

# Rain Gardens, et cetera



PHOTO CREDIT: *City of Austin*

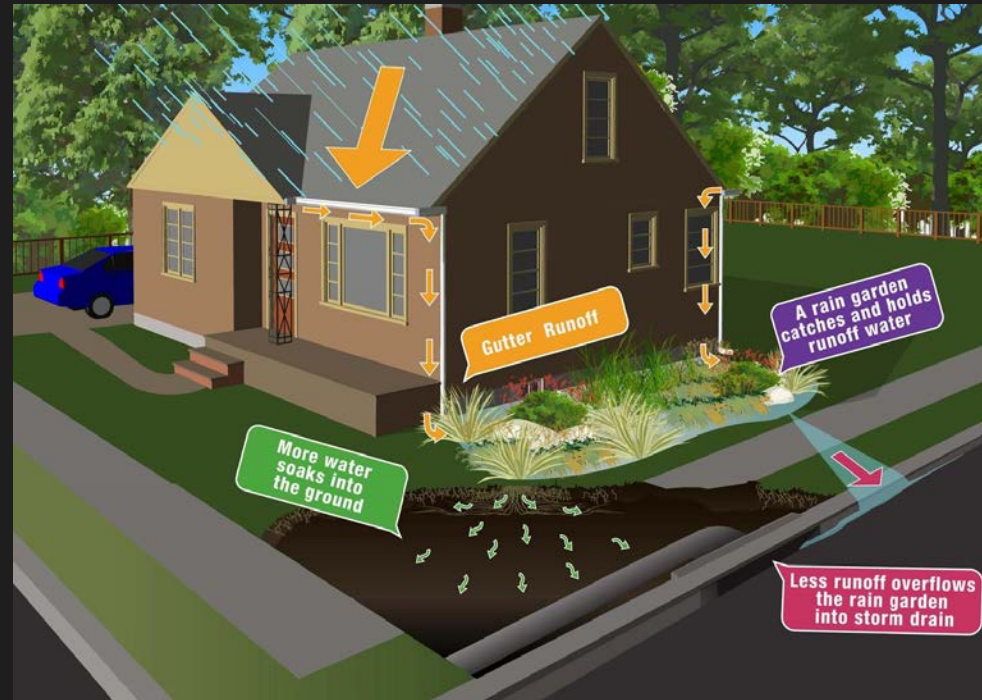
**Susan Kenzle, RLA, LI, ISA**

# Rain Garden

What is it?

A vegetated basin that absorbs and filters rainwater runoff that comes from roofs, sidewalks, and driveways. Typically, there is an INLET (water in) and an OUTLET (water out).

