

Las Vegas, New Mexico Urban Forestry Management Plan 2026





City Council Acceptance and Adoption

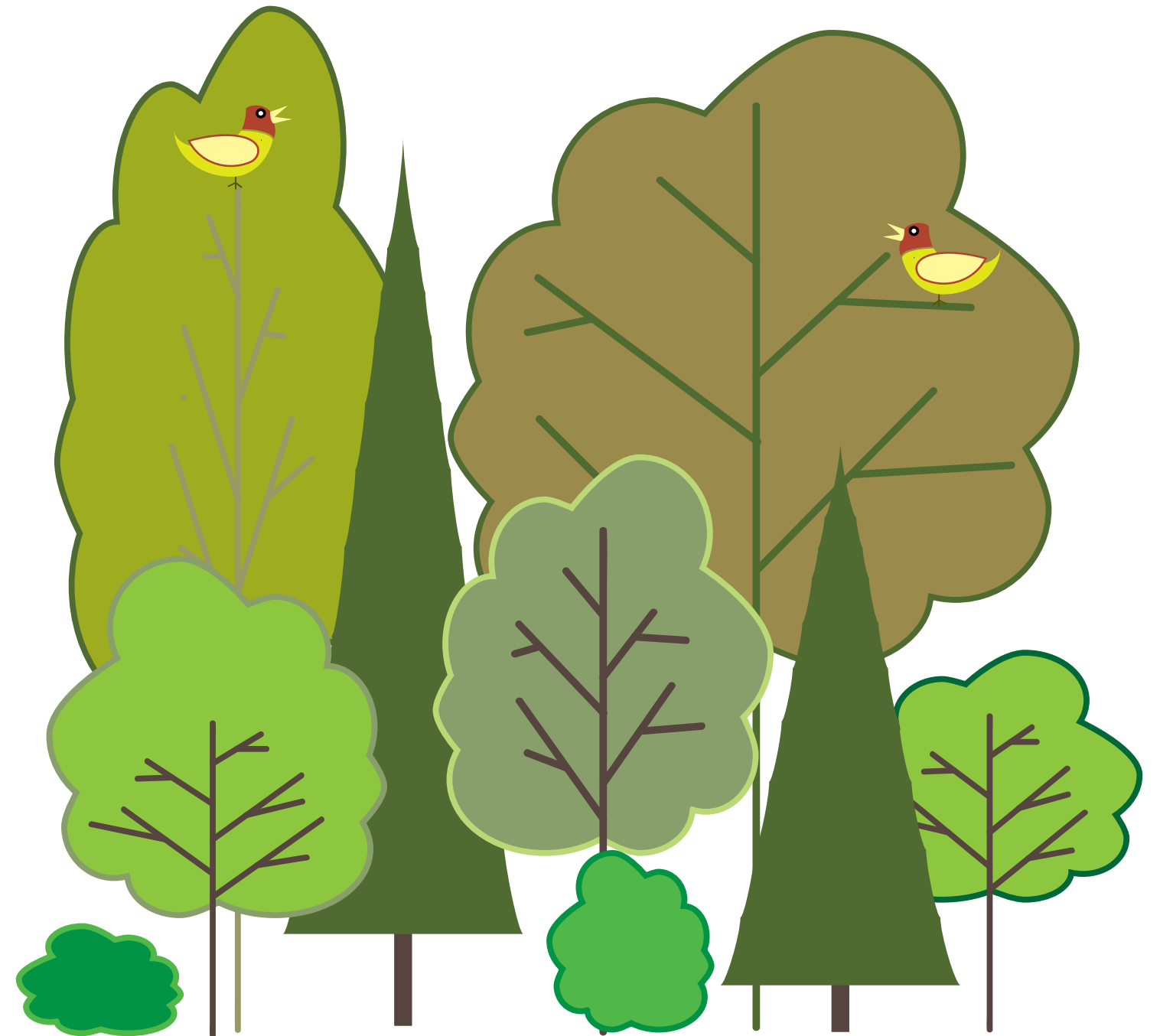
This Urban Forestry Management Plan is hereby accepted and adopted as a guiding policy by the City Council of Las Vegas, New Mexico, on this 17th of June, 2024.



Mayor



City Clerk



Acknowledgments

It is through collaboration that great things happen. We sincerely thank all the people who have helped to facilitate this document. This project was federally funded through the State of New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division.

Special thanks to Kristen Sanders, Project Urban and Community Forester for the State of New Mexico, who has supervised, guided and supported this project since its inception, and Shannon Atencio, Las Vegas District Forester for the State of New Mexico, who oversaw its actualization. Special thanks to Jacob Pederson, Resource Management Bureau Chief, for his leadership, support, and thematic council.

Thanks to the Las Vegas Mayor and City Council, Las Vegas Tree Board, Tierra y Montes Soil and Water Conservation District, the Urban Forestry Council, and the Santa Fe Municipal Tree Board for their insight, support, and encouragement.

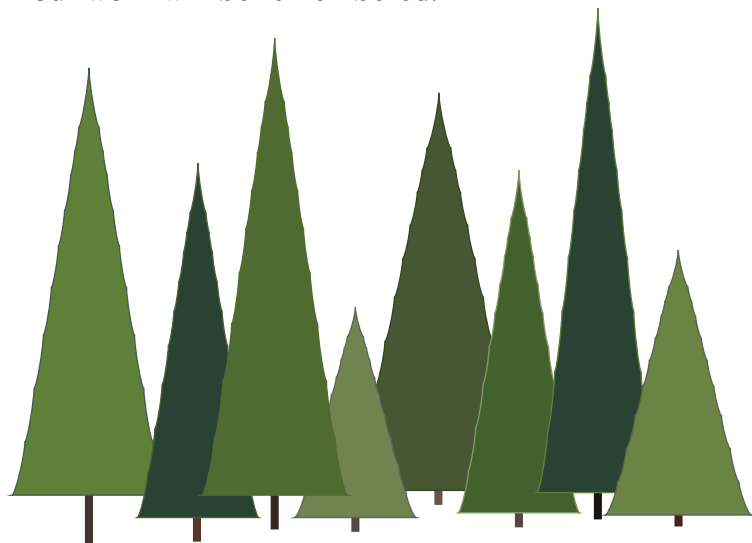
Thank you to the tireless dedication and work of the Seeds of Wisdom, LLC team, past and present, who have helped design, map and write this document, as well as those who have helped build the green infrastructure and plant the trees that have shaped this content, since 2005. Special thanks go to Athena Beshur, principal urban forestry designer, and Matthew Ellis, creative director, for their leadership in the development of this plan.

Thanks to all the people of Las Vegas for filling out surveys and sharing flooding and urban forestry concerns.

Thanks to Hermit’s Peak Watershed Alliance, New Mexico Forest and Watershed Restoration Institute and the San Miguel County Tax Assessor’s office for sharing map layers.

We recognize and extend gratitude & respect to all the people who have cared for this land and its healing waters.

Thank you in advance to all those who choose to incorporate some part of the following pages to support trees in our semi-arid desert. Your work will be remembered.



Land Acknowledgment

We recognize that this land and its healing waters are revered by the Pecos Pueblo, Jicarilla Apache, Ndé Kónitsaaí Gokíyaa (Lipan Apache), and Ute Nations and their descendants.

We honor and respect those who continue to care for and steward this place since time immemorial. With humility and admiration to the First Nations people, we extend gratitude for their connection to the land in all its beauty.



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Acequia and Community Ditch Fund

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Girl Scouts of America

Summer Forest Stewards Youth Corp Program

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Wildfire Resilience Training Center, Luna Community College



Represented at a tree board meeting include locals from: Las Vegas Tree Board, City Parks Division, Tierra y Montes Soil & Water Conservation District, Highlands University Forestry Department, State Forestry Division, and the Las Vegas City Council. Photo credit: Tom Lamberth, 2025

Vision Statement

The Las Vegas, New Mexico urban forest connects to the native landscape surrounding us.

These ancient lands reflect on the fortitude of our hardworking and proud community.

With great care we preserve the pillars of place, our resilient mature trees alongside the wonderfully historic architecture.

With intelligence, foresight and care, we nurture and grow our tree canopy, which cleans our air and water.

Using the precious gift of rainwater, our soils, waterways, native plants and animals share in the livability of our beautiful and diverse home.



Executive Summary

The city of Las Vegas with its historic parks and buildings has long been admired for its western charm and engaging residents. The trees in Las Vegas are an essential part of what makes the community a special place for celebrations like the July 4th Fiestas in the Plaza and the many fairs and family gatherings in the neighborhood parks. The trees provide bright blooms in the spring, cooling shade, and clean the air, while creating a sense of wellbeing.

This is why it is essential for the community to come together to prioritize the valuable asset that is our urban forest. The aging trees in Las Vegas need special care to further their longevity. The changing climate requires an innovative approach to keep our city a green and comfortable environment. By using the strategies put forth in this plan including rainwater capture, climate ready tree selection, proper pruning, and updated irrigation we can ensure that Las Vegas retains its tree-shading charm for many years to come.

The Hermits Peak / Calf Canyon wildfire destroyed mountains and forever changed our way of life. The flooding that followed compromised the water system and damaged homes. As the community looks toward recovery, new ideas such as green stormwater infrastructure will help to reduce flooding and provide storage for water to be used during times of drought.

An urban forest encompasses all trees and shrubs regardless of property ownership. Whether on private land, along the street, within a park, or in the open space, all trees count. The trees in our urban forest have adapted to the inconsistent moisture, sustained drought, and extreme temperature changes each day brings. They reflect the fortitude, enduring strength and hope of recovery citizens of Las Vegas hold.

The changing climate is one of uncertainty. We may have very high, or very low, temperatures. Our rain events may not exist, or come in torrents. Climate adaptation involves taking a closer look at the issues and predictions at the local level and preparing for them. In this way we can realize the goal of livability for our citizens, our wildlife, and our natural environment.

This Urban Forestry Management Plan is unique. It is a post-fire plan that incorporates concepts and designs for both urban forestry and green stormwater infrastructure. Community and agency involvement were integral in creating a shared vision for the future, steering the planning process, and understanding the depth of post-fire recovery. The plan incorporates an overview of the current conditions and canopy cover in Las Vegas, NM. It shows the impacts of flooding from Geographic Information Systems analysis and resident's experiences.

