Point Source [	60	
2	20.0	Shrubs	Low water use plants:	Point Source [	1386	
3	20.0	Shrubs	Special Landscape Are	In-Line Drip: 1	1560	

Landscape Plan Review

Water Budget Worksheet Dropdown Menus

Planting Descs

New | Search Criteria

Description
Bio-retention Plants (all plant types)
Trees
Shrubs
Woody Groundcovers
Forbs and Flower-beds
Grasses
Strap-leafed Plants
Succulents and Cactuses
Vines
Water Feature

Irrigation Methods

New | Search Criteria

Efficiency Factor	Description
0.9	In-Line Drip: Tubing with pre-inserted emitters at regular intervals
0.85	Point Source Drip: Blank tubing with emitters inserted by installer as required
0.8	Multi-stream High Efficiency Nozzle
0.75	Bubblers: Pressure compensating, not to exceed 0.25 GPM
0.7	Spray: Fixed, rotary, or micro-spray
1.0	Water Feature: Pool, spa, fountain or pond

Hydrozones

New | Search Criteria

Plant Factor	Description
1.0	Special Landsape Area: Edibles (vegetables, herbs or fruit)
1.0	Special Landscape Area: Non-potable water (recycled, rain or grey water irrigation)
1.0	Special Landscape Area: Recreational turf and pools (non-residential)
0.8	Turf: Cool season (ryegrass, bluegrass, fine fescue)
0.6	Turf: Warm season or native grasses (bermuda, zoysia, red fescue, etc.)
0.9	High water use plants: Full sun
0.8	High water use plants: Part sun
0.7	High water use plants: Shade
0.6	Moderate water use plants: Full sun
0.5	Moderate water use plants: Part sun
0.4	Moderate water use plants: Shade
0.3	Low water use plants: Full sun
0.2	Low water use plants: Part sun or shade
0.1	Very low water use plants: Full sun
0.05	Very low water use plants: Part sun or shade
0.8	Pool or spa: Covered (residential)
1.0	Pool or spa: Uncovered (residential)
1.0	Water feature: Fountain or pond

Landscape Plan Review

Annual Water Budget (ETWU and MAWA)

EBMUD - Water Efficient Landscape Worksheet

The purpose of this worksheet is to calculate a project's Estimated Total Water Use and Maximum Applied Water Allowance to determine its compliance with the Model Water Efficient Landscape Ordinance (MWELO). This worksheet is to be filled out by the project applicant and is a required element of the MWELO Landscape Documentation Package.

Property Address: 175 Gil Blas Rd., Danville, 94526

Reference Site (See MWELO Appendix A): Walnut Creek

Annual ETo (Reference Evapotranspiration Rate): 46.2 Inches

ETAF (ET Adjustment Factor) for Landscape Areas: 55.0 %

ETAF for Special Landscape Areas: 100%

NOTES

1) ETo is the reference evapotranspiration rate and represents the water needs of grass at a given location. It is an estimate of the inches of water lost due to evapotranspiration from a field of cool-season grass that is well watered. ETo values can be derived from MWELO Appendix A for locations across the State of California.

2) Use an evapotranspiration adjustment factor (ETAF) of 45% for new non-residential landscapes, 55% for new residential landscapes and 65% for schools. ETAF is a percentage of ETo and establishes the amount of water allowed per year for irrigation.

3) Use an ETAF of 100% for any special landscape areas which are those dedicated solely to edible plants, programmed recreational areas (e.g. public pools and sports fields), areas irrigated with non-potable water (e.g. recycled, grey and rain water) and stormwater treatment facilities that are required by permit (e.g. bio-retention basins, bio-swales, and flow-through planters).