AKA **Green Stormwater Infrastructure.**



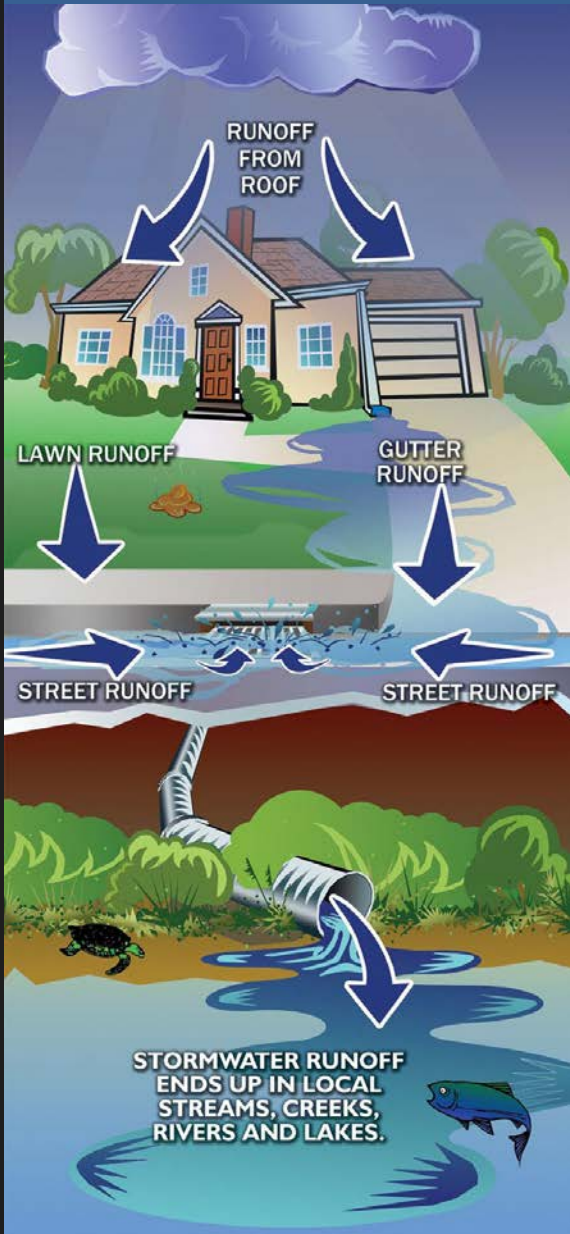
GRAPHIC CREDITS: *City of Austin*

## COMMERCIAL

## RESIDENTIAL

# Rain Garden: Why?

## For dealing with water quality, flooding, and erosion

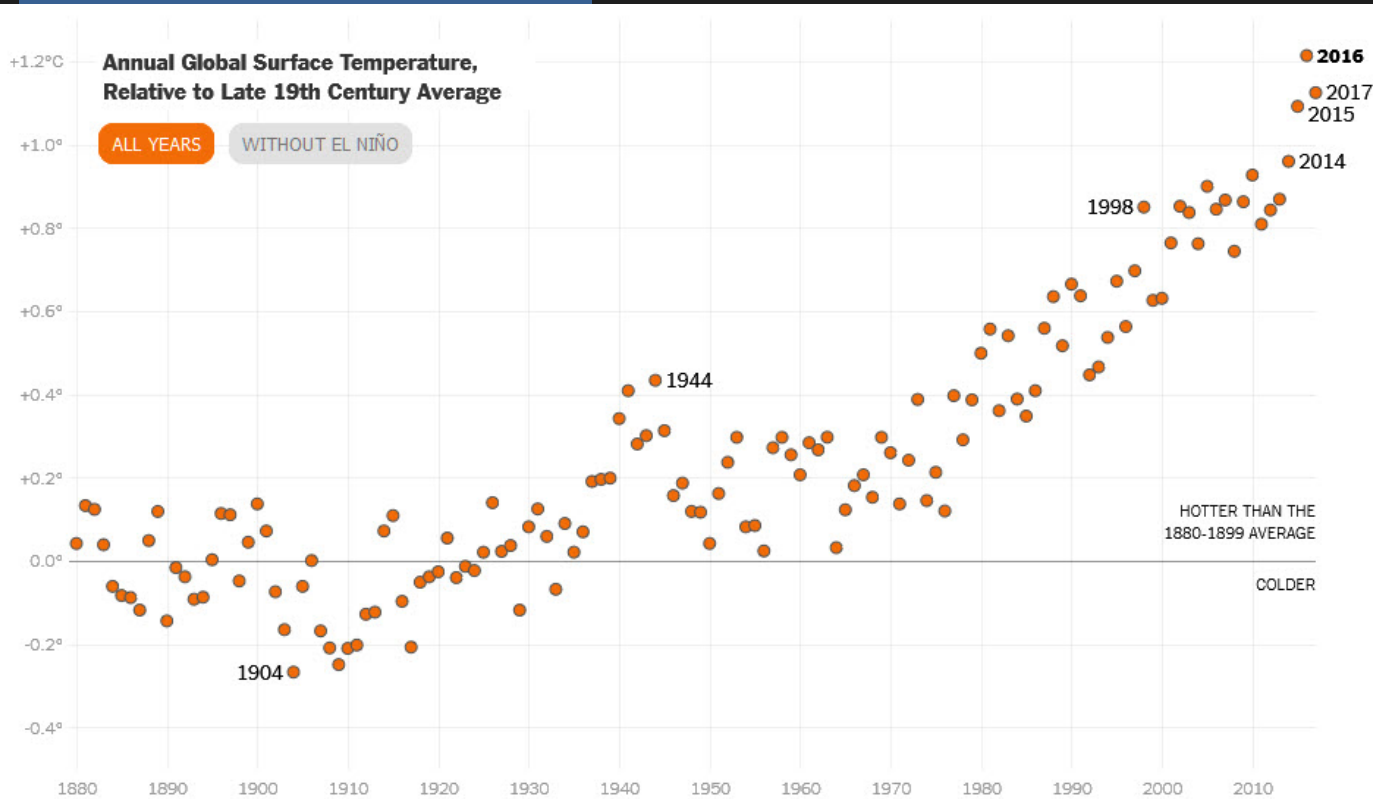


PHOTO/GRAPHIC CREDITS: *Triple Pundit.com*; *NCDENR*

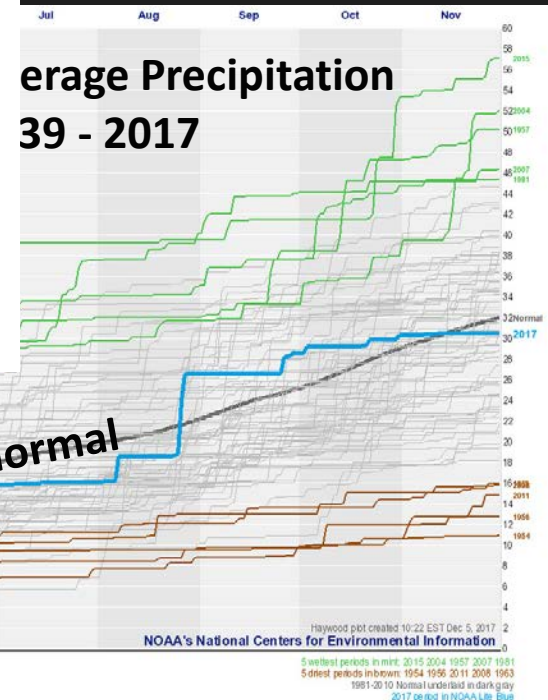
## Stormwater is a challenge, an opportunity

# Rain Garden: Why?

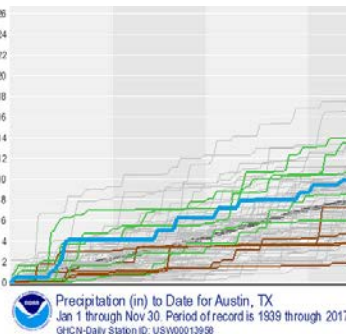
# Climate is changing



Source: NASA



SOURCES: NASA, NOAA



# Rain Garden: Benefits

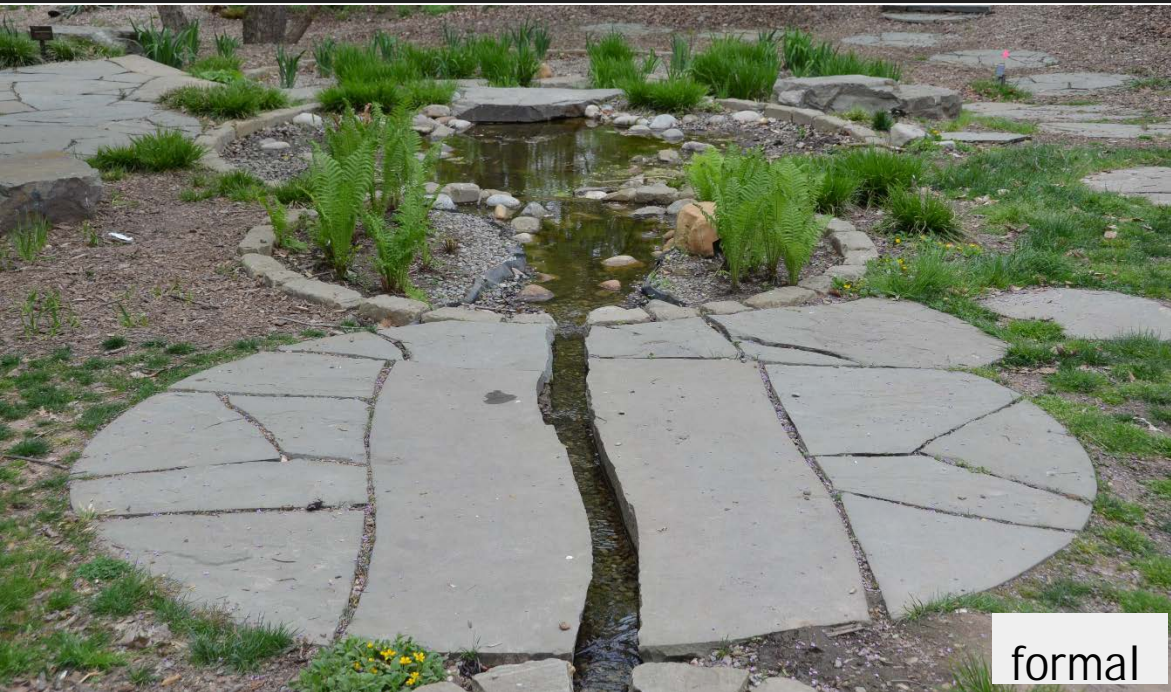
- Water Quality credit - see Environmental Criteria Manual 1.6.7.2
- Landscape credit - see Environmental Criteria Manual 2.4.9
- Multiple other goals:
  - manages/treats site stormwater runoff +
  - Beautification +
  - Ecological benefits: integrating nature into the city (Imagine Austin); urban heat island reduction; wildlife/pollinators; carbon capture; recharge +
  - Reduces potable water use for landscape irrigation
- Flexibility in stormwater management: many rain gardens spread across a site instead of one large pond