The plan also provides concept designs for several City parks, integrating passive rainwater harvesting solutions into the designs for the growth of trees. This will create security of our canopy while mitigating flooding. Best Management Practice specifications offer practical tree care guidance and green infrastructure techniques that are simple, efficient and effective.

The plan is divided into three sections that represent the process of recovery for our community and includes a twenty-five year implementation plan with a simple and straightforward process to monitor and evaluate its progression. Like the recovery of an oak acorn buried under the char of the fire, through care, we can grow our tree canopy.



The first section is **FIRE**, which provides context and background for the project. It describes the current conditions, the effects of the Hermit's Peak / Calf Canyon Fire, and subsequent flooding. Also, it includes chapters on current tree inventory data and fire-wise landscaping, especially within the Wildland-Urban Interface to the surrounding forest.



The second section **HEART** details clearly defined goals for this 25-year plan. It connects to the essential quality of community and delves into the place-making quality inherent in a mature tree canopy. It includes beautifully illustrated conceptual designs for some of the parks and general recommendations for all parks in Las Vegas. It features a conceptual map of additional trails to connect the community to parks and schools, helping to improve pedestrian safety. General solutions to water concerns include suggestions for the park irrigation system as well as information about wind behavior and transpiration. Incentive program options are offered, as well as a cost estimate for tree care and additional park & street tree plantings.



The third section **HOPE** provides strategies to reach our goals. This includes a recommended tree list based on the temperatures, planting zones and soil geology of Las Vegas. Illustrated low-impact development and green infrastructure technologies show the ease of incorporating these best management practices. Additionally, the City Council's adopted 2026 updates to the tree ordinances are provided.



Finally, the **APPENDIX** reconnects the plan to the global urban forestry initiative, as has been set by the United Nations. It provides additional data, such as Tree Structure by Species chart, which provides a breakdown of number of trees in the inventory by species, the average condition of the species, as well as tonnage calculation of our trees as urban wood assets. This section also offers charts by i-Tree Eco including hydrology effects of trees in the inventory, a breakdown of the trees in each park, and specific trees slated for removal, should funding become available. The extensive bibliography of sources finalizes the plan.

The hope is that this plan will be used not only on public lands, but that its use will ripple throughout the private sector to create shade, enhance livability, and strengthen the community bonds for an undaunted tomorrow.

May it be useful,

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Engagement & Planning

Community involvement has been paramount to developing this plan. Residents know where flooding occurs when it rains. They remember how the shade of a tree-lined street felt when they were young. They also know what they want to see & have in their outdoor living spaces. As such, input of residents is imperative to creating a successful urban forestry plan. This plan was not created in a silo. We are grateful for the involvement, encouragement, questions, concerns, and guidance that propelled this document forward.

Here are some methods of engagement used in its creation:

- Engage City Council and City Manager in each step: conceptual frameworks, incentives, addressing community need, and provide cost estimates for funding.
- Design and print a survey and distribute it throughout town: coffee shops, the library, grocery stores, and schools. Share copies of the survey to teachers, tree board members, and community organizations.
- Create an ArcGIS Survey123 version of the survey. Advertise in the local newspaper, The Las Vegas Optic, with a QR Code to the survey. Distribute it electronically via social media. Place fliers on telephone poles in the most popular parks with a link to the QR Code.
- Plan a Kick-off Meeting using "Now, Wow, How" (Carmichael 2024), partner with a local restaurant to provide food for community at meeting. Ask questions and accept feedback.
- Market the plan using local, regional, and national media via press releases and interviews (radio, newspaper, social media) and include Links / QR code to access community surveys.
- Invite local politicians, representatives, community organizations, teachers, and press.
- Interview / share project on local radio and national radio stations.
- Interview with Santa Fe New Mexican newspaper.
- Attend monthly Tree Board meetings when invited. Provide updates, including rough drafts of pages, maps, initial concept designs, incentives, and tree inventory data.
- Gather and utilize local documents from the Parks Director, especially the Park Audit.
- Engage community in informal and formal settings to solicit feedback: booth local events such as the Harvest Festival, talk to community members in parks, community meetings, social media, and educational events.
- Make an announcement at local conferences to encourage regional subject-expert survey responses.
- Provide maps and resources to relate urban forestry perspective in community plans.
- Hire and engage with a local subject matter experts.



Figure 1: Planning Process Framework

Call to Action

Public works, including green stormwater infrastructure (GSI), tree planting, tree care and the administration of projects, require funds to coordinate, design and implement. This plan offers Las Vegas a gateway to grant funding. The funding could be generated under several headings, including health, equity, urban forestry, tree planting, tree care, green infrastructure, stormwater management, livability, habitat, and riparian restoration. Funding should pursue rainwater harvesting in conjunction with tree planting, in order to help trees grow using rainfall as a primary water source.

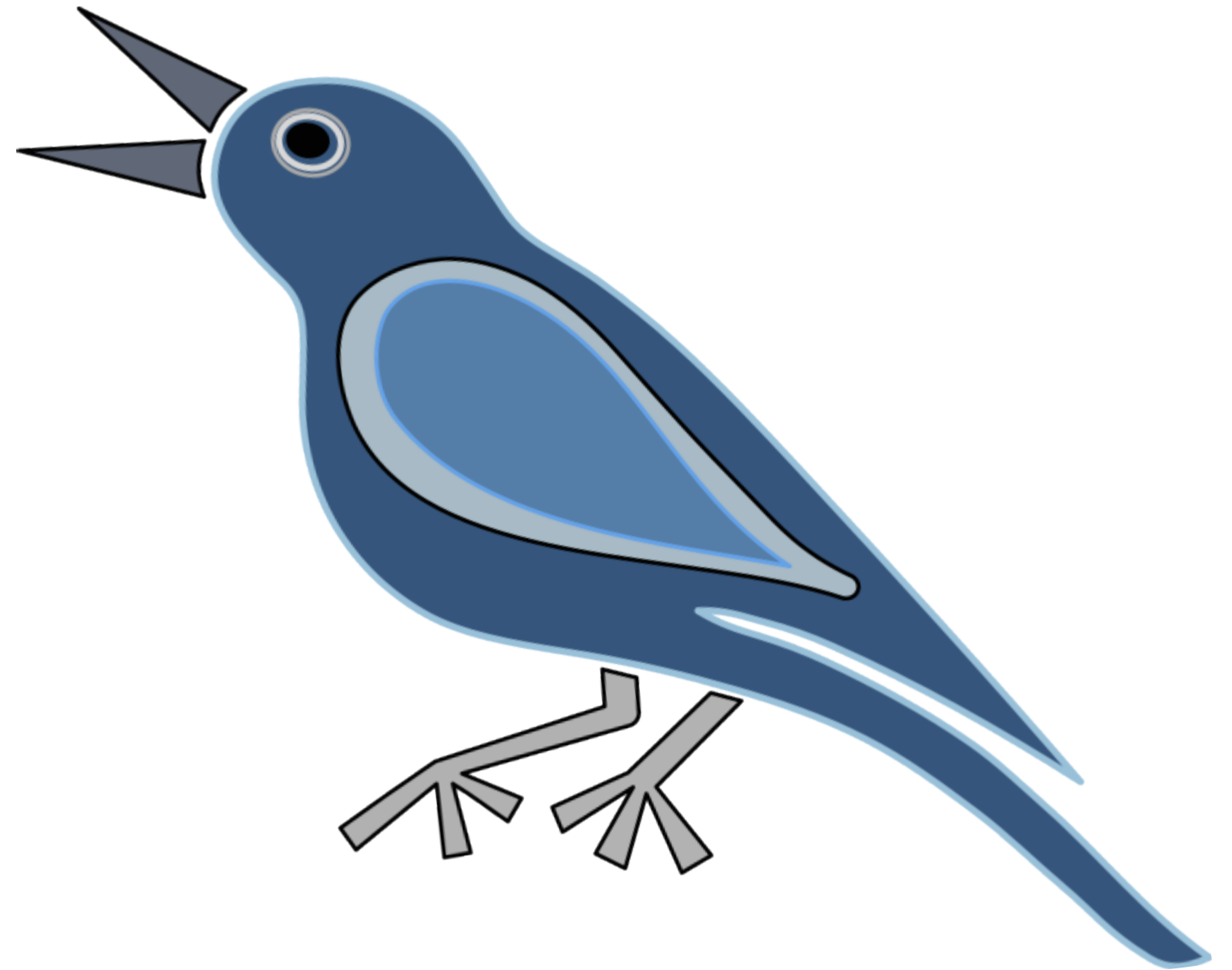
The participation of willing and enthusiastic people is needed to implement this plan. Training staff, residents, and contractors is necessary. Trees should never be topped, but it is a common occurrence both by citizens and contractors. Tree care professionals should know when and how to structurally prune a tree, and we provide an initial guide to support this training. Staff are needed for Parks, Open Space, and Urban Forestry Initiatives. This includes hiring specialists, such as certified arborists and skilled irrigators, to heighten City standards.

Collaboration is key to success. Coordination needs to exist between City departments in order to make best multifaceted use of this plan. Skilled citizens can offer consultation, and others can learn, implement, and share the techniques illustrated here as well as ones they create. Trainings, such as Querencia in Action workshops, are testament to this collaborative support system that makes Las Vegas unique and primed for a resilient, durable tree canopy.

Throughout this plan are more detailed calls to action. Some actions seem small, but cumulatively these will create meaningful change. An example of this is the redundancy of small-scale water harvesting. Although each rain garden may support one or three trees, the excess rainwater drains to the next garden, to re-establish the shaded street canopies nostalgically remembered from the past.

*“Not all of us can do great things,
but we can do small things with
great love.”*

- Saint Mother Teresa



State of New Mexico Forest Action Plan



The New Mexico Forest Action Plan is closely aligned with this plan. The reoccurring yellow and red "NM state icon" emphasizes how each page is aligned with the New Mexico Forest Action Plan. This gives a snapshot of how the local urban forestry goals align with state priorities. Here, state priorities are described and listed in numerical order with associated page titles as a quick reference.

1.5 - Goals for 25-Year Plan

Develop collaborative strategies to promote a dynamic patchwork mosaic of riparian and wetland vegetation and habitat as water availability and community priorities allow.

1.7 - City of Las Vegas Community Identified Areas of Flooding (Map)

Support and expand public outreach and education to foster a society that supports watershed restoration activities and values resilient and healthy forest ecosystems.

