



STAFF REPORT

Meeting Date: June 30, 2015
To: Honorable Mayor & City Council
From: Ken Pfalzgraf-Parks and Urban Forest Manager
Subject: Artificial Turf and Landscaping Alternatives for Residential Front Yards and Parkways

Attachments:

1. May 18, 2015 Study Session Public Works Department Staff Report "Artificial Turf and Live Plant Alternatives for Residential Front Yards and Parkways (including attachments)
2. City Lobbyist Statement re: AB 1164
3. Artificial Turfgrass Specification provided by Community Works Design Group

INTRODUCTION

This report provides additional information previously requested by the City Council with regards to the use of artificial turfgrass in residential front yards and City parkways and other landscaping alternatives as a means of achieving water use reduction mandates.

BACKGROUND

As part of Governor Brown's executive order declaring a state of emergency drought in the state of California, the City of Beverly Hills was mandated to reduce water use by 32%. In response, the City immediately stopped irrigating in turfgrass medians and implemented other water saving mandates including reducing the number of days that landscaping in the City can be watered (to two days per week) and limiting sprinkler run times (to eight minutes per watering day). In addition, the City is considering a number of other options aimed at helping residents meet water use reduction targets, including the use of artificial turfgrass in residential front yards and in City parkways. At present, City code limits the use of artificial turfgrass at residential properties to side and rear yards only.

At the request of Councilmember Krasne, the City Council began discussion on the issue during the April 21, 2015 Study Session meeting. As a result of that discussion, staff was requested to provide a report on artificial turfgrass and landscaping alternatives for residential front yards and parkways, including information about artificial turfgrass product quality.

At the May 18, 2015 City Council Study Session, the Council expressed its wishes that the City is able to provide materials and resources to help residents make educated decisions on what they can do to save water around their homes.

With regards to artificial turfgrass, the May 18, 2015 staff report provided an overview of the current code; information detailing the advantages and disadvantages of both live plants and artificial turfgrass in terms of water conservation; and a brief synopsis of the environmental, health and safety topics that typically surface when the use of artificial turfgrass is being considered. The preference of the Design Review Commission to promote the use of drought tolerant/native plants in residential front yards in lieu of artificial turfgrass was noted, as was the concern of the City arborist that the use of artificial turfgrass in the parkways would elevate soil temperatures, which may negatively impact the health of the City trees, including the potential loss of City trees.

Turning the focus to live plant alternatives, staff introduced principals from the Green Gardens Group ("G3"), a landscape consulting firm that provides water saving advisory services to customers of governmental agencies including the Metropolitan Water District and the Los Angeles Department of Water and Power. The G3 presentation tracked several landscapes through the transition from spray irrigated live turfgrass to drip irrigated and waterwise. Several practical water saving methodologies were discussed including land forming for water retention, soil modification and rain catching. Examples of printed resources produced by G3 for other agencies, which are also available via the internet, were provided for Council review.

In closing discussion on artificial turfgrass and natural landscape alternatives at the May 18, 2015 Study Session, Honorable Mayor Gold summarized the issues and suggested future discussion should focus on three considerations:

- Outside of requiring a few minor modifications, current City code is such that property owners can transition spray irrigated live grass areas to waterwise drought tolerant/California native plantings irrigated by a drip system. Councilmembers agreed that information should be provided to residents about drip systems including how long a drip system should run during an irrigation cycle.
- If artificial turfgrass is allowed in front yards, how will the City ensure that quality products are being installed and maintained to a standard that preserves the City's aesthetic quality while protecting the City against artificial turfgrass related risks?
- If artificial turfgrass is allowed in City parkways, how will trees be protected from decline and loss?

DISCUSSION

The following address the three issues stated above:

Does the current City municipal code enable property owners to effectively transition live grass lawn areas to waterwise drought tolerant/native plantings and produce the desired water savings targets in the future? Are minor modifications to the current municipal code required to enhance the ability of property owners to make waterwise changes?

While doing routine windshield surveys of the City's trees, staff has noted an increasing number of properties that have converted traditional live turfgrass areas to more drought tolerant plantings. While some property owners have decided to retrofit their overhead spray systems to a subterranean drip configuration, others have left the spray system in place to irrigate their new plantings. For example, residents report the cost to remove parkway grass and replace with a drought tolerant *Dymondia* ground cover ranging from \$4.00 to \$12.50 per square foot, with the higher cost including a change in the irrigation system from overhead spray to subterranean drip. Both property owners reported immediate water savings, which they felt would increase as the *Dymondia* plantings become established and require even less water (see Fig. 1).



Figure 1- *Dymondia* parkway planting, McCarty Drive

The only problem either of these sample property owners referenced in the interview was a question about the use of mulches to cover open dirt spaces while newly installed plants grow to become established and cover more ground. Current code classifies some materials which could be used as mulches under the category of "paving."

It is becoming increasingly apparent that as more of these aesthetically pleasing drought tolerant landscapes are installed throughout the City, neighbors are finding them attractive enough to consider conversion projects of their own. To encourage more residents to make the conversion from live turfgrass to drought tolerant landscapes in the interests of meeting water conservation targets, the City Council may consider the following:

- Provide a web-based plant list for drought tolerant landscapes which identifies durable and appropriate plants for specific uses in the landscape (e.g. low parkway plantings).
- Modifying current code to allow the use of stepping stones or pathways in no more than ten percent of the parkway surface to enhance pedestrian traffic flow from adjacent parking sites.
- Modify the landscape irrigation run time mandates to be appropriate for drip systems and low flow irrigation spray heads (i.e. after landscape is established, run times up to one hour for drip systems and 25 minutes for low flow spray heads on allowed water days).

In summary, an increasing number of live grass lawn to drought tolerant landscape conversions are being seen throughout the City. This trend indicates that some residents are willing to make an investment that will pay off in continued water savings while enjoying the aesthetic and environmental benefits of a live landscape. For the most part, these converted landscapes offer a better aesthetic than lawns which are currently receiving a fraction of the water they actually require to thrive during the hottest months of the year.

If artificial turfgrass is allowed in front yards, how will the City ensure that quality products are being installed and maintained to a standard that preserves the City's aesthetic quality while protecting the City against artificial turfgrass related risks?

At present, the City of Beverly Hills Municipal Code does not allow artificial turfgrass in residential front yards.

In response to the Governor's emergency drought declaration, governmental agencies throughout California are considering a number of water saving methods, including the expanded use of artificial turfgrass. Assembly Bill 1164 (AB 1164) includes language that looks to prohibit local agencies from enacting or enforcing any ordinance or regulation that prohibits the installation of synthetic grass or artificial turf on residential property. In turn, approximately \$300 million would be appropriated over three years to provide matching funds for local incentives to replace water inefficient residential landscaping with drought tolerant landscaping.

During discussions on whether to expand the permissible use of artificial turfgrass to residential front yards in the City, several health and safety, including tree health and aesthetic concerns have been raised. In the interests of offering an option to those property owners who wish to consider the use of artificial turf in their private property yards as an effective means of reaching water use reduction targets, the City Council has requested that staff present a specification that is intended to ensure that those residents who might choose to use artificial turfgrass in front yard areas will install a high quality, long lasting product in a proper manner so as to avoid aesthetic problems (see Fig. 2), while limiting the City's exposure to risk liabilities.



Figure 2- Poor quality artificial turfgrass installation

A sample specification from a landscape architecture firm that has designed several park and play area improvements in the City is attached. The specification is applicable for a residential application and requires an experienced contractor to properly install an environmentally friendly product with a 15 year warranty period and to provide a maintenance plan to ensure the long-term durability and aesthetic of the product.

The next step in allowing the use of artificial turfgrass in residential front yards would be to request the Planning Commission to develop an ordinance with new standards regarding the use of artificial turfgrass in residential front yards. Among the considerations in developing the ordinance would be defining what percentage of artificial turfgrass coverage in a residential front yard would be permissible and what proximities would need to be maintained in order to install artificial turfgrass into residential front yards without jeopardizing the health of any heritage and/or protected trees.

In summary, should the City Council choose to modify the Municipal Code to allow the use of artificial turfgrass in residential front yards, then it is recommended that stringent product, installation and maintenance specifications must be conditioned into a permitting process to avoid long-term aesthetic and liability problems.

If artificial turfgrass is allowed in City parkways, how will trees be protected from decline and loss?

The specification for the proper installation of a quality artificial turfgrass requires that the upper portion of the soil profile be removed and replaced. In addition, the specification requires that the sub-base material be compacted. Therefore, preparing the parkway for the proper installation of artificial turfgrass per specification will result in damage to tree roots and includes compacting soil above the remaining root system, which impedes both water and air flow. Finally, artificial turfgrass is known to elevate soil temperatures which will also have an ill effect on tree roots and ultimately, the City's parkway trees.

On June 23, 2015, the Recreation and Parks Commission moved unanimously (4-0) to not endorse the use of artificial turf in City parkways.