REGULATORY



PHOTO CREDITS: City of Austin

# Rain Garden: Various Forms



formal



photo by Austin Water

informal

# Rain Garden: Various Locations



residential/commercial



roadside/ROW



Street median



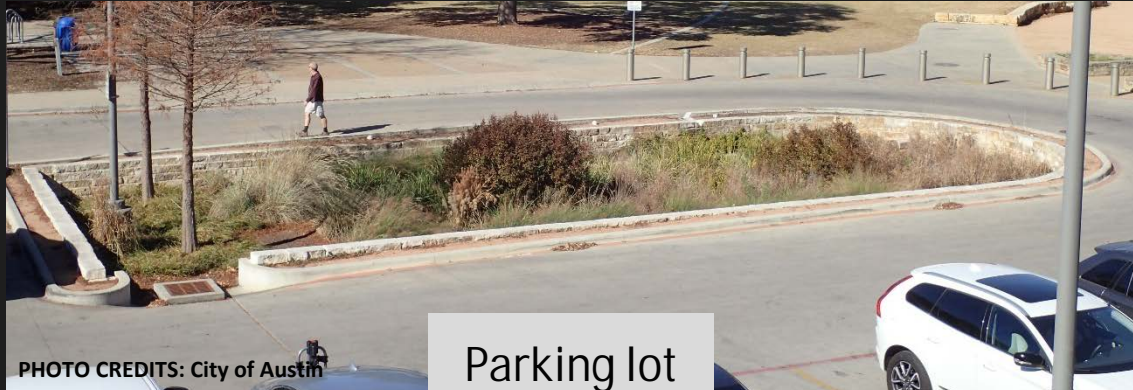
school



Urban trail



residential



Parking lot

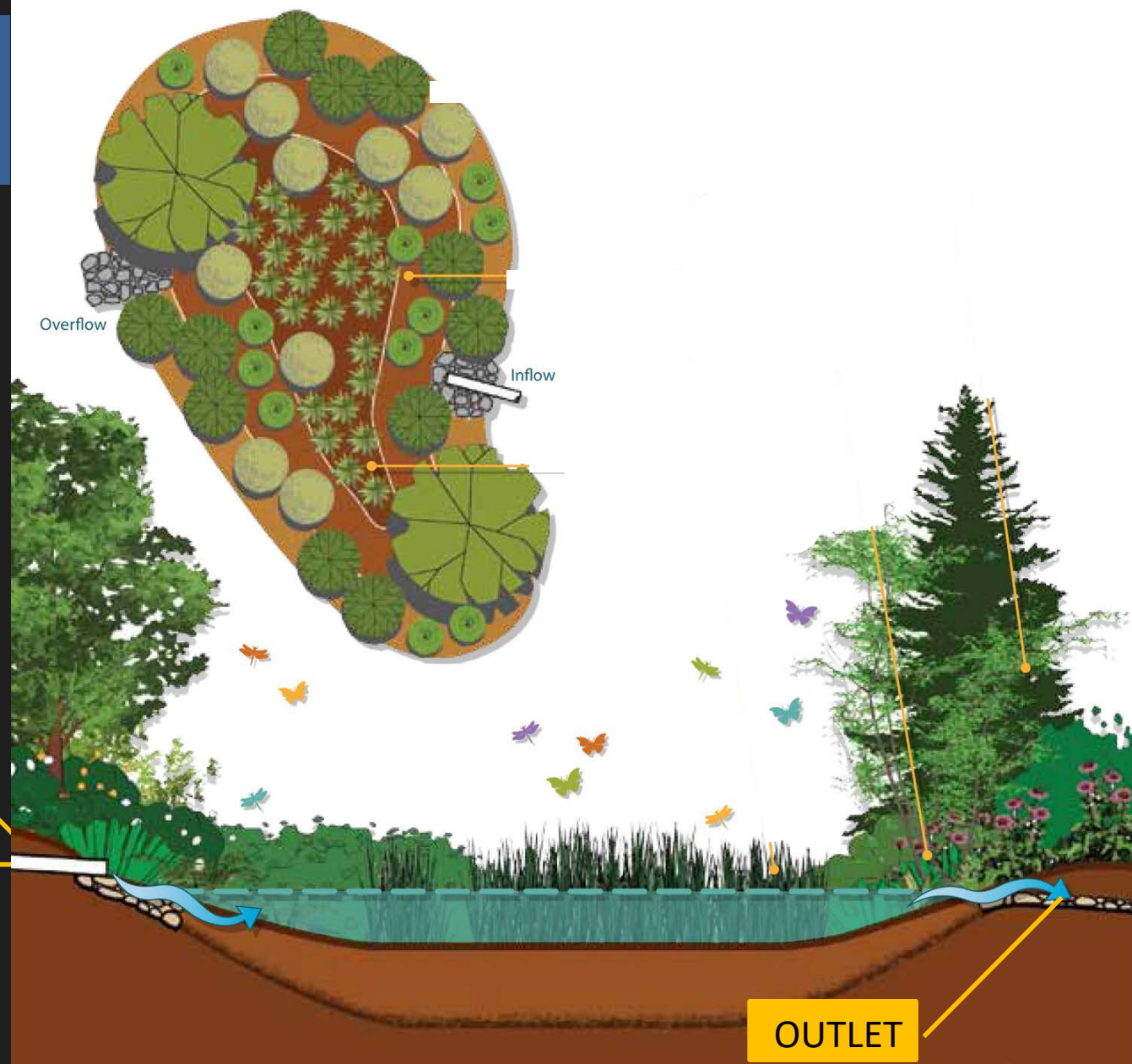
# Rain Garden: Components

- **Berm**
- **Inlet/Inflow** – water in
- Side slope
- **Basin bottom**
- **Outlet/outflow** (not all have this; outlet for water could be infiltration)

BERM

INLET

OUTLET



SOURCE: *Rain garden Handbook for Western Washington*, Washington State Department of Ecology, June 2013.



# Rain Garden: Components



PHOTO CREDITS: SVR Design; tenthacrefarm.com; wikihow.com

# Rain Garden water

Do I need gutters?

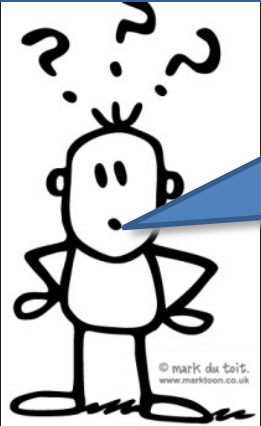
No, but it helps



swale



# Rain Garden water



Can I capture  
overland flow  
from my yard,  
from the  
driveway?

**Yes!**  
**Absolutely!**



Channel drain



Driveway sloped to  
rain garden

PHOTO CREDITS: [earthwizards.com](http://earthwizards.com)

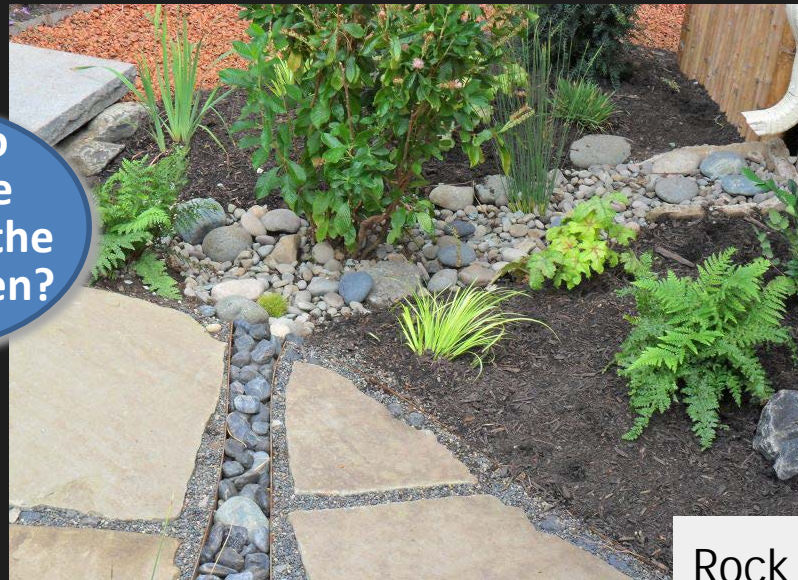
# Rain Garden water

Go outside  
when it rains.



# Rain Garden water

How do  
I get the  
water to the  
rain garden?



Rock channel



downspout



Pipes/French drain



Trench drain

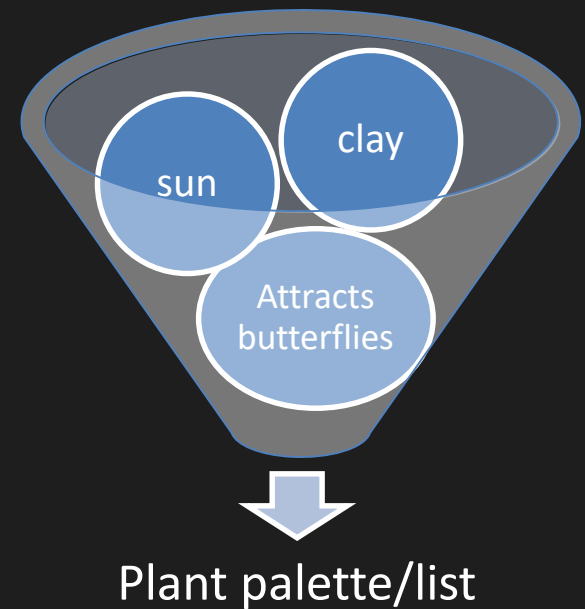
PHOTO CREDITS: [citube.com](http://citube.com);  
[pinterest.com](http://pinterest.com); [Photomontana.net](http://Photomontana.net);  
[Wikimedia.org](http://Wikimedia.org)

# Rain Garden Plants

Hey!  
What  
works?