2.4.2 - Wildland Urban Interface - 5/30/100 Rule

Coordinate existing programs in New Mexico that can or could help communities and landowners implement post-fire response on private, municipal and other lands that do not qualify for a local, regional, or national Burn Area Emergency Response (BAER).

2.4.3 - Wildland Urban Interface (WUI)

Identify and fill gaps in authorities, funding and program direction to provide coordinated post-fire response on all lands and jurisdictions to protect lives, property and infrastructure; rebuild infrastructure resilient to post-fire conditions; and restore ecosystems after wildland fires.

4.1 - Top Powerline Trees

Provide tool/toolkit to help rural electric cooperatives improve required vegetation management plans along utility rights of way in New Mexico.

5.1 - 25 Year Plan Guide Years 1-5

Inventory, research, monitor and model to inform management and regulatory decisions.

5.5 - Ordinances

Improve laws, regulations, and policies to protect New Mexico’s plant diversity.

6.2.1 - Mora Reforestation Center (John T. Harrington)

Expand nursery capacity in New Mexico, produce adequate number of high-quality seedlings to meet reforestation needs for burned areas and other reforestation opportunities.

6.3.3 - Tree Inventory Survey

Develop climate-ready methods, strategies and a matrix for planting prescriptions considering future climate impact to seedling survival. This will require reforestation goals specific to each land managing agency and shall include mapping of all planting sites pre and post planting.

7.1.1 - Recommended Tree List

Identify and promote tree and shrub species for New Mexico urban environments that can survive both current and projected climates.

7.1.2 - Hubs, Corridors & Neighborhood Parks

Identify areas with specific challenges to urban forest biodiversity, age, health, and resilience to target replanting efforts.

7.1.3 - Stormwater & Flooding

Integrate urban forestry into all scales of city and state-scale master plans, emphasizing the role of the urban forest as green infrastructure to mitigate heat and manage stormwater.

7.1.4 - Rain Gardens

Advance urban forest design principles that include appropriate soil volume and quality and make the greatest use of available water in supporting urban trees and landscapes.

7.1.5 - Community Habitat Hubs

Increase urban tree and shrub canopy by strategically targeting planting in areas with the most human health and safety need.

7.1.6 - Benefits of Trees

Integrate the urban forest into landscape scale efforts to create habitat, restore water cycles, and mitigate climate change.

7.2.1 - Stakeholders

Expand collaboration between urban forestry and related fields, agencies, and sectors to diversify and leverage stewardship of the urban forest.

7.2.2 - Best Management Practices

Incorporate findings about urban tree and shrub survival in changing Southwestern climate in urban forest management practices and recommendations.

7.2.3 - 25-year Plan Guide

Increase statewide training opportunities on proper tree care and maintenance practices.

7.2.4 - Las Vegas Incentives

Provide communities with cost-saving tools to assist in management of the community forest.

8.2 - Acequias in Las Vegas

Practice shared stewardship across landscapes to make strategic investments aimed at mitigating risk, improving forest health, and increasing resilience in New Mexico’s ecosystems.

8.3 - Urban Wood

Support forest trade association and members. Promote sustainable utilization businesses and markets.

9.1 - Conceptual Framework

Develop and maintain a statewide land conservation strategy using relevant science to help guide conservation investments with state and federal funding. The conservation strategy should identify biodiversity hotspots and cultural resources including valuable riparian areas, wildlife corridors and pinch-points, and important public water source and working forests.

10.2 - Post Hermit’s Peak / Calf Canyon Wildfire Risk

Develop a system and procedures for shifting outdoor recreation and tourism during wildfire and when post-fire risks are severe.

10.3 - Rodriguez Park

Restore forests, woodlands and grasslands that are settings for high-volume recreation such as State Parks, ski areas, water recreation sites, and trail heads.

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*“Under a sky of azure,
where balmy breezes blow,
Kissed by the golden sunshine,
is Nuevo México.
Home of the Montezuma,
with fiery hearts a glow,
State of the deeds historic,
is Nuevo México.*

*O fair New Mexico, we love, we love you so,
Our hearts with pride will o'erflow, no matter where we go,
O fair New Mexico, we love, we love you so,
The grandest state to know,
New Mexico.”*



Fire

Hermit's Peak / Calf Canyon Fire

Fire Size and Date

In the spring of 2022, New Mexico experienced its largest wildfire to date, the Hermit's Peak / Calf Canyon Wildfire, which burned 341,735 acres - over 500 square miles (NM FWRI n.d.). The fire began as a two separate burns, eventually merging and spreading north & south (Figure 1). The Hermit's Peak fire began on April 6, 2022 as a prescribed burn which escaped containment in the afternoon of the same day due to high winds and deteriorated burn conditions (U.S. Forest Service 2022). The Calf Canyon fire began as a pile burn that smoldered through the winter and several snowfalls and escaped containment on April 19, 2022 (Gabbert 2022). The Calf Canyon piles were four miles west of where the Hermit's Peak fire was burning. On April 22, driven by strong winds, the fires merged and became the massive Hermit's Peak / Calf Canyon Wildfire (Gabbert 2022).

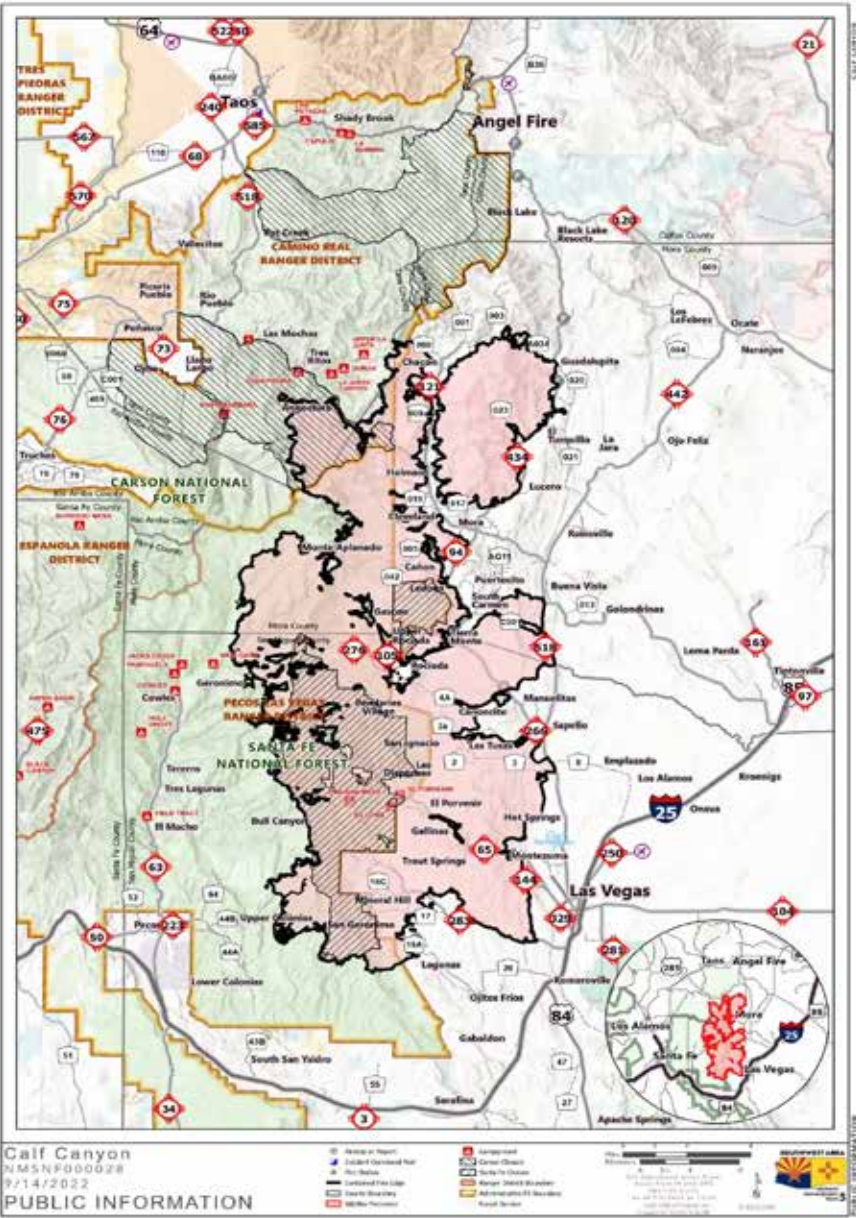


Figure 2: Map of Hermit's Peak / Calf Canyon Wildfire.
Map Source: New Mexico Fire Information Sept. 14, 2022

Post-Fire Impacts on Forested City Land

The Hermit's Peak / Calf Canyon Fire nearly reached the city limits of Las Vegas. Through its devastation of the adjacent forest, impacts rippled throughout the City and its urban forest. Flooding increased significantly, especially as stormwater flowed off of the western slopes. The force of this stormwater destroyed culverts, bridges and roads. With the onset of monsoon rains, sediment ran down slopes left barren from the fire. The intensity of flooding changed the course of the city floodplain by 61.69 acres, per FEMA maps before and after the fire.

Due to severe sedimentation in the water treatment facility, citizens lacked potable water. The City's aging water treatment plant was unable to filter the water laden with sediment, resulting in a distribution of potable water until a new temporary filtration system could be put in place (Elbein 2022). No water was provided to the landscape during this time. This exacerbated the drought stress on trees throughout the city, which were not able to be irrigated.

Recovery efforts commenced immediately after the fire, incorporating local knowledge alongside



Potable water trucked from Santa Fe to Las Vegas



Bottled water emergency distribution, Las Vegas

government entities such as the USDA's Natural Resource Conservation Services (NCRS). Flood prevention strategies included gabion baskets to direct water flow and sand bags to protect homes.

Post-fire hydrophobic soil prevented water absorption upstream. Although monsoons brought an abundance of rain to the dehydrated city, the stormwater was not clean and carried significant debris.

In June 2022, the Army Corps of Engineers engaged contractors to implement engineering solutions to protect Las Vegas from flooding (US-ACE 2022). One project was to entrench sections of the Gallinas River within the city. This removed vegetation along the riparian corridor that otherwise would have slowed and spread the flow of water onto the river banks.

