

SLOW IT, SPREAD IT, SINK IT

Capturing Rain for more Resilient Cities

Kat Sawyer
Program Manager, Greening Urban Watersheds

Anya Kamenskaya
EBMUD Water Conservation Representative

Feb 25, 2021
1-2:30pm



Upcoming Spring Webinars

Mar 4, 1-2pm

Plant Selection for Beginning Gardeners

Mar 8, 2-3:15pm

Gardening in Summer- Dry Climates
(Geared for Professionals)

Mar 11, 1-2pm

Irrigation Basics
(English and Spanish)

Mar 16, 1-2pm

Graywater: Laundry to Landscape

Mar 18, 5-6pm

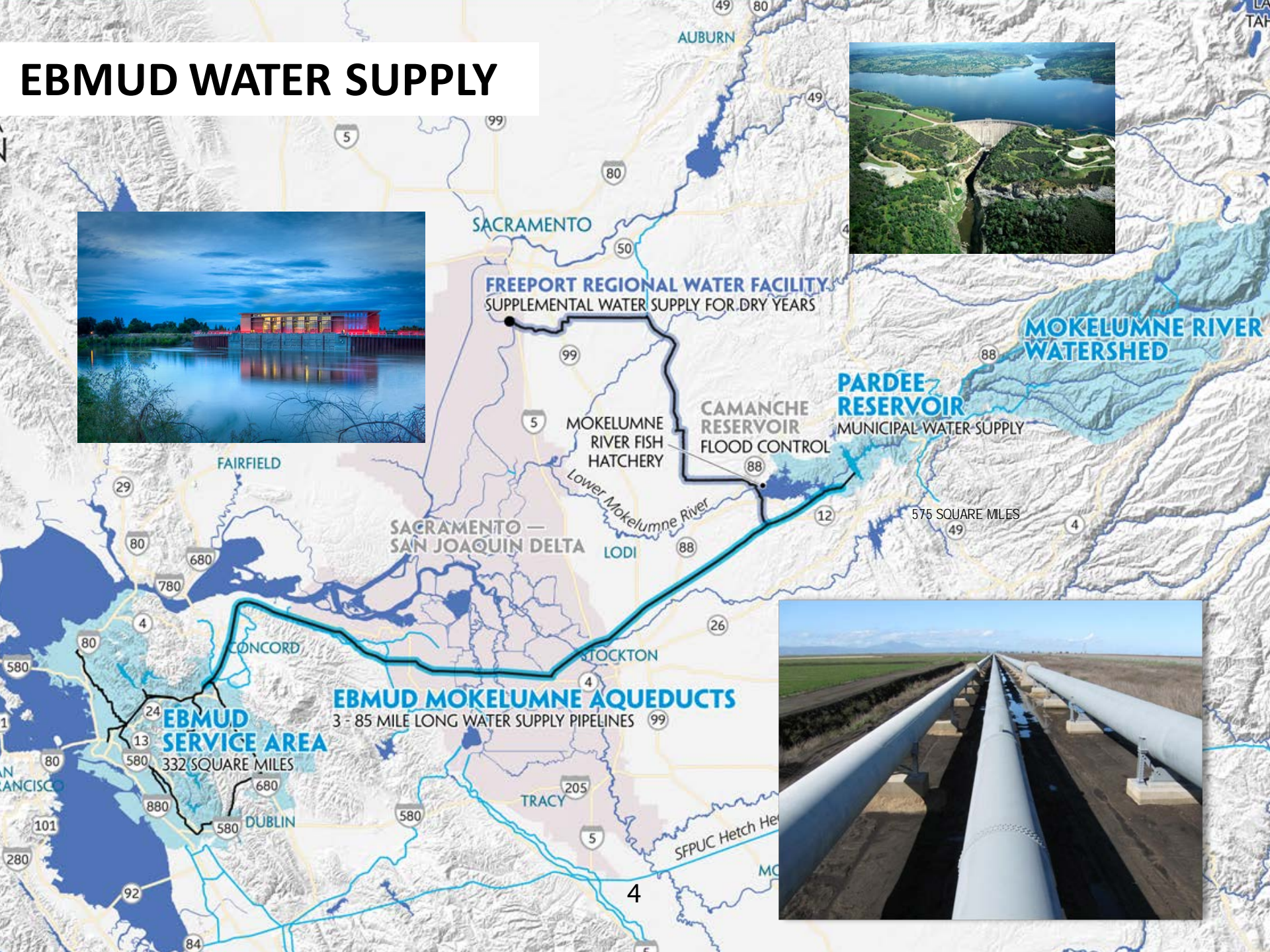
Home leak detection
(English and Spanish)

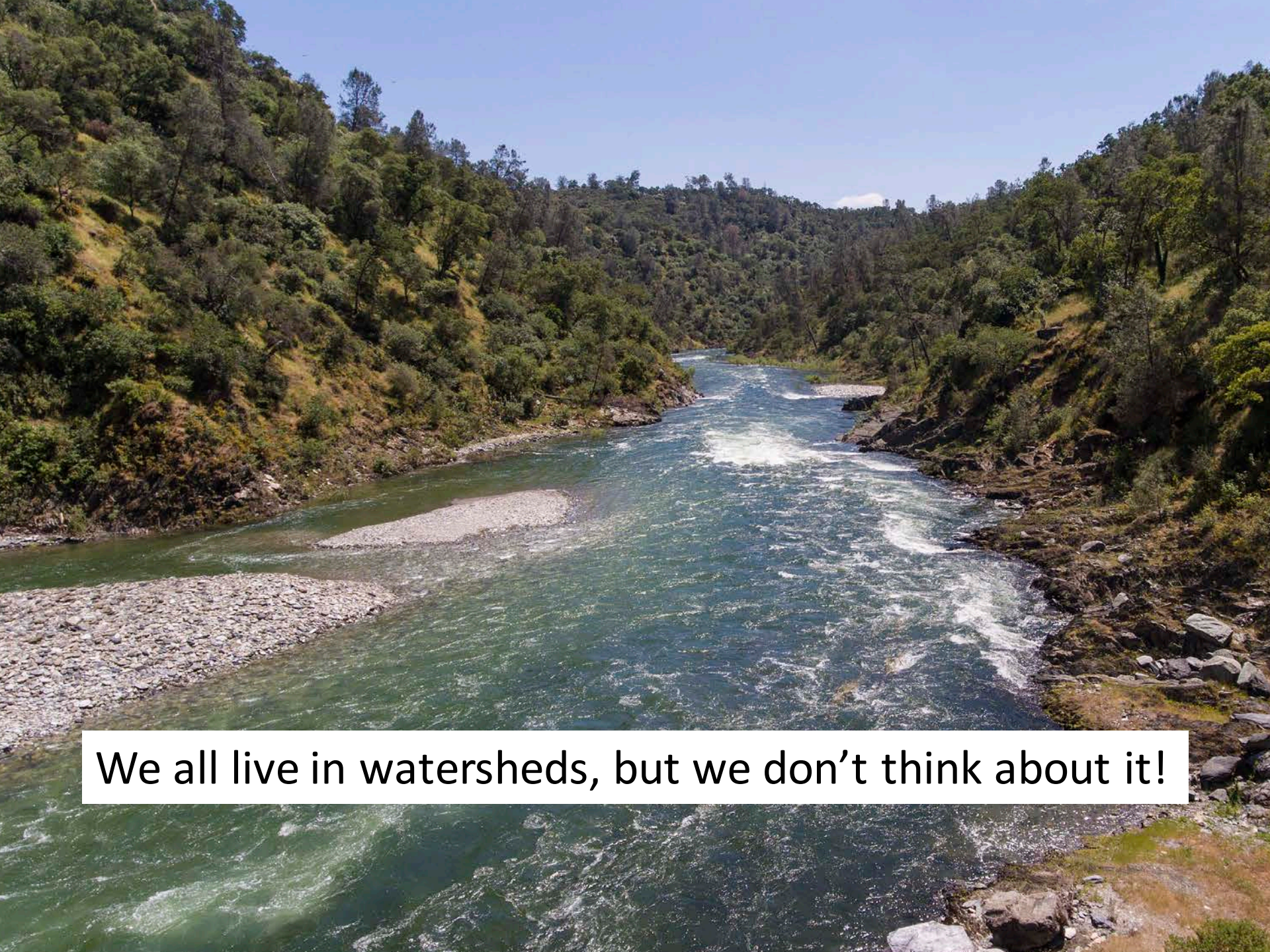
Register at
ebmud.com/watersmart!

Agenda

- EBMUD Water Supply
- Water in Context
- Watershed Approach
- Benefits of Rainwater
- Rainwater Harvesting
 - Overview, Parts, Maintenance
- Rain Gardens
 - Overview, Plants, Maintenance
- Green Infrastructure
- Q and A

EBMUD WATER SUPPLY





We all live in watersheds, but we don't think about it!

Water and Wastewater Service Areas



1.4 million water customers

740,000 wastewater customers

>4,200 miles of pipe

400,000 meters

Average EBMUD Household Water Use

Outdoor water use: 34%

Indoor water use: 66%



TOTAL RESIDENTIAL WATER USE

OUTDOOR
29%

INDOOR
71%

SINGLE-FAMILY RESIDENTIAL WATER USE

OUTDOOR
34%

INDOOR
66%

MULTI-FAMILY RESIDENTIAL WATER USE

OUTDOOR 15%

INDOOR
85%

NOTE:

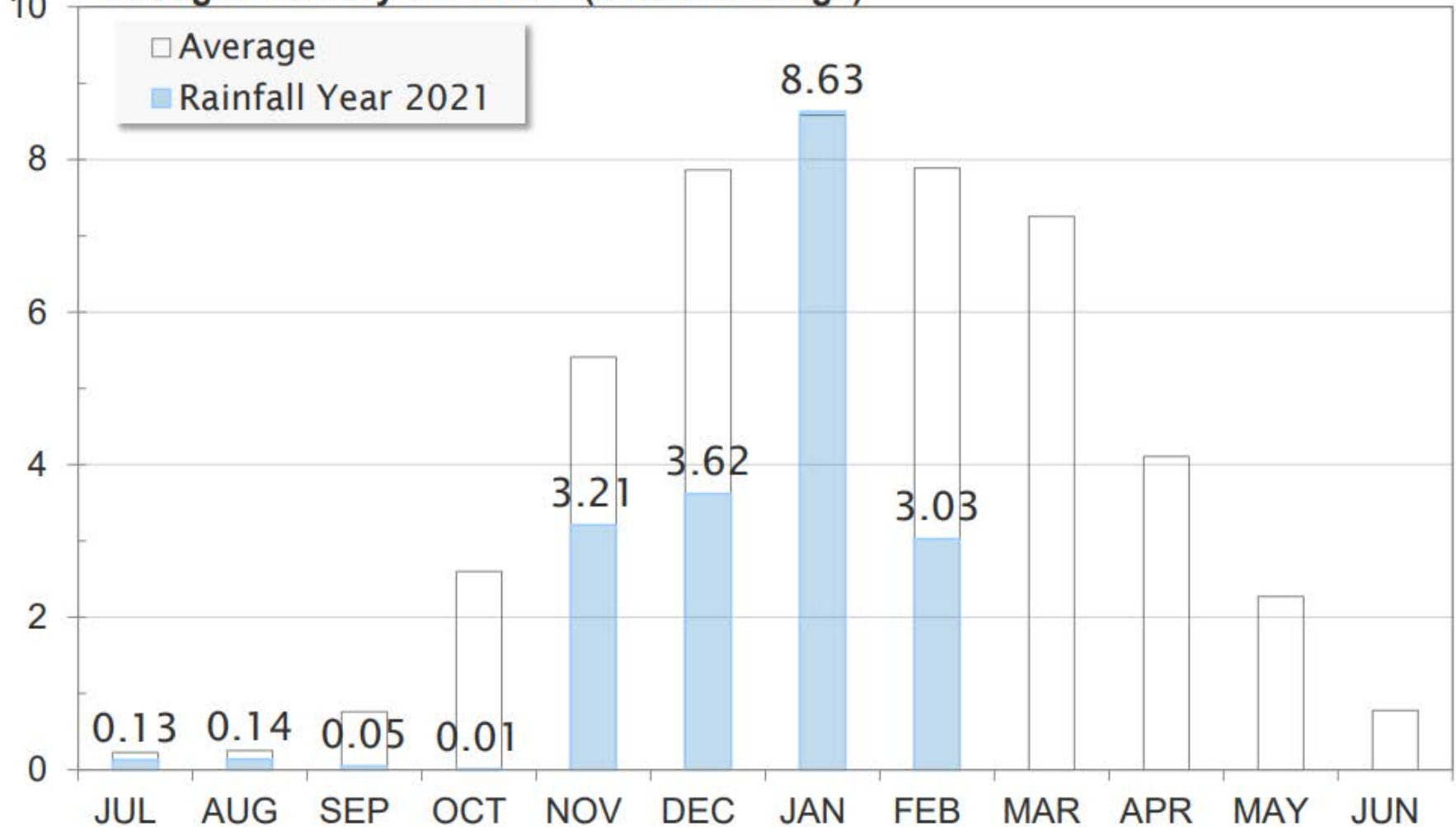
Based on Calendar Year 2005-2015 metered consumption data.

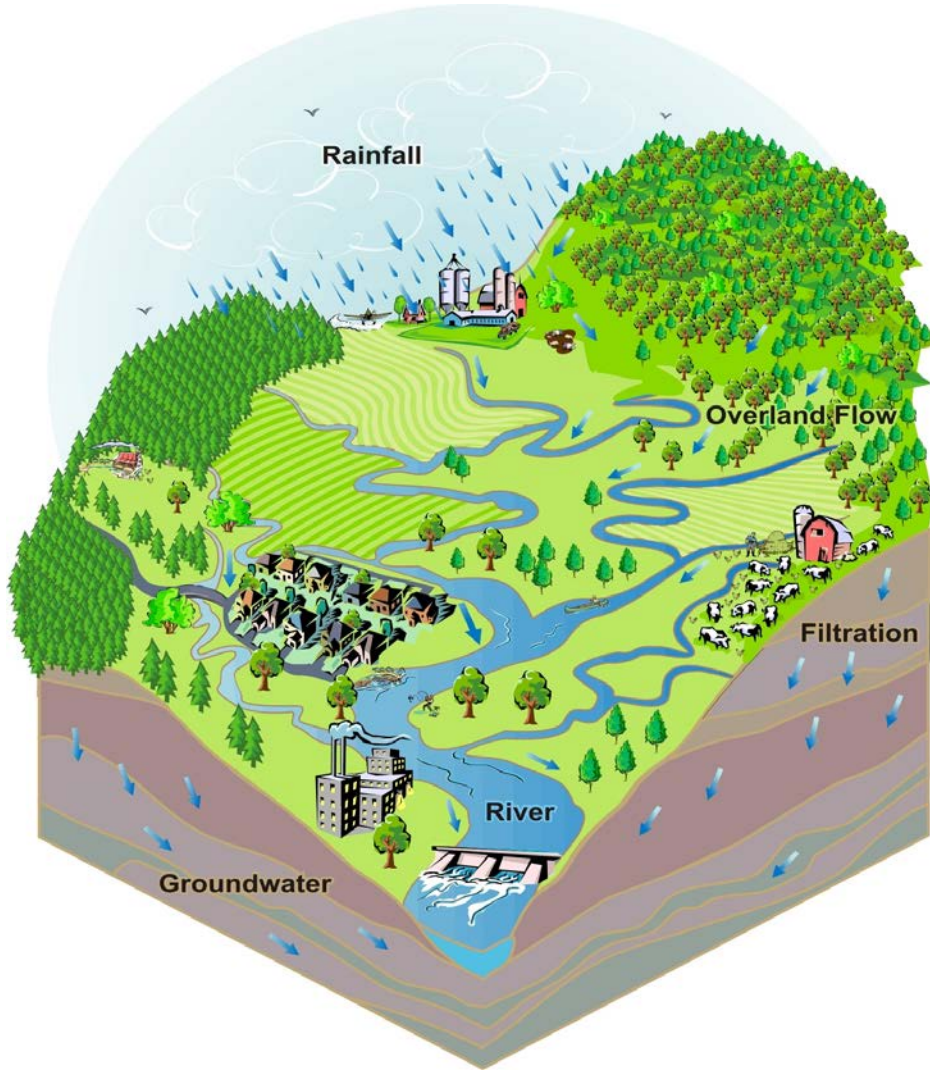
Current Water Supply

Mokelumne Precipitation



Through February 17: 18.82" (61% of average)





Natural Watershed



Urban Watershed



The built environment is paved

STORM WATER

Problem or Solution



PAVE IT
PIPE IT
POLLUTE IT

or

SLOW IT
SPREAD IT
SINK IT





Gray Infrastructure = pipes

Urban Stormwater Management with Green Infrastructure



NATURAL SYSTEM BENEFITS

- ✓ Provide Habitat
- ✓ Slowly Release Storm Flow
- ✓ Filter Pollutants
- ✓ Recharge Groundwater
- ✓ Reduce Erosion

Green Infrastructure helps cities become sponges!



YOU can be a part of the solution!



Watershed Approach

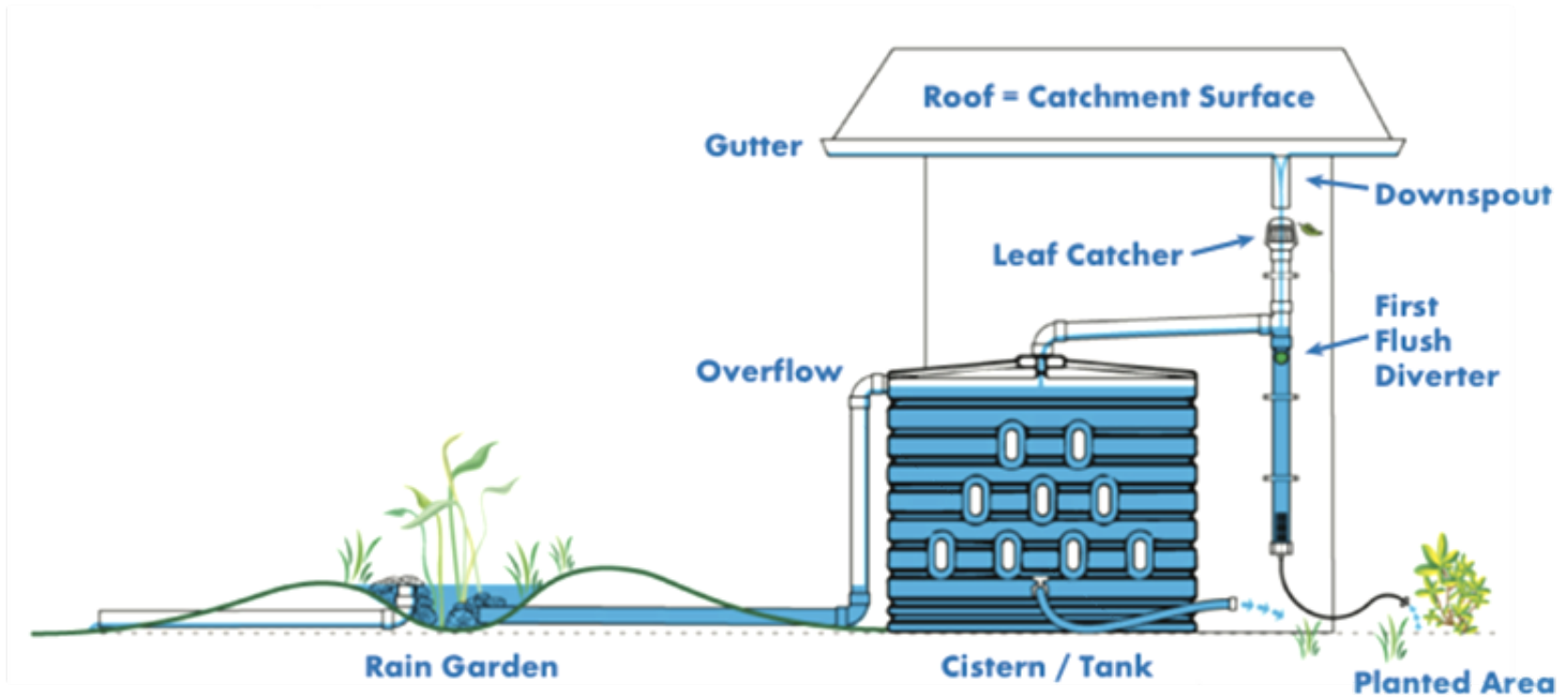
- Healthy living soil captures rainwater
- Climate-appropriate plants reduce irrigation needs
- Efficient irrigation supplements rain

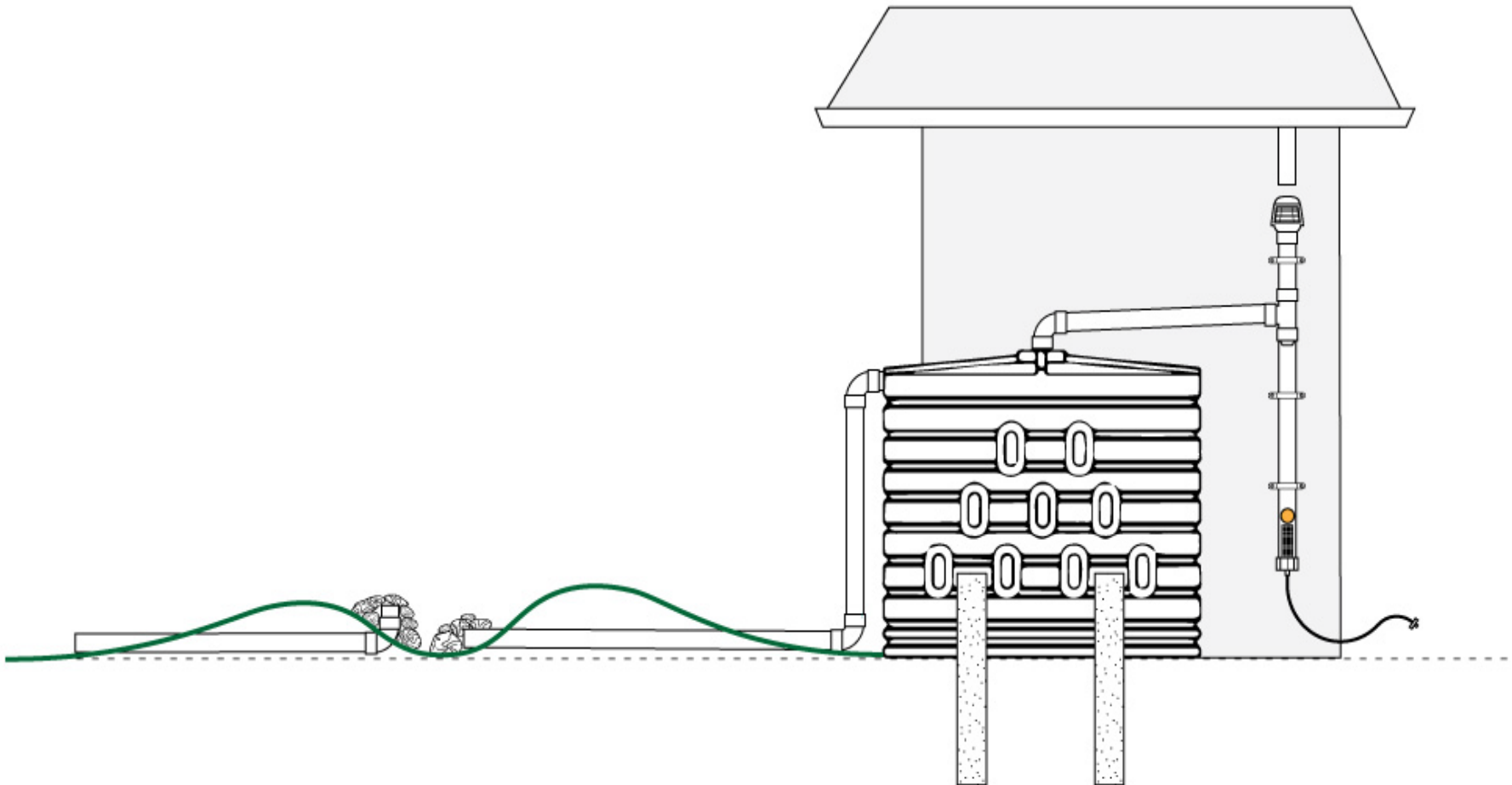


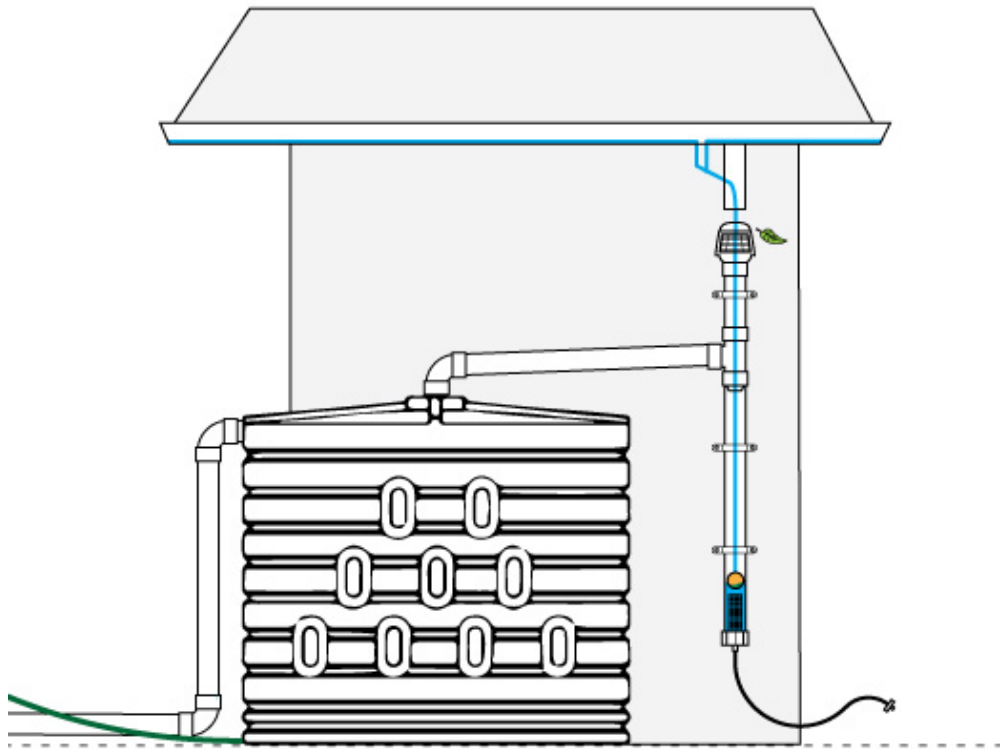
Rainwater Harvesting – slow it! (and store it)



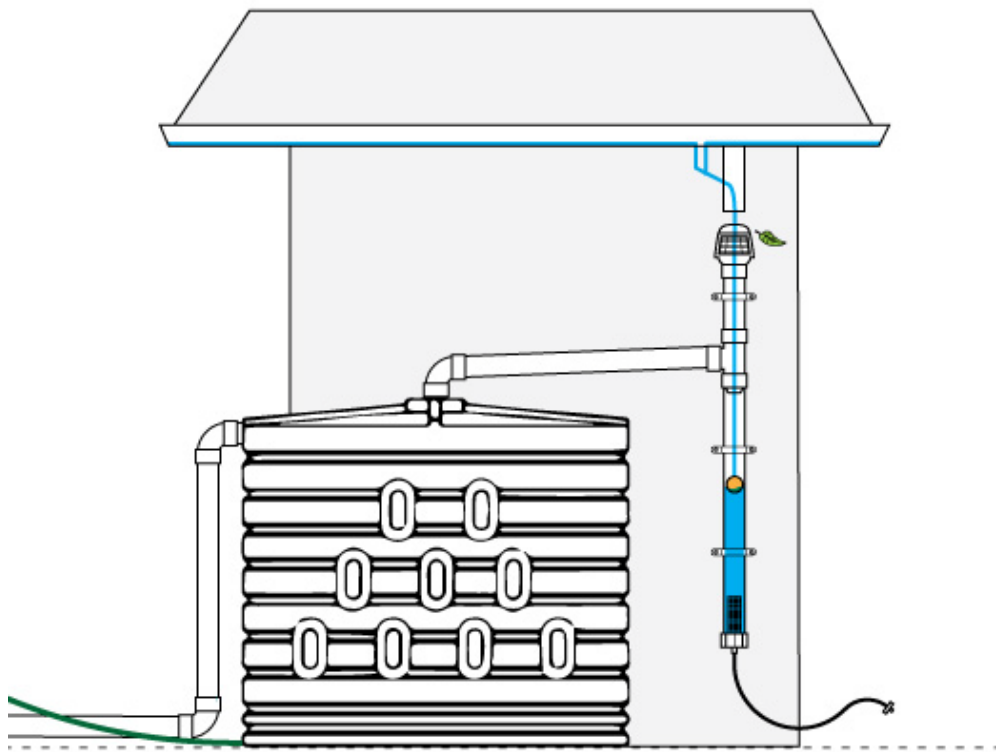
Rainwater System



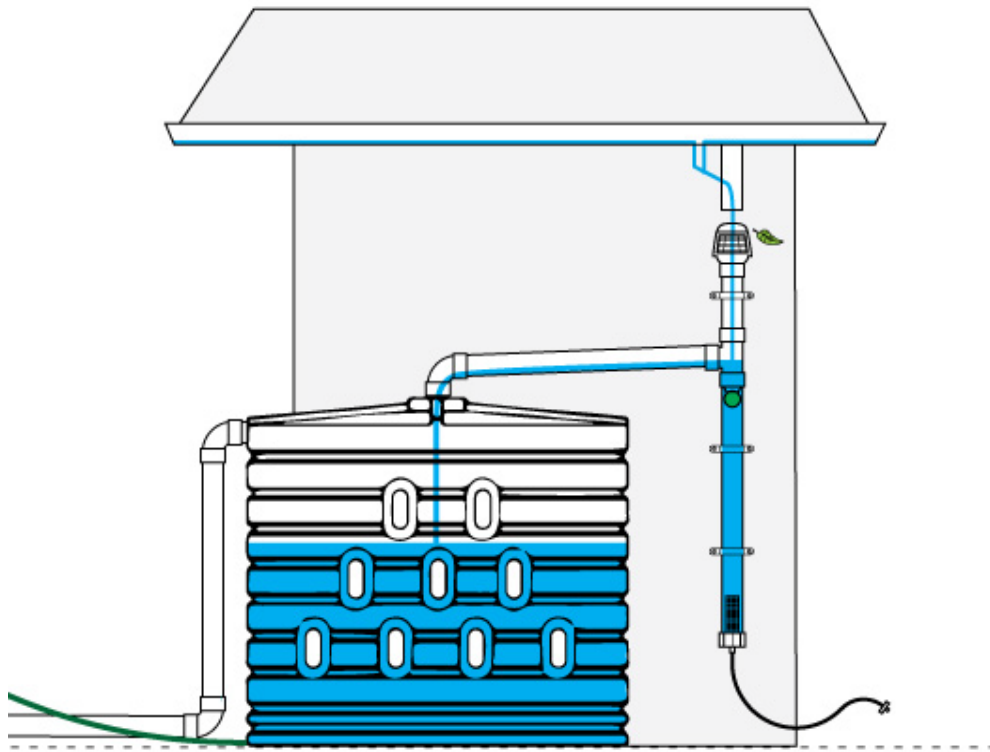




Rainwater is filtered through leaf screen and goes to the first flush.

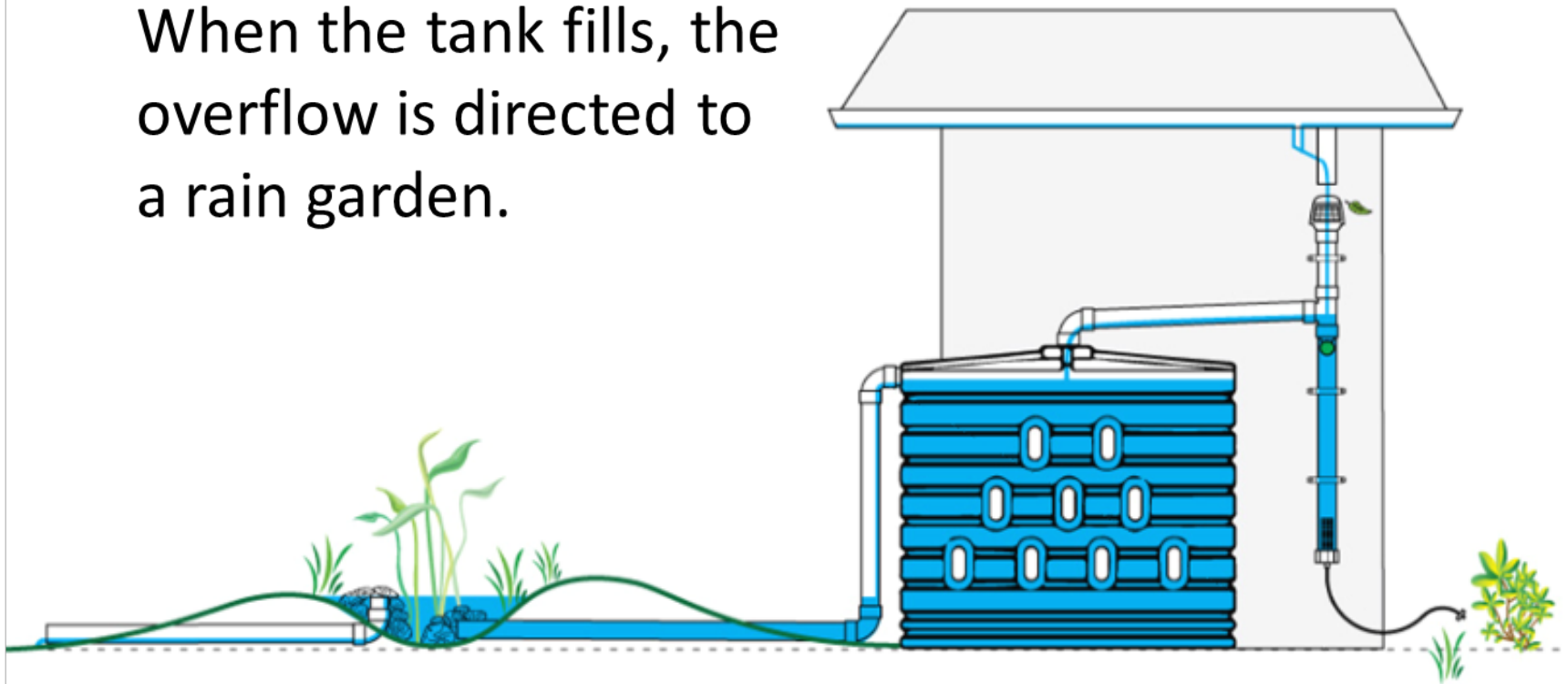


A plastic ball floats on top of the water as the first flush fills.



The ball seals off the first flush and water flows into the tank.

When the tank fills, the overflow is directed to a rain garden.



Components of Rainwater Harvesting System

- Roof – metal or non-leaching surface
- Conveyance – gutter to downspout to tank
- Cistern – size balanced with irrigation demand (space is limiting factor). Tank location – close to downspout, easy delivery path
- Foundation/Structural/Seismic Support
- First flush diverter
- Plumbing – light-tight food grade pipes
- Screens for debris and mosquito abatement
- Overflow – to pervious surface (or storm drain)

Sizing your Cistern

- Rule of thumb - .6 gallons per square foot per 1" of rainfall
- 1 inch of rain on 1000 square foot roof collects 600 gallons of rainwater
- Bay Area averages 23 inches of rain per year (in the rainy months, then dry the rest of the year)
- $(1000 \times .6) \times 23 = 13,800$ gallons/year → 1000 square foot roof can collect almost 14K gallons per year!
- **Space is the limiting factor** – how wide is the garden gate?







Easy-to-Install Downspout Diverter



Maintenance of your RWH system

- Clean gutters/screens
- Unscrew bottom of First Flush + clear out debris, slime after rainy season
- Rinse tank at the end of summer before the rainy season starts again
- Check for leaks at connection points
- Observe your system when it rains!

Questions on Rainwater Harvesting?

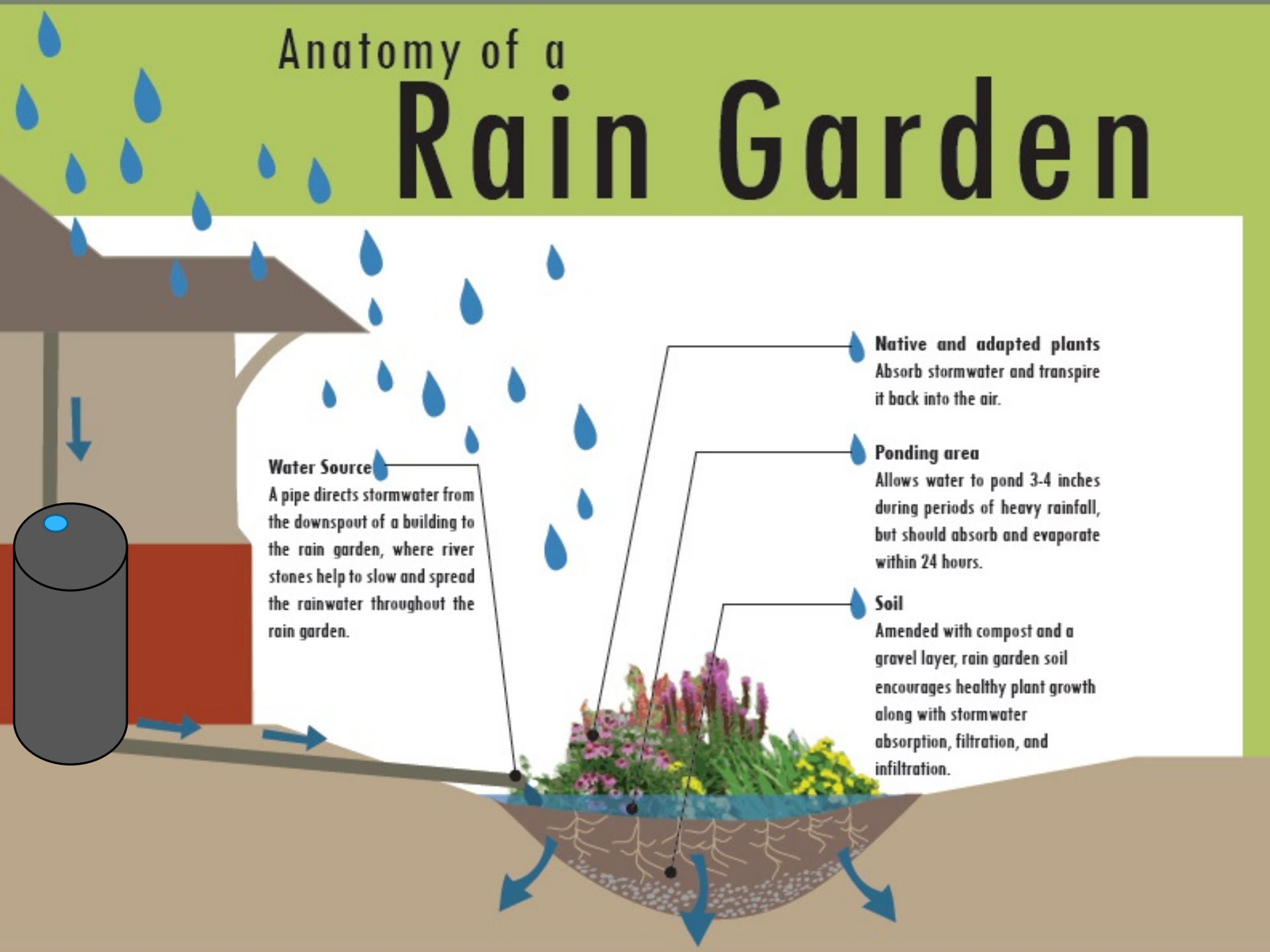
Are you considering a
rainwater harvesting system for your home?

Rain Gardens – residential scale green infrastructure



Anatomy of a

Rain Garden



Water Source

A pipe directs stormwater from the downspout of a building to the rain garden, where river stones help to slow and spread the rainwater throughout the rain garden.

Native and adapted plants
Absorb stormwater and transpire it back into the air.

Ponding area
Allows water to pond 3-4 inches during periods of heavy rainfall, but should absorb and evaporate within 24 hours.

Soil
Amended with compost and a gravel layer, rain garden soil encourages healthy plant growth along with stormwater absorption, filtration, and infiltration.

Building your Rain Garden

- ✓ Clear out area, remove existing plants and roots if needed.
- ✓ Make a **reservoir** for the water to flow into, digging down to a depth below your entry and exit points.
- ✓ Set the overflow outlet at the same elevation as the maximum "fill" for the "pond". Pond depth should be 4" - 6".
- ✓ Set cobblestones at entry and exit points.
- ✓ Infiltration rate of soil is faster for sandy soil, slower for clay-rich soil.

Downspout Rain Garden



Planting your Rain Garden

- ✓ Add compost into native soil, mix and add back into reservoir
- ✓ Set out plants into your preferred arrangement, dig holes for plants 2x width of pot, add several handfuls of compost into hole
- ✓ Install the plant so the crown is about ½" or so above the soil.
- ✓ Pack amended soil by hand around the root ball. Water thoroughly.
- ✓ Place bark mulch carefully to cover all the exposed soil at least 2" deep, preferably 3" deep.

Rain Garden Plants – Think Tiers!

BOTTOM of Rain Garden

- * Plants that can handle an influx of water with dry spells in between (grasses and rushes). These plants don't mind having wet roots.

MID-SLOPE

- * CA natives that grow along rivers and creeks. (Riparian)

TOP LEVEL (or Berm)

- * CA natives have the added benefit of attracting beneficial insects and pollinators. Flowers add color!

Native Plants for your Rain Garden

- BOTTOM of Rain Garden
 - *Juncus patens* - CA Gray Rush
 - *Anemopsis californica* - Yerba Mansa
 - *Carex nudata* - California Black-flowering Sedge
- MID-SLOPE
 - *Cornus sericea* - Red Twig Dogwood
 - *Erythranthe cardinalis* - Scarlet Monkeyflower
 - *Iris douglasiana* - Douglas Iris
- TOP LEVEL (or Berm)
 - *Ceanothus maritimus* - Maritime Ceanothus
 - *Diplacus aurantiacus* - Bush Monkeyflower
 - *Epilobium canum* - California Fuschia

19th St. Richmond

Street side rain garden





El Cerrito Green Streets Program



Valencia St. San Francisco

Rain Gardens and Bioswales

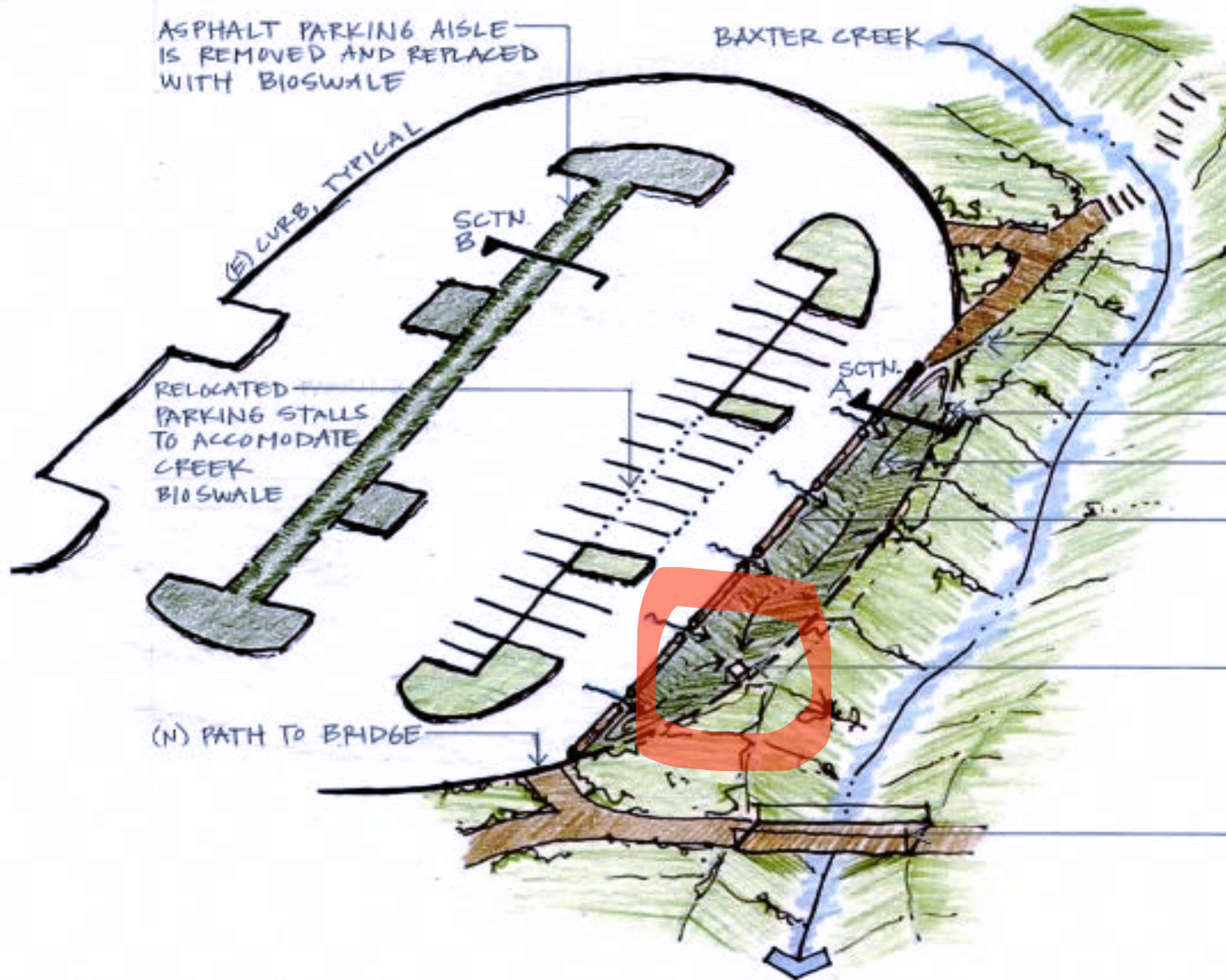
- Rain gardens and bioswales help cities mimic the functions of a natural watershed (Sponges)
- Direct urban runoff into specially designed landscapes that allow rainwater to infiltrate and percolate into the earth to be cleaned by natural systems (Sink it!)

Rain Gardens and Bioswales

Examples:

- Curb cuts on streets that direct stormwater runoff into RAIN GARDENS
- Bioswales – engineered swales that are connected to overflow into drains

Baxter Creek, Richmond





Curb Cut



Storm drain overflow

Bioswale planting in progress





Bioswale planted!

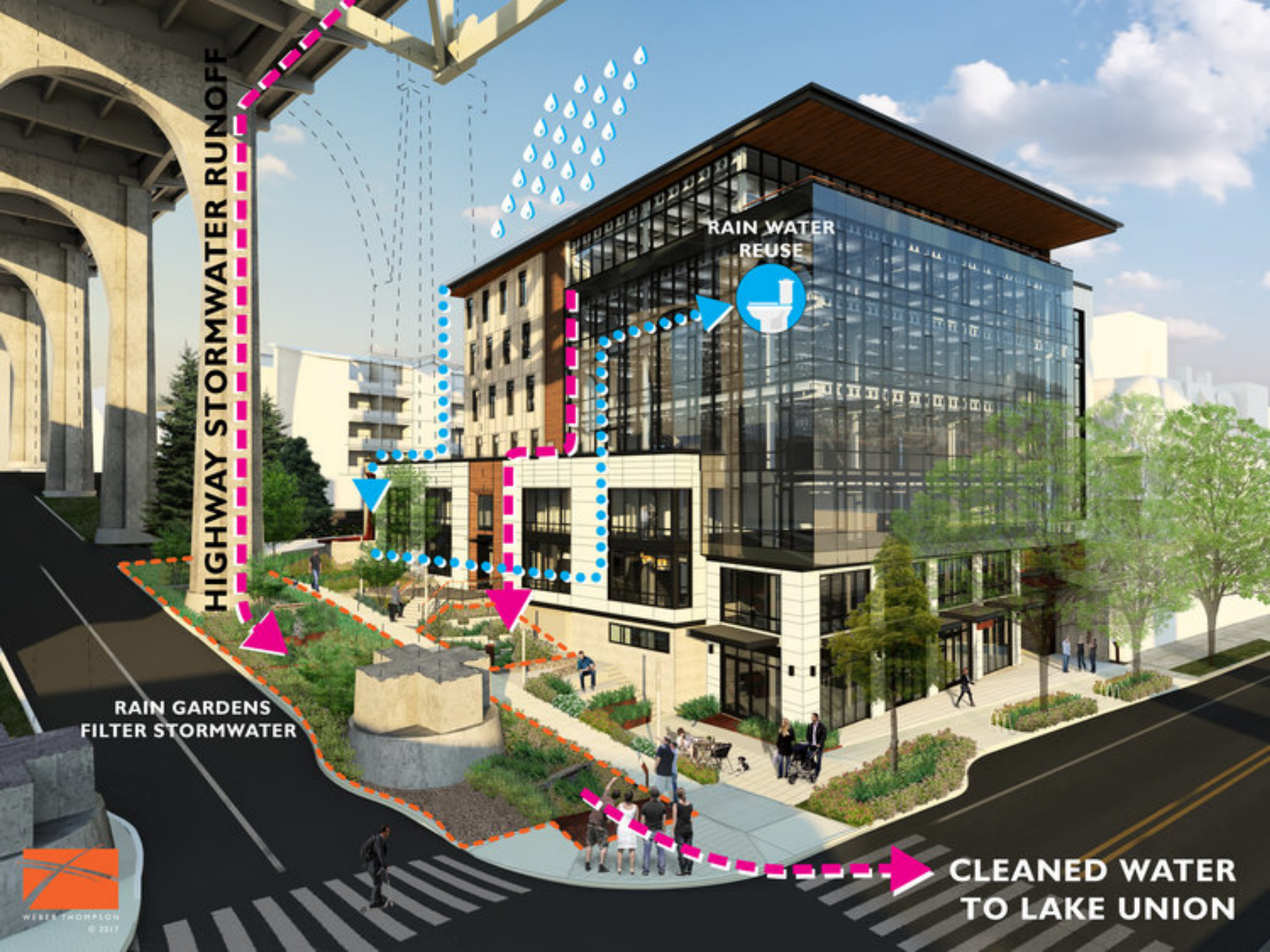
HIGHWAY STORMWATER RUNOFF

RAIN WATER REUSE



**RAIN GARDENS
FILTER STORMWATER**

**CLEANED WATER
TO LAKE UNION**



Resources

- The Watershed Project - thewatershedproject.org
- East Bay Municipal Utility District - www.ebmud.com/watersmart
- Brad Lancaster - www.harvestingrainwater.com
- San Francisco Public Utilities Commission - sfwater.org
- TWP YouTube video link:
www.youtube.com/watch?v=wcy6RqxzV-w

Landscape Rebates

up to \$2,000 for residential properties
(up to \$15,000 for multi-family)



Summary

- EBMUD water flows from the Mokelumne watershed in the Sierra Nevada mountains
- CA historically has cycles of extreme “wet” and “dry”
- Cities can be rehabbed to act more like “sponges” for water to soak into soil during “wet” times to prepare for the “dry”
- Rainwater harvesting creates water storage opportunities in your immediate urban area by
- Raingardens also amend the built environment by allowing water to be stored in soil/plants
- Rainwater harvesting/raingardens can be implemented on small and large scales



Questions?

Thank you!

Kat Sawyer

Greening Urban Watersheds Program Manager

kat@thewatershedproject.org

Anya Kamenskaya

Water Conservation Representative

akamensk@ebmud.com

510-986-7613