It depends...



**PLANT CHARACTERISTICS:**

Evergreen? Deciduous? Blooms? Seasonal interest? Other.

**RAIN GARDEN TYPE:**

Full or partial infiltration, filtration? Saturated zone?

**SOIL:**

Slow draining, fast draining? Clay, sand? Thin, Deep, Rocky?

**SITE CONDITIONS:**

Sunny? Shady? Surrounded by concrete (hot)? Etc.

**LOCATION:**

What is the context: In a yard? In the ROW or parking lot (sight distance restrictions)? Etc.

**AESTHETICS:**

Is appearance important? Formal, informal, manicured or more shaggy?

**OTHER CONSIDERATIONS:**

Attract pollinators, birds? Other users – kids, dogs? Maintenance considerations (who? How much?)

**NOTE: Austin's rain gardens are dry most of the time. Don't assume wetland plants.**

# Rain Garden Plants

Where's the info?



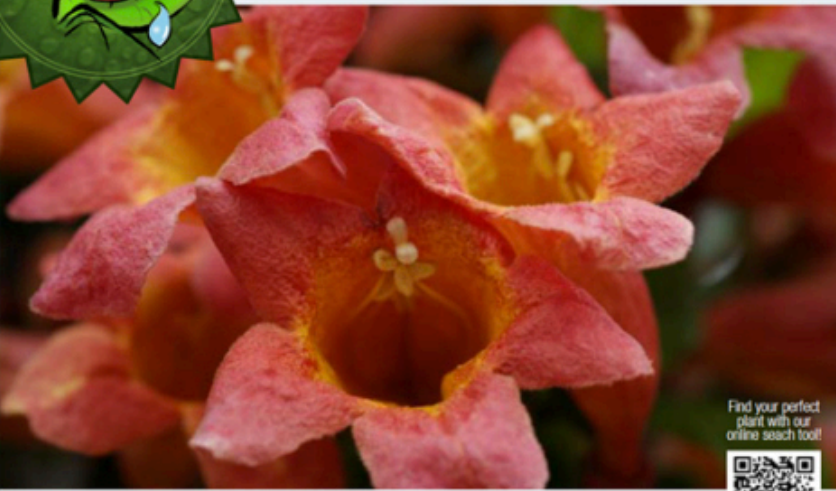
Many plants to choose from

Many plants are rain garden suitable

Texas A&M AgriLife Extension Service City of Austin growgreen.org



## Native and Adapted Landscape Plants



an earthwise guide for Central Texas

Find your perfect plant with our online search tool!



A screenshot of the Wildflower Center's Native Plant Database website. The page has a blue header with the Wildflower Center logo and navigation links like 'Shop', 'Interact', 'Rental', 'SITES', and 'Contact'. Below the header is a search bar and a list of menu items including 'Native Plants', 'About NPIN', 'Bibliography', 'Botanical Glossary', etc. The main content area is titled 'NATIVE PLANT DATABASE' and features a search form with fields for 'Name' (scientific or common names) and 'Family' (Acanthaceae (Acanthus Family)). Below the search form is a 'COMBINATION SEARCH' section with various filters for 'Select State or Province', 'Habit', 'Duration', 'Light requirement', 'Soil moisture', 'Bloom Characteristics', 'Leaf Characteristics', and 'Size Characteristics'. A QR code is visible in the bottom right corner of the screenshot.

# Rain Garden Plants



What  
about the  
butterflies?

Yes!  
Rain gardens can have  
plants for pollinators...  
It's important





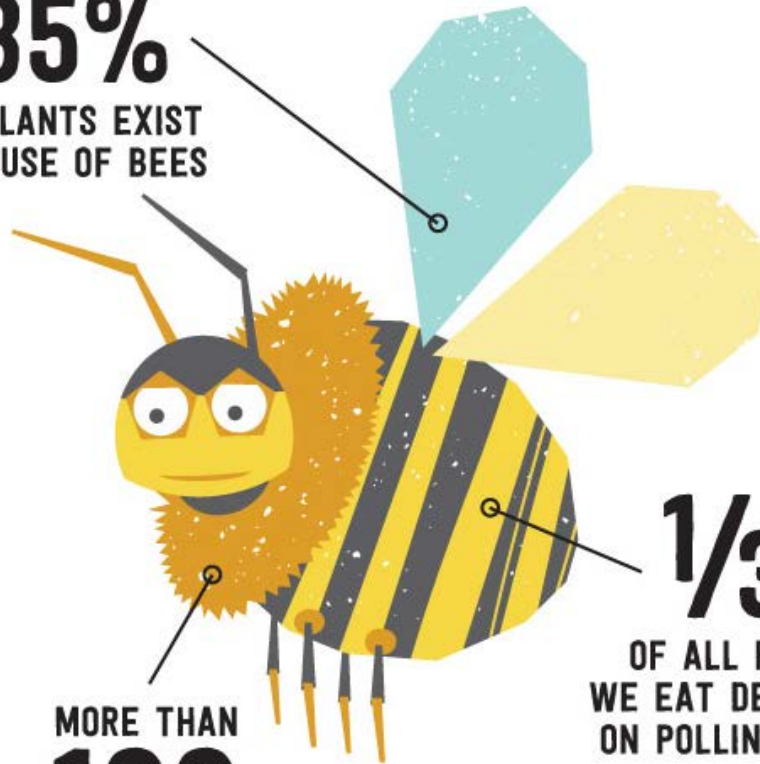
# Rain Garden Plants



and the bees, the birds, others

Pollinators are important because...

**85%**  
OF PLANTS EXIST  
BECAUSE OF BEES



**1/3**  
OF ALL FOOD  
WE EAT DEPENDS  
ON POLLINATORS

MORE THAN  
**100**

TYPES OF CROPS ARE POLLINATED  
BY BEES IN THE US—INCLUDING  
THE CLOVER AND ALFALFA  
THAT FEED OUR COWS

# Rain Garden Plants



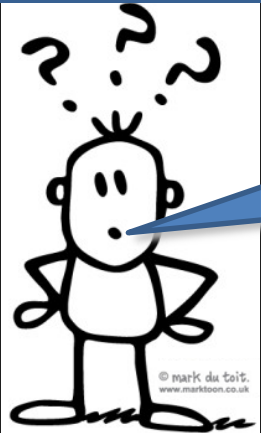
Plant  
diversity is  
important  
for...

Pollinator plants and  
others...

soil microbial health, resiliency, year-round interest,  
erosion control

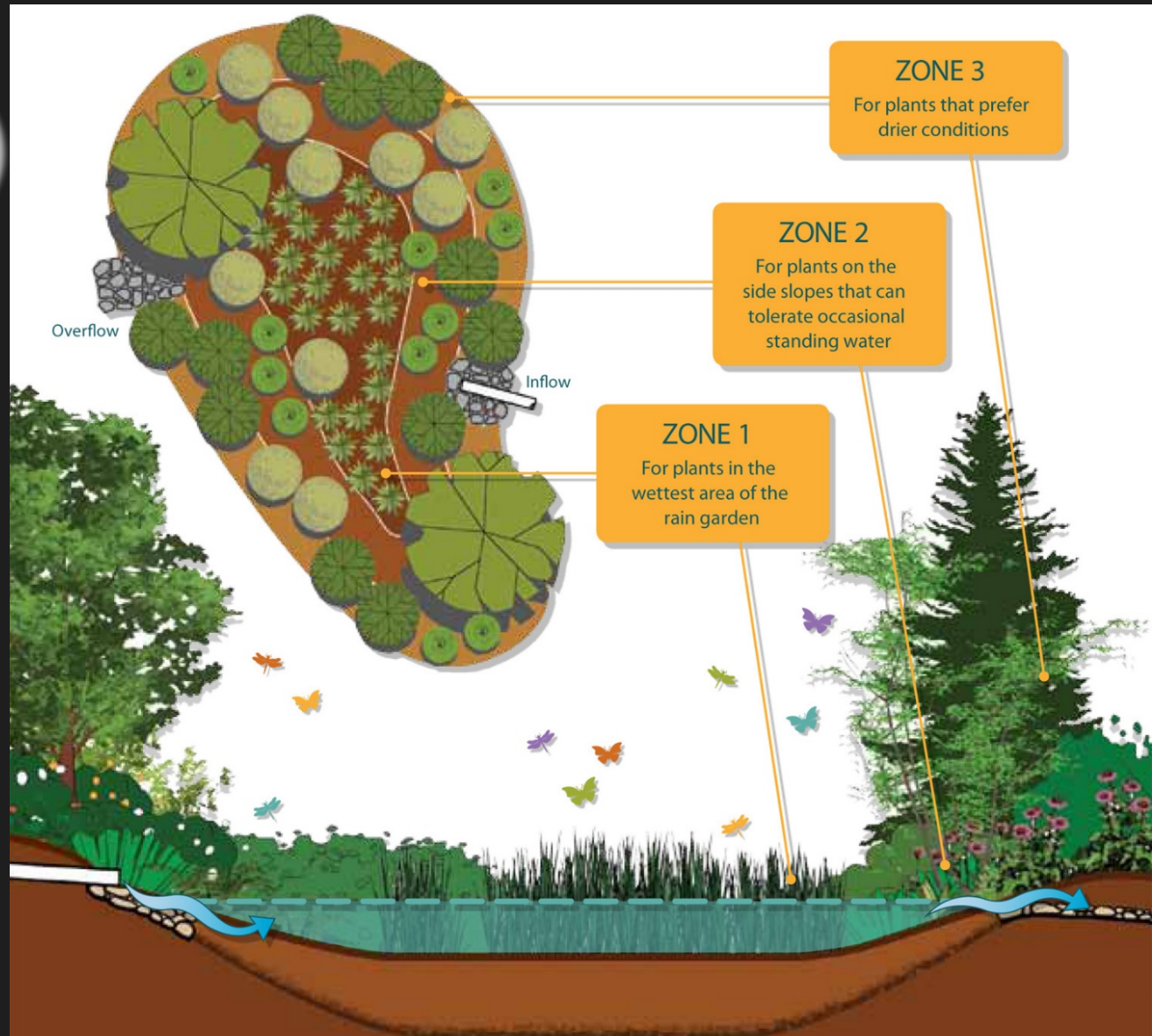


# Rain Garden Plants



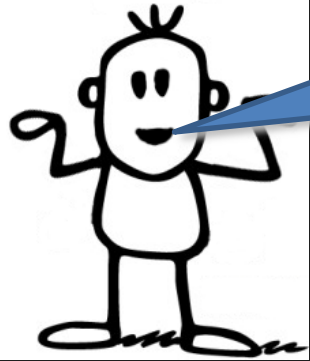
Where do I put the plants?

Everywhere...  
on the berms,  
on the slopes,  
on the bottom



SOURCE: Rain garden Handbook for Western Washington, Washington State Department of Ecology, June 2013.

# Rain Garden Plants



Yehaa!  
Plants  
everywhere

Plants on the berms,  
on the slopes,  
on the bottom



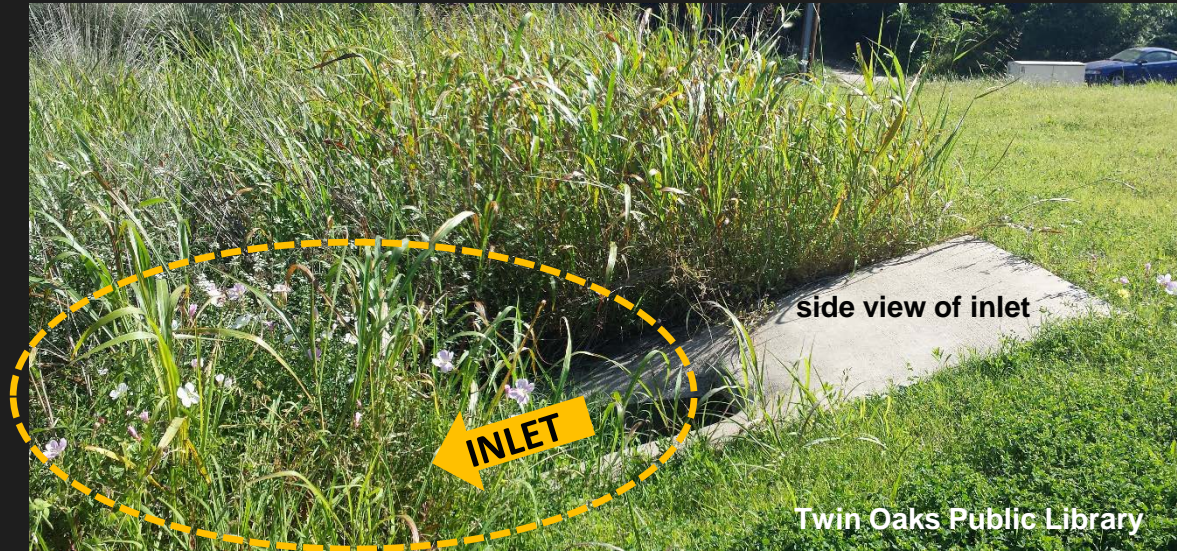
PHOTO CREDIT: *City of Austin*

Northwestern Recreation Center

# Rain Garden Plants Everywhere

However...

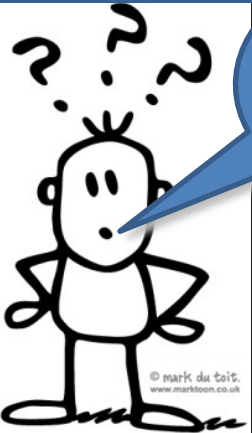
Choked with  
weeds &  
tall plants



Shorter plants at the  
inlet and basin  
help ensure water  
inflow and sediment  
removal



# Rain Garden Plants



How many plants do I need?

## Plant Spacing Estimation Chart

Total Square Feet of Bed	Plant Spacing – On Centers						
	6"	8"	10"	12"	18"	24"	36"
50	200	113	73	50	22	13	6
100	400	225	145	100	44	25	11
150	600	338	218	150	66	38	17
200	800	450	290	200	88	50	22
250	1000	563	362	250	110	63	28
300	1200	675	435	300	132	75	33
400	1600	900	580	400	176	100	44
500	2000	1125	725	500	220	125	55
600	2400	1350	870	600	264	150	66
700	2800	1575	1015	700	308	175	77
800	3200	1800	1160	800	352	200	88
900	3600	2025	1305	900	396	225	99
1,000	4000	2250	1450	1000	440	250	110

## Plant Spacing Multipliers

Space Between Plants	Spacing Multiplier (Plants per square foot)
6"	4
7"	2.94
8"	2.25
9"	1.78
10"	1.45
11"	1.19
12"	1
15"	0.64
18"	0.44
24"	0.25
30"	0.16
36"	0.11

**“There’s an app for that.”**



Space between Plants	Spacing Multiplier or Plants per Square Foot
4"	9
5"	5.76
6"	4
7"	2.94
8"	2.25
9"	1.78
10"	1.45
11"	1.19
12"	1
15"	0.64
18"	0.44
24"	0.25
30"	0.16
36"	0.11

# Rain Garden Soil



Health rain garden soil has...

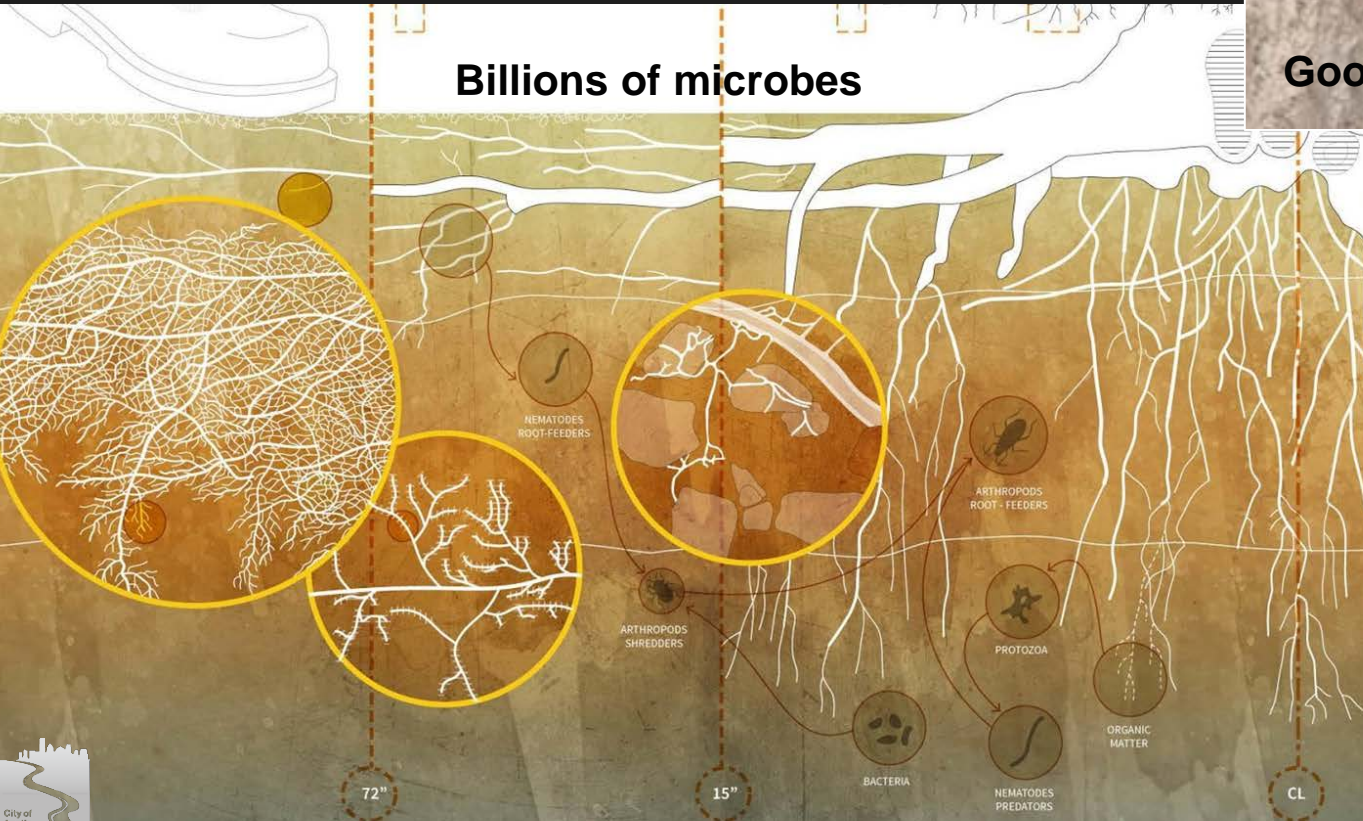


Dark color



Good infiltration

Billions of microbes



earthworms

# Rain Garden: What else?



What about the kids?

Kid accessible & kid friendly plants



Path through garden to prevent compaction





# Rain Garden: What else?



What  
about the  
dogs?



Containment  
&  
dedicated  
dog areas



Dog-friendly plants  
(ASPSA.org list)



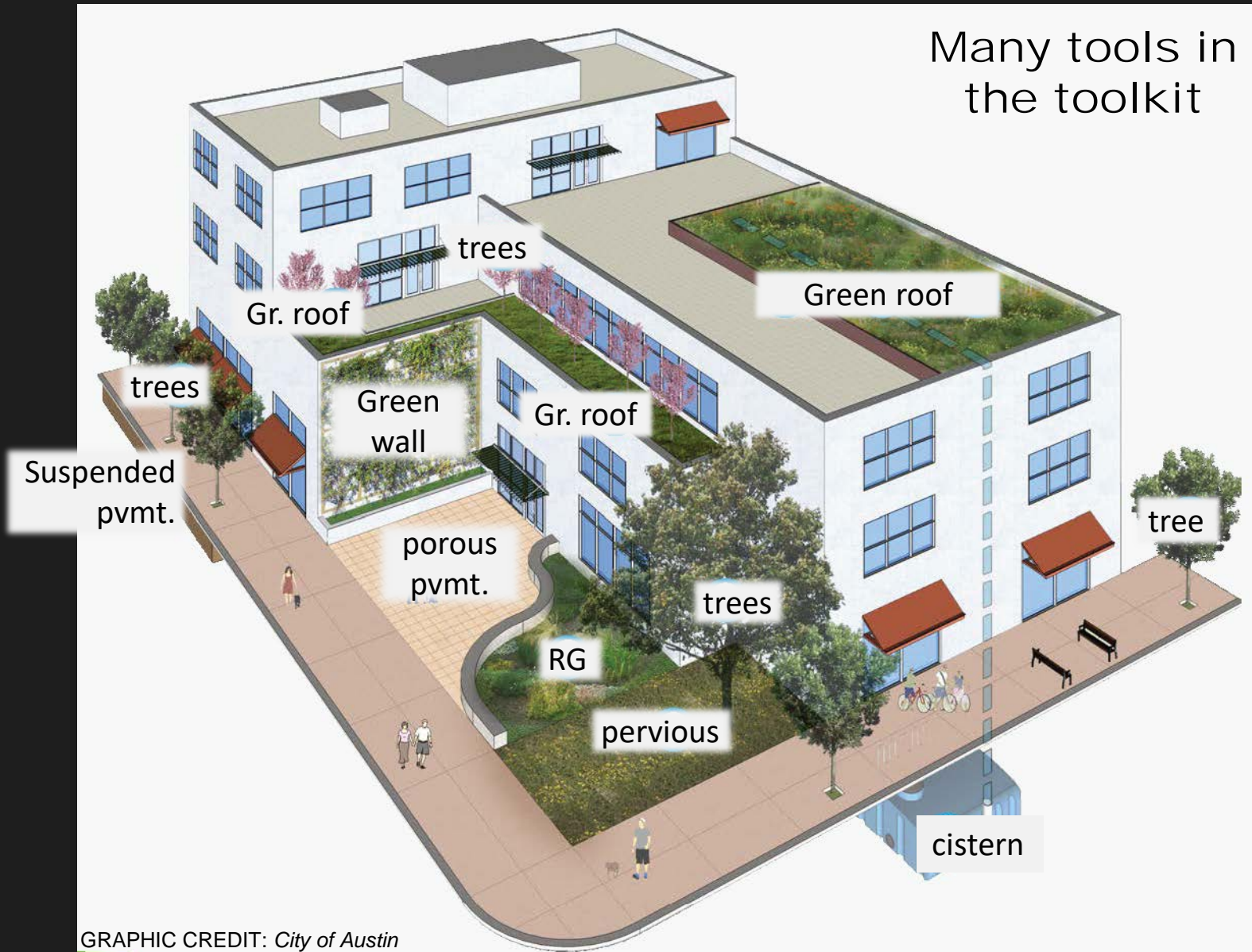
# Rain Gardens Et cetera

Rain and stormwater are...  
assets, opportunities



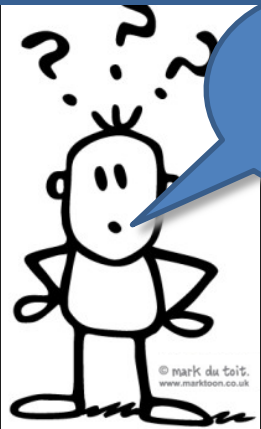
# Rain Gardens, et cetera

Functional Green “Integrating nature into the city”

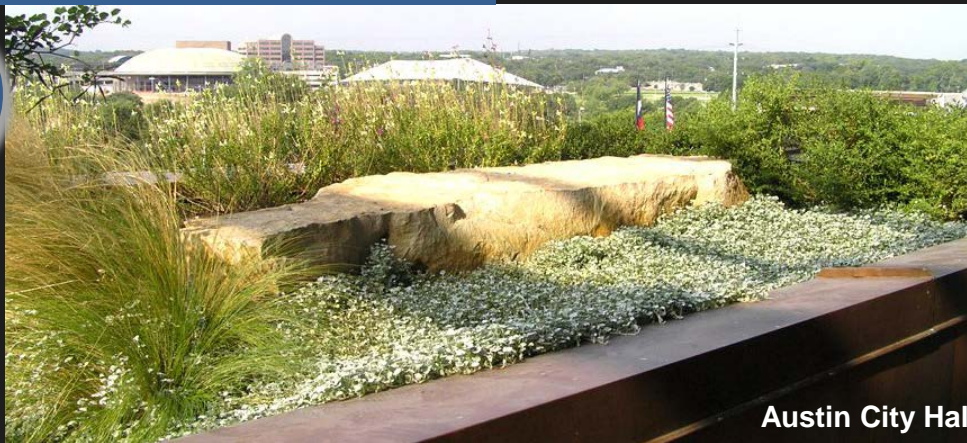


# Green Stormwater Management

# Green Roof



What else can we do?



Austin City Hall



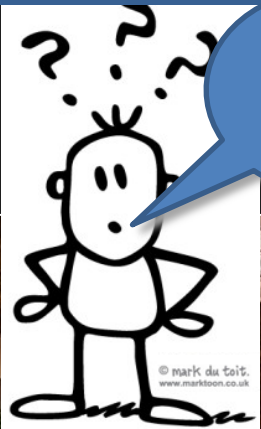
T3 Parking Garage  
Lamar @ MLK Jr Blvd



Edgeland House

# Green Stormwater Management

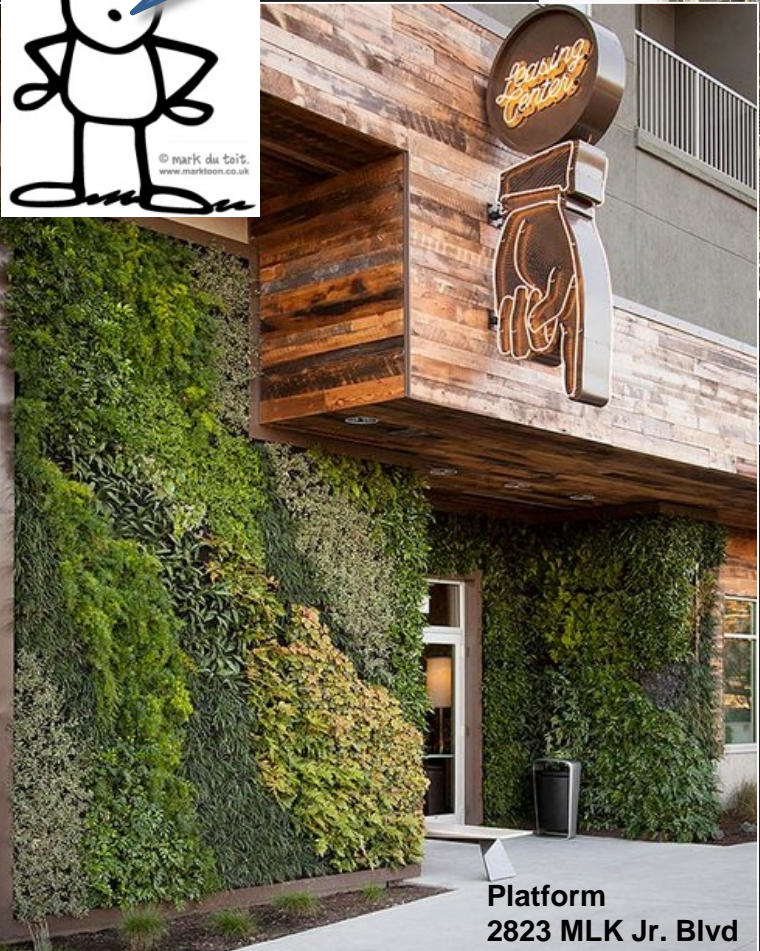
# Green/Living Wall



What else can we do?



T3 Parking Garage  
Lamar @ MLK Jr Blvd



Platform  
2823 MLK Jr. Blvd

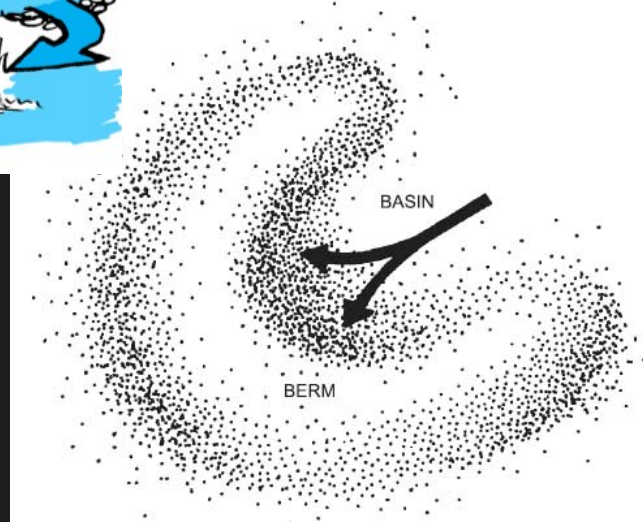


Goldsmith Hall,  
UT Austin

# Green Stormwater Management

## Land Sculpting

Direct the rain!



# Green Stormwater Management

## Land Sculpting



slow the rain,  
direct the rain,  
let it soak in

Berms, Infiltration Meadows,  
Soil Decompaction



# Green Stormwater Management

## Land Sculpting



Rain catcher  
champions

Log terracing



Zilker Disc Golf

Dry Streambed



One Texas Center

Infiltration Meadow



Zilker Disc Golf

PHOTO CREDITS: City of Austin



# Green Stormwater Management



There's more?



## Green Alley



## Stormwater Tree Well

## Planter Box



# Green Stormwater Management



What about urban trees?

## Porous Pavers & Suspended Pavement



Republic Square

# Green Stormwater Management



Wait!  
There's  
more

Pervious Pavement

## Porous Pavers

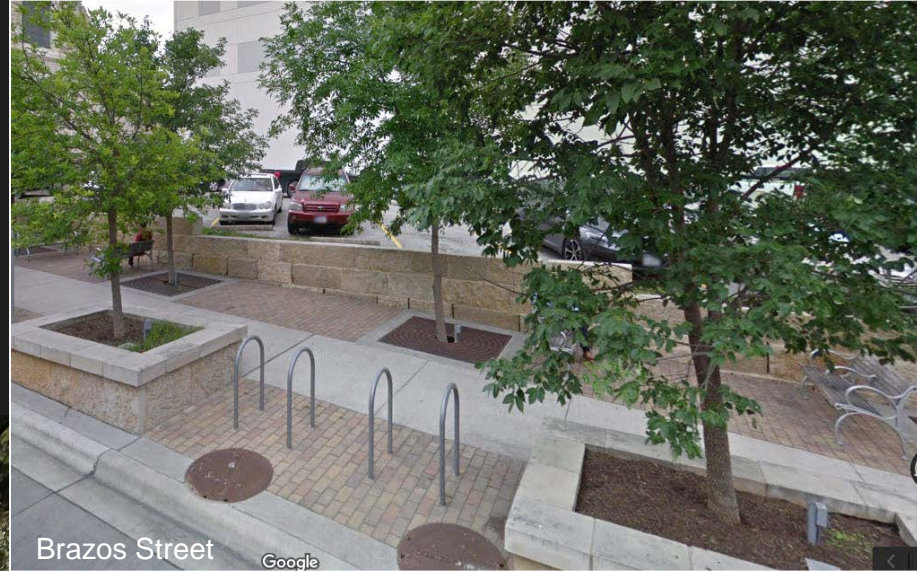


PHOTO CREDITS: [raynedrops.com](http://raynedrops.com);  
Google; City of Austin

# Green Stormwater Management



## Rainwater Collection

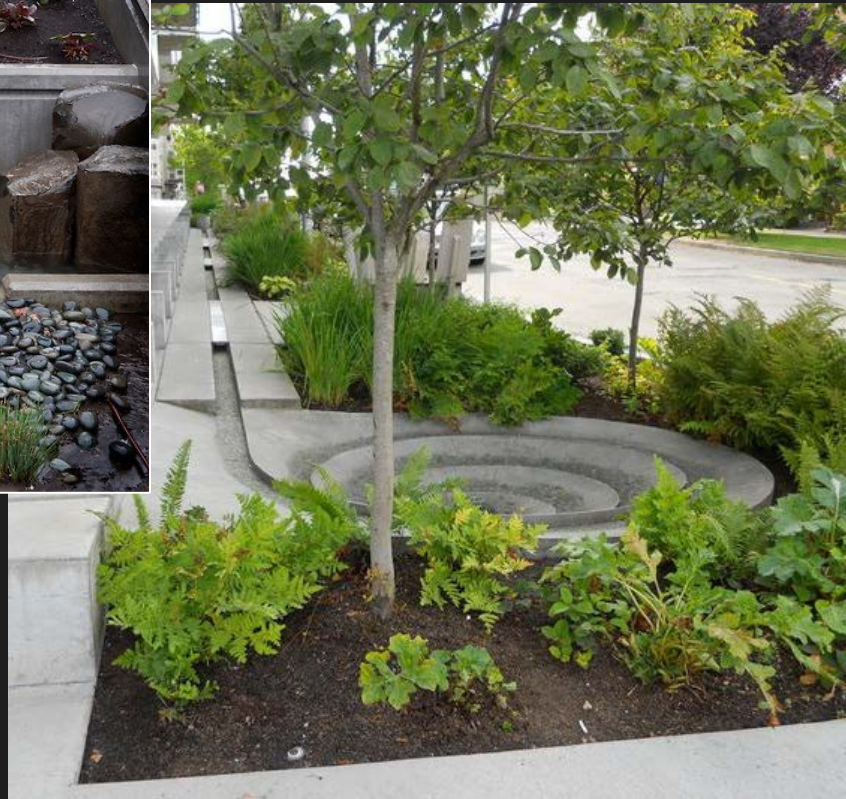
Rain tanks – Twin Oaks Library



# Green Stormwater Management



## Artful Rainscapes



# Past Grow Green Presentations

## Plants

S. Kenzle & D. Nuffer Jan. 29, 2016

<http://www.austintexas.gov/content/1361/FAQ/2993>

## Maintenance

S. Kenzle & A. Haile Feb. 17, 2017

<http://austintexas.gov/faq/2017-handouts-and-presentations>

## Design/Construction

T. Franke Feb. 17, 2017

<http://austintexas.gov/faq/2017-handouts-and-presentations>

# Resources

## REGULATIONS/SPECIFICATIONS

- ★ City of Austin Environmental Criteria Manual: 1.6.7.H  
Green Storm Water Quality Infrastructure, Rain Garden
- ★ Rainwater Harvesting ECM 1.6.7.D
- ★ Porous Pavement ECM 1.6.7.E
- ★ Soil Decompaction - COA Standard Specification 661

## GUIDELINES

### FACT SHEET:

[www.austintexas.gov/raingardens](http://www.austintexas.gov/raingardens)

### PLANT GUIDES:

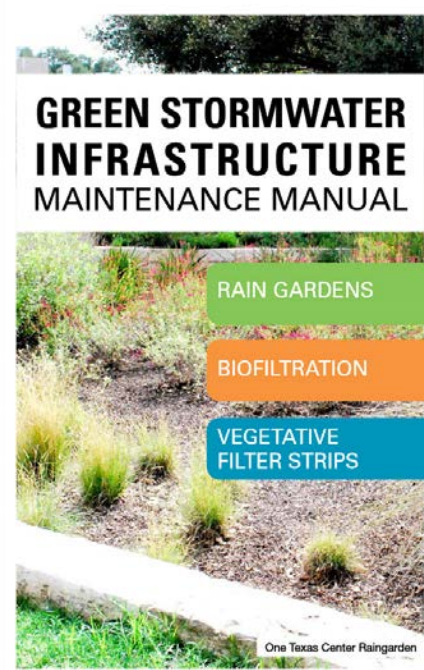
[www.austintexas.gov/department/grow-green/plant-guide](http://www.austintexas.gov/department/grow-green/plant-guide)

[www.wildflower.org/plants](http://www.wildflower.org/plants)

### MAINTENANCE MANUAL:

[www.austintexas.gov/department/stormwater-management](http://www.austintexas.gov/department/stormwater-management)

grow green  
Texas A&M AgriLife Extension Service  
City of Austin



# Resources

## DISCOUNTS/REBATES

- ★ **WPD Stormwater Management Discount** (drainage fee)

<http://www.austintexas.gov/page/drainage-charge-discount>

- ★ **Austin Water Waterwise Rainscape Rebate** RESIDENTIAL & SCHOOL

[http://www.austintexas.gov/sites/default/files/files/Water/Conservation/Rebates\\_and\\_Programs/WaterWiseRainscapeRebate.pdf](http://www.austintexas.gov/sites/default/files/files/Water/Conservation/Rebates_and_Programs/WaterWiseRainscapeRebate.pdf)

- ★ **Austin Water Rainwater Harvesting Rebate**

<http://www.austintexas.gov/department/rebates-tools-and-programs>

## OTHER LOCAL RESOURCES

- ★ **City of Austin, Public Works, Neighborhood Partnering Program**

<http://www.austintexas.gov/neighborhoodpartnering>

- ★ **City of Austin, Office of Sustainability, Bright Green Future School Grant**

<http://www.austintexas.gov/brightgreenfuture>

- ★ **Austin Parks Foundation** <https://www.austinparks.org/programs/>

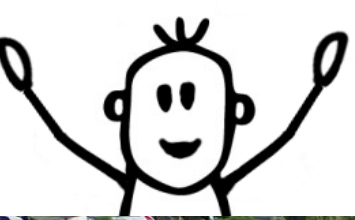
- ★ **WPD Grow Green Landscape Professionals** (training & professionals list)

[http://austintexas.gov/watershed\\_protection/growgreen/landscape\\_professionals.cfm](http://austintexas.gov/watershed_protection/growgreen/landscape_professionals.cfm)

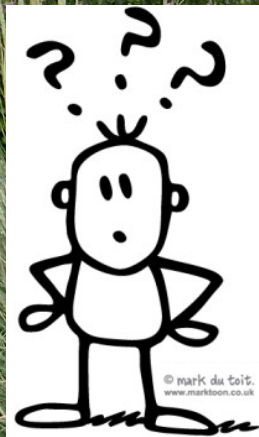


PHOTO CREDITS: City of Austin





Thank you for attending



Questions?

Discussion

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