Entrenching the river pushed water through the corridor to quickly exit the city, preventing an overabundance of water in the river that could top the banks and flood surrounding streets and homes. It served this purpose in the short term, but it worked against the major restoration efforts made only two years earlier to "Rewind the River" (HPWA 2020, Miller 2020). The unintended consequence of the 2022 manipulation is a continuing incision of its created channel and disconnect from the floodplain.

Within the burn scar, aerial reseedling occurred throughout the spring and autumn of 2023 to stabilize slopes. Erosion prevention techniques such as log contour felling and log run-downs were taught in workshops to empower landowners to conserve and restore their land. These techniques trap and preserve sediment on site, preventing erosion from carrying materials and sediment downstream into reservoirs and lakes.

Tree Stress Near Fire

Early recovery work responded to the immediate threats to infrastructure and homes, however did not readily address the root cause of the devastation - the loss of vegetation. Existing trees suffered. This is apparent in the updated tree inventory of street and park trees. Newly planted trees died as a direct result of lack of irrigation and water use restrictions in the year after transplanting.

Trees undergo several stresses during a fire. Their Leaves or needles, fine surface roots, trunks and branches are scorched. New growth buds burn, reducing regrowth. The extent of delayed mortality depends on how much of the tree was burned, the thickness of the bark, and if the tree was girdled, externally or internally (Scott 2025). Trunk girdle is a ring of complete loss of bark and cambium which blocks nutrients and water from reaching the canopy. If the tree survives, it can become susceptible to insect pests, which respond to pheromone stress signals. Photosynthesis is reduced due to lack of leaves or needles.

Internal damage affects water, sugar and nutrient transport, especially relating to the cambium, xylem and phloem. When fire desiccates a xylem tube, air bubbles form. In order to then transport water to the leaves and upper branches, the tree diverts the water around the tube, decreasing function, especially to branches relying on the damaged sections. These secondary causes can impact the devastation by up to 90% (Scott 2025) of delayed mortality.

Now is the time to engage in proactive solutions to address future vulnerabilities. Trees that were not drought stressed prior to fire are more likely to survive post-fire.

The Urban Forestry Management Plan makes recommendations on guiding stormwater as a source of irrigation in the City's parks and along streets. This water will be used to grow the tree canopy, reducing flooding and damage to grey infrastructure. These restorative initiatives will buffer the city from post-fire impacts and allow the city to build long-term resiliency.

KEY TAKEAWAYS

- **Fire damages trees in multiple ways.**
- **It takes years see damage.**
- **Post-fire soil does not absorb water well.**
- **Restore absorption with soil building.**
- **Rainwater harvesting captures and uses stormwater for landscapes.**
- **Local workshops teach post-fire waterwise methods.**
- **Techniques are scalable.**

Post-Fire Recovery

The impacts of the Hermit's Peak / Calf Canyon fire affected large areas, both urban and rural. Within the City of Las Vegas, recovery has taken several forms, from infrastructure updates and road work to barriers that direct stormwater. This plan will focus on recovery efforts that align with urban forest management and green infrastructure principles to increase the health and resiliency of the urban canopy.

Since the wildfire, many programs have been underway to curb its effects. In the burn scar, re-vegetation and erosion control have been important components of the recovery process mitigating the post-fire impacts downstream. These downstream impacts include flooding and debris flows (FEMA 2012), especially above the two reservoirs, Peterson Dam and Bradner Dam. Much of the work discussed in this plan will focus on the City of Las Vegas and the downstream effects of the wildfire, most notably the degradation of the urban canopy.

The wildfire has exacerbated flooding issues and created new concerns for roads and infrastructure, while inundating the City's water treatment plant with silt and organic matter, contaminating the water (El-Bawab 2022). The City has received funding to modernize their treatment plant, but this will take time to develop and implement.

Stormwater can be harvested throughout the City through passive harvesting techniques, allowing gradual infiltration into the soil for root development, while reducing its force and impact on infrastructure. Even very simple soil permeability methods improve water absorption. Groundcover and organic litter soften the impact of rainfall, improving absorption. These methods will improve the City tree canopy, rippling into health benefits for residents.

The wildfire has exacerbated flooding issues and created new concerns for roads & infrastructure.

Green stormwater infrastructure is a large component of the urban forestry plan, as it is both necessary for resilience, critical for semi-arid conditions, and a necessary response to flooding. Creating rain gardens in our semi-arid climate offers the perfect combination of wet/dry water cycling. Water percolates into the soil, and after a rain event, the soil dries sufficiently for the soil to remain aerobic, meaning that it continues to offer oxygen transfer at the root zone.

Community-driven efforts are enhancing disaster recovery with long-term solutions. Luna Community College received \$3 million from the USDA to initiate a Wildfire Resiliency Training Center that supports training and education in the natural resource fields and provides the region with a workforce prepared to handle disaster mitigation and recovery (Luna Community College 2023).

Resources for fire mitigation may be found through:

- www.csfs.colostate.edu
- www.firewise.org
- www.livingwithfire.org
- www.headwaterseconomics.org
- nmfwri.org/stewardship/conservation-science-center/
- www.nfpa.org/education-and-research/wildfire/firewise-usa



CALL TO ACTION

Take a community workshop to learn about post-fire recovery and reforestation.

Preliminary Restoration Trees

The State of New Mexico Energy, Mineral, and Natural Resource Department, in collaboration with New Mexico Highlands University and New Mexico State University, has developed the New Mexico Reforestation Center in Mora, NM. The center grows trees, shrubs, and grasses from local seed stock for homeowner purchase at very low cost with specific species for the Hermit's Peak/ Calf Canyon burn scar.

Trees available include:

- Ponderosa Pine
- Douglas Fir
- White Fir
- Limber Pine
- Bristlecone Pine
- Quaking Aspen
- Gambel Oak
- Piñon Pine
- Rocky Mountain Juniper
- Oneseed Juniper
- Mountain Mahogany
- Narrowleaf Cottonwood
- Fremont Cottonwood
- Rio Grande Cottonwood

Post-fire restoration aims to "match seed source to planting site" (Foe 2024), as these contain genetic traits most adapted to site conditions. Curtis and Curtis Seed has also created the Hermit's Peak Restoration Blend seed mix for quick coverage to hold soil.

Additionally, the State Conservation Seedling Program "offers low-cost seedlings to landowners to plant for reforestation, erosion control, windbreaks, streambank restoration, and wildlife habitat improvement" (EMNRD 2025).

Small trees, thin-barked species, and upper canopy branches are especially vulnerable post-fire. Not only are they more at risk of having transport issues, but they may be unaccustomed to direct sunlight. Without other trees around them, vulnerable tissue can become sun scalded. It is not recommended to paint them with oil based paint to prevent sun scald, as this can clog lenticels (Scott 2025), making gas exchange difficult. If coating is necessary, the use of a natural kaolin clay, such as Surround, will provide protection without clogging lenticels.

Hermit's Peak Watershed Alliance is restoring aspects of the Rio Gallinas within city limits in their recovery work. This will have long-term benefits to the water quality in the city and support the urban forest.

Land management workshops and programs were developed to assist homeowners with recovery. Querencia in Action, hosted by the New Mexico Forest and Watershed Restoration Institute, educates landowners in erosion control techniques and land restoration (Matlock 2023). There are many mitigation and recovery methods that residents within the city limits can implement around their home and property to complement the work being done in the forests. Methods used in the larger scale of the mountain restoration work can be scaled down and applied within the city to achieve similar results.

Post Hermit's Peak / Calf Canyon Wildfire Risk

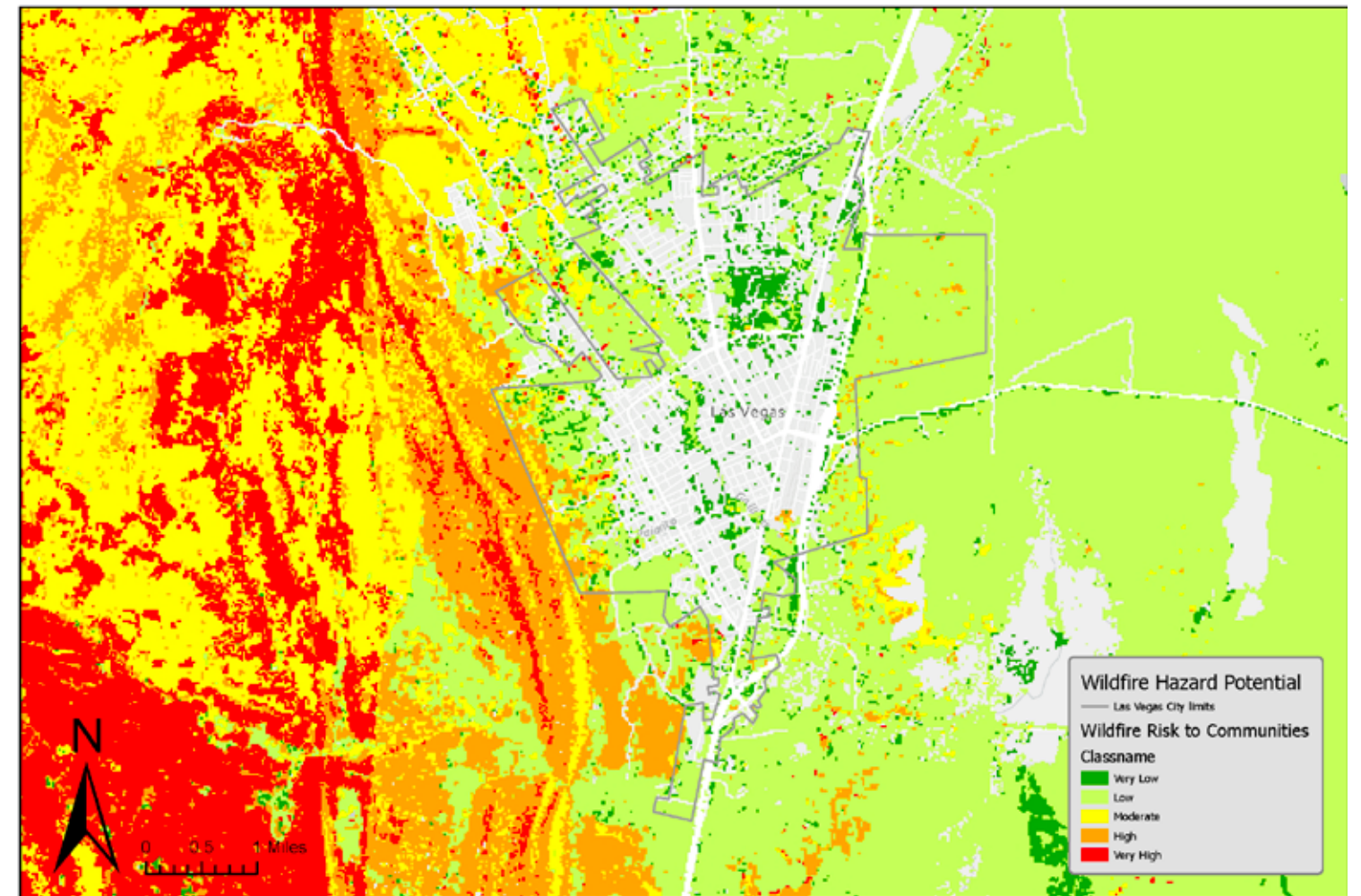


Figure 3: Wildfire Hazard Potential, Las Vegas, NM (US Forest Service 2024).