Considering the long-term effect on City trees, staff suggests that the City Council consider the use of artificial turfgrass in City parkways only as a last resort in water conservation and if used, require a separate tree irrigation system to provide for the proper irrigation needs of the parkway tree(s).

FISCAL IMPACT

Costs related to landscape improvements on residential properties and parkways are the responsibility of the property owner. There will be staff time and related costs should the City Council direct staff to modify the Municipal Code. In addition, code changes may require additional staff time and related costs for construction inspection and code enforcement activities related to the use of artificial turfgrass. Cost estimates will be provided once direction is received on whether or not a permitting process to allow for artificial turf installation is to be developed.

RECOMMENDATION

Staff seeks City Council direction in the following areas:

1. The modification of current municipal code and water restrictions to promote the conversion of residential live grass lawns and parkways to drought tolerant materials.
2. Modification of current municipal code to allow for the use of artificial turfgrass in residential front yards.
3. Modification of current municipal code to allow for the use of artificial turfgrass in City parkways.

Steve Zoet
Approved By

A handwritten signature in black ink, appearing to be 'SZ', written over a horizontal line. The signature is stylized and includes a large loop at the bottom.

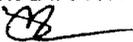
Attachment 1



STAFF REPORT

Meeting Date: May 18, 2015

To: Honorable Mayor & City Council

From: Trish Rhay, Assistant Director of Public Works Services - Infrastructure & Field Operations 
Michelle Tse, Senior Management Analyst *mst*

Subject: Artificial Turf and Live Plant Alternatives for Residential Front Yards and Parkways

Attachments:

1. Synthetic Surface Heat Study
2. Safety Issues Related to Artificial Turf
3. Sample Parkway Design Guide

INTRODUCTION

This report is a follow-up to the City Council's direction from the April 21, 2015 Study Session to provide an overview of synthetic turf options and live plant alternatives for residential front yards and parkways.

DISCUSSION

During the April 21, 2015 Study Session, in response to a request by Councilmember Krasne, the City Council discussed the possible use of artificial turf in residential front yards and parkways to achieve water conservation. The discussion took place when the State declared a statewide water use reduction and is requiring the City to reduce water use by 36%. During the Study Session, the City Council directed staff to return with a review of synthetic turf options and live plant alternatives for use in both residential front yards and parkways.

The City's current Zoning Code limits the use of nonliving material in front yards. Thus, synthetic turf is limited to areas not visible from the public street. Parkways, the area between the outside edge of the sidewalk and inside edge of the curb, are a component of the public right-of-way. According to the Beverly Hills Municipal Code, the abutting property owner shall plant and maintain the parkway with grass or other plant material that is maintained at no more than six inches (6") in height as approved by the City's arborist. Changes in any of the existing regulations would require an amendment to the City's Municipal Code.

Both live plant and artificial turf presents advantages and disadvantages. The following is a summary of these considerations.

Artificial Turf	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Requires relatively low maintenance • Requires considerably less water use than natural grass • Higher grade quality products have better aesthetics and look more like real grass • One-time installation cost 	<ul style="list-style-type: none"> • Eventually deteriorates due to wear and tear; requires upkeep • If used in parkways, reduced water use will impact City trees • The manufacture and composition of synthetic turf (typically plastic), together with reduction in living plant material, could increase the community's carbon footprint • May trap heat, creating "heat islands"

Sample studies related to artificial turf are included in this report as attachments. One study reports that artificial turf creates "heat islands," with surface temperatures greater than asphalt and natural turf. There have also been reports that the rubberized infill made from recycled tires may contain carcinogens, posing health risks.

Parkways

If synthetic turf is allowed in parkways, the "heat islands" and reduced watering in these areas will impact the City trees planted in these areas. An alternative may be to use California native/drought tolerant plant options and include a drip irrigation system, which reduces overall water use while maintaining live landscaping. A sample Parkway Design Guide is included as Attachment 3, highlighting various ways in which drought tolerant and/or native plant alternatives can be used on parkways. A similar guide can be developed for both parkways and residential front yards.

Residential Front Yards

The Design Review Commission discussed the potential use of artificial turf on residential front yards during their May 7, 2015 meeting. The Commission prefers the use of drought tolerant/native plants over artificial turf. However if the City Council did allow for artificial turf, then the Commission recommends it would have to be a high quality turf product. The Commission also expressed there may be challenges with enforcing the use of high quality products.

The advantages and disadvantages for live plant alternatives are as follows:

Live Plant Alternatives	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Requires less water than natural grass • Flexibility in design to promote live garden-like community • Large selection of native drought tolerant landscaping options • Native plants require less fertilizer and pesticides than natural grass 	<ul style="list-style-type: none"> • Requires some maintenance (pruning, cutting, etc.) • May limit the yard's use as a recreational area • Initial cost of installation and some maintenance • Must be properly maintained and driveways kept clear to not be visual obstructions for vehicles and pedestrians

Staff has been working with Green Gardens Group ("G3"), a landscape professional group, to provide guidance and information on live plant alternatives that could be used to maintain the City's garden-like community while conserving water. G3 is one of the conservation program partners with Metropolitan Water District and is also working with Los Angeles Department of Water & Power ("LADWP") with their turf removal program.

G3 will be in attendance during the May 18, 2015 City Council Study Session to provide an overview of live plant alternatives that could be used in residential front yards and parkways. G3 will also highlight the distinctions between drought tolerant plant and native plant options.

FISCAL IMPACT

Costs related to landscape improvements on parkways and residential front yards will be borne by the resident. Any needed removal and replacement of impacted City trees along the parkway generally costs the City between \$1,200 to \$2,000 per tree.

RECOMMENDATION

Staff seeks City Council direction on the use of artificial turf or live plant alternatives in residential front yards and parkways.



George Chavez
Approved By

Attachment 1

“Synthetic Surface Heat Studies”
C. Frank Williams and Gilbert E. Pulley
Brigham Young University

Synthetic turf surfaces have long been regarded as a lower maintenance alternative to natural turf. However, synthetic surfaces like natural turf have their shortcomings. In the spring of 2002 a Field Turf synthetic surface was installed on one half of Brigham Young University’s Football Practice Field. The other half of the installation is a sand-based natural turf field. Shortly after the Field Turf was installed football camps were started. The coaches noticed the surface of the synthetic turf was very hot. One of the coaches got blisters on the bottom of his feet through his tennis shoes. An investigation was launched to determine the range of the temperatures, the effect water for cooling of the surfaces, and how the temperatures compared to other surfaces.

On June of 2002 preliminary temperatures were taken at five feet and six inches above the surface and at the surface with an infrared thermometer of the synthetic turf, natural turf, bare soil, asphalt and concrete. A soil thermometer was used to measure the temperature at two inches below the surface of the synthetic turf. Also, water was used to cool the surface of the natural and artificial turf. It was determined that the natural turf did not heat up very quickly after the irrigation so only the artificial turf was tracked at five and twenty minutes after wetting. The results of the preliminary study are shocking. The surface temperature of the synthetic turf was 37° F higher than asphalt and 86.5° F hotter than natural turf. Two inches below the synthetic turf surface was 28.5° F hotter than natural turf at the surface. Irrigation of the synthetic turf had a significant result cooling the surface from 174° F to 85° F but after five minutes the temperature rebounded to 120° F. The temperature rebuilt to 164° F after only twenty minutes. These preliminary findings led to a more comprehensive look at the factors involved in heating of the artificial turf.

Three aspects of light were measured along with relative humidity. The synthetic surface was treated as two areas, the soccer field and the football field and the natural turf was one area. Four randomly selected sampling spots were marked with a measuring tape from reference points on the fields so it could be accessed for subsequent data collection. Bare soil, concrete, and asphalt sampling areas were selected and marked in a similar manner. The results are shown in table form below:

Table 1.

Surface	Average Surface Temperature between 7:00 AM and 7:00 PM	
Soccer	117.38° F	high 157° F
Football	117.04° F	high 156° F
Natural Turf	78.19° F	high 88.5° F
Concrete	94.08° F	
Asphalt	109.62° F	
Bare Soil	98.23° F	

Table 2.

Two inch depth	Average Soil Temperature between 7:00 AM and 7:00 PM	
Soccer	95.33° F	high 116° F
Football	96.48° F	high 116.75° F
Natural Turf	80.42° F	high 90.75° F
Bare Soil	90.08° F	

Table 3.

Shade	Average Temperature between 9:00 AM and 2:00 PM	
Surface Temperature of Natural Turf	66.35° F	high 75° F
Surface Temperature of Artificial Turf	75.89° F	high 99° F
Average Air Temperature	81.42° F	

Surface Temperature of A.T. (Artificial Turf) is significantly higher than air or soil temperature of A.T. The amount of light (electromagnetic radiation) has a greater impact on temperature of A.T. than air temperature. The hottest surface temperature recorded was 200° F on a 98° F day. Even in October the surface temperature reached 112.4° F. This is 32.4° F higher than the air temperature. White lines and shaded areas are less affected because of reflection and intensity of light. Natural grass areas have the lowest surface and subsurface temperatures than other surfaces measured. Cooling with water could be a good strategy but the volume of water needed to dissipate the heat is greatly lessened by poor engineering (infiltration and percolation).

Average air temperature over natural turf in the late afternoon is lower than other surfaces. Soil temperature of A.T. is greater than bare soil and natural turf. Humidity appears to be inversely related to surface and soil temperature. It is likely that energy is absorbed from the sunlight by the water vapor.

The heating characteristics of the A.T. make cooling during events a priority. The Safety Office at B.Y.U. set 120° F as the maximum temperature that the surface could reach. When temperature reaches 122° F it takes less than 10 minutes to cause injury to skin. At this temperature the surface had to be cooled before play was allowed to continue on the surface. The surface is monitored constantly and watered when temperatures reach the maximum. The heat control adds many maintenance dollars to the maintenance budget.

A budget comparison was made using actual dollars spent and for every dollar spent on the A.T. maintenance one dollar and thirty cents was spent on the natural turf (N.T.) practice field. While construction costs are very unbalanced, for every dollar spent on the N.T. eleven dollars and seventy-seven dollars were spent on the A.T.

The area under the carpet of BYU's installation is designed to move water from the surface and into an extensive drain mat system. This part of the installation is two thirds of the overall cost of the A.T. Thus, for a 2.5 million dollars installation approximately 1.7 million dollars go for the subsurface and drainage. The most interesting thing about this is that the drain mat probably sees little or no water. The surface is hydrophobic and the undersurface is poorly engineered to favor water retention rather than drainage. That seems like a high price to pay for something that does not work!

Artificial turf surfaces have their place in the turf industry. They can work in environments where grass will not grow and are marginal. However, they are costly and not maintenance free. It is important to take all the factors in to consideration before making a large investment. Don't take the manufacture's word for the factors of concern i.e. don't let the fox guard the hen house. The propaganda on BYU's installation is charts with surface temperatures less than the air temperature and claims for drainage of 60 inches per hour. The question still remains is A.T. 11.47 times better than natural turf?

Attachment 2

The Washington Post

Early Lead

Is there a link between artificial turf and cancer in soccer goalies?

By **Cindy Boren** October 9, 2014

Every day, hundreds of thousands of soccer goalies come home from competing on artificial turf fields and remove rubber crumbs from their hair, mouths, nose and abrasions, shaking the stuff from their clothing and gear.

The particles, called butadiene rubber or “crumb rubber,” is made from synthetic fibers and scrap tires. It raises dust over the fields and smells like, well, former tires. Now, a number of people are questioning the safety of fields that contain those crumbs and an NBC News report cited incidences of cancer specifically among goalies. Because of a lack of research, it is not clear whether there is a causal connection yet, but it’s a question worth exploring because the material can contain benzene, carbon black and lead and it’s prevalent on the soccer fields at schools and parks across the country. The turf is the latest iteration of the artificial playing surface, one that carried the promise of a softer impact for athletes — important in an era of increasing awareness of the dangers of concussions.

In 2009, Amy Griffin, the associate head soccer coach at the University of Washington, was visiting two female goalies who had been diagnosed with non-Hodgkin’s lymphoma, when a nurse brought a disturbing trend to her attention. NBC’s Hannah Rapple reports:

That day, the nurse looked down at the woman Griffin was sitting with and said, “Don’t tell me you guys are goalkeepers. You’re the fourth goalkeeper I’ve hooked up this week.”

Later, the young woman with the chemo needle in her arm would say, “I just have a feeling it has something to do with those black dots.”

Artificial turf fields are now everywhere in the United States, from high schools to multi-million-dollar athletic complexes. As any parent or player who has been on them can testify, the tiny black rubber crumbs of which the fields are made — chunks of old tires — get everywhere. In players’ uniforms, in their hair, in their cleats.

But for goalkeepers, whose bodies are in constant contact with the turf, it can be far worse. In practices and games, they make hundreds of dives, and each plunge sends a black cloud of tire pellets into the air. The granules get into their cuts and scrapes, and into their mouths. Griffin wondered if those crumbs – which have been known to contain carcinogens and chemicals – were making players sick. “I’ve coached for 26, 27 years,” she said. “My first 15 years, I never heard anything about this. All of a sudden it seems to be a stream of kids.” Since then, Griffin has compiled a list of 38 American soccer players – 34 of them goalies – who have been diagnosed with cancer. At least a dozen played in Washington, but the geographic spread is nationwide. Blood cancers like lymphoma and leukemia dominate the list.

How Safe Is the #Artificial #Turf Your Child Plays On? <http://t.co/7hR3qajfge> @HRappleye reports. pic.twitter.com/oFpjpTwRkr

— NBC Investigations (@NBCInvestigates) October 8, 2014

The turf, whether toxic or not, is also drawing attention as “the next battlefield for workplace gender discrimination,” as Quartz puts it. FIFA plans to use the turf, rather than natural grass, for the women’s World Cup next summer in Canada, a decision that prompted a lawyer representing Abby Wambach and other stars to file a lawsuit in the human rights tribunal of Ontario. The issue gained traction when Sydney Leroux tweeted a photo of her legs after a game — and it was immediately shared by Kobe Bryant, Kevin Durant and others.

This is @DrinkBODYARMOR athlete @sydneyleroux after playing on turf! #ProtectTheAthlete #USWNT <http://t.co/e5NhMgwkCq> pic.twitter.com/5jFpl12L8j — Kobe Bryant (@kobebryant) August 13, 2014

Whether there are greater dangers to health, though, is uncertain. “NBC’s own extensive investigation,” Rappleye writes, “which included a review of the relevant studies and interviews with scientists and industry professionals, was unable to find any agreement over whether crumb turf had ill effects on young athletes, or even whether the product had been sufficiently tested.”

While more testing is needed, New York City moved to stop installing crumb rubber fields in its parks in 2008 and the Los Angeles Unified School District did the same in 2009. In Maryland, the Safe Healthy

Playing Fields Coalition supports legislation to require warning signs at artificial turf fields and opposes a bill to use state funds to construct artificial turf fields.

Meanwhile, Griffin continues to do her own research on the topic, telling Rappleye that she sends crumbs from each field her team plays on to a lab for testing.

“I’m looking for answers, because I’m not smart enough to come up with them on my own,” Griffin said. “I would love someone to say, ‘We’ve done some tests and we’ve covered all of our bases — and, yes, it’s safe.’ That would be awesome. I would love to be proved wrong.”

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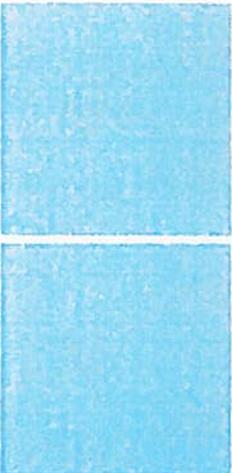
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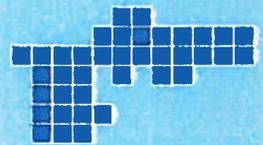
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Attachment 3



PARKWAY DESIGN GUIDE



*City of West Hollywood
March 2010*



WHY ARE PARKWAYS IMPORTANT?

1

The parkway is the strip of land between the street and the walkway. In other geographic regions, it is known as tree lawn or planting strip. The parkway and walkway together make up the sidewalk, which is part of the public right-of-way. Street trees are planted in the parkway and are the most important plants in the parkway.

Parkways are important to individual property owners and the City as a whole for the following reasons:

- Parkway provide soil volume that street trees need to grow into healthy, mature trees that provide shade, collect stormwater, consume carbon and provide other environmental and health benefits.
- Parkway can collect stormwater and irrigation runoff and return it to the groundwater table.
- Parkway provide a buffer between pedestrians on the walkway and cars in the street.
- Parkway improve the curb appeal of your home, potentially increasing its value.
- Parkway provide a buffer between pedestrians on the sidewalk and cars in the street.
- Parkway enhance the visual quality of the city.

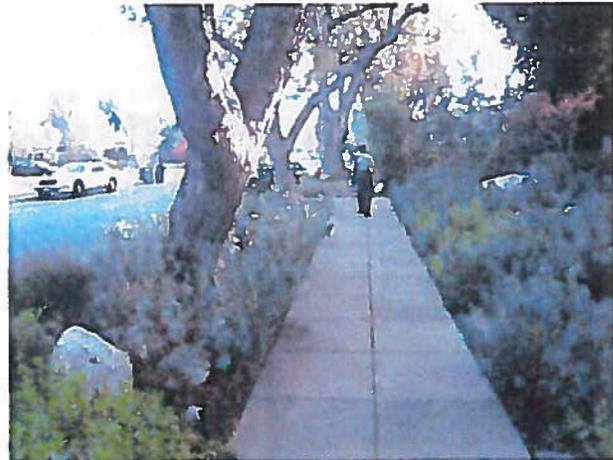
In West Hollywood, the adjacent property owner is responsible for maintaining all of the parkway except the street trees, which are maintained by the City. They can only be planted, trimmed and removed by the City and not by private property owners.

Parkways can be designed in a variety of ways, depending on the individual property owner's design objectives and commitment to maintenance. However, all parkways should require relatively little supplemental water, little mowing and little fertilizing to reduce their carbon footprint. In particular, conventional grass parkways that require high levels of supplemental water and regular mowing and fertilizing should be avoided. West Hollywood property owners are encouraged to convert their conventional grass parkways (and front yards) into drought-tolerant, sustainable parkways (and front yards). This brief document provides guidance for making that transition.



PARKWAY WALKWAY LANDSCAPED
SIDEWALK SETBACK

Typical residential parkway of the past, based on those on the East Coast and Midwest where supplemental irrigation typically is not required and where parkways are called "tree lawns."



PARKWAY WALKWAY LANDSCAPED
SIDEWALK SETBACK

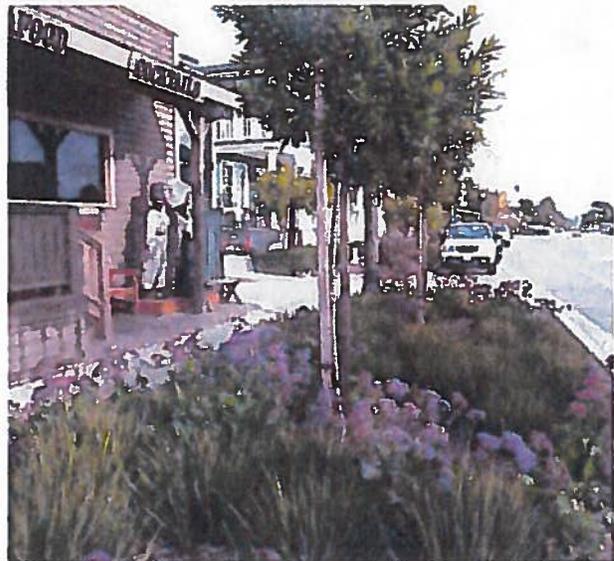
In Southern California, we need to reduce the use turf grass to reduce water use and the greenhouse gases generated by lawn mowers. The parkway of the future will be drought tolerant, collect runoff and require minimal gas or electric powered maintenance.

2

PARKWAY DESIGN CRITERIA

To reduce water use and carbon emissions and provide storm and irrigation water infiltration, soil volume for street trees, a buffer between pedestrians and the street, pedestrian access between the street and walkway, visibility of both motorists and pedestrians, erosion/fugitive dust control, and the visual benefits of landscaped parkways, all parkways shall be:

- As wide as possible up to 8' wide, given minimum walkways widths of 4' in residential zones and 5' in commercial zones.
- At the same elevation as the curb and walkway within 6" of them, for example, soil 2" below edge of curb and walkway elevations and covered with 2" of mulch, so the surface elevations of the walkway or curb and adjacent parkway are the same.
- At least 75% unpaved and either 1) slightly swaled, that is, sloping a few inches to the center at not more than a 3:1 slope, to collect storm and irrigation water if the plant materials in the parkway are not walkable or 2) at the same finished elevation as the walkway if the plant materials in the parkway are walkable.
- Irrigated in a manner that results in no overspray onto the walkway or street, e.g., buried in-line drip, and consistent with the City's landscape ordinance and State Model Landscape Ordinance (9-10-09).
- At least 50% covered with plant materials, which 1) do not require mowing more frequently than once every few months, 2) are drought tolerant and can survive with irrigation only occasionally from November - March, once a week April - June, and twice a week July - October (for example, plants listed in WUCOLS III¹ as having Moderate, Low or Very Low water use- see Table 1 for examples), 3) do not exceed a height of 2' within 5' of a driveway/curbcut and, excluding trees, 4' elsewhere, 4) do not have thorns or sharp edges adjacent to any walkway or curb, and 5) are located at least 4 feet from any tree trunk.
- Where unpaved, covered with a permeable natural material, e.g., mulch, stabilized decomposed granite, gravel, or stones, that prevent erosion and dust.



¹ WUCOLS, an acronym for Water Use Classification of Landscape Species, can be downloaded at <http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf>

For parkways adjacent to curbside parking, if the parkway planting is not walkable (see Table 1 for examples of plants that are walkable) , a means of access from the curb to the walkway shall be provided . It may vary with the adjacent use and street characteristics, for example:

- On heavily trafficked streets (major and minor arterials), an 18" wide paved, walkable strip along the back of the curb that is at the same finished elevation as the curb should be provided.
- Where there are striped curbside parking spaces, a path across the parkway should be provided every two cars between two marked spaces.
- Adjacent to single-family homes and low-density multi-family housing (2 to 4 units/5,000 SF lot), stepping stones or a walkway across the parkway should be provided every 50 feet.

Where there is no curbside parking and the parkway is not walkable, a path or stepping stones shall be provided every 50 feet.

As specified on page 2, plants with thorns should not be planted adjacent to any walkway where someone might come in contact with the thorns.



A "landing strip" at the curb allows easy access from parked cars.



A path across the parkway completes access from parked cars to the walkway.



3

DESIGNING YOUR PARKWAY

WHAT'S YOUR TYPE?

Type 1 Parkway - Low-Maintenance, Walkable Plants

If you want a parkway that requires minimal design and maintenance, install walkable plants. Table 1 lists some examples. Most of the grasses listed do not require mowing. Sedge, Buffalo and Grama Grass can be mowed a few time a year to maintain a lawn-like appearance.

Type 2 Parkway - Low-Growing, Low-Maintenance Plants

If you want a parkway that requires a little more design and the addition of a walkway or stepping stones, but still requires minimal maintenance, plant low-growing grasses and/or groundcover. There are many choices; Table 2 lists some of them. Your parkway might be meadow-like in appearance with a mix of grasses and perennials, including some from Table 1 and some from Table 2.

Type 3 Parkway - Complement Your Front Yard

If you want a parkway that is an extension of your sustainable, non-lawn front garden, use low- to medium-height grasses, shrubs and perennials. There are many plant choices with this parkway type. Table 3 lists some reliable drought-tolerant natives that are taller - but still less than 3 feet tall - that can be mixed in with plants in Table 2.

Note: there are many other plants that are suitable for parkways, which you can find in the on-line resources. Email us your parkway success stories and we will add them to the parkway list.

DIGGING IN

Preparing Your Parkway Soil

The most important thing you can do to ensure your parkway's success is to prepare the soil. Soil preparation saves you money in the long run because it reduces the need to replace plants, lowers water use and reduces fertilizer applications.

- Remove all existing turf - let it die and dig it out.
- Remove enough soil to create the swale described on page 2 and then remove 2-3" more.
- Till the parkway soil to depth of one foot.
- Amend it with compost.

Watering Your Drought-Tolerant Parkway

Too much water can kill drought-tolerant plants. So, don't over-water, especially in clay soil. The best approach is to water only when the soil is dry at a depth of 3" to 4". Or, turn on your in-line drip irrigation three times a week (45 minutes each time) to establish your parkway (first 3 months); then, once it is established, once a week from October through March and twice a week from April through September.

On-Line Resources

Use these resources see see images, recommended spacing, and detailed descriptions of these plants and others:

bewaterwise.com

theodorepayne.org

elnativo.com

smggrowers.com

monrovia.com

sunset.com and *Sunset Garden Book*

California Native Plants for the Garden Bornstein et al.

Table Legend

N = California or Southwest native

L = Low water use

M = Moderate water use

o.c. = on center

Table 1. Example Type 1 Walkable Plants - No Path Required

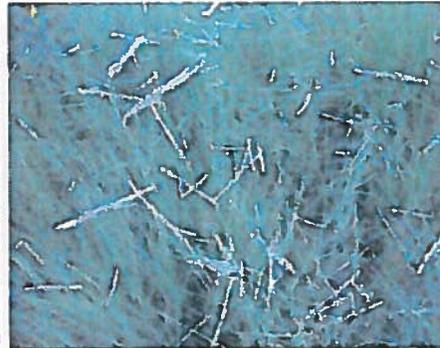
Botanical Name	Common Name	Water Use	Height x Spacing	Notes
Low Water Use/Low or No Mow Turf or Grass-like Perennials				
<i>Buchloe dactyloides</i> UC Verde™	UC Verde™ Buffalo Grass	N, L	6" x 6"	winter dormant (brown)
<i>Bouteloua gracilis</i> 'Hachita'	'Hachita' Blue Grama Grass	N, L	6" x 6"	
<i>Carex pansa</i> (<i>C. praegracilis</i>)	California Meadow Sedge	N, M	6" x 9"+	Grows in shade or sun
Low-Growing Perennials (12 inches or less)				
<i>Achillea millifolium</i> cultivars	Achillea cultivars	L	12" x 3'	mow 3-4x/year
<i>Chamaemelum nobile</i>	Chamomile	M	8" x 12"	
<i>Dymondia margaretae</i>	Dymondia	L	3" x 6"	slow growing

Other untested ideas: there are several lawn substitute seed mixes, including Fleur de Lawn and Ecology Lawn, that may work.

Buchloe dactyloides UC Verde™



Bouteloua gracilis 'Hachita'



Carex pansa (*C. praegracilis*)



Achillea millifolium cultivar mowed



Chamomile



Dymondia margaretae



3 DESIGNING YOUR PARKWAY

Table 2 Example Type 2 Low-Growing, Low-Maintenance Plants - Path Required

Botanical Name	Common Name	Water Use	Height x Spacing	Notes
Low-Growing Grasses or Grass-like Perennials (18 inches or less)				
<i>Carex divulsa</i> (C. tumicola)	Berkeley Sedge	N, M	12" x 2'	
<i>Festuca glauca</i> 'Siskiyou Blue' & other var.	Blue Fescue	M	12" x 12"	
<i>Pennisetum alopecuroides</i> 'Little Bunny'	Little Bunny Fountain Grass	L	12" x 12"	
<i>Sesleria autumnalis</i>	Autumn Moor Grass	M	15" x 2'	
Low-Growing Perennials/Succulents (18 inches or less)				
<i>Achillea millefolium</i> 'Terra Cotta'	Yarrow Terra Cotta & other cultivars	L	12" x 4'	mow 1/year for meadow
<i>Aptenia cordifolia</i> /A. cordifolia 'Red Apple'	Heartleaf Ice Plant	L	6" x 12"	
<i>Delosperma cooperi</i>	Trailing Ice Plant	L	8" x 15"	
<i>Drosanthemum floribundum</i>	Rosea Ice Plant	L	8" x 15"	
<i>Dudleya hassei</i>	Santa Catalina Live Forever	N, VL	8" x 18"	
<i>Erigeron karvinskianus</i> & E.glaucus	Santa Barbara & Seaside Daisy	N,M	12" x 2'	
<i>Fragaria vesca</i> ssp. <i>Californica</i> or <i>F. chiloensis</i>	Woodland or Coastal Strawberry	N, M	8" x 2'	Grows in shade
<i>Gazania rigens leucolaena</i>	Gazania (grayish lvs.)	M	6" x 2'	
<i>Gazania linearis</i> 'Colorado Gold'	Colorado Gold Gazania (green lvs)	M	6" x 2'	
<i>Hypericum calycinum</i>	Creeping St. Johnswort	M	12" x 12"	Clip yearly; likes shade
<i>Iris douglasiana</i> & 'Pacific Coast Hybrids'	Douglas & Pacific Coast Iris	N, M	12" x 18"	Mix with grasses
<i>Lantana</i> Patriot series cultivars	Dwarf Lantana	L	12" x	
<i>Lessingia flaginifolia</i> 'Silver Carpet'	Beach Aster	L	12" x 4'	
<i>Monardella villosa</i>	Coyote Mint	N, VL	15" x 2'	
<i>Nepeta mussinii</i> (N. faassenii)	Catmint	M	15" x 18"	
<i>Osteospermum fruticosum</i>	Trailing African Daisy	L	6" x 18"	
<i>Oenothera caespitosa</i> & other species	Tufted evening primrose	N,L	12" x 2'	
<i>Rosmarinus officinalis</i> 'Huntington Carpet' or other prostrate varieties	Prostrate Rosemary	L	18" x 2'	
<i>Scaevola aemula</i> varieties	Fairy Fan Flower		8" x 2'+	
<i>Senecio serpens</i> , <i>S. mandraeliccae</i>	no common name	L	12" x 2'	
<i>Thymus</i> species	Thyme	M	8" x 2'	
<i>Verbena peruviana</i> & hybrids	Verbena	L	6" x 2'	
<i>Vinca minor</i>	Dwarf Periwinkle	M	12" x 4'	Plant in shade
Low-Growing Shrubs (18 inches or less) - all require regular trimming at parkway edges				
<i>Ceanothus</i> 'Centennial'		N, L	18" x 4'	needs good drainage
<i>Cotoneaster dammeri</i> 'Lowfast', <i>C. salicifolia</i> 'Repens', <i>C. apiculatus</i> 'Tom Thumb'	Groundcover Cotoneaster varieties	M	18" x 4'	
<i>Juniperus horizontalis</i> & <i>J. procumbens</i> var.	Groundcover Juniper varieties	L	6-18" x 4'	see Sunset for list

West Hollywood

PARKWAY DESIGN GUIDE



Carex divulsa



Festuca glauca



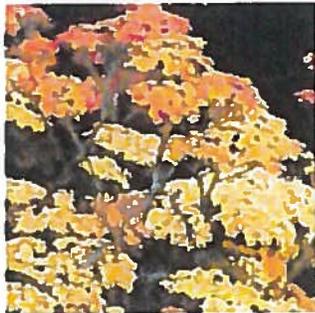
Sesleria autumnalis



Pennisetum 'Little Bunny'



Achillea 'Terra Cotta'



Apnea cordifolia 'Red Apple'



Delosperma cooperi



Drosanthemum floribundum



Dudleya hassei



Erigeron glaucus 'Wayne Roderick'



Gazania rigens leucolaena



Gazania linearis



Fragaria chiloensis



Hypericum calycinum



Iris douglasiana



Lantana 'Patriot Rainbow'



3 DESIGNING YOUR PARKWAY

Lessingia filaginifolia 'Silver Carpet'



Mondardella villosa



Nepeta mussinii



Osteospermum fruticosum



Oenothera caespitosa



Rosmarinus officinalis



Scaevola aemula



Senecio mandraeliccae



Thymus



Verbena peruviana varieties



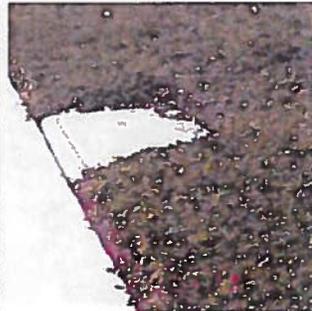
Vinca minor



Ceanothus 'Centennial'



Cotoneaster dammeri



Juniperus procumbens



Juniperus horizontalis var.



Table 3 Example Type 3 Medium Height, Drought Tolerant Plants - Path and More Maintenance Required

Botanical Name	Common Name	Water Use	Height x Spacing	Notes
18" to 36" Tall Grasses				
<i>Helictotrichon sempervirens</i>	Blue Oat Grass	L	2' x 2'	
<i>Leymus condensatus</i> 'Canyon Prince'	Canyon Prince Wild Rye	N, L	2' x 3'	
<i>Nasella tenuissima</i> (<i>Stipa tenuissima</i>)	Mexican Feather Grass	N, V L	2' x 2'	
<i>Pennisetum orientale</i>	Oriental Fountain Grass	L	18" x 18"	
<i>Pennisetum setaceum</i> 'Eaton Canyon'	Dwarf Red Fountain Grass	L	2' x 3'	
18" to 36" Tall Perennials/Succulents				
Aloe 'Blue Elf' & other small varieties	Blue Elf Aloe	L	18" x 18"	
<i>Anigozanthos</i> 'Bush Pearl', 'Bush Ranger' & 'Bush Devil'	Kangaroo Paws varieties		2' x 2'	
<i>Limonium perezii</i>	Statice	L	2' x 3'	+ flower height
<i>Lomandra longifolia</i> 'Breeze' & 'Little Con'	Lomandra cultivars	M	2' x 3'	
<i>Penstemon heterophyllus</i> 'Margarita BOP'	Foothill Penstemon	N, M	18" x 18"	
<i>Phormium</i> 'Tom Thumb' & 'Jack Spratt'	Small Flax hybrids	M	2' x 2'	
18" to 36" Tall Shrubs				
<i>Arctostaphylos densiflora</i> 'Pacific Mist'		N, L	2' x 6'	
<i>Artemisia pycnocephala</i> 'David's Choice'	David's Choice Sandhill Sagebrush	N,	2' x 3'	
<i>Ceanothus gloriosus</i> 'Anchor Bay'		N, L	2' x 6'	
<i>Cistus salvifolius</i>	Sageleaf Rockrose	L	2' x 3'	
<i>Iva hayesiana</i>	Poverty Weed	N, VL	2' x 3'	
<i>Lantana montevidensis</i>	Trailing Lantana	L	2' x 3'	Cut back yearly
<i>Lantana</i> 'Gold Rush', 'New Gold' & 'Chapel Hill Yellow'			2' x 3'	Monrovia
<i>Mimulus</i> hybrids inc. 'Jelly Bean Yellow'	Shrubby Monkeyflower hybrids	N, L	2' x 3'	
<i>Rosa</i> Flower Carpet varieties	Groundcover Roses	M	2' x 3'	Monrovia
<i>Salvia apiana</i>	White Sage	N, VL	3' x 4'	
<i>Salvia</i> 'Bee's Bliss'	Bee's Bliss Sage	N, L	2' x 4'	
<i>Verbena lilacina</i> & <i>V. lilacina</i> 'De La Mina'	Lilac Verbena	N, L	3' x 3'	

3 DESIGNING YOUR PARKWAY

Helictotrichon sempervirens



Leymus condensatus 'Canyon Prince'



Nasella tenuissima



Pennisetum orientale



Pennisetum setaceum 'Eaton Canyon'



Aloe 'Blue Elf'



Anigozanthos 'Bush Pearl'



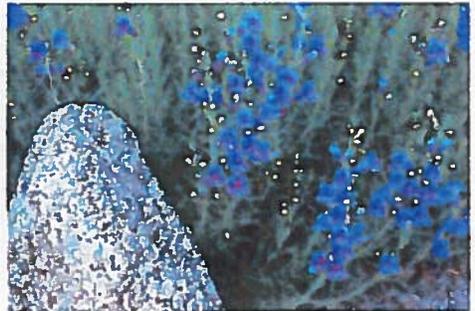
Limonium perezii



Lomandra longifolia 'Breeze'



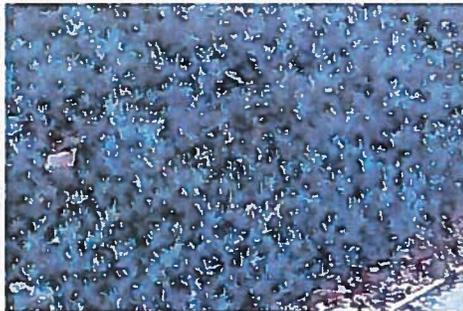
Penstemon heterophyllus 'Margarita BOP'



Phormium 'Jack Spratt'



Arctostaphylos densiflora 'Pacific Mist'



Artemisia pycnocephala 'David's Choice'



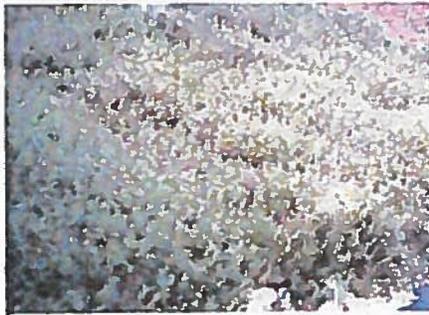
Ceanothus gloriosus 'Anchor Bay'



Cistus salvifolius



Iva hayesiana



Lantana montevidensis



Lantana 'Gold Rush'



Mimulus 'Jelly Bean Yellow'



White Flower Carpet Rose



Red Flower Carpet Rose



Amber Flower Carpet Rose



Salvia apiana



Salvia 'Bee's Bliss'



Verbena lilacina



4 EXAMPLES

Good Examples of Type 1 Parkway (Walkable Plants)



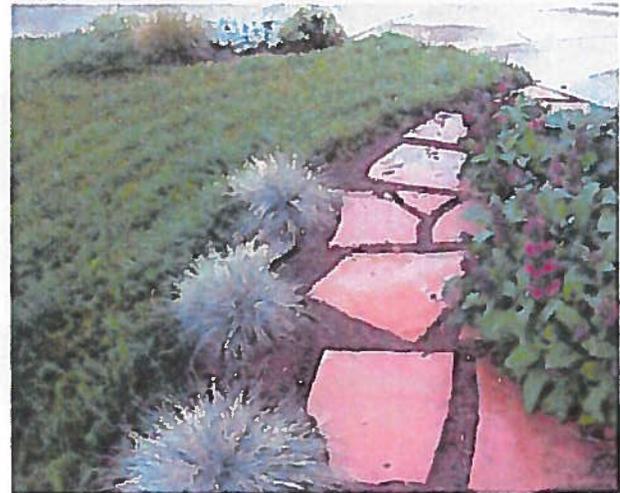
California Meadow Sedge (*Carex pansa*) can manage with little or no supplemental water from November - April and irrigation once a week the rest of the year. It can be mowed a few times a year for a more lawn-like appearance.



UC Verde Buffalo grass (*Buchloe dactyloides UC Verde™*) is a drought-tolerant cultivar of Midwest native Buffalo grass.



Dymondia (*Dymondia margaritae*) (Rangley Ave.) is a low growing, walkable groundcover



Regularly mowed Yarrow (*Achillea millefolium*) is lawn-like.

Good Examples of Type 2 Parkway



Berkeley Sedge (*Carex divulsa*) (Westmount Drive) requires very little care and similar water to California Meadow Sedge.



Gazania (Norwich Dr.) are a reliable relatively drought-tolerant groundcover that tolerates light traffic.



Autumn Moor Grass (*Sesleria autumnalis*) requires very little care and similar water to the Sedges.



A prostrate Rosemary like 'Huntington Carpet' (Pointsettia Dr.).

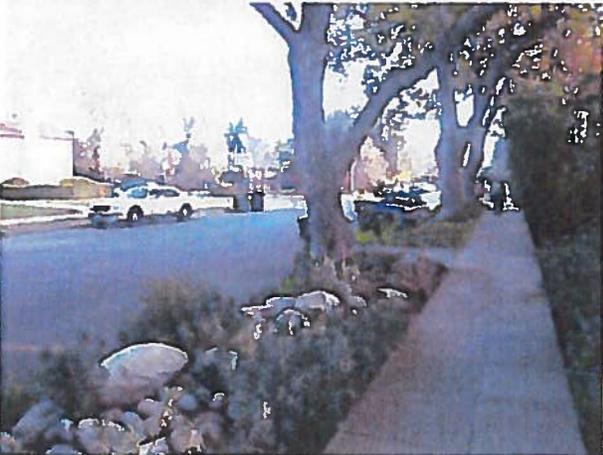
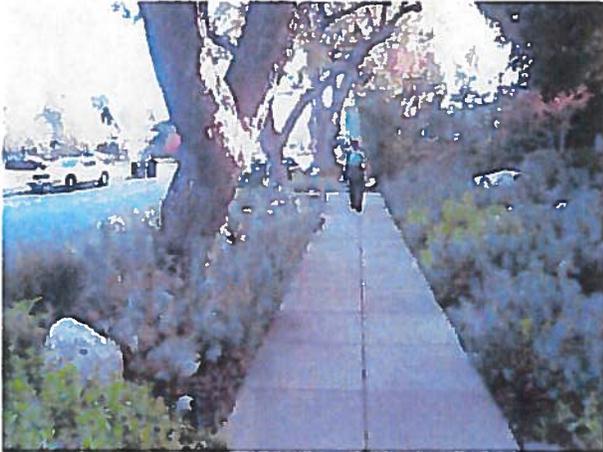


Blue Fescue (*Festuca cultivars*) (Dorrington Ave.) require good drainage and tolerate some shade.

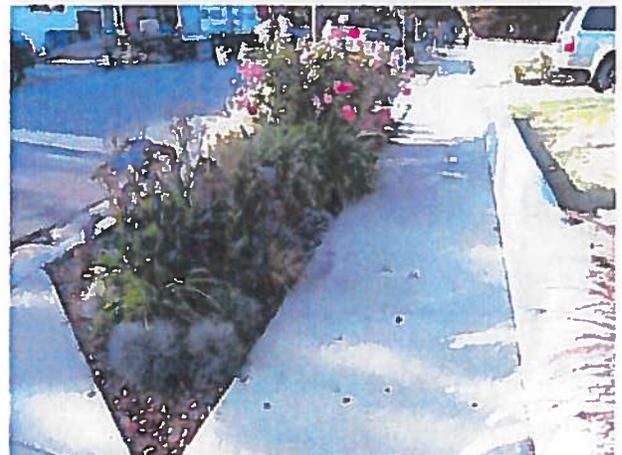


Dwarf Periwinkle (*Vinca minor*) is a good choice for a shady parkway.

Good Examples of Type 3 Parkway: Perennial Gardens



This mix of drought-tolerant perennials (Orlando Ave.) extends the front yard landscaping to the curb and incorporates river rock. It is beautifully maintained and would be a perfect example if the parkway were swaled rather than mounded.



This mix of fairly drought-tolerant perennials (Westbourne Dr.) provides color to brighten the street and includes a pathway.

Other Good Examples



Mexican Feather Grass (*Nasella tenuissima*) (Pointsetta Drive) needs to be cut back to about 9" high every winter. It self-seeds and spreads but can be managed.



Native Deer Grass (*Muhlenbergia rigens*) needs a wide parkway.



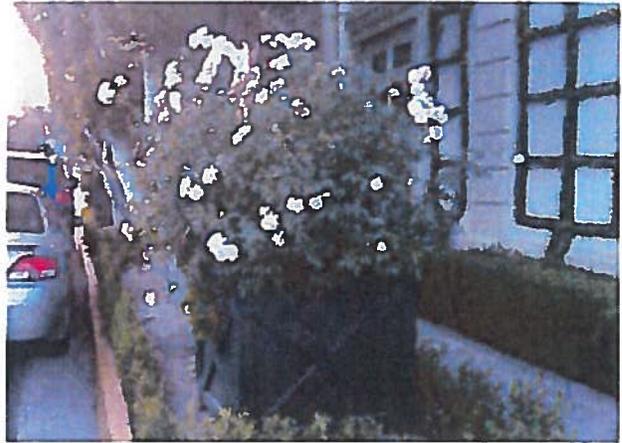
Lantana needs to cut back so it does not become too tall and woody



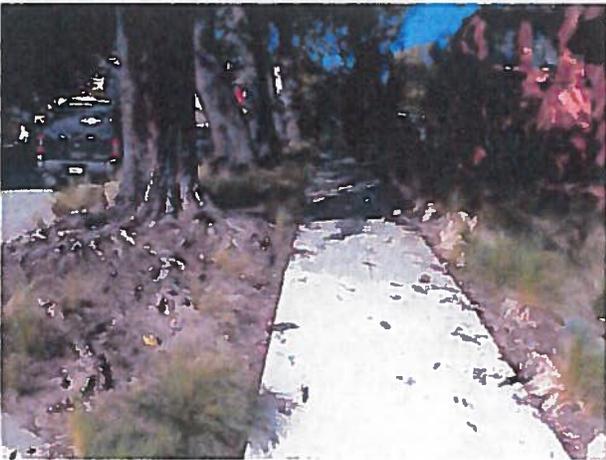
Autumn Moor Grass and other low, clumping grasses require little maintenance.

4 EXAMPLES

Special Parkway Conditions



Pots or other elements may be appropriate in some locations. An encroachment permit is required for elements other than plants and paving.



While plants should not be placed within 4' of a tree trunk to reduce competition for nutrients, grasses and clumping perennials may be planted between large surface roots farther away, provided they do not adversely affect the tree.

Attachment 2



SHAW/YODER/ANTWIH, inc.
LEGISLATIVE ADVOCACY • ASSOCIATION MANAGEMENT

DATE: June 23, 2015

TO: Cheryl Friedling,
Deputy City Manager
City of Beverly Hills

FROM: Andrew K. Antwih, Partner
Shaw / Yoder / Antwih, Inc.

SUBJECT: AB 1164 (Gatto) – Water conservation: drought tolerant landscaping

Purpose: Assembly Bill 1164 would prohibit a local government from enacting or enforcing any ordinance or regulation that prohibits the installation of synthetic grass or artificial turf on residential property, and would appropriate \$300 million over three years to provide matching funds for local incentives to replace water inefficient residential landscaping with drought tolerant landscaping.

Background: With the state's historic drought entering its fourth year, government entities at all levels are considering methods to cut back on water use. Governor Brown has called for a 25% reduction in urban water use and approved emergency regulations to meet that reduction goal, including compelling the replacement of 50 million square feet of lawns throughout the state.

Many Californians have decided to replace their lawns with more drought tolerant landscaping options, including artificial turf and drought resistant plants, and many of them are able to take advantage of local turf removal rebate programs like the one operated by the City of Beverly Hills. However, some local governments and homeowner associations (HOAs) have placed bans on artificial lawns, citing aesthetic, property value, or safety-related reasons while defending their local control over these issues.

This bill would prevent artificial turf bans by local governments, including cities and counties. It should be noted that one city that has received attention for its ban is the City of Glendale, which is located in the author's district. Another bill, AB 349 (Gonzalez), would similarly prevent bans for HOAs. That bill passed the Senate Committee on Transportation and Housing on June 23 by a unanimous vote of 11-0, and the Governor, who previously vetoed a similar bill, has displayed openness to it in light of the continuing drought. Asm. Gonzalez is also the coauthor of AB 1164.

This bill has an urgency clause, meaning that it would take effect immediately, and also that it would require a 2/3rds vote in both houses of the Legislature to pass.

Impact: This bill would prevent the City of Beverly Hills from prohibiting the installation of synthetic grass or artificial turf on residential property. If the bill passed, the City's turf removal

rebate program would likely be eligible for state matching funds from the State Water Resources Control Board.

Recommendation: Beverly Hills has been required by the state to reduce its water consumption, much of which is related to lawn upkeep, by 36%. The City has already put a number of new restrictions in place in response to this requirement. The City should consider the importance of retaining local control over housing requirements while remaining sensitive to the urgent need to achieve its reduction targets and prepare for continuing drought conditions. It should also consider the financial benefits of matching funds for the turf removal rebate program. We would recommend a **watch** position for now, and we would also note that the League of California Cities has not yet taken a position.

Status: AB 1164 passed the Assembly before the current language of the bill was amended in on June 22. It is currently pending before the Senate Committee on Transportation and Housing. It is likely that this bill will be sent to the Governance and Finance committee, which would have more significant jurisdiction over this policy. It will have to return to the full Assembly for a vote if it passes the Senate.

Support/Opposition:

Support: None yet registered.

Oppose: None yet registered.

Attachment 3

SECTION 32 18 16
SYNTHETIC GRASS SURFACING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes synthetic grass surfacing for installation with accessories as indicated on the Drawings and specified herein.

1.3 SYSTEM DESIGN

- A. The synthetic grass surfacing system shall be specifically designed and recommended by the manufacturer for use specified on the plans.
- B. The synthetic grass surfacing system shall be constructed to maximize dimensional stability, to resist damage during normal use, and to minimize UV degradation, including fading.
- C. The synthetic grass surfacing system shall be resistant to staining, weather, insects, rot, mildew, and fungus growth, and shall be non-allergenic and non-toxic.

1.4 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's product data, specifications and installation instructions for each product specified.
 - 1. Include sources for component materials.
- B. Material Certificates: Signed by manufacturer, certifying the materials and system proposed for the project comply with the specified performance criteria.
- C. Shop Drawings: Submit shop drawings that include scaled plans, sections, and large-scale details showing the installation and attachment of the synthetic grass surfacing system.
 - 1. Include locations of all seams in fabric surfacing.
- D. Samples:
 - 1. 18 inch by 18 inch samples showing details of finished installation. Include an example of a field joined seam between adjacent rolls and outside edge attachment.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualifications for Installer.
- B. Qualifications for Manufacturer.

- C. Maintenance Data: For synthetic grass surfacing system and maintenance equipment, to be included in maintenance manuals. Include the following:
 - 1. Manufacturer's written instructions manual for routine cleaning, adjustment, grooming, and other maintenance procedures. Include activities and procedures that could be detrimental to the synthetic grass surfacing system and should be avoided.
 - 2. Owner's manuals for field grooming and sweeping equipment.
 - 3. Warranty information for field grooming and sweeping equipment.
- D. Project Record Drawings: Record actual locations of seams and drains on the Record Drawings.
- E. Warranty: 3 signed copies of signed warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm specializing in the manufacturing of synthetic grass surfacing for a minimum of five years and who has completed work similar in design and extent to that required for the project and whose work has resulted in construction with a record of successful in-service performance.
- B. Installer Qualifications: Firm experienced in the installation of synthetic grass, who is certified by the synthetic grass manufacturer to install their materials, who has successfully installed work similar in design and extent to that required for the project, in not less than 10 projects of similar scope, to the satisfaction of the Owner, in the last three years, who employs trained workmen that are experienced in the installation of the synthetic grass system proposed for the project, and whose work has resulted in construction with a record of successful in-service performance.
- C. Single-Source Responsibility: Obtain synthetic grass surfacing system materials, including drainage mat, adhesives and seaming materials, from a single manufacturer regularly engaged in manufacturing the materials.
- D. Pre-installation Conference: Prior to the start of the synthetic grass surface system work, coordinate a conference, to be held at the Site, in accordance with Section 01 31 00, Project Management and Coordination, to review the construction schedule, availability of materials, installer's personnel qualifications and experience, equipment and facilities needed to make progress and avoid delays, installation procedures, testing, inspection, and certification procedures, and coordination with other work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site in original, unopened containers, wrapping, or packaging, with manufacturer's labels intact, identifying project, material, and production run or lot number for fabric roll.
- B. Immediately following delivery, inspect materials and components for damaged or defective items, including materials that are not uniform in color, out of tolerance regarding edge alignment and minimum pile height. Materials that are found to be damaged or defective shall be replaced at no additional cost to the Owner.

- C. Store materials in a secure, dry, well-ventilated location where protected from weather, exposure to UV, soil, dust, moisture and other contaminants. Store fabric rolls horizontally, on a flat surface.
- D. Handle according to manufacturer's recommendations to prevent damage, deterioration, distortion, or soiling.

1.8 PROJECT CONDITIONS

A. Environmental Limitations:

- 1. Do not install synthetic grass surfacing materials when:
 - a. Substrate surfaces/materials are wet, excessively damp, or have standing water.
 - b. Rain is imminent or forecast within 48 hours following proposed time of installation.
 - c. Weather conditions, or forecasted conditions, in the opinion of the installer or manufacturer's representative, will have an adverse effect on the installation.
 - d. Humidity levels are outside of the limits recommended by adhesive manufacturer.
- 2. Install synthetic grass surfacing materials only when:
 - a. Material surface temperatures, including aggregate base materials, are above 45 degrees F, and anticipated to remain above 45 degrees F for not less than 48 hours following installation.
 - b. Ambient air temperature is 50 degrees F and rising, but not more than 95 degrees F, and forecast to remain above 50 degrees F for not less than 48 hours following installation.
 - 1) Ambient air temperatures shall be taken in the shade, away from artificial heat sources, such as exposed pavement and stone aggregate fill.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Synthetic Grass Surfacing System Fabric: For repairs and/or replacement of areas displaying excessive wear.
 - a. 100 sq ft of fabric, 15 ft wide roll.
 - 2. Cleaning Solution: One gallon of industrial-strength cleaning solution, recommended in writing by fabric manufacturer, and fabric manufacturer's written cleaning instructions.

1.10 WARRANTY

- A. Warranty: Submit a written warranty for the synthetic grass surfacing system agreeing to repair or replace materials and components of the synthetic grass surfacing system that develop defects in materials or workmanship within the specified warranty period and any other deterioration of the surfacing system or evidence of failure to meet performance requirements. Defects include the following:

1. Excessive Fading: Defined as the synthetic grass surfacing system shall remain a uniform color, without a change in appearance that is perceptible and objectionable, as determined by the Owner, when viewed visually in comparison with the original samples.
 2. Ultraviolet (UV) and heat degradation.
 3. Excessive Wear: Defined as the synthetic grass surfacing system pile height shall not decrease by more than 10 percent each year, or more than 50 percent within the specified warranty period beyond that attributable to normal use.
 4. Tuft bind loss.
 5. Fabric delamination.
 6. Loss of backing integrity.
 7. Seam and edge raveling.
 8. Perimeter attachments.
 9. Distortion, either vertically or horizontally, due to dimensional instability.
- B. Warranty Period: 15 years from the date of Substantial Completion.
- C. The warranty shall include that if the synthetic grass surfacing system is determined to no longer be serviceable within the specified warranty period, the manufacturer and installer shall, at no cost to the Owner, remove and replace those areas of the surfacing system not meeting the specified performance criteria.
- D. The warranty shall not be limited by the amount of use and shall not be prorated.
- E. Provide warranty signed by the Contractor, surfacing system manufacturer, and installer.
- F. The above warranties are in addition to, and not a limitation of, other rights the Owner may under the Contract Documents.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. The synthetic grass surfacing system shall comply with the following:
1. Linear Density: Not less than 5,040 Denier; ASTM D 1557.
 2. Pile Weight: Total pile weight 80 oz/sq yd; ASTM D 5848.
 3. Primary Backing Weight: 8 oz/sq yd; ASTM D 5848.
 4. Secondary Backing Weight: Average 20 oz/sq yd; ASTM D 5848.
 5. Total Weight: 104 oz/sq yd; ASTM D 5848.
 6. Tuft Bind: Not less than 8 lbs; ASTM D 1335.
 7. Flame Resistance: Pass; ASTM D 2859.
 8. Drainage Through Fabric: Not less than 30 inches per hour; ASTM F 1551.
 9. Lead Content: Comply with ASTM F 2765 for maximum lead content. Meet all federal and state heavy metal compliance standards.
- B. Provisions for Thermal Movement: The synthetic grass surfacing system, when installed, shall accommodate expansion and contraction, to a maximum of 1.0 percent, over the average range of temperature and humidity conditions experienced in Beverly Hills.
- C. Uplift Resistance: The synthetic grass surfacing system shall be capable of withstanding wind loads in cladding wind load test report.

- D. Drainage: The synthetic grass surfacing system shall allow for the free movement and drainage of surface water through the surfacing system.

2.2 SYNTHETIC GRASS FABRIC

- A. Yarn: Athletic quality polyethylene parallel-long slit fiber yarn engineered specifically for outdoor use and stabilized to resist the effects of ultra-violet breakdown, heat, wear, water, fungus attacks, and airborne pollution.
 - 1. Yarn:
 - a. Field: Polyethylene with HeatBlock.
 - b. Trim: Texturized Polypropylene.
 - 2. Yarn Length:
 - a. Field: 1-1/2 inches long, nominal.
 - b. Trim: 1-1/4 inch long, nominal, +/- 15 percent.
 - 3. Color:
 - a. Field: Turf Green.
 - b. Trim: Turf Green.

2.3 INFILL

- A. Granular Infill: Manufacturer's standard granular infill to control odors made from 100 percent natural organic material and 97 percent pure clinoptilolite zeolite, installed in ratio, density, and thickness recommended by the manufacturer for the application.

2.4 ACCESSORIES

- A. Perimeter Board: Wood and plastic composite materials made from reclaimed wood fibers and reclaimed or recycled thermoplastic polymer plastic material.
- B. Drainage Pad: Recycled closed cell polyethylene foam pad with drainage channels on the bottom of the pad. Density of pad as recommended by synthetic grass manufacturer.
 - 1. Poly-Green Foam, Poly-Green Foam LLC.
 - 2. Or other as recommended by grass surfacing manufacturer.

-or-

- C. Drainage Mat: Recycled polypropylene drainage core of fused, entangled filaments in a square waffle pattern with a geocomposite fabric bonded to one side.
 - 1. Enkadrain 3811R, Colbond, Inc.
 - 2. Or other as recommended by grass surfacing manufacturer.
- D. Provide all additional materials, equipment and accessories necessary for a complete installation as recommended by the manufacturer. Included are all perimeter fasteners, backings, tools, labor, equipment, and means for protection of adjacent surfaces and materials.

2.5 FABRICATION

- A. Fabric Rolls: Fabricate synthetic grass fabric in strips, 15 ft wide by length required to extend completely across the grass surfacing area, without intermediate cross seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine area to receive synthetic grass surfacing system, with installer present, for compliance with manufacturer's requirements and other conditions affecting performance.
 - 1. Verify the finish elevations, slopes, and planarity of the base comply with requirements of the Project and surfacing system manufacturer.
 - 2. Record findings, prepare a written report, signed by Contractor and installer, and submit copies of report to the Owner.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of installation shall indicate acceptance of existing conditions.

3.2 PREPARATION

- A. Thoroughly clean the area to receive the synthetic grass system of foreign material and all other substances and materials that may be detrimental to permeability and/or installation of the synthetic grass system.

3.3 INSTALLATION

- A. General: All work shall be performed by skilled workmen, who are experienced and trained by the manufacturer in the installation of the synthetic grass system. Work shall be performed in accordance with the Drawings, reviewed shop drawings, and manufacturer's written installation instructions.
- B. Synthetic grass surfacing fabric rolls shall be unrolled and allowed to relax prior to installation.
- C. Fabric Roll Installation:
 - 1. Synthetic grass surfacing fabric rolls shall be installed across entire width of area, parallel to long dimension, or as directed by the Architect, directly over drainage pad/ mat.
 - a. Rolls shall extend from edge to edge and be attached to perimeter boards. Cross seams are not allowed.
 - b. Rolls shall be rolled out in same direction and installed with uniform pile direction of fibers.
 - c. Rolls shall be laid straight and true to line. Adjacent rolls, when laid together, shall form a tight fitting seam for the entire length of the fabric. Fitted pieces are not allowed.
 - 2. Spot glue to drainage pad/mat and concrete slab at edges as recommended by the surfacing system manufacturer.
 - 3. Attach the surfacing fabric to the perimeter boards with staples or nails as recommended by the surfacing system manufacturer
- D. Seaming of Fabric:
 - 1. Seams in the synthetic grass fabric rolls shall be glued together with seaming cloth, utilizing the manufacturer's standard seaming procedures and materials, ensuring that each roll is properly attached to the next.
 - a. Seams shall be flat, tight, and permanent, with no separation or fraying.

- b. Seams, when completed, shall display no visible signs of joining, with fibers brushed to provide full coverage of fibers over the seam.
- E. Infill Material Installation: Install infill materials shall be applied as recommended by the surfacing system manufacturer, to ensure the voids between the fibers are filled and the fibers are being held vertically and non-directional

3.4 CLEANING AND PROTECTION

- A. The installer shall keep the site clean and clear of debris throughout the project. Waste materials, including excess materials remaining after completion of the Work, shall be removed and legally disposed of offsite.
- B. Installer shall provide all labor, supplies, and equipment required to completely remove stains and other blemishes from all finished surfaces.
- C. Provide protection over installed synthetic grass surfacing systems, including closing the area to traffic, as required to ensure installed system will be free of damage at time of Substantial Completion.

3.5 INSPECTION

- A. Inspection: After installation is complete, the synthetic grass surfacing system installer, synthetic grass surfacing system manufacturer's representative, and Owner shall inspect the installation. Any corrections shall be noted in a written report and completed prior to Substantial Completion.

3.6 DEMONSTRATION AND TRAINING

- A. Train Owner's staff regarding maintenance and repair/replacement of the synthetic grass surfacing system, and maintenance. Training dates and times shall be coordinated by the Owner.
- B. All training shall be completed prior to Substantial Completion of the project.

END OF SECTION