



## Malibu Lumber Yard Methods

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The full case study can be found at:

<https://landscapeperformance.org/case-study-briefs/malibu-lumber-yard>

## Malibu Lumber Yard – Malibu, CA

### Methodology for Landscape Performance Benefits

#### Environmental

- ***Manages the first 3/4-in of rainfall using a system of permeable surfaces, gravel beds, and bioswales, which eliminate the need for a conventional drainage system.***

The stormwater benefit was derived from the site construction plans and site tour following construction. All non-building surface area on the site is permeable and the site is graded to direct all runoff to two onsite bioswales. These bioretention facilities are designed to treat the first 3/4-in of rainfall, which equates to about the 85th percentile for 24-hour storm events. Capture of larger storm events would not result in significant gains in treating water quality because the dirtiest water occurs during the “first flush” of rain. The City of Malibu approved plans without a conventional storm drainage system because it was determined that stormwater would be sufficiently reduced and treated using this system.

- ***Removes an estimated 80-94% of Total Suspended Solids (TSS) in stormwater runoff.***

According to the *Stormwater Sand Filter Sizing and Design, A Unit Operations Approach* by Ben R Urbonas, P.E., Chief, Master Planning and South Platte River Programs, Urban Drainage and Flood Control District, Denver, Colorado (<https://udfcd.org/wp-content/uploads/uploads/resources/technical%20papers/Sand-flt-paper.pdf>), sand filters such as the Delaware Sand Filter Bioswales used on the Malibu Lumber Yard site, can filter out an average of 80-94% of Total Suspended Solids (TSS).

- ***Treats 100% of wastewater in an on-site biomembrane reactor water treatment system.***

The wastewater treatment benefit was confirmed in the MEP and Civil plans that show restaurant and restroom waste directed to an onsite water treatment unit manufactured by GE Power and Water, which can treat up to 17,000 gallons of water per day as noted on their website: [http://www.gewater.com/products/equipment/mf\\_uf\\_mbr/mbr.jsp](http://www.gewater.com/products/equipment/mf_uf_mbr/mbr.jsp) (no longer available)

- ***Eliminated potable water use for irrigation by using reclaimed water and reduced the amount of water required for irrigation by 66% through plant selection.***

The current landscape maintenance provider, ValleyCrest Landscape Maintenance, confirmed that 100% of water used to irrigate the landscape is reclaimed water purchased from the Las Virgines Municipal Water District.

The reduction in the amount of irrigation water needed was determined via a series of calculations as recommended in the USGBC New Construction and Renovation Reference Guide, Version 2.2 under the Water Efficient Landscape LEED credit.

1. A baseline irrigation calculation was determined by evaluating water usage for plant material with average water requirements covering the same surface area as the existing plant material and using the same irrigation system. In this scenario, plant material would require water 3 times per week with an average of 10 minutes of watering per cycle.

- The current water usage for irrigation was determined by calculating actual water used for the low and extremely low water-use plant palette used for the site, which is an average of 10 minutes of watering once each week.

The baseline plant palette would require 305,214 gallons of water per year at the cost of \$498/year. The low water-use palette installed at Malibu Lumber Yard requires 101,735 gallons of water per year at the cost of \$166/year. Chart A below depicts water use calculations for the baseline plant palette and Chart B shows calculations for the current low water use palette.

Chart A – Baseline Plant Palette

Station	Su	M	Tu	W	Th	F	S	Total	GPM	Total Gal.
1		10		10		10		30	3.20	96
2		10		10		10		30	5.20	156
3		30		30		30		90	1.00	90
4		30		30		30		90	1.00	90
5		10		10		10		30	24.00	720
6		10		10		10		30	8.40	252
7		10		10		10		30	7.20	216
8		10		10		10		30	18.00	540
9		10		10		10		30	2.40	72
10		10		10		10		30	8.00	240
11		10		10		10		30	2.80	84
12		10		10		10		30	6.00	180
13		10		10		10		30	24.00	720
14		10		10		10		30	6.00	180
15		10		10		10		30	9.71	291.3
16		10		10		10		30	36.00	1080
17		10		10		10		30	22.74	682.2
18		30		30		30		90	1.00	90
19		30		30		30		90	1.00	90

Total Usage in Gallons per Week      5,869.50  
 Total Usage in Gallons per Year      305,214.00  
 Total Usage in HCF                      408.04  
 Las Virgenes MWD Rate                1.22  
 Total Cost                                    497.81

Chart B - Low Water-Use Plant Palette

Station	Su	M	Tu	W	Th	F	S	Total	GPM	Total Gal.
1		10						10	3.20	32
2		10						10	5.20	52
3		30						30	1.00	30
4		30						30	1.00	30
5		10						10	24.00	240
6		10						10	8.40	84
7		10						10	7.20	72
8		10						10	18.00	180
9		10						10	2.40	24

10		10						10	8.00	80
11		10						10	2.80	28
12		10						10	6.00	60
13		10						10	24.00	240
14		10						10	6.00	60
15		10						10	9.71	97.1
16		10						10	36.00	360
17		10						10	22.74	227.4
18		30						30	1.00	30
19		30						30	1.00	30

Total Usage in Gallons per Week	1,956.50
Total Usage in Gallons per Year	101,738.00
Total Usage in HCF	136.01
Las Virgenes MWD Rate	1.22
Total Cost	165.94

- ***Contributes to a reduction in the urban heat island effect by replacing 70% of the existing asphalt on the site with concrete permeable pavers, which have 7 times the reflectance. 19 trees also contribute to this effort by providing shade.***

Per the USGBC New Construction and Renovation Reference Guide, Version 2.2 under the Heat Island Effect LEED credit, asphalt has a very low SRI of zero and reflectance of 0.05, whereas concrete (in the form of permeable pavers), the replacement material for 70% of the site has a SRI of 35 and reflectance of 0.35. With the additional enhancement of shade from 19 additional trees per site construction plans, the new design allowed for a significant increase in solar reflectivity and in turn a reduction in heat island effect.

**Economic**

- ***Commands rents that are 5% higher on average than those in surrounding retail centers.***

Figure from CB Richard Ellis, the property management company for Malibu Lumber Yard.