Project Background

The cascading and compounding effects of damage caused by the Hermit's Peak / Calf Canyon fire create management challenges (Romero 2022). The intention of this plan is to incorporate innovative nature-based solutions to resolve some of these recovery concerns. These methods could help guide management decisions, enhancing the charm and pride of Las Vegas as a Tree City USA. As illustrated in Figure 3, wildfire risk still exists adjacent the City. Protecting the city through resiliency planning and action is proactive and supportive of the future desired condition.

Wildland Urban Interface

Creating a safe home within the forest

Fire mitigation stems from the need to protect valued structures, their access, and people living near or within the natural forest. Implementing techniques reduces the potential of wildfire damage to homes and infrastructure and keeps people living in this interface safe. The Wildland Urban Interface (WUI) is “the zone of transition between unoccupied land and human development (Figure 3). It is the line, area or zone where structures and other human development meet or intermingle with undeveloped woodland or vegetative fuels” (U.S. Fire Administration 2022).

The Federal Emergency Management Agency (FEMA) defines a defensible space as “an area around a building in which vegetation, debris, and other types of combustible fuels have been treated, cleared, or reduced to slow the spread of fire to and from the building” (FEMA 2008). Creating defensible space around the home and for a community as a whole within the wildland urban interface provides the framework for fire mitigation design. Per Porfirio Chavarria, City of Santa Fe’s wildland urban interface specialist, “the goal of the mitigation work isn’t to remove all the surrounding vegetation, but to limit a fire’s potential to burn out of control” (Julig 2025). Because the City of Las Vegas borders forested land, inherently linked to its vegetation (Radeloff 2023), defensible space planning extends into the City.

Living in the WUI presents a number of considerations during a wildfire. Situations can change quickly in the WUI, converting safe areas to unsafe within a short period of time. Knowing the guidelines, having an evacuation plan, and being prepared to follow emergency instructions from the city will ensure a quick exit when necessary.

Although some circumstances are beyond the capacity for mitigation techniques, implementing design strategies can reduce intensity of fire around the home while still living in the charm of a forested city. Aesthetics and sentiment influence how details of WUI preparedness get implemented.

Focus should start within the home. Pack a go-bag containing essential items such as medications, medical and legal documents, insurance documents, passports, water, flashlights and pet food to streamline an evacuation. Having a way to connect to family members, as well as emergency alerts from authorities, is “one of the easiest things to do,” (O’Neill 2022). If a go-bag with your laptop, charger, and other daily used items isn’t practical, create a list to quickly be able to add these into the go-bag later.

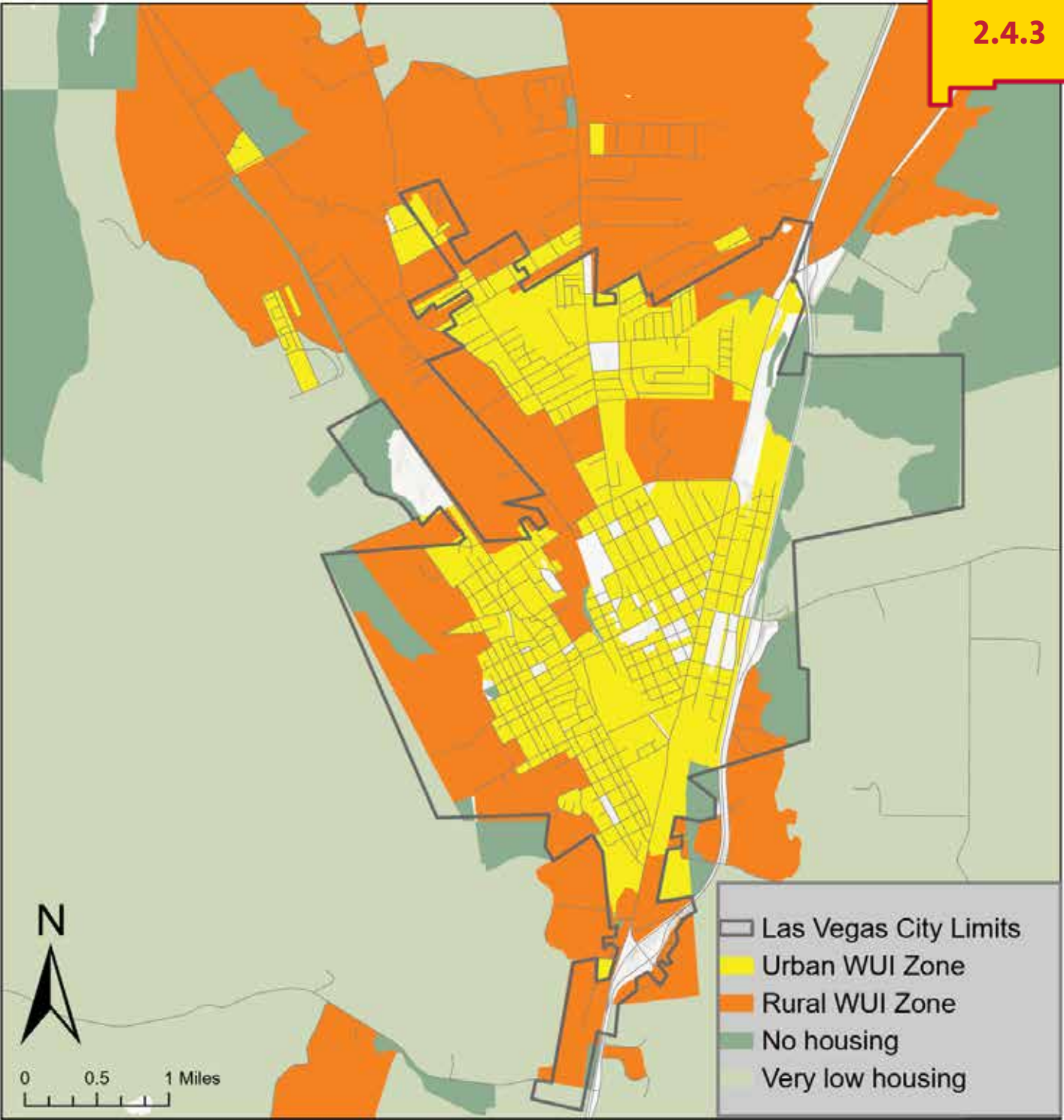
Around Las Vegas a number of programs have been created to assist homeowners with fire mitigation around their homes (Matlock 2023). Chipper days, defensible space workshops and wildfire structural ignition awareness classes give residents opportunities to learn how to manage their home and build a defensible space on their property. Additional resources can be found through New Mexico Forest and Watershed Restoration Institute’s Conversation Science Center and The Wildfire Resiliency Training Center at Luna Community College.

National programs provide further education on living in the WUI and managing for defensible space. The National Fire Protection Association created the Firewise program which offers resources and certifications to prepare for wildfire (Firewise USA 2022). This toolkit offers actionable home and property items with suggested implementation time and costs.

KEY TAKEAWAYS

- **Have a go-bag and a list of additional items to take.**
- **Organize with neighbors, especially those who may need extra help.**
- **Develop buffers around the home for fire.**
- **Follow the 5-30-100 rule for buffer zones.**

Las Vegas Wildland Urban Interface



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Figure 4: Existing rural and urban WUI zones show wildfire risk within city limits..



The 5/30/100 Rule



The 5-30-100 rule (Figure 4) offers strategies to create defensible space within the home ignition zones (HIZ), each of which extends farther away from essential structures (NFPA 2025).

ZONE 1: Immediate (0-5 feet)

The immediate zone requires removal of ignition sources and includes the structure to 5-foot buffer. The prescription for this area addresses “hardening the home” (O’Neill 2022) and immediate surroundings: decks, gaps in roofing shingles, items stored along the building or flammable vegetation adjacent to the house. Sealing off corrugated holes in metal roofing or lining eaves with 1/8-inch metal mesh are examples of actionable items within the immediate zone.

These techniques prevent embers from reaching flammable materials on or in the roof. Other examples include removing vegetation along the siding of the house and clearing gutters of leaves and pine needles.

Fire moves up slopes faster than on flat land. As such, these should receive additional treatment. Figure 5 illustrates when a slope is adjacent to a building, zone 1 can extend up to 100-feet. Short grasses predominate, and trees are limbed up with wider spacing between patches of trees.

Survivable Space within the home

When remodeling or during new construction, consider the following to improve fire safety:

- Non-combustible roof
- Double pane windows
- Screen vents
- Fire resistant walkways and hardscape
- Replacing worn siding
- Fire resistant concrete and steel
- Reducing vinyl fencing
- Functioning light bulbs around house

Buffer around the home

- Reduce fuel load next to buildings (firewood, excessive mulch).
- Remove uninterrupted fuel, like tall dry grass, near the house.
- Create a 5-foot fire break around the home to allow fire fighters to safely defend the building, while dragging their hose.
- Provide a water source right next to the home.
- Limb up to 6-feet or 1/3 of the tree, whichever is less.
- Remove branches over building and within 10-feet from chimney.

ZONE 2: Intermediate (5-30 feet)

Within the intermediate zone, creating defensible space centers around the concepts of fire-wise landscaping: removing and reducing vegetation, establishing plants with high water content and low sap, and introducing fuel breaks. Creating patches of trees with space in between the patches, or limbing up to six feet reduces ladder fuels, and thereby lessens a potential spread into the immediate zone.

