

Santa Fe GREEN Streets



Guadalupe Street Sustainable Landscape/Stormwater Catchment Pilot Project

Greening the Desert: Planting the Rain

Guadalupe Street, from Paseo de Peralta on the north to Paseo de Peralta on the south, is proposed as a pilot project for a future city-wide Green Streets program that harvests rainwater runoff from street surfaces and utilizes it for irrigation of plantings along city sidewalks. Curb-cuts, sidewalk inlet bridges, and chicanes allow stormwater to irrigate planted basins, **benefiting the community by:**

- encouraging wildlife diversity
- providing shade and cooler microclimates that lower summer urban heat island temperatures
- improving air quality by lowering dust and smoke levels
- replenishing ground water resources
- reducing erosion
- lowering demand on potable water
- lowering strain on stormwater infrastructure
- helping to minimize the risk of catastrophic flooding
- removing pollutants from stormwater using plants as bioremediators
- cultivating food bearing climate-appropriate plants and trees

In Tucson, studies have shown that the implementation of Green Stormwater Infrastructure over a 25-year scenario throughout Tucson watersheds would result in over \$2.5 million dollars of annual community benefits in the form of flood reductions, water conservation, property value increases, reduced urban heat island impacts, improved stormwater quality, reduced heating and cooling needs, air quality improvements, and the energy associated with pumping Central Arizona Project water and groundwater. A Santa Fe GREEN Streets Pilot Project on Guadalupe Street provides an opportunity to take action on citizen concerns around climate change, water and the street commons in a manner that provides positive outcomes for multiple stakeholders across a multitude of issues.

Climate Change and the Santa Fe Basin

Streetscapes and urban habitat are vulnerable to the projected increase in storm intensity and higher temperatures. More intense storms may result in short term urban flooding, with impacts to commons areas, homes, businesses and transportation routes. Higher temperatures, particularly summer heat waves and increases in nighttime high temperatures, may place increased stress on urban dwellers, particularly the elderly, the infirmed, and infants as well as on urban vegetation. Increased temperatures will also place greater stress on streets and pavement, resulting in the buckling and cracking of concrete and/or blacktop surfaces during heat waves. Decreases in urban vegetation in response to potential water limitations may increase the urban heat island effect. The effect could be mitigated to some degree through the planting of shade trees, but if these are not low-water-use trees, this vegetation planting may increase overall water use.

Anticipated impacts and vulnerabilities connected with climate change in the Santa Fe basin include:

- increased temperatures
- diminished snowpack and earlier spring melt of existing snowpack
- reduced stream flow due to greater evaporation rates and water use by plants
- earlier stream flow peak and dampened peak flows
- drier mid- to late-summers
- more severe and frequent droughts
- increased fire activity and risk of catastrophic fire
- more intense precipitation events resulting in increase peak storm flows, greater magnitude and frequency of flooding, higher erosion rates, more sediment transported by storm flows
- decreased surface and ground water availability
- increased water use
- storage insufficient to capture storm events
- degradation of water quality
- more frequent restrictions from Rio Grande Compact
- increased competition over water resources
- higher water needs
- less groundwater recharge
- forests vulnerable to insects, fire, and desiccation
- incursion of invasive species
- habitat degradation due to storms, flooding, erosion, and lack of water
- reduction in available water supply for agriculture
- greater divergence between highest stream flows and when water is needed for irrigation
- increased pressure to transfer agricultural water rights to urban areas
- rural/urban conflicts over water and water rights
- increased food prices
- increased water needs for green spaces
- increase of urban flooding
- increased competition for water for energy production in water intensive coal, natural gas and nuclear, less hydropower production; reduction in solar production because of higher temperatures and more air particulates
- increased energy consumption during the summer
- failure of infrastructure (paved roads, bridges, culverts, rails) designed for less extreme conditions
- tourism and population growth may decrease if climate conditions are unfavorable
- insurance premiums may rise for services impacted by natural hazards
- cost of energy and water may increase as each becomes more expensive to acquire and transmit
- limited local and regional governmental resources to provide emergency services for increased severe weather events
- maladaptation of institutions' inflexible response to rapidly changing conditions
- disruption of cultural identities and traditions

Community Recommendations:

- improve ecosystem biodiversity
- manage and plan restoration holistically
- design or modify bridges and culverts to handle higher intensity runoff events
- incorporate urban agriculture in water and land-use planning
- provide incentives and programs to reduce water use, especially during drought
- augment potable water supplies with reclaimed wastewater
- increase ground water storage and recharge
- require pervious pavement where appropriate
- improve soils and watershed resiliency
- expand water harvesting techniques
- encourage small farms in the City and County and food-scapes in commons areas
- promote locally sourced (less than 100 miles) food that does not require shipping and supports local ecosystems and community members
- encourage cultivation of climate appropriate crops.

Sources:

- Climate Change and the Santa Fe Basin: Preliminary Assessment of Vulnerabilities and Adaptation Strategies, Bureau of Reclamation WaterSMART Program Initiative, 2013
- Brad Lancaster, Ted Ex Talk, Tucson, AZ, March 6, 2017
- Brad Lancaster: www.rainwaterharvesting.org
- Stormwater Brainsorm: Session, City of Santa Fe and EPA, Santa Fe Long-Range Stormwater Management Plan, September 26, 2017.
- Portland Green Streets Program: www.portlandoregon.gov/bes/
- Solving Flooding Challenges with Green Stormwater Infrastructure in the Airport Wash Area, Watershed Management Group, 2015

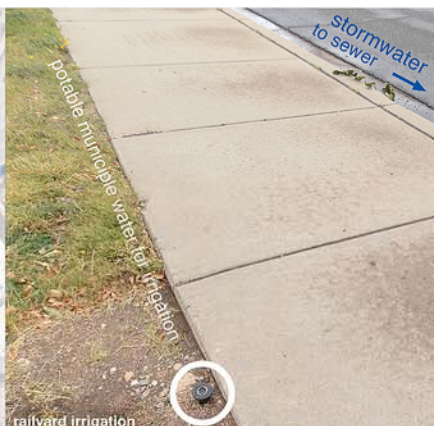


North Guadalupe Street:

- widen sidewalk to six feet
- remove traffic islands at center of street
- provide planted, stormwater irrigated buffers/curb extensions/chicanes between sidewalk and street
- provide limited additional street parking where street width allows

South Guadalupe Street:

- retrofit curb cuts and accessible stormwater inlet bridges to irrigate railyard park plantings and barren patches of dirt along sidewalks and fronting buildings
- where possible, set parking areas several additional feet back from sidewalks to allow for larger planting areas



The 1846 Map of Santa Fe shows the agricultural fields of the Guadalupe Street district's past including multiple irrigation canals that came off the Rio Santa Fe.



The 1915 Map of Santa Fe Water Mains shows additional irrigation canals and drainages, relocation of the Rio Santa Fe and the railroad line along Guadalupe Street.



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