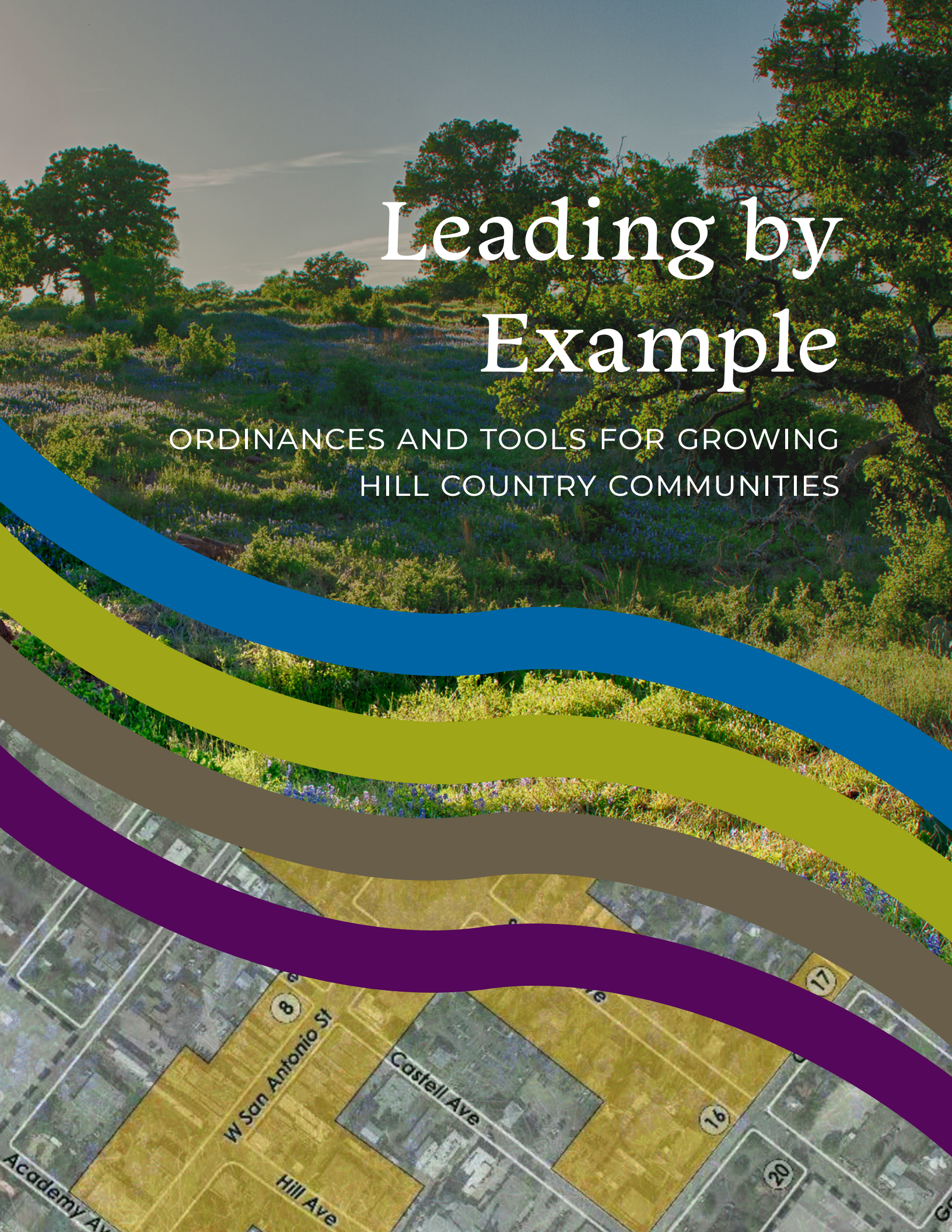
Leading by Example

ORDINANCES AND TOOLS FOR GROWING HILL COUNTRY COMMUNITIES



Using the Guides

This project is organized into topical chapters: Water, Land and Skies, Transportation, and Zoning and Development. Each chapter contains *guides* that focus on a particular ordinance, or aspect of an ordinance, your community may be interested in adopting. Each guide introduces the ordinance topic and includes strong example ordinances, resources for further research, and a list of best practices.

EXAMPLE ORDINANCES

> A selection of ordinances from the Hill Country and beyond are available for download throughout this guidebook. Strong components and necessary context are included as needed.
> City Names **and** underlined text **link to ordinances and code sections.**

RESOURCES

The guides are snapshots of ordinances. Resources include relevant organizations and guiding documents that provide more in-depth information about each topic.

▸ *Underlined and italicized titles link to the corresponding document.*

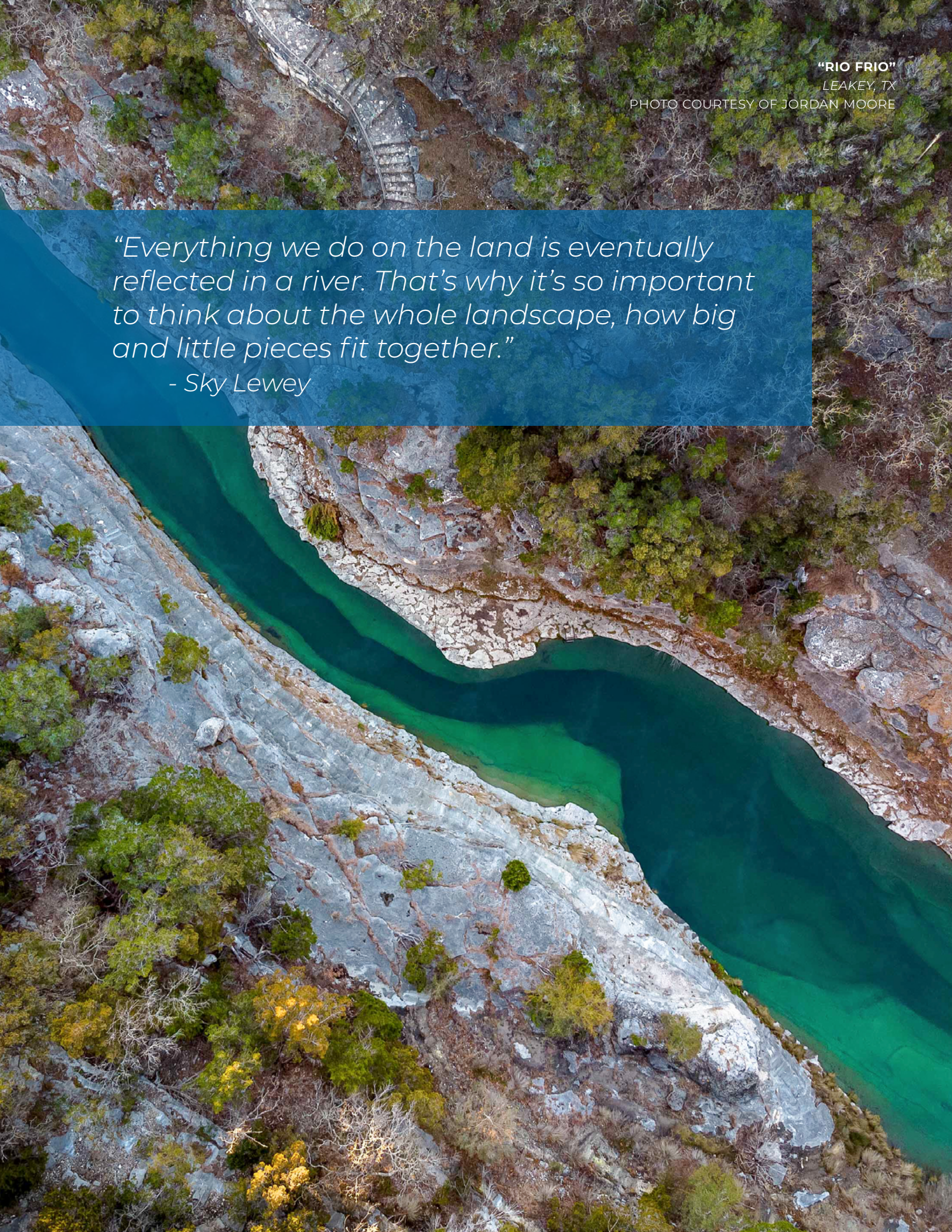
BEST PRACTICES

A compilation of methods to undertake when crafting the ordinance. These suggestions are widely accepted as the most responsible and effective procedures for the given topic.

WATER

The Texas Hill Country is a region defined by its water resources, from our iconic rivers and lakes to our renowned swimming holes. As the region grows, more pressure is placed on our resources. It is imperative we make the most with what we have. In adopting water conscious ordinances, local governments can do their part in promoting smart water use.

This chapter includes ordinances to address water quality and quantity – from promoting small-scale best practices like rainwater harvesting or drought watering restrictions, to larger-scale measures like holistic watershed protection planning.



"RIO FRIO"
LEAKEY, TX
PHOTO COURTESY OF JORDAN MOORE

"Everything we do on the land is eventually reflected in a river. That's why it's so important to think about the whole landscape, how big and little pieces fit together."

- Sky Lewey

Watershed Protection

We all live in a watershed and our activities on the land have a direct impact on the health of our watersheds and water resources. A watershed – also known as a basin – is an area of land where all water flows to a single stream, river, lake or even ocean. Natural boundaries of watersheds can be very small for a single creek or stream, or quite large—like the Colorado River basin. The goal of watershed protection is to manage the impact of human activities to prevent flooding, erosion, and pollution of surface water and aquifers.

WATERSHEDS EXTEND BEYOND MUNICIPAL AND COUNTY BOUNDARIES. PARTNERSHIPS WITH COMMUNITIES AND STAKEHOLDERS IN ALL JURISDICTIONS ARE VALUABLE WHEN CRAFTING WATERSHED PROTECTION PLANS.

Watershed protection can mean many different things, including low-impact development, stream setbacks, flood management, impervious cover limits, or an all encompassing integrated watershed management approach. These and other strategies for watershed protection are covered in subsequent sections of this guidebook.

Economic & Environmental Benefits of Healthy Watersheds

- Improved water quality and aquifer recharge
- Reduced vulnerability to flooding and erosion
- Increased biodiversity and reduced risk of invasive species
- Reduced vulnerability to climate change and natural disasters
- Increased property values and quality of life
- Human health benefits through access to natural spaces

WATERSHED PLANNING
A HOLISTIC APPROACH

For communities interested in addressing water quality problems in a more holistic manner, a **watershed protection plan (WPP**) is a great way to identify sources of pollution and prioritize protection strategies. A WPP is a comprehensive management plan that protects watersheds from land uses and human activities that pollute or degrade the health of the watershed. Done well, the planning process is thorough and collaborative, incorporating stakeholder input and feedback at multiple points along the way. Comprehensive planning can provide a guide for growth that is economically and environmentally sustainable.

A plan on its own is not legally binding or enforceable. It is a policy document that expresses intent, sets goals, and outlines key strategies. An ordinance is a legally enforceable means to implement portions of a plan.

EXAMPLE WATERSHED PROTECTION PLANS

Boerne, TX
▸ Upper Cibolo Creek Watershed Protection Plan

Wimberley, TX
▸ Cypress Creek Watershed Protection Plan

FUNDING & PLANNING RESOURCES

Federal Government funding for watershed protection exists under the **Clean Water Act section 319(h)**. To qualify, planning projects are required to meet the EPA's Nine Elements for Watershed-based plans, which are discussed in the handbook below.

▸ *Handbook for Developing Watershed Plans to Restore and Protect Our Waters (the quick guide)*

The **EPA** maintains a list of funding opportunities for watershed planning.

▸ View the funding opportunities *here.*

Low Impact Development

As we develop residential and commercial areas, land that once absorbed and retained rainfall is paved over. Rain quickly runs off our buildings, sidewalks, roads, lawns, and parking lots creating negative downstream consequences, such as increased flooding risks and stream degradation. The primary objective of *low-impact development (LID)* is to capture, filter, and retain water as close to the point of rainfall as possible by mimicking a site's pre-development hydrology and ecological functions.

Conventional stormwater management facilities control flooding and reduce downstream impacts by using impervious cover (usually concrete) to direct, transport and hold runoff.

LID features work to increase water infiltration and rainfall retention on-site by reducing and breaking up impervious cover. LID is the "swiss army knife" of the watershed protection tool box because it is easily adapted to new and existing development and provides a wide range of benefits.

Economic & Environmental Benefits of LID

- Improved water quality
- Reduced frequency and severity of flooding
- Restored aquatic habitat
- Improved groundwater recharge
- Reduced heat island impacts
- Improved air quality
- Pollinator species habitat
- Enhanced neighborhood beauty
- Reduced construction costs
- Enhanced property values

Common LID Practices

RAIN GARDENS AND SWALES

RAINWATER HARVESTING

WETLAND CREATION AND PRESERVATION

REDUCTION OF IMPERVIOUS SURFACES

STREAM SETBACKS & RIPARIAN BUFFERS

TREE CANOPY PRESERVATION

DEVELOPMENT DENSITY

GREEN CORRIDOR PRESERVATION

GREENROOFS

LID PRACTICE SPOTLIGHTS

Rain gardens are vegetated, depressed landscape areas designed to capture, infiltrate and/or filter stormwater runoff. The biofiltration areas remove pollutants in stormwater runoff similar to other treatment systems. However, because they are restricted to smaller drainage areas and shallower ponding depths, which necessitate a larger surface area, infiltration, evapotranspiration, and biological uptake mechanisms may be more significant for rain gardens than other treatment best management practices (BMPs).

BIOFILTRATION AREA IN SAN MARCOS, TX.
PHOTO COURTESY OF SYDNEY BECKNER

GREEN ROOF ON A PARK PAVILION IN LEAGUE CITY, TX.
PHOTO COURTESY OF GIFT - TEXAS A&M AGRILIFE EXTENSION

Green roofs are "contained" green spaces on top of human-made structures. Green roofs are commonly thought about as a solution for densely populated urban areas, but their benefits apply to buildings and cities of any size. Green roofs are great for reducing urban heat island effect and also provide stormwater management, increased energy efficiency and roof durability, aesthetic improvements.

▸ Green Roofs for Healthy Cities is a national non-profit organization with great resources for greening.

EXAMPLE ORDINANCES

MARBLE FALLS, TX

KYLE, TX

BOERNE, TX

SAN ANTONIO, TX

- Encourages the installation of LID features and allows development credits for their Regional Storm Water Management Program.

▸ San Antonio River Authority Technical Design Guidance Manual
Boerne and San Antonio each point to this manual for guidance.

RESOURCES

The **EPA** website on Urban Runoff has a number of helpful resources on how communities can grow while reducing negative environmental impacts.

▸ *Terminology of Low Impact Development*

▸ *Costs of Low Impact Development*

▸ *Maintenance of Low Impact Development*

▸ *Encouraging Low Impact Development*

Texas Living Waters Project (TLW) is a collaboration of conservation groups working to preserve our state's water resources. The TLW team routinely publishes helpful resources and issue papers like this one, detailing possible funding sources for nature-based flooding solutions.

▸ *Nature-Based Solutions to Flooding in the Hill Country*

Hill Country Alliance created a guidebook of LID projects and information on the professionals who helped make them happen.

▸ *One Water in the Texas Hill Country*

Clean Coast Texas is a program of the Texas General Land Office (GLO) that works to help communities protect water quality along the coast. The health of the coast depends largely on the actions of upstream users. Clean Coast Texas has produced several useful guides on stormwater solutions.

▸ *Sustainable Stormwater Solutions: Why Design Matters*

▸ *Sustainable Stormwater Solutions: Maintenance Requirements*

▸ *Sustainable Stormwater Solutions: Guide to Retrofitting*

BEST PRACTICES

Seek input from community stakeholders and tailor ordinances to local conditions. Community support is invaluable and brings important political and logistical support for enforcement.

Treat and think of stormwater as a resource, rather than a problem to be managed. Wide-scale use of LID practices can help developed watersheds act more like undeveloped watersheds by mimicking natural infrastructure. When we create systems that return rainwater to where it would naturally go, we help nature support our communities. Doing so saves money and increases property value, mitigates flooding, improves water quality, and beautifies open spaces.

Maintenance practices and schedules are critical to prevent weak performance or system failure. When compared to traditional stormwater infrastructure over time, LID can be more cost-effective. LID typically requires lower initial investment and more ongoing maintenance, especially early on as vegetation becomes established. Once established, LID practices can largely be maintained like other landscaping elements. Maintenance for dispersed LID systems, such as rainwater harvesting systems, and permeable paving that fall on private parcels need to come with clear maintenance instructions and schedules so that private property owners have the tools to keep these solutions fully-functional.

Require watershed protection solutions for all new residential and commercial properties. Purely voluntary participation in LID reduces the effectiveness of the entire system.

Incentivize property owners to apply LID practices in existing developments. Within existing developments, there are often opportunities to add LID features and enhance the performance of the site.

Impervious Cover Limits

Impervious cover is any surface that does not absorb or retain rainfall, examples include: roofs, pavement, sidewalks, patios, and compacted soil. As we build more housing developments, roads, and commercial buildings, land that was once open space and absorbed rainfall is paved over causing more water to runoff. This can lead to more intense flooding downstream, which threatens lives and homes, increases pollutant loads to surface water bodies, and endangers aquatic habitats and species. By requiring that new developments retain a certain percentage of permeable land or surface, communities can mitigate some of the negative effects of runoff.

Example Ordinances

Each example includes an extensive list of what is considered impervious cover and offers development incentives.

Woodcreek, TX

Wimberley, TX

Dripping Springs, TX

Boerne, TX

Austin, TX

- Uses the maximum allowable impervious cover instead of the existing amount of impervious cover when modeling floodplains to ensure the floodplain area isn't expanding with development.
- Overlapping incentives encourage applicants to build below the maximum allowable impervious cover.

ROCK BIORETENTION ZONE IN A HOUSTON PARKING LOT.
PHOTO COURTESY OF DAVID BATTS, CONSTRUCTION ECOSERVICES

BEST PRACTICES

List of what is and is not considered impervious cover. This sets clear guidance for developers, city staff, and the community on the types of surfaces and materials that factor into site area calculations. The regional examples listed below all have good lists.

Offer development incentives. An interesting feature of the City of Wimberley's ordinance is that functioning rainwater harvesting systems are not considered impervious cover and can be used to obtain credits toward any impervious cover requirements.

Consider zoning activities when setting maximum percentages. Industrial and commercial areas typically require higher impervious cover to be economically viable. Thus, water quality treatment and volume management should be required to offset the effects of imperviousness. For example, the City of Austin places more stringent requirements on these potentially pollutive activities and requires industrial sites to have an on-site water quality and detention pond system for highly contaminated runoff.

PERMEABLE PAVEMENT

Permeable pavement is paving that is porous to allow water infiltration. It is a more environmentally sensitive way to manage stormwater than standard paving.

Types of permeable paving:

- Pervious concrete
- Porous asphalt
- Permeable interlocking concrete pavers (PICP)
- Grid pavement system

PERVIOUS PAVERS IN THE RAIN. LEAGUE CITY, TX.
PHOTO COURTESY OF TCWP - TEXAS A&M AGRILIFE.

GRID PAVEMENT SYSTEM. PHOTO COURTESY OF MAGGIE NEMETZ

IS PERMEABLE PAVEMENT THE BEST OPTION?

BENEFITS

- Contributes to groundwater recharge.
- Reduces the amount of untreated stormwater reaching rivers and lakes, which reduces pollutants and stream bank erosion.
- Stays cooler than standard paving in summer temperatures, which reduces the urban heat island effect.
- Reduces flood risk by storing water that is released at a slower rate.

HOWEVER...

Due to the low filtering capacity of standard permeable paving designs, it is not always the right solution.

- Without a treatment train downstream permeable paving is not recommended for sites within aquifer recharge zones because stormwater may not be adequately filtered before reaching the groundwater.
- Permeable paving on its own is not suitable for sites with poor soil drainage, high levels of wind-blown dust and debris, slopes over 5%, or high concentrations of oil, grease, heavy metals, or toxic chemicals.

MODIFICATION

- One of the simplest design modifications is to include a sand layer in the pavement section that improves pollutant removal.

Stream Setbacks

A stream setback is a development regulation that protects the land along stream banks from human activities that could damage riparian vegetation, aquatic life, soils, and water quality. These regulations go by many names, such as riparian buffers, water quality buffer zones, water quality transition zones, and erosion hazard zones. The setbacks limit development adjacent to riparian and wetland zones to reduce exposure to flood risk and preserve the capacity of the buffer to minimize contamination hazards through ecological processes.

Benefits of Stream Setbacks

- Protects human life, health, and property from flooding events and erosion by slowing floodwaters.
- Stabilizes banks through protected native plant growth.
- Prevents the degradation and pollution of groundwater.
- Retains groundwater recharge features.
- Maintains natural beauty and community character.
- Protects wildlife habitat, including for endangered species.

Resources

The **Association of State Wetland Managers** published a extensive best practice and model ordinance guide.

▸ *Model Ordinances for Regulating Wetlands, Riparian Habitats, and Stream Buffers*

Texas Parks and Wildlife published the following resource as a guide for restoring riparian areas. It includes descriptions of necessary government permits, site preparation, and much more**.**

▸ *Restoration Design Guidelines for Texas Hill Country Riparian Areas*

The **Hill Country Alliance** Land Program has resources on good land stewardship practices for individuals and municipalities, including the following overview of the benefits of “Grow Zones” along creeks rivers.

▸ *Grow Zones and Targeted Access Along Creeks and Rivers*

"THE MIGHTY UPPER GUADALUPE RIVER"
PHOTO COURTESY OF ALISON LYONS

BEST PRACTICES

Recognize public health and safety benefits of stream setbacks that promote healthy and ecologically functional riparian areas

Obtain and adopt large scale wetland, riparian, and floodplain maps. Recognizing that there are financial limits to map accuracy and detail, provide mechanisms within the ordinance for establishing boundaries and addressing map inaccuracies that will accrue over time. Whenever possible, shift data gathering responsibilities to permit applicants.

Establish a review board to develop regulations and evaluate permit applications. Grant the board or commission authority to require riparian management and mitigation plans based on the size and type of development project, as well as the amount of riparian area affected.

Incentivize repairing degraded riparian buffers. Provide applicants with credits for other code requirements when they de-pave, remove invasive species, plant native riparian species and fix degraded buffer areas.

Include "Grow Zone" policies that halt mowing along publicly owned stream banks. Doing so allows the growth of more dense and diverse riparian vegetation that can improve water quality, prevent erosion, increase wildlife habitat, and provide other important ecosystem services.

STREAM SETBACKS
IN HILL COUNTRY JURISDICTIONS

CITIES

- BLANCO
- WOODCREEK
- WIMBERLEY
- BULVERDE
- BURNET
- MARBLE FALLS
- LAGO VISTA
- BEE CAVE
- BOERNE
- LAKEWAY
- SAN MARCOS
- AUSTIN
- SAN ANTONIO

COUNTIES

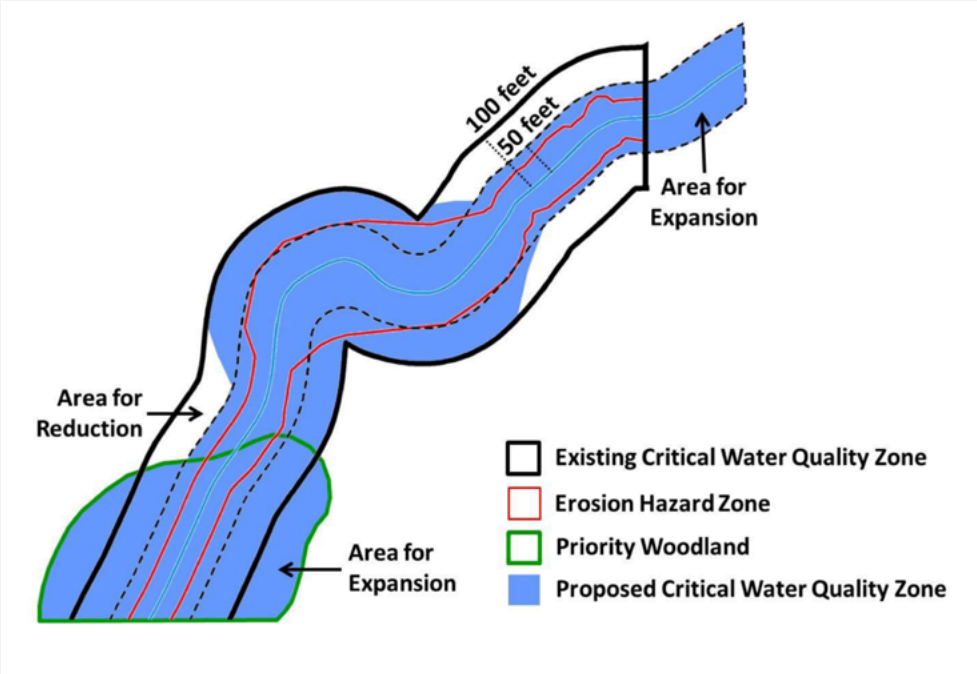
- BEXAR
- HAYS
- TRAVIS

Section 26.177 of the Texas Water Code authorizes municipalities to establish a water pollution control and abatement program. Many Hill Country cities have used this authority to establish stream setbacks within city limits and their extra-territorial jurisdictions (ETJs).

BUFFER AVERAGING ON A MINOR WATERWAY

This City of Austin graphic shows an approach called "buffer averaging." This allows the buffer boundaries around a stream to be altered in certain areas, as long as the overall surface area of the buffer is the same or greater.

SOURCE: CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.5.2-D



STREAM SETBACKS

Governments take different approaches to implementing stream buffers and setbacks. Some institute fixed-width, non-varying setbacks for a variety of riparian areas (*see Bulverde*). Others adopt sliding-scale approaches with variable standards based on factors such as: the waterway's contributing zone size, the presence of critical environmental features, and land use.

Table interpretation example: A stream in **Blanco** with a 15-acre contributing zone would have a setback, or "buffer," of 25 ft on either side of that stream's centerline (i.e. a total buffer of 50 ft). Any proposed development along this stream would not be allowed within this buffer.

City	Setback zone type	Acreage of contribuing zone	Setback zone (feet from stream centerline)	Notes
Blanco Wimberley Woodcreek	Graduated Setbacks	5 - 40	25	This approach gives landowners a choice at the time of platting to either use a graduated setback method or apply setbacks based on the floodplain boundaries.
		40 - 128	50	
		128 - 320	100	
		320 - 640	200	
		640	300	
	Floodplain Boundaries	For creeks and rivers draining >5 acres and <40 sq miles	25 ft from 100-yr floodplain boundary	
		For creeks and rivers draining >40 sq miles	FEMA 100-yr floodplain buffer	
Bulverde	All City and ETJ Waterways	>25	60	This is a simple one-size-fits-all approach.
Boerne	Protection Zone 1	25 - 128	35	This approach uses graduated buffers, but also creates more stringent protections closer to the stream (PZ1) and less stringent protections further from the stream (PZ2). Together, they create the Total Protection Zone.
		128 - 320	55	
		320 - 640	70	
		≥640	100	
	Protection Zone 2	25 - 128	20	
		128 - 320	30	
		320-640	50	
		≥640	50	
	Total Protection Zone = PZ1 + PZ2	25 - 128	55	
		128 - 320	85	
		320 - 640	120	
		≥ 640	150	
San Marcos	Waterways with a FEMA defined floodway		100 ft from FEMA floodway	This approach adds 100 ft to FEMA floodway boundaries wherever they are available and a graduated buffer scheme throughout the rest of the community. Within the Edwards Aquifer Recharge Zone, there are heightened restrictions.
	Where FEMA maps don't exist	5 - 50	25	
		50 - 250	50	
		250 - 1000	100	
		>1000	200	

Water Conservation

Municipalities play a crucial role in promoting water conservation through the adoption of ordinances and best practices. Such efforts not only help to ensure a sustainable supply of water for future generations but also provide economic benefits, including reduced operating costs for water utilities and improved efficiency of water usage. Additionally, water conservation measures can help to mitigate the impact of droughts and other water-related challenges. Reducing inefficient water uses, such as watering golf courses or lawns with potable drinking water, can help ensure that in a drought-prone region there is water available for domestic sanitaion and fire protection.

While each ordinance or practice taken individually can make a difference, a comprehensive approach to water conservation can yield even greater benefits by reducing overall water consumption and promoting resilient water management practices. By taking a proactive stance on water conservation, municipalities can help to safeguard this vital resource into the future.

Example Ordinances

The following communities have water conservation ordinances that outline their drought contingency plans as well as additional rules to reduce the inefficient use of water.

Blanco
Wimberley
Austin
San Antonio

BEST PRACTICES

Address system leaks. An analysis of 2019 water data by the National Wildlife Federation found that Texas utilities are losing about 572,000 acre-feet per year of water, corresponding to an average of about 51 gallons of water per service connection every day (*see report here*). Addressing water losses in a water system is usually very cost effective, especially when compared to other supply strategies.

Install smart meters to provide real-time accounting of the timing and patterns of use. Such detailed information can help identify unseen sources of leakage and prioritize abatement measures.

Structure water rates to reflect the full long-range costs of operating and maintaining a water utility. A tiered rate structure charges a lower rate for basic household water usage, with progressively higher rates for additional consumption to promote conservation and reflect the true cost and value of water resources.

RESOURCES

The Environmental Protection Agency designed a guide to help water utilities and governments carry out assessments of the potential for future water conservation and efficiency savings to avoid or minimize the need for new water supply development

▸*Best Practices to Consider when Evaluating Water Conservation*

Texas Living Waters Project is a collaboration of conservation groups, including the Hill Country Alliance, that issues publications about water conservation and stewardship. For more information, visit *www.texaslivingwaters.org*.

▸ *Hidden Reservoirs: Addressing Water Loss in Texas*

The Texas Water Development Board website is another great resource.

▸ *Water Conservation Best Practices Management Guide.*

Rainwater Harvesting

Rainwater harvesting is the technique of capturing rainwater and diverting it to storage basins or planted areas for use or treatment. It is a great way to reduce stormwater runoff, reducing erosion and downstream flooding, while reaping the benefit of the collected rainwater. Rainwater harvesting can be combined with rain gardens and swales for slower release and to reduce landscape size. Municipalities can promote the use of rainwater harvesting systems by offering clear guidelines on permit requirements and incentivizing implementation through credits and rebates

Rainwater harvesting system
Photo courtesy Halff Associates

Example Ordinances

- Blanco
- Wimberley
- Bee Cave
- Boerne
- Austin

Relevant State Codes and Legislation

- **Texas Tax Code 151.355** exempts state sales tax on rainwater harvesting equipment. To claim, provide form 01-339 to the supplier at the time of purchase. The form is available at: *www.comptroller.texas.gov/taxes/sales/forms/index.php*.
- **Texas Property Code 202.007** prevents homeowners associations from banning rainwater harvesting installations.
- **Texas House Bill 3391** *(effective 2011)* requires rainwater harvesting system technology to be incorporated into the design of new state buildings and allows financial institutions to consider making loans for developments using rainwater as the sole source of water supply.

BEST PRACTICES

Require rainwater harvesting as an option for prospective homebuyers. The City of Wimberley requires all homebuilders and developers building new single family residential homes to provide a rainwater harvesting option to prospective buyers.

Incentivize rainwater harvesting systems. The City of Blanco allows the use of harvested rainwater as an alternative water source for irrigation and therefore those irrigating with rainwater are exempt from city drought restrictions (so long as stand-alone systems are not connected to city water to avoid potential contamination).

Include detailed graphics and equations to aid in system design. The City of Austin has adopted an extensive ordinance in an effort to promote the adoption of rainwater harvesting systems. It includes detailed best management practices and design options for a variety of systems.

Encourage native plant use with rainwater harvesting to conserve water. Landscaping irrigation can use up to 50% of municipal water, so conserving water through plant choice is crucial before implementing rainwater harvesting.

RESOURCES

The Texas Water Development Board (TWDB) is a great resource providing fact sheets and free trainings for city and county staff. The manual below offers a comprehensive guide on the advantages of rainwater harvesting, along with detailed technical guidance for establishing a system. Learn more at *twdb.texas.gov/innovativewater/rainwater*.

▸ *The Texas Manual on Rainwater Harvesting*

RESOURCS FOR LARGE SCALE RAINWATER HARVESTING

Rainwater harvesting can also happen at the subdivision and commercial development scale. The documents below provide models and considerations for large scale water harvesting.

▸*Rainwater Harvesting as a Development-Wide Water Supply Strategy*

▸*Water Harvesting Guidance Manual* (see pages 18-21)

Water Reuse

Water reuse is the process of treating and using otherwise wasted water sources - such as greywater or blackwater - in additional ways such as irrigation, industrial processes, or even as a source of clean drinking water. By reusing water, we can reduce demand on existing water resources, decrease energy use and carbon emissions associated with water treatment and transport, and mitigate the impacts of droughts. As the region's population grows, water reuse will be a critical tool for ensuring water supply needs are met.

Water reuse also provides economic benefits by creating a reliable and cost-effective water supply and by reducing the costs associated with wastewater disposal.

Economic & Environmental Benefits of Water Reuse

- Conserves potable water
- Lowers water bills
- Reduces wastewater discharge to sensitive water bodies
- Decreases load on local sewers
- Enhances drought resilience
- Increases water supply reliability.

Two Types of Water Reuse

Centralized water treatment refers to the process of treating water at a single location and distributing it to various consumers through a network of pipes. This is typically done by large municipal water treatment plants that are responsible for supplying clean water to entire cities or regions.

Decentralized water treatment involves treating water at or near the point of use. This means that water is treated at a smaller scale, such as in individual homes, buildings, or neighborhoods. Decentralized systems can include technologies such as point-of-use filters, reverse osmosis units, and other small-scale treatment devices.

BEST PRACTICES

Engage stakeholders in the development of water reuse ordinances, including the public, industry representatives, and water utilities. This can help to ensure that the ordinances are effective, acceptable, and feasible.

Include provisions that address health and safety concerns, including monitoring and testing requirements, treatment standards, and public notification requirements.

Provide incentives to encourage water reuse. Municipalities may consider providing incentives such as reduced fees for permits or water rates for entities that implement water reuse.

Develop a monitoring and reporting framework to ensure compliance with standards and to track the success of the program.

Consider public perception. Public perception can be a significant barrier to water reuse. Municipalities should consider public outreach and education programs to help build trust and acceptance of water reuse. This can include workshops, online resources, and public information campaigns.

FUNDING RESOURCES FOR WATER REUSE PROJECTS

Centralized Public Systems

Clean Water State Revolving Fund (CWSRF) assists communities with low-cost financing for a wide range of activities related to wastewater, stormwater, and reuse infrastructure.

▸ Learn more at *twdb.texas.gov/financial/programs/CWSRF*.

State Water Implementation Fund of Texas (SWIFT) was formed by the Texas Legislature to offer low-cost financial aid to support projects in the state water plan. As of fiscal year 2022, SWIFT has committed around $9.9 billion for projects throughout Texas.

▸ Learn more at *twdb.texas.gov/financial/programs/swift/*.

Decentralized Private Systems

PACE (Properly Assessed Clean Energy) funding can be used by private real estate holdings to finance the upfront capital costs of water reuse, including developing onsite infrastructure to capture and reuse non-potable water like rainwater and air conditioner condensate. For communities looking to pass rules encouraging decentralized water reuse, private buildings can take advantage of this program.

▸Learn more about the program from this Texas Water Trade report *here*.

CENTRALIZED NON-POTABLE SYSTEMS

While non-potable water is not suitable for drinking, it is perfect for irrigation and outdoor water uses. Centralized systems for water reuse are more technical than decentralized systems and require additional planning and investment to implement. However, they are very useful in larger communities and can be scaled as demand for non-potable water grows.

The San Antonio Water System (SAWS) operates the nation's largest recycled water facility supplying non-potable water to customers for irrigation, manufacturing and other uses. Learn more here.

Purple pipes are used to indicate water is not potable or drinkable.
(CC) FLICKR

EXAMPLE ORDINANCES

BUDA

- Tier 1 reclaimed water used by City for landscape irrigation along roadways. Bulk reclaimed water station available for customers with nonpotable water needs (§24.06.032c).

BOERNE

DIRECT POTABLE REUSE

Direct Potable Reuse (DPR) is a process of treating wastewater to meet drinking water standards, and then directly returning it to the drinking water supply system. To ensure public safety, it is crucial to establish strong monitoring and regulatory frameworks. DPR is not new in Texas but it has been slow to adopt. The cities of Big Spring and Witchita Falls utilized DPR quickly when experiencing emergency water shortages in 2013 and 2014.

EL PASO will begin construction late 2023 on a 10-million-gallon-per-day facility will be the first to allow advanced treated water to flow directly into the water distribution system

▸ Learn more about El Paso's Advanced Purification facility *here*.

WATER REUSE
DECENTRALIZED APPROACHES

On-Site Water Reuse refers to the practice of treating and reusing water on the same property or location where it is generated. These decentralized systems can be customized to fit the specific needs of a property or building and can be designed to operate in conjunction with municipal water systems or as standalone systems.

Rainwater, air conditioner condensate, and greywater can be treated to produce high-quality water that can be reused for non-potable purposes like irrigation, toilet flushing, and cooling.

Subchapter F of Chapter 210 of the Texas Administrative Code outlines the authorized uses of greywater systems for residential, commercial, industrial, and agricultural uses.

AUSTIN, STARTING DECEMBER 2023, WILL REQUIRE ON-SITE WATER REUSE SYSTEMS FOR ALL NEW COMMERCIAL AND MULTI-FAMILY DEVELOPMENT PROJECTS OF 250,000 SQ. FT. OR GREATER.

EXAMPLE ORDINANCE

AUSTIN

- *Regulation of Onsite Water Reuse Systems*

RESOURCE

Texas Living Waters Project released the following study finding that onsite water reuse can bring financial and quality-of-life benefits to affordable housing residents.

- *Opportunities for Realizing Water Reuse in Affordable Housing*

First edition published May 2023

Learn more at HILLCOUNTRYALLIANCE.ORG/LEADINGBYEXAMPLE

hill country alliance