A spacing of 18-feet between the crowns of trees is recommended for this area (NFPA 2025). However, forest types influence prescriptions. For example, in Piñon-Juniper forests, priority is given to creating space between tree clumps, and "these trees should only be pruned to remove branches that are dead or are touching the ground. Live branches can be pruned up to 3 feet above the ground, or a third the height of the tree, whichever is less" (Colorado State Forest Service 2021).

Design Considerations

- Work with the surrounding land to create a defensible space.
- Everything does not have to be limbed up to 6-feet.
- Patches can exist of groupings of trees space between each patch, depending on the distance from the home (Figure 5).
- Encourage natives over invasive trees, as natives do not spread in the same way.
- Create a mosaic of diversity of species, age class and size.
- Create breaks and low growth in sections.
- Separate trees from ground fuels.
- Remove ladder fuels under trees.
- Mow grass to 4-inches height
- Select trees to retain based on health and species.

Street Level

- Build buffers into the landscape including along the street.
- Instead of lining streets with a continuous line of trees (like ducks in a row), plant groupings of trees, preferably with stormwater as a water source, and then have breaks in between these groupings.
- Create fire breaks between the mountains and the city.

ZONE 3: Extended (30-100 feet, may extend to 200 feet)

Within the Extended zone, fire is permitted, but the goal is to keep it reduced to the ground and away from sources of fuel. Cleaning up yard waste and removing dead or tightly clustered trees help slow the spread of fire. In this zone tree canopies should be spaced appropriately based on slope and distance to the home.

Define the space, break continuity, and prune or provide separation between the trees.

Recommendation is **not** to remove all trees to 100-feet. The NFPA (2025) suggests 12-feet between crowns for trees closer to the intermediate zone and 6-feet crown spacing farther away from the protected structure. Crown spacing in this zone is based on NFPA 1144: Standard for Reducing Structure Ignition Hazards from Wildland Fire

Within all these zones, consideration should also be given to emergency response personnel. Leaving gates open and unlocked, moving vehicles and equipment and ensuring bridges are rated to support fire vehicles will give personnel better opportunities to defend a home and property.

Much of these efforts require community input to be effective, extending the concept of the home ignition zone to an entire neighborhood will help community members feel safer in their surroundings (Chavarria n.d.).

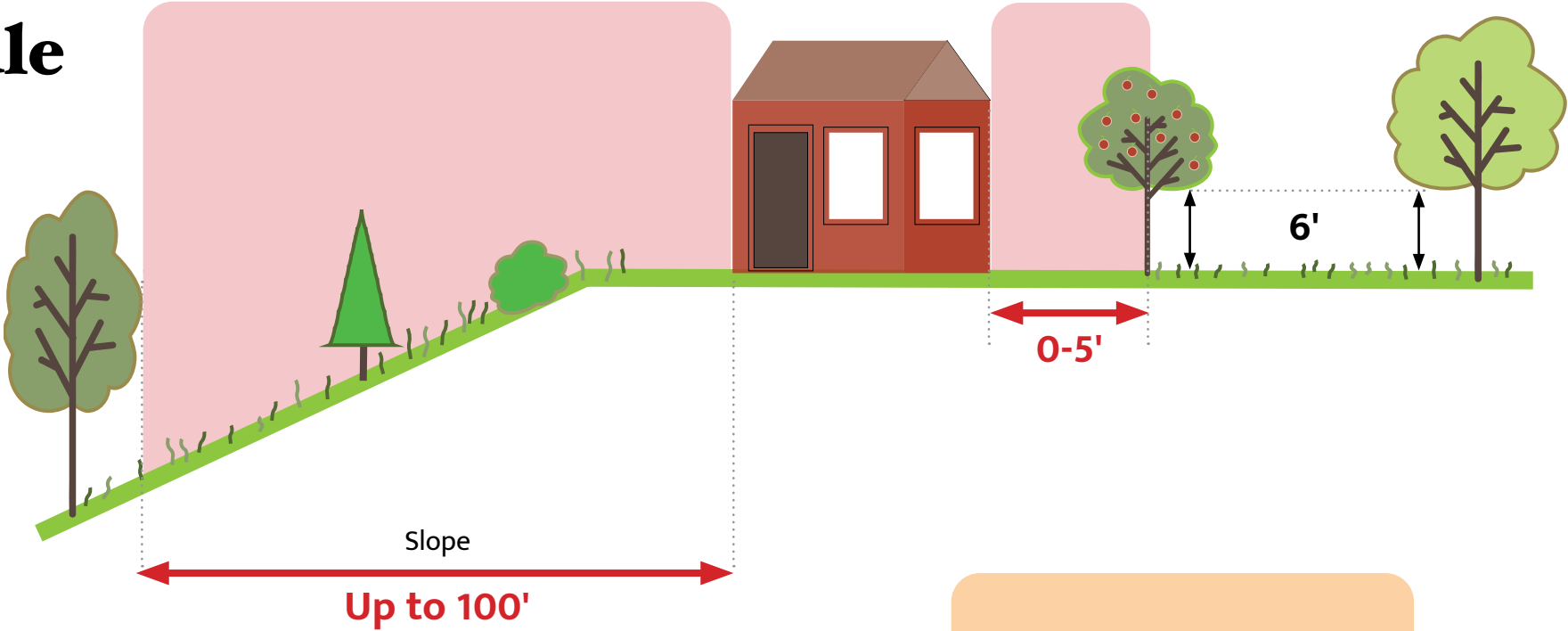
Emergency Access

- Make it easy for emergency access.
- Create accessibility and make it possible for firefighters to reach the home.
- Have driveways be at least 14-feet wide, at ground level up to at least 14-feet high, so that a fire truck can safely enter.
- Create a 45-foot turn-around so that emergency vehicles can turn around and exit safely.
- Make it possible for firefighters to easily see that they are able to enter safely onto the property.
- Provide clear address signage for firefighters.
- If you have a gate, have it swing into the property.
- In the event of a fire, leave the porch light on so firefighters can see the house.

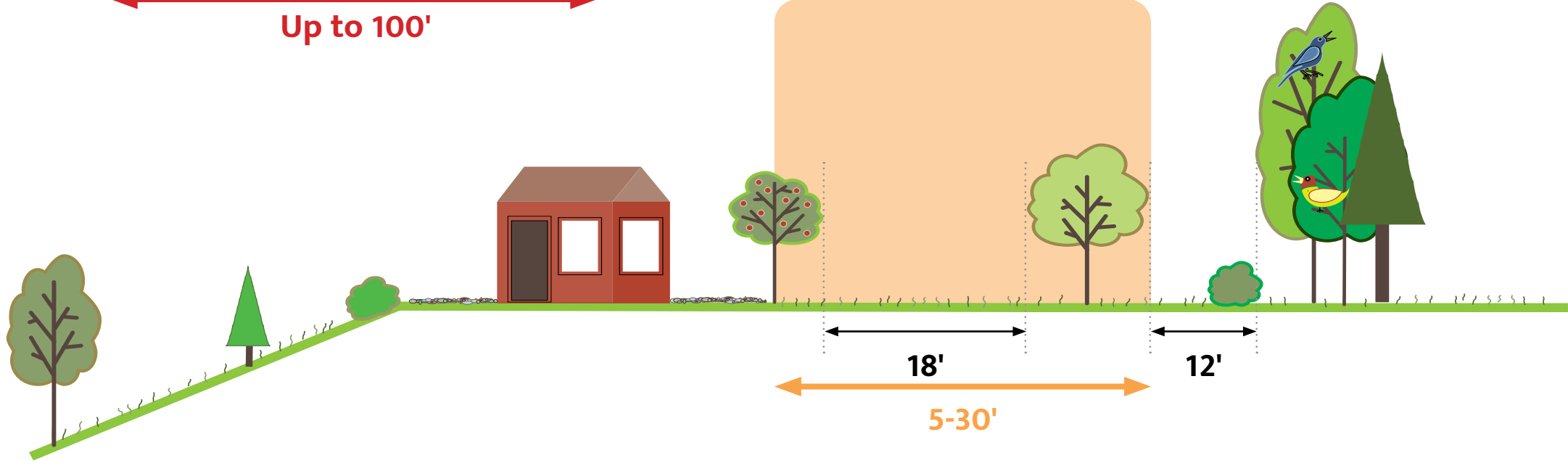
The 5/30/100 Rule

ZONE 1: Immediate
0-5 feet from building

Slope extends ZONE 1
to 100 feet from building



ZONE 2: Intermediate
5-30 feet from building



ZONE 3: Extended
30-100 feet from building

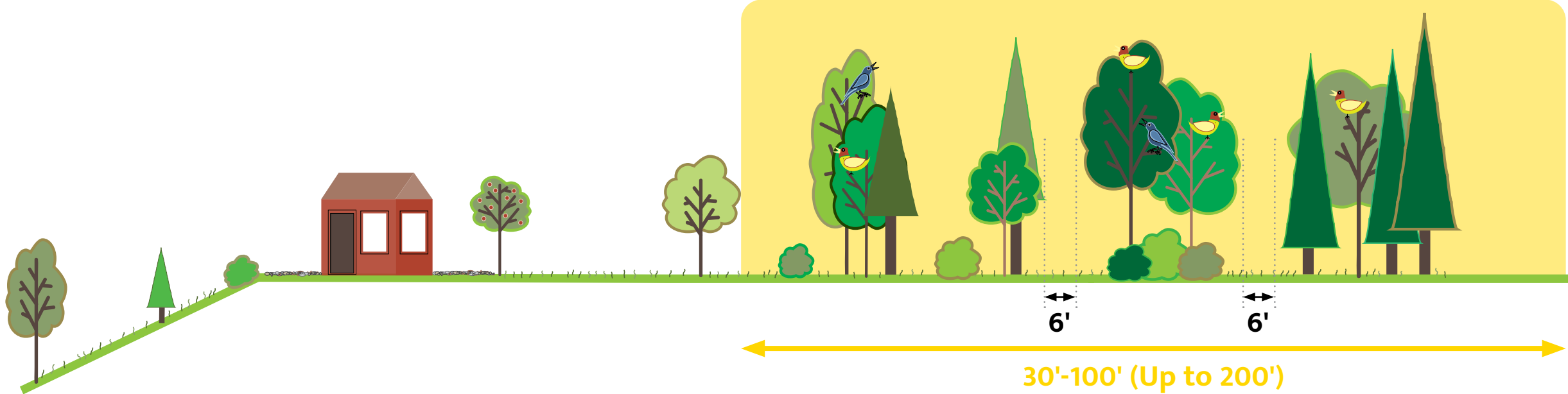


Figure 5: Wildland Urban Interface Zones.

Stormwater & Flooding

Stormwater and Flooding

Water is essential to life. As Elizabeth Barlow Rogers describes in her evocative book *Learning Las Vegas* (2013, 68),

“The settlers’ first step was the selection of a town site. Water was a primary consideration, and the place they chose was at the point where the Gallinas River, a seemingly inconsequential tributary of the Pecos, flows out of a deep, narrow canyon before reaching the flat, grassy land at the western margin of the Great Plains. They named their settlement Nuestra Señora de los Dolores de Las Vegas. In this way they combined the name of their patron saint, Our Lady of Sorrows, with their most important economic asset: the vast grasslands they had been eying for several years with a mixed desire and trepidation.”

The mountains drain into the Gallinas River directly and indirectly through several arroyo basins. As the town grew around the Gallinas River, portions of Las Vegas historically extend into the 100-year floodplain. The river collects water falling on the mountains and can become inundated, especially during monsoon season. A source of economic value, this moisture serves the crops, animal husbandry, and extends to the meadows.

Flooding events can be opportunities to collect, and store valuable water for later use, such as for growing and irrigating trees.

However, flooding occurrences from seasonal rains have increased in the city as a consequence of the Hermits Peak/ Calf Canyon fire. Burnt roots and hydrophobic forest soils led to less water absorption (Brooks n.d.), more erosion, and an overall increase in water downstream. Vegetation once diffused and helped soil absorb rainfall in the mountains. Now it drains directly into the Gallinas.

In June 2024, Las Vegas and surrounding burn scar received 4 to 7 inches of rain in one storm event. Receiving half of a standard yearly rainfall in a few hours caused significant damage to the city, reservoirs and water treatment plant.

These storm events and subsequent flooding will increase in frequency and intensity during New Mexico’s monsoon season. Permanent and cost effective solutions are needed to handle the abundance of water when and where it falls. These solutions should protect the reservoirs above the city from silt inundation as well as roads and homes within the city.

KEY TAKEAWAYS

- Water source in the desert helped create Las Vegas.
- Forests help reduce flooding.
- Flooding has increased in the city since the fire.
- Solutions collect water where it falls.
- Solutions should hold silt from going into reservoirs.
- Maps help visualize where flooding occurs.
- Maps allow for more accurate design of solutions.
- Citizens help identify areas of flooding.
- Slowing stormwater recharges the aquifer.

The 100-year floodplain has increased 10% within city limits between 1986 and 2024

FEMA 100 Year Flood Zones: 1986 and 2024

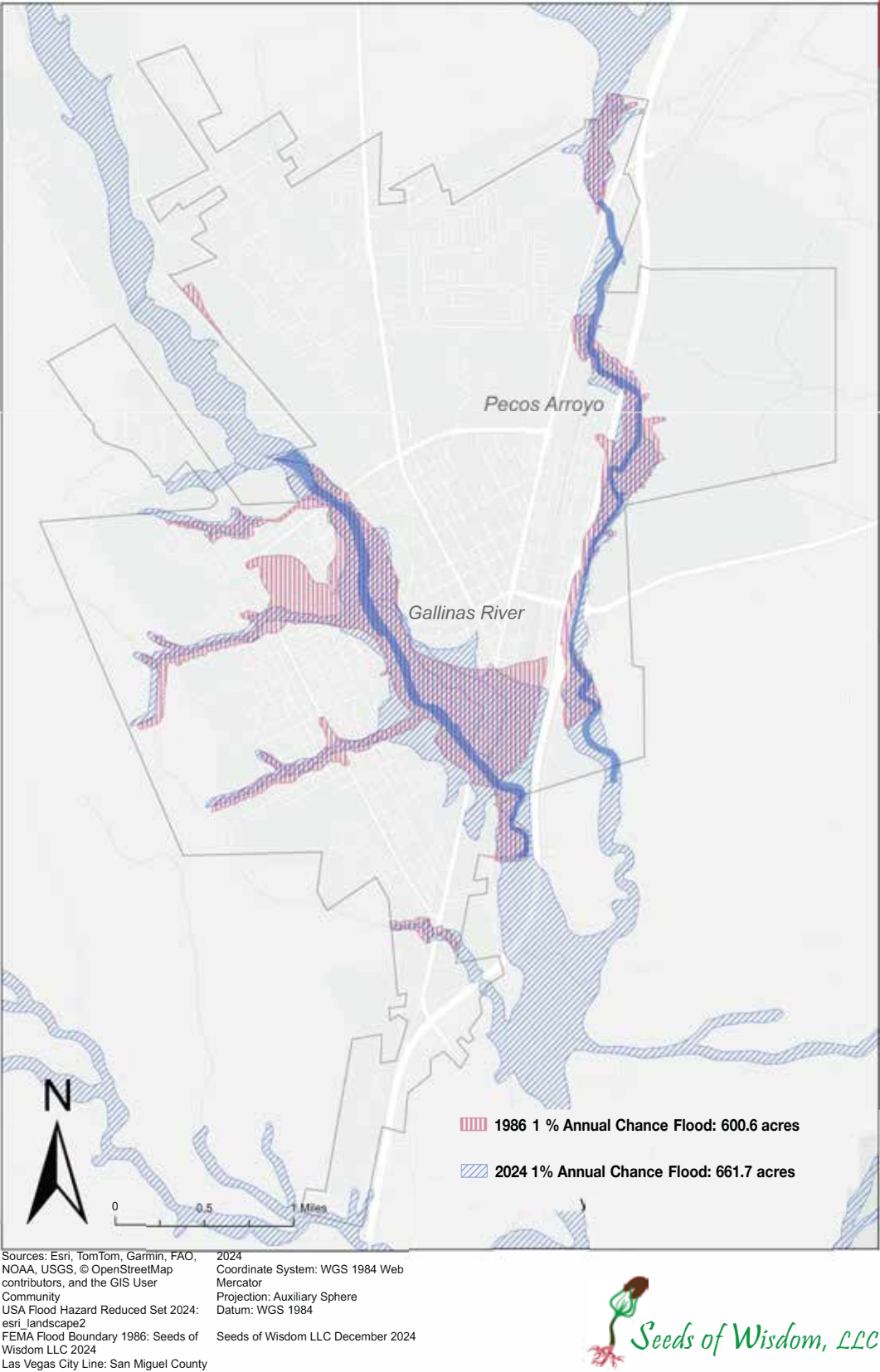


Figure 6: FEMA flood risk mapping displays the extent of the 100 year floodplain. The regulatory floodway is the Gallinas River.

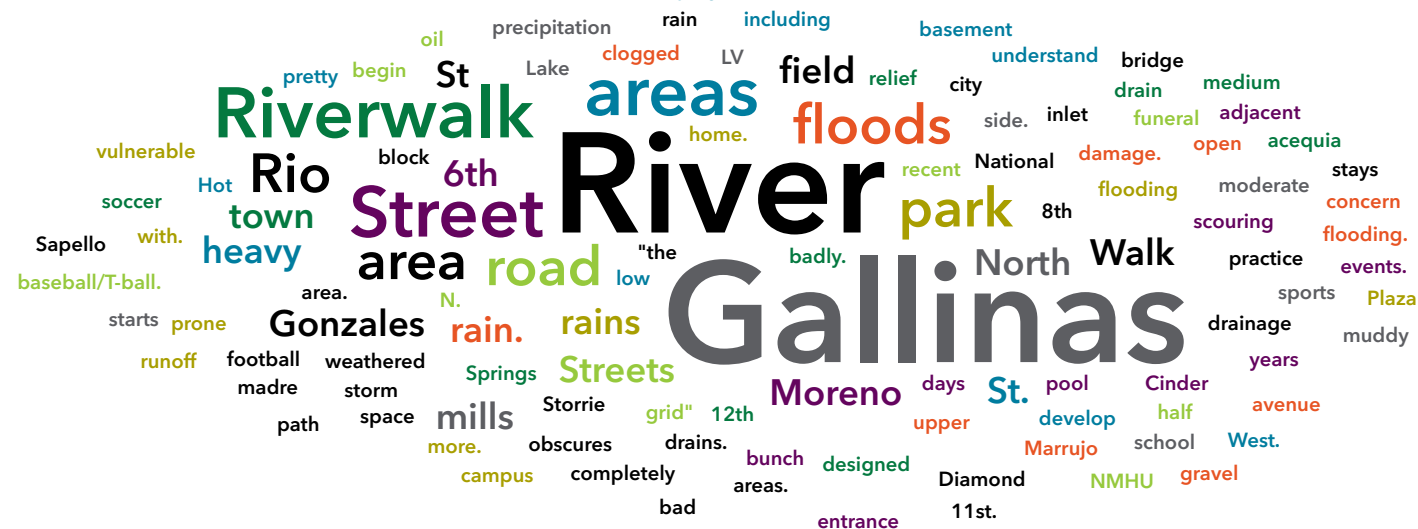


Figure 7: Word cloud produced from survey

The Federal Emergency Management Agency (FEMA) has identified and mapped the 100-year floodplain for the Rio Gallinas and surrounding waterways. The 100-year flood, or 1% annual chance of flooding, represents the extent and magnitude of flow that would have a 1% probability of reoccurring. Each year has its own chance for this recurrence interval (Water Science School 2018, USGS 2018). As illustrated, a large portion of downtown Las Vegas is within this 100 year floodplain, which has grown by 61 acres since previously measured (Figure 6). Data mapping provides a basis for locations in need of stormwater infrastructure.

Flood Impacts

In recent years Las Vegas has seen several 100-year floods that impacted residents and businesses. Urban infrastructure damaged by flooding has created costly cleanups and put stress on water facilities (City of Las Vegas 2024). Maps are also used by insurance companies to rate structures prone to flooding. Increases in insurance premiums adds one more financial cascading effect of the fire.

During the June 2024 flood, many businesses were forced to suspended operations due to a lack of potable water availability in the city. During these times the city distributed sand bags, cases of water and applied necessary water restrictions to lessen the burden on the city's water system. These short-term solutions become costly when flood events happen year after year with consequential impacts.

Flooding from the Gallinas is exacerbated by additional water running through the city's two major drainages, the Pajarito and the Hermanos arroyos. These two arroyos are important drainages for moving stormwater from the mountains into the Gallinas, and beyond the city. With deposition from forest soil, debris and ash, the arroyos more easily exceed their capacity and cause damage to properties during high precipitation events. Emergency responses provide reactionary solutions to the current crisis. (Maciel 2024b). This plan offers actionable ways to move forward strategically. Utilizing this plan, the community will prepare for drought and flood using green infrastructure solutions.

Stormwater solutions can utilize water as a precious resource to address urban forest vulnerabilities.

Citizen Input

Surveys and community events offer opportunities to collect public input regarding relevant issues to the urban forest such as flooding, park use, and tree care. Responses were tracked through Survey123, an esri ArcGIS application for survey creation and data collection. The data offers additional insight into areas where flooding occurs during storms.

A word cloud produced from the survey results (Figure 7) shows the Gallinas Riverwalk Park is a concern for many residents during monsoon season. Other areas repeatedly mentioned are 6th Street and Gonzales Street.

Figures 8 and 9 display areas of concern drawn by community members. Residents offer valuable insight into where water drains during rain events, which can be incorporated into design plans. Combining FEMA flood maps with personal accounts of flooding and survey data, helps planners determine why certain areas flood and where water moves. This results in faster and more accurately placed solutions, utilizing stormwater by directing flow to plantings or reserving for later irrigation.

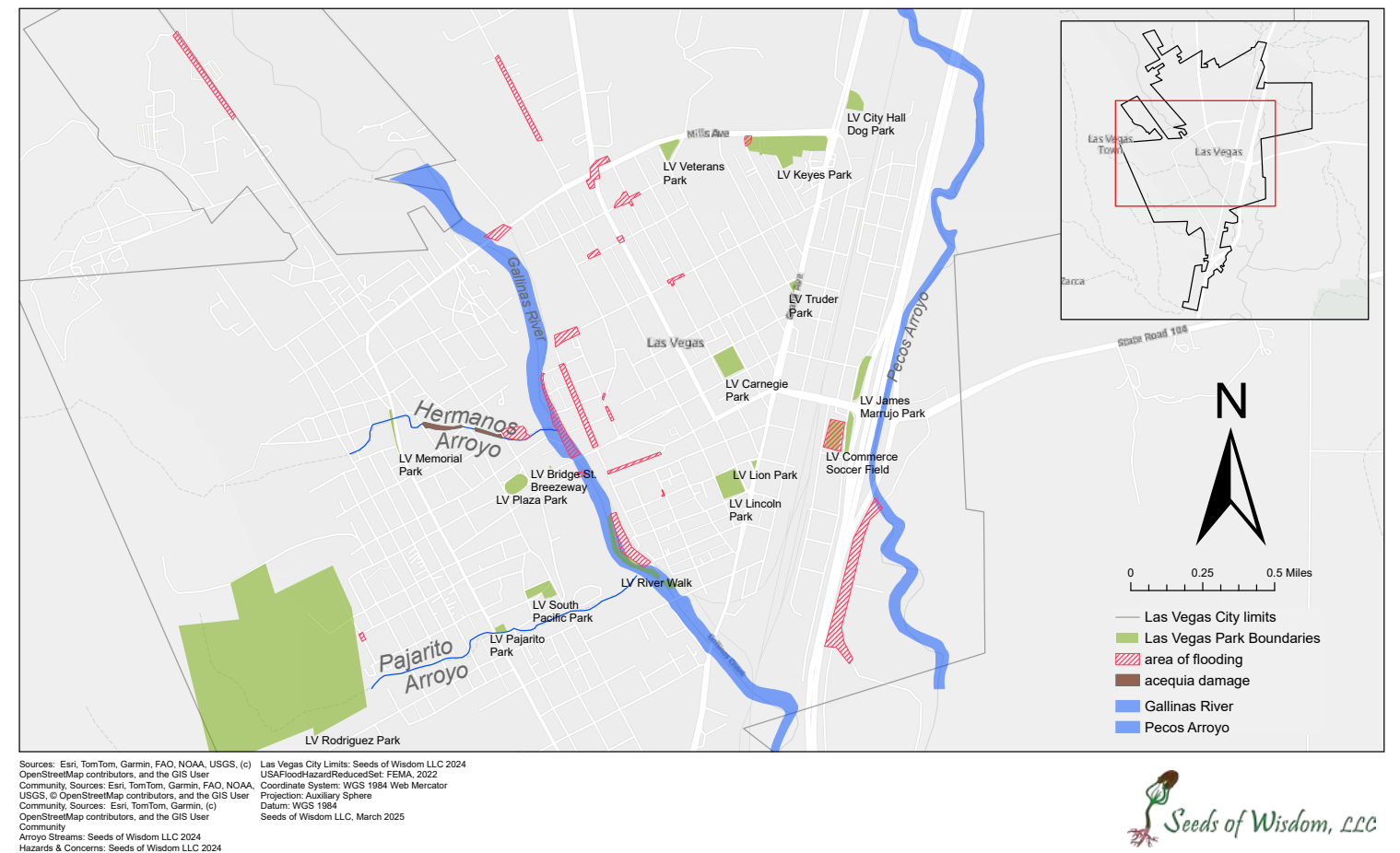


Figure 8: The community has identified areas of flooding concern during high precipitation events.

Opportunities

The survey results drive work that addresses the needs and concerns of residents. To this effect, areas identified in the survey become opportunities to reduce erosion, improve stormwater infrastructure and recognize potential sources of irrigation. The goal is clear: slow the flow of water through the city and turn it into a resource to strengthen the urban forest.

Whether along roadways, within parks, or in home gardens, rainfall can be guided to grow trees, cleaned before entering into waterways, and allowed to percolate into the aquifer to further water security.



CALL TO ACTION

Plan ahead when designing landscapes and planting trees & gardens to slow the flow.

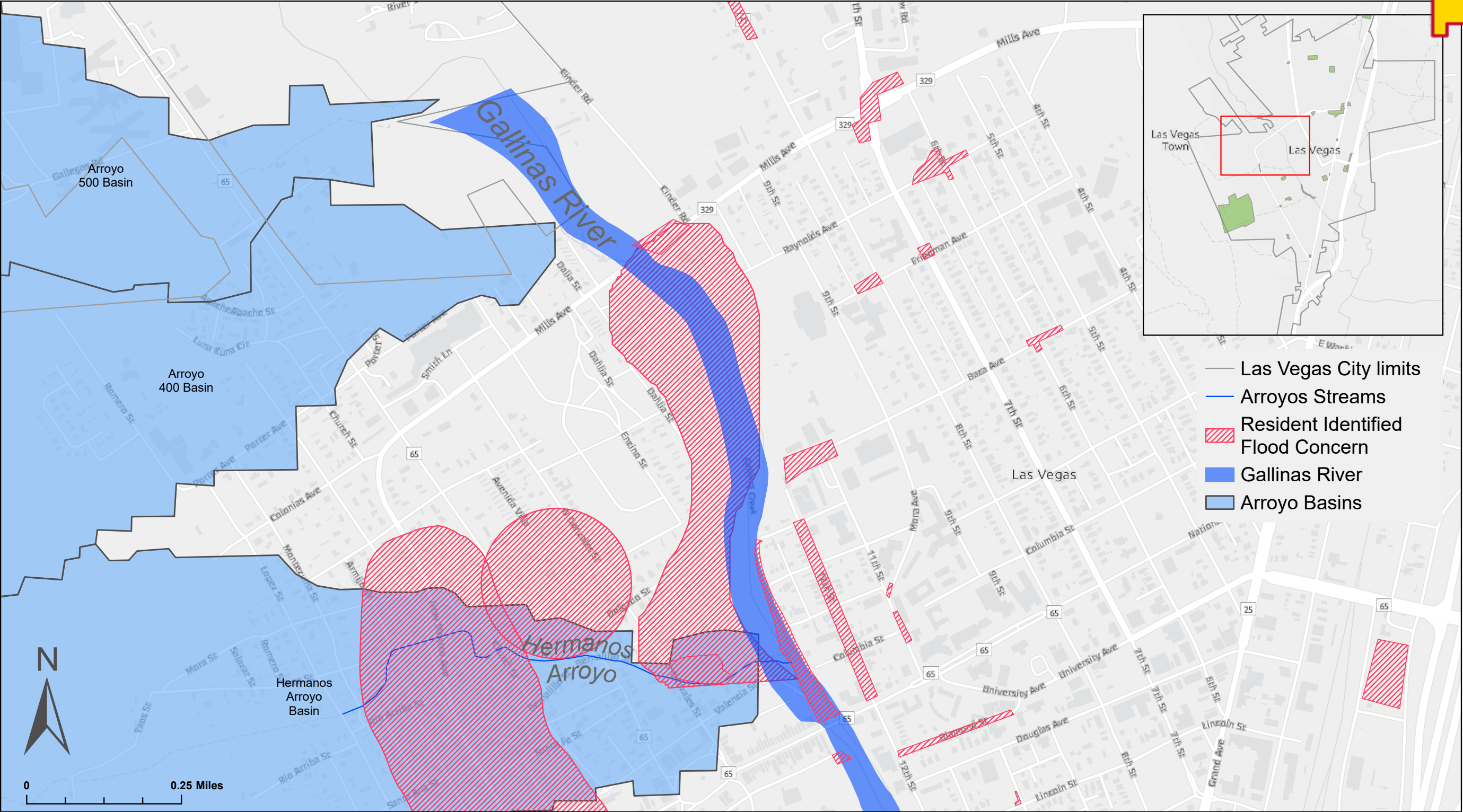
How can you creatively slow & use stormwater?



A bridge along the Gallinas Riverwalk. Flotsam can be seen on the bridge, left when the river crested at peak height. Photo Credit: Michael Remke, June 2024



City of Las Vegas Community Identified Areas of Flooding



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community Las Vegas City Limits: San Miguel County, 2023 Hazards & Concerns: Seeds of Wisdom LLC, 2024

Coordinate System: WