Conserve your water while protecting your property!

Capture rainfall runoff close to where it falls from the sky to maximize the potential of the water to provide multiple benefits by slowing water down, spreading it out and sinking it into the ground throughout the watershed

LID Practices can address problems created by stormwater on your property as shown in the illustration below. Shade and air quality are enhanced as a native tree canopy cools the ground and adjacent buildings while producing oxygen and reducing air pollution. Erosion control is improved with rocks and vegetation. Water quality is improved with vegetation as the soil and plant roots strain organic matter, pathogens, phosphorus, and suspended solids out of stormwater. Flooding is reduced while roots from native vegetation and organic wood mulch improve soil health and increase infiltration rates. Water is conserved when deep roots are established and no supplemental watering beyond natural rainfall is needed.

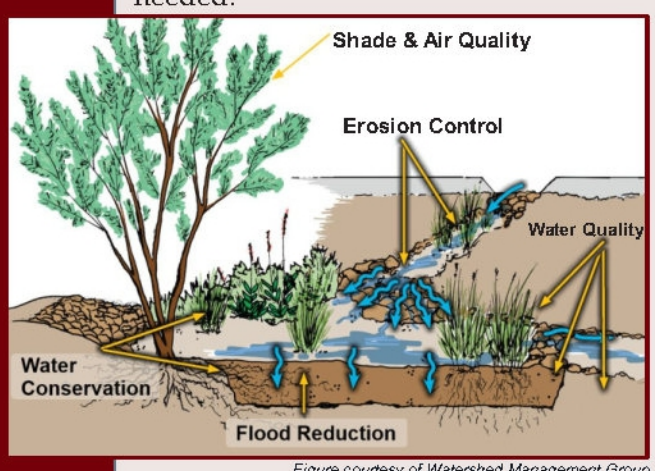

Figure courtesy of Watershed Management Group

If you are enjoying this brochure and would like to see more information see the Santa Cruz County Water Harvesting Guidance Manual on the County's website or contact:

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jhays@santacruzcountyaz.gov
520-375-7830

Photo courtesy of Watershed Management Group

ARIZONA
SANTA CRUZ COUNTY
Flood Control District

Low Impact Development Design Guide

for Flood Protection and Water Sustainability

Low Impact Development (LID) is a cost-effective method to employ rainfall and runoff as a resource to protect and enhance your property and save you money!

Photo and figure courtesy of Watershed Management Group

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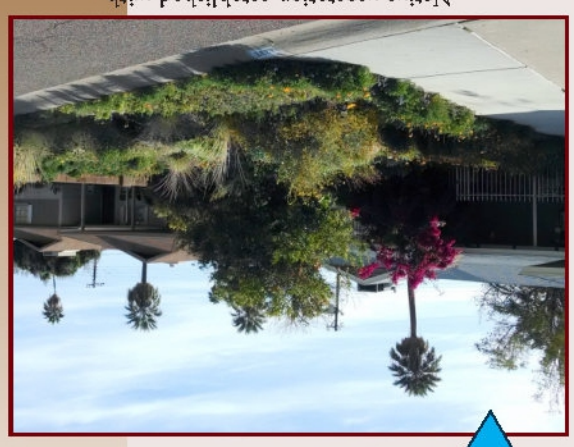
Photos courtesy of Watershed Management Group

Native vegetation established with effective use of stormwater



Planted native vegetation

Earthwork in progress for an LID retrofit

Four years after LID retrofit

Rain garden harvesting roof runoff

Flood and Sediment problems

Best Practices:

Healthy soils = Functional LID

During Construction:

- Avoid compaction
- Loosen soil/over excavate basin bottoms
- Plant appropriate native vegetation
- Use wood mulch

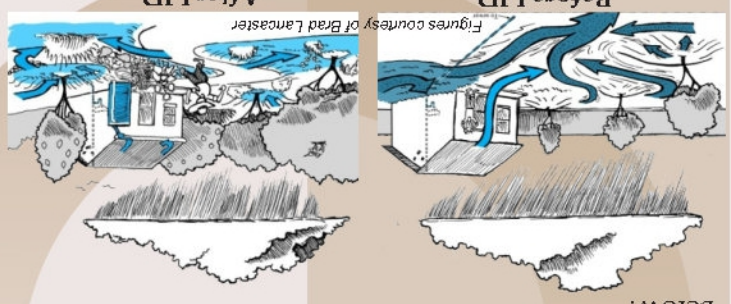
Maintenance:

- Minimize soil disturbance
- Avoid raking and leaf blowers
- Leave chopped trimmings as mulch
- Manually remove unwanted vegetation
- NO chemicals

Photo courtesy of Watershed Management Group

Integrated Design

Integrated design is the process of examining flows of water across a landscape and looking for the best opportunities to utilize that water beneficially to achieve design goals. Integrated design provides an opportunity to blend the full range of LID practices based on observations of existing conditions to address the needs and constraints of the site. When possible, work with an engineer, designer, landscaper, contractor or consultant who has appropriate experience and accreditation for LID design and implementation in the arid southwest. A common phrase among experienced LID practitioners is "slow, spread and sink stormwater" as seen in the graphics below.



Figures courtesy of Brad Lancaster

Before LID

After LID

Santa Cruz County Resource Guide
for Flood Protection and Water Sustainability

1

Rain Garden

A rain garden may mitigate flooding/drainage challenges associated with roadway flooding, sheet flow across residential parcels, and on-parcel runoff from impervious residential surfaces. Rain gardens provide optimal areas to increase vegetation for both soil stabilization and shade benefits. Areas of ponding are ideal places to locate rain gardens to create conditions for greater infiltration. Loosen soil at least 6 inches deep after excavating the infiltration area, add organic mulch 4 inches deep, plant grasses that thrive in periodic inundation conditions, and allow tree roots to establish in basin

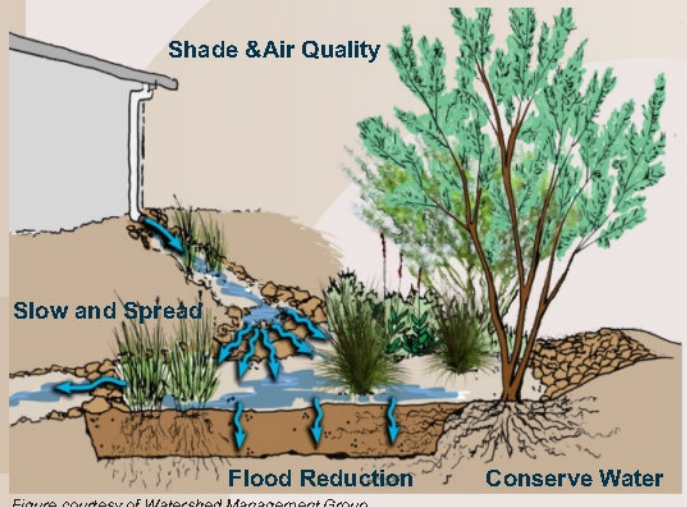


Figure courtesy of Watershed Management Group

Roof Area (sf)	500	1,000	2,500	3,500
Rainfall	Rain Garden Area (sf)			
0.25"	14	28	69	97
0.50"	28	56	139	194
0.75"	42	83	208	292
1.00"	56	111	278	389
1.50"	83	167	417	583
2.50"	139	278	694	972
3.50"	194	389	972	1,361
5.00"	278	556	1,389	1,944

The chart above assumes a 9" depth for the rain garden

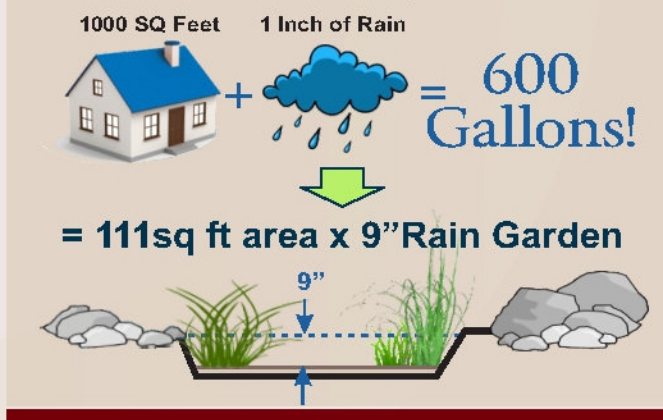
2

Berms

Berms can be placed to retain water for landscape irrigation benefits and/or redirect stormwater flows away from property and structures. Berms are often constructed on contour, perpendicular to the slope of the land to slow water down and promote infiltration. Berm slopes should not be steeper than 3:1. For example, a 3 foot wide berm should not be taller than 1 foot. Use a maximum slope of 3:1 on the upstream side , while on the downstream side, use a 4:1 slope. In sandy soils, slopes of 5:1or more are preferred to minimize berm erosion. Berm should be compaceted as directed by an Engineer.

Figure courtesy of Flood Control District of Maricopa County

Make sure to size for a larger rainfall event!



6

3

Rain Tank

Rain tanks offer an important method in arid regions to store water during dry periods for outdoor and indoor water use. Tanks can be sized to capture a home's annual water needs if space and budget allow.

Roof Area (sf)	500	1,000	2,500	3,500
Rainfall	Rain Tank Capacity (gal)			
0.25"	75	150	375	525
0.50"	150	300	750	1,050
0.75"	225	450	1,125	1,575
1.00"	300	600	1,500	2,100
1.50"	450	900	2,250	3,150
2.50"	750	1,500	3,750	5,250
3.50"	1,300	2,600	6,545	9,150
5.00"	1,850	3,750	9,350	13,100

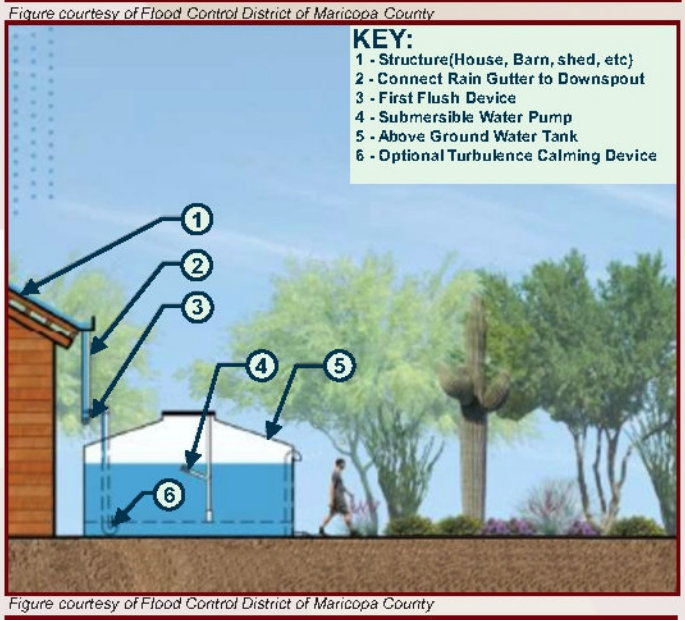
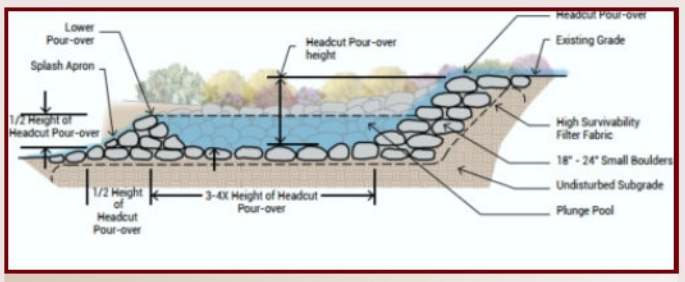


Figure courtesy of Flood Control District of Maricopa County

5

Zuni Bowl

Zuni Bowls can be used in washes/channels or in the uplands to dissipate energy, manage sediment, and stop erosion and head cutting. It is important to use experienced, skilled labor to effectively place rock to resist the forces of flows and to ensure large rock are keyed in at the bottom of the bowl and the edges of the banks where erosive forces will be greatest.



Zuni Bowl construction Detail

4

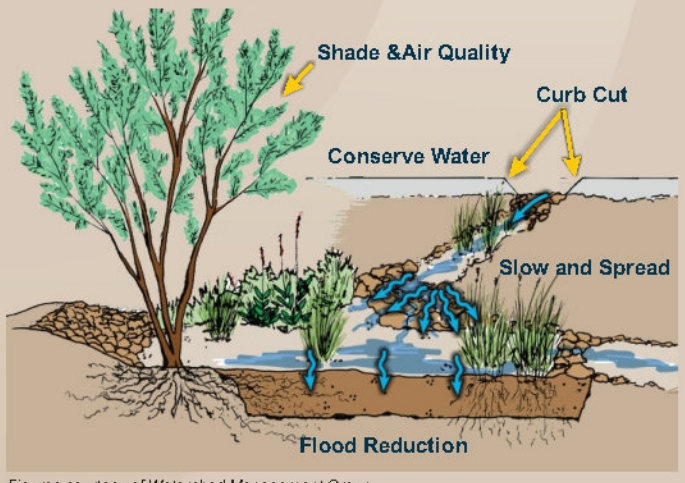
One Rock Dam

One Rock Dams are an important tool for residential scale erosion control, especially as an alternative to a check dam. A series of well-built One Rock Dams in a wash or erosive flow path can be much more effective than check dams, especially given the relative difficulty of constructing check dams and the potential for failure resulting in increased erosion and flood risks.

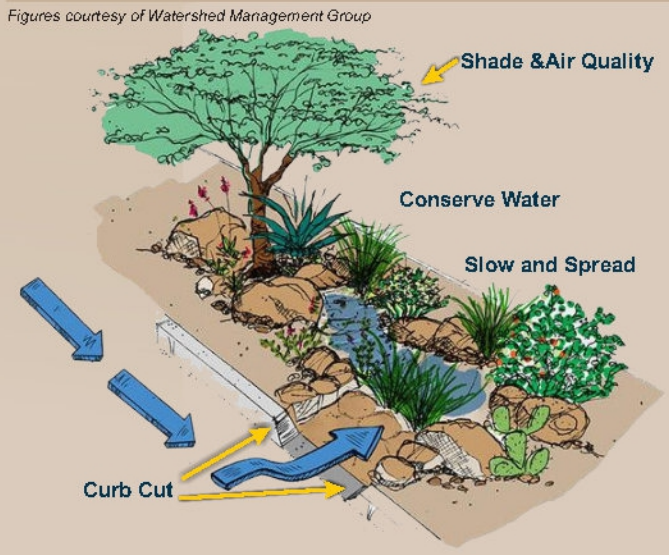
A well-constructed One Rock Dam will tie rock into the adjacent banks and secure the low flow rock below the channel bed to create sufficient strength to resist the expected scour/erosion forces. Rock should be sized for the largest expected flows to ensure features remain in place to minimize erosion in all expected design conditions.

Curb Cut

Curb cuts are important features in areas with curb and gutter for incorporation into new development as well as retrofitting developed communities. Curb cuts capture, slow and clean street runoff.



Figures courtesy of Watershed Management Group



Zuni Bowl Illustrative Perspective

Figure courtesy of Flood Control District of Maricopa County

Natural Processes Enhanced by LID Practices

1. Interception
2. Infiltration
3. Nutrient Recycling
4. Transpiration
5. Evaporation
6. Sedimentation
7. Filtration
8. Energy Dissipation
9. Soil Actions
10. Microbial Decomposition

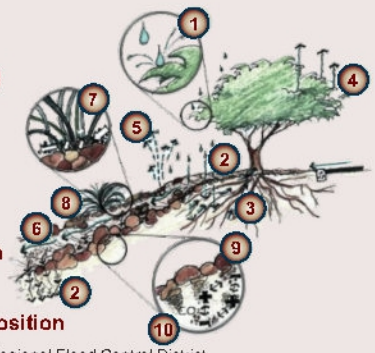


Figure courtesy of Pima County Regional Flood Control District

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