ESTIMATED TOTAL WATER USE (ETWU) = (ETo) x (APF) x (Area) x (0.62) where 0.62 is the coefficient that converts inches to gallons per square foot

ZONE/ VALVE #	PLANTING DESCRIPTION Eg. Medium Trees, Groundcover, Water Feature, etc.	PLANT FACTOR (PF) Water requirements as a % of ETo	IRRIGATION EFFICIENCY (IE) Percent of applied water that reaches its target (e.g. root zone or water feature) by irrigation method	ADJUSTED PLANT FACTOR (APF) (PF/IE) = APF Watering requirements adjusted for irrigation efficiency as a % of ETo	HYDROZONE AREA (AREA) Square Feet	CONVERSION FACTOR The coefficient that converts inches to gallons per square foot	ETWU PER HYDROZONE (ETo)(APF)(Area)(0.62) = Annual gallons required to irrigate this landscape
Landscape Areas (LA)							
1	Shrubs	30%	90%	33%	450	0.62	4241
4	Forbs	30%	90%	33%	675	0.62	6361
5	Trees	50%	90%	56%	90	0.62	1445
6	Shrubs	20%	90%	22%	185	0.62	1170
7	Shrubs	30%	90%	33%	125	0.62	1178
8	Shrubs	30%	90%	33%	160	0.62	1508
9	Grasses and Strap-leafed Plants	60%	90%	67%	500	0.62	9610
10	Trees	60%	90%	67%	100	0.62	1922
11	Shrubs	30%	90%	33%	120	0.62	1131
12	Trees	50%	90%	56%	90	0.62	1445
13	Shrubs	30%	90%	33%	245	0.62	2309
14	Shrubs	20%	90%	22%	350	0.62	2213
15	Water Feature	100%	100%	100%	35	0.62	1003
				Totals:	3125	0.62	35536
Special Landscape Areas (SLA)							
2	Trees			100%	560	0.62	16041
3	Forbs			100%	125	0.62	3581
				Totals:	685	0.62	19622
Controller Controller A						ETWU Grand Total:	55158

MAXIMUM APPLIED WATER ALLOWANCE (MAWA) MAWA represents the annual water budget for this landscape. It is the maximum amount of water allowed per year for irrigation	
	LA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for LA:	49213
	SLA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for SLA:	19521
MAWA Grand Total:	68834

PLANT FACTOR RANGES:

0-10% = Very low; 10-30% = Low; 40-60% = Moderate; 70-100% = High. Water Requirements cited in this ordinance are derived from the publication â€œWater Use Classification of Landscape Species â€ (ucanr.edu/sites/WUCOLS/).

IRRIGATION METHODS AND EFFICIENCIES:

Spray = 70%; Rotating nozzle = 75%; Bubblers = 80%; Point-source drip = 85%; In-line drip = 90%; Water feature = 100%

Pass: Yes

ETWU shall not exceed MAWA

Landscape Plan Review

EBMUD

Monthly Base Schedule and Water Budget

Monthly Irrigation Schedule for the Estimated Water Use Controller Controller A		Monthly ETO Values:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Annual
			0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
ZONE/ VALVE #	FLOW RATE Sum of all emitters in a zone in gallons per minute (GPM)	AVERAGE PRECIPITATION RATE (IN/HR) (FR x 60 Min per Hr)/(Area in SF/1.6 In per SF)	Monthly Run Time in Minutes												
Landscape Areas															
1	2.0	0.43	37	69	133	202	257	308	340	294	216	152	69	46	2121
4	6.7	0.961	16	31	60	90	115	138	152	131	97	68	31	21	949
5	0.9	0.968	28	52	101	153	195	233	257	222	163	115	52	35	1605
6	0.8	0.418	25	48	92	139	177	212	234	203	149	105	48	32	1464
7	1.2	0.929	17	32	62	94	119	142	157	136	100	70	32	21	982
8	1.6	0.968	16	31	59	90	114	137	151	130	96	67	31	20	942
9	5.0	0.968	33	62	121	183	233	279	308	266	195	137	62	42	1921
10	1.0	0.968	33	62	121	183	233	279	308	266	195	137	62	42	1921
11	1.2	0.968	16	31	59	90	114	137	151	130	96	67	31	20	942
12	0.9	0.968	28	52	101	153	195	233	257	222	163	115	52	35	1605
13	2.4	0.948	17	31	60	92	117	140	154	133	98	69	31	21	962
14	1.5	0.415	26	48	93	140	179	214	236	204	150	105	48	32	1475
15	5.0	13.825	3	7	13	19	24	29	32	28	20	14	7	4	201
Special Landscape Areas															
2	2.5	0.432	111	208	403	611	778	931	1028	889	653	458	208	139	6417
3	3.0	2.323	21	39	75	114	145	173	191	165	121	85	39	26	1193
Monthly Budget for the Maximum Applied Water Allowance															
Landscape Areas															
		Inches applied per month	0.4	0.8	1.6	2.4	3.1	3.7	4.1	3.5	2.6	1.8	0.8	0.6	25.4
		Gallons per month	852	1598	3089	4687	5965	7137	7883	6817	5007	3515	1598	1065	49213
		Average gallons per day	27.5	57.1	99.6	156.2	192.4	237.9	254.3	219.9	166.9	113.4	53.3	34.4	
Special Landscape Areas															
		Inches applied per month	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
		Gallons per month	340	637	1232	1869	2378	2845	3143	2718	1996	1402	637	425	19622
		Average gallons per day	11.0	22.8	39.7	62.3	76.7	94.8	101.4	87.7	66.5	45.2	21.2	13.7	
All Landscape Areas															
		Total Gallons per month	1192	2235	4321	6556	8343	9982	11026	9535	7003	4917	2235	1490	68835

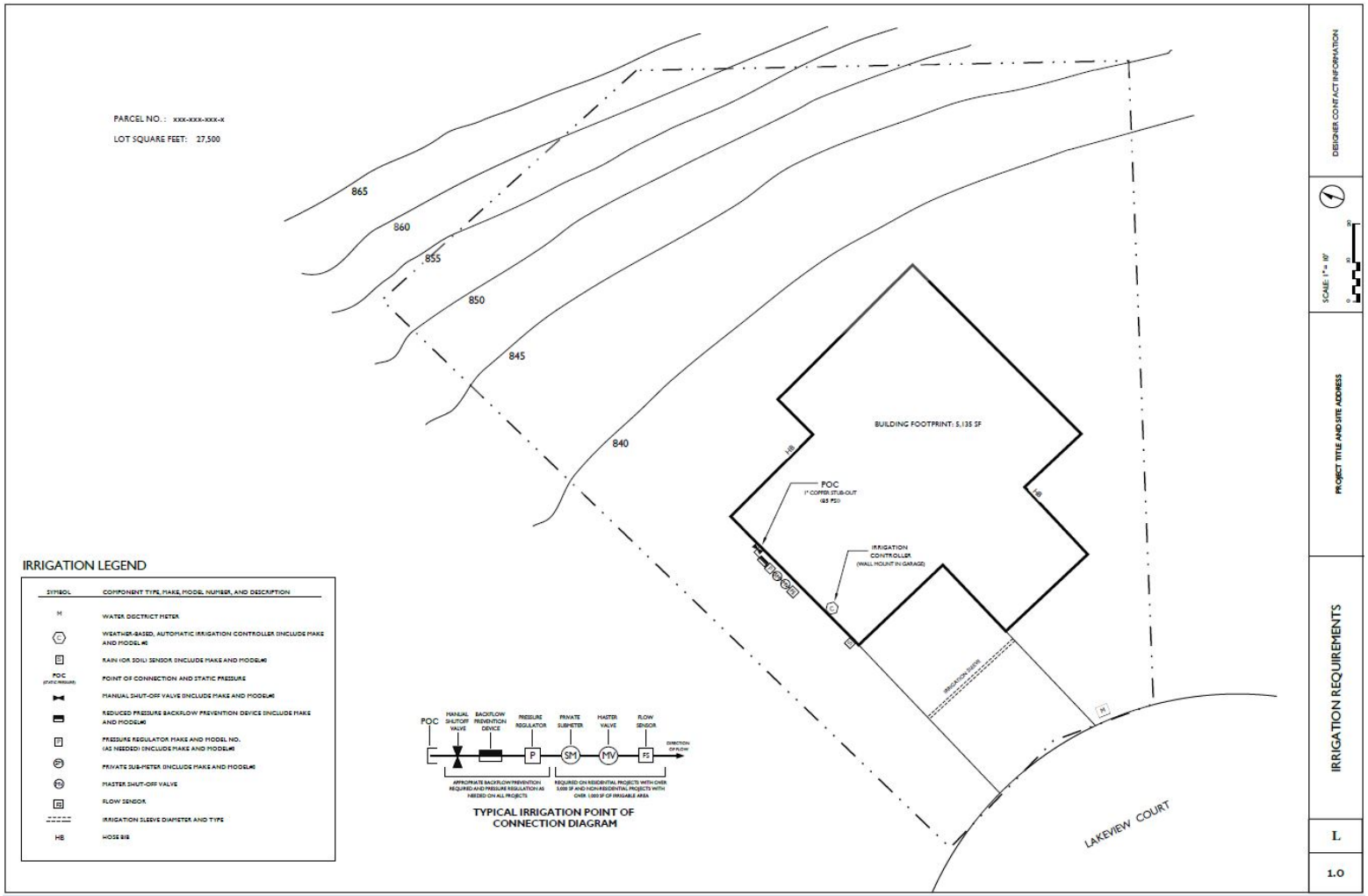
Landscape Plan Review

EBMUD Assigning a Default Irrigation Demand

- **Required** for new construction without landscape plans
- **EBMUD estimates** irrigation demand and assigns a flow rate based on the potential for future irrigation
- **Irrigation Demand + Indoor Demand = Total Demand**
- **Water Meter** sized by Total Demand

Landscape Plan Review

Default Irrigation Components



Landscape Plan Review

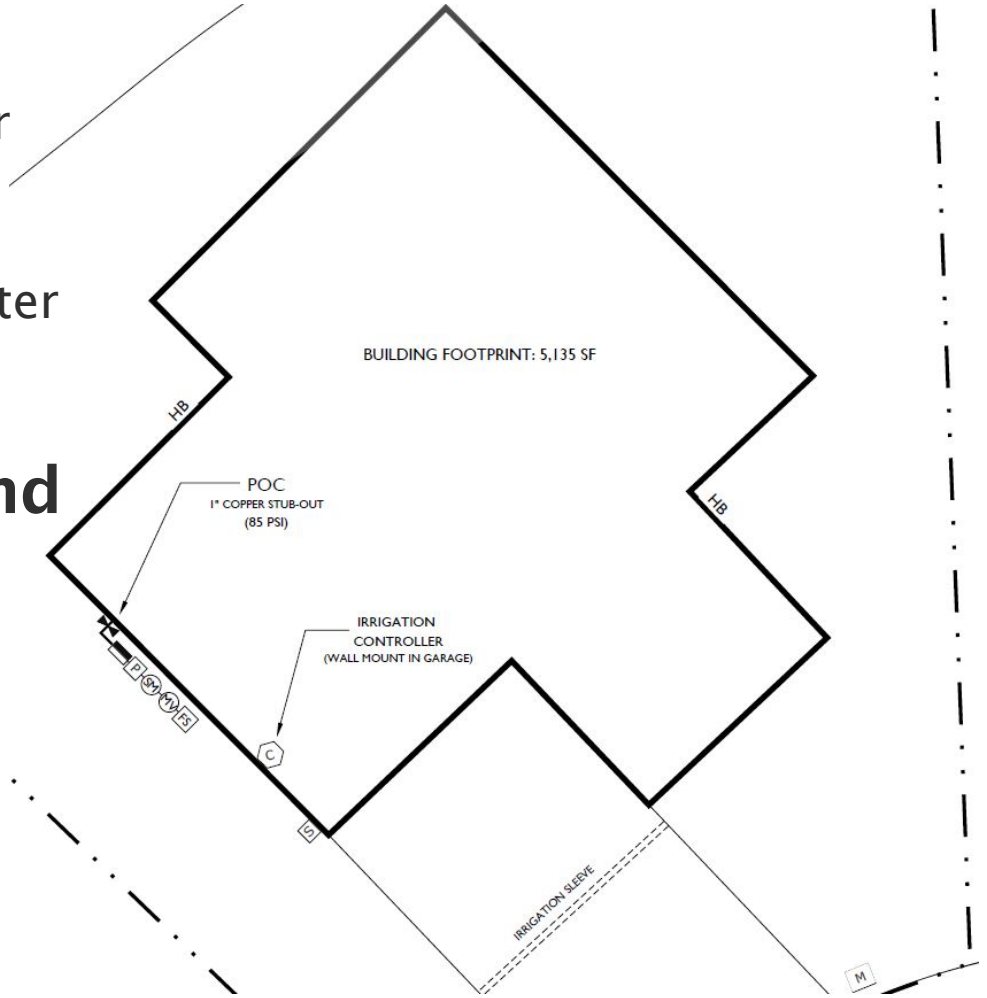
Default Irrigation Components

All projects require:

- Weather-based controller w/ sensor
- Manual shut-off valve
- Reduced pressure backflow preventer
- Pressure regulator as needed

Residential over 5000 SF and Non-residential over 1,000 SF require:

- Private sub-meter
- Master valve
- Flow sensor



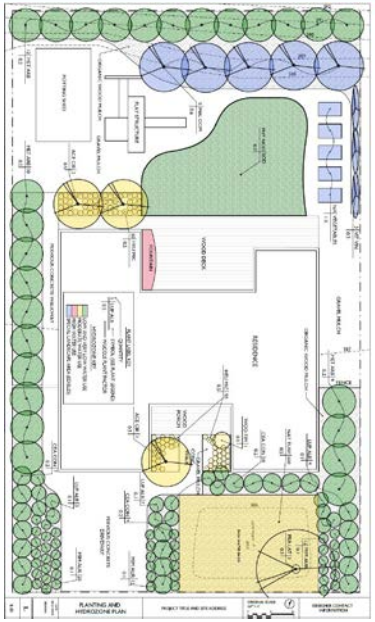
Water Efficient Landscape Requirements

Tips for Compliance and Efficient Review

Tips for Compliance and Efficient Review

Planting Plan Tips

- Color code or shade plant materials and group into hydrozones
- Include the WUCOLS water use in the legend and labels
- Cross check plans, notes and details for consistency
- Include the following requirements in the notes:



PLANTING

- *TURF IS LIMITED TO 25 PERCENT OF THE TOTAL IRRIGATED AREA (EXCEPT WHERE NON-RESIDENTIAL PLAY FIELDS ARE A PROGRAM REQUIREMENT) AND NOT PLANTED ON AREAS SLOPING MORE THAN 25 PERCENT.*

- *PLANTINGS MUST BE GROUPED INTO HYDROZONES BASED ON MICROCLIMATE, SOIL TYPE, PLANT TYPE, AND WATER USE CLASSIFICATION (SEE WUCOLS: WWW.UCNR.EDU/SITES/WUCOLS/).*

COMPOST

- *INCORPORATE COMPOST AT A RATE OF FOUR (4) CUBIC YARDS PER 1,000 SQUARE FEET INTO THE TOP SIX (6) INCHES OF SOIL OR COMPOST PER HORITICULTURAL SOIL REPORT RECOMMENDATIONS.*

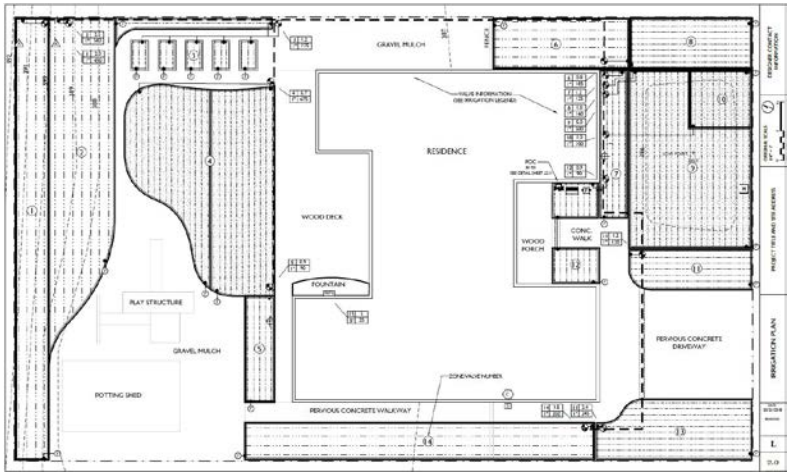
MULCH

- *APPLY ORGANIC MULCH TO A MINIMUM DEPTH OF THREE (3) INCHES ON ALL EXPOSED SOIL IN THE PLANTED AREA EXCEPT WHERE CONTRAINDICATED.*

Tips for Compliance and Efficient Review

Irrigation Plan Tips

- Number valves/zones
- Include valve/zone flow rate & area
- Include Appropriate POC components on plan
  - Manual shutoff valve should be the first component
  - Must include backflow prevention device

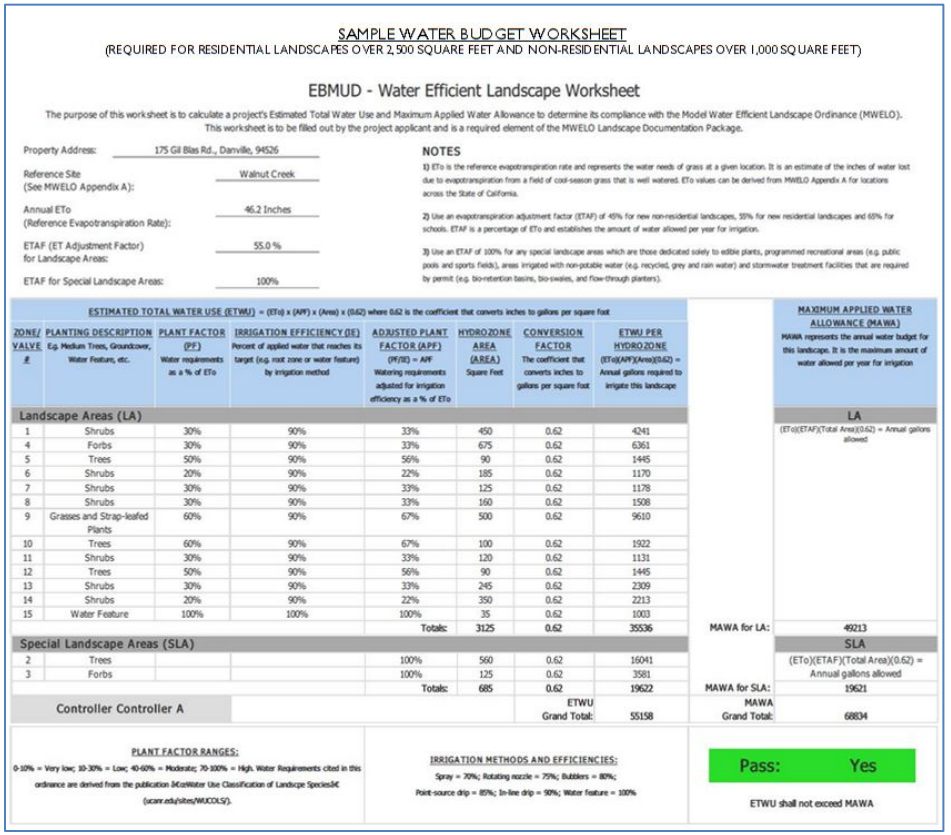


- Clearly and accurately define zone boundaries
- Identify the number and/or spacing of emitters
- Include emitter flow rates
- No mixing emitter types in a zone
- Matched precipitation required
- No variable rate emitters allowed
- Bubblers and point-source drip emitters may not exceed 0.25GPM/15GPH
- Include topo if slopes are present
- No elevation change over 8’ within a drip zone

Tips for Compliance and Efficient Review

Water Budget Worksheet

- Use MWELO Appendix A for ETo value
- Enter each zone on a separate line
- Zone bio-retention basins separately
- Assign the plant factor to the highest water using species in the zone



SAMPLE WATER BUDGET WORKSHEET

(REQUIRED FOR RESIDENTIAL LANDSCAPES OVER 2,500 SQUARE FEET AND NON-RESIDENTIAL LANDSCAPES OVER 1,000 SQUARE FEET)

EBMUD - Water Efficient Landscape Worksheet

The purpose of this worksheet is to calculate a project's Estimated Total Water Use and Maximum Applied Water Allowance to determine its compliance with the Model Water Efficient Landscape Ordinance (MWELO). This worksheet is to be filled out by the project applicant and is a required element of the MWELO Landscape Documentation Package.

Property Address: 175 Gil Blas Rd., Danville, 94526

Reference Site (See MWELO Appendix A): Walnut Creek

Annual ETo (Reference Evapotranspiration Rate): 46.2 Inches

ETAF (ET Adjustment Factor) for Landscape Areas: 55.0 %

ETAF for Special Landscape Areas: 100%

NOTES

1) ETo is the reference evapotranspiration rate and represents the water needs of grass at a given location. It is an estimate of the inches of water lost due to evapotranspiration from a field of cool-season grass that is well watered. ETo values can be derived from MWELO Appendix A for locations across the State of California.

2) Use an evapotranspiration adjustment factor (ETAF) of 45% for new non-residential landscapes, 55% for new residential landscapes and 65% for schools. ETAF is a percentage of ETo and establishes the amount of water allowed per year for irrigation.

3) Use an ETAF of 100% for any special landscape areas which are those dedicated solely to edible plants, programmed recreational areas (e.g. public pools and sports fields), areas irrigated with non-potable water (e.g. recycled, grey and rain water) and stormwater treatment facilities that are required by permit (e.g. bio-retention basins, bio-swales, and flow-through planters).

ESTIMATED TOTAL WATER USE (ETWU) = (ETo) x (APF) x (Area) x (0.62) where 0.62 is the coefficient that converts inches to gallons per square foot

ZONE/ VALVE #	PLANTING DESCRIPTION E.g. Medium Trees, Groundcover, Water Feature, etc.	PLANT FACTOR (PF) Water requirements as a % of ETo	IRRIGATION EFFICIENCY (IE) Percent of applied water that reaches its target (e.g. root zone or water feature) by irrigation method	ADJUSTED PLANT FACTOR (APF) (PF/IE) = APF Watering requirements adjusted for irrigation efficiency as a % of ETo	HYDROZONE AREA (AREA) Square Feet	CONVERSION FACTOR The coefficient that converts inches to gallons per square foot	ETWU PER HYDROZONE (ETo)(APF)(Area)(0.62) = Annual gallons required to irrigate this landscape
Landscape Areas (LA)							
1	Shrubs	30%	90%	33%	450	0.62	4241
4	Forbs	30%	90%	33%	675	0.62	6361
5	Trees	50%	90%	56%	90	0.62	1445
6	Shrubs	20%	90%	22%	185	0.62	1170
7	Shrubs	30%	90%	33%	125	0.62	1178
8	Shrubs	30%	90%	33%	160	0.62	1508
9	Grasses and Strap-leafed Plants	60%	90%	67%	500	0.62	9610
10	Trees	60%	90%	67%	100	0.62	1922
11	Shrubs	30%	90%	33%	120	0.62	1131
12	Trees	50%	90%	56%	90	0.62	1445
13	Shrubs	30%	90%	33%	245	0.62	2309
14	Shrubs	20%	90%	22%	350	0.62	2213
15	Water Feature	100%	100%	100%	35	0.62	1003
				Totals:	3125	0.62	35536
Special Landscape Areas (SLA)							
2	Trees			100%	560	0.62	16041
3	Forbs			100%	125	0.62	3581
				Totals:	685	0.62	19622
Controller Controller A						ETWU Grand Total:	55158

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

MAWA represents the annual water budget for this landscape. It is the maximum amount of water allowed per year for irrigation

	LA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for LA:	49213
	SLA
	(ETo)(ETAF)(Total Area)(0.62) = Annual gallons allowed
MAWA for SLA:	19621
MAWA Grand Total:	68834

PLANT FACTOR RANGES:

0-10% = Very low; 10-30% = Low; 40-60% = Moderate; 70-100% = High. Water Requirements cited in this ordinance are derived from the publication â€œWater Use Classification of Landscape Speciesâ€ (ucanr.edu/sites/WUCOLS/).

IRRIGATION METHODS AND EFFICIENCIES:

Spray = 70%; Rotating nozzle = 75%; Bubblers = 80%; Point-source drip = 85%; In-line drip = 90%; Water feature = 100%

Pass: Yes

ETWU shall not exceed MAWA

Tips for Compliance and Efficient Review

Other Considerations

Irrigation demand

- Zone with the highest flow rate determines outdoor demand
- Higher demand can result in higher System Capacity Charge
- Lower flow rates can save your client tens of thousands of dollars

Default demand and irrigation components

- If irrigable area exists but no landscaping proposed, EBMUD will assign a **default irrigation demand** used to determine a **System Capacity Charge**.
- New development with 500 SF of irrigable area or more must install a weather-based controller and irrigation stub-out with appropriate point-of-connection components based on MWELO area thresholds based on irrigable area.

THANK YOU!

EBMUD - Water Conservation Division

375 11th Street, Oakland CA

510-287-1900

http://www.ebmud.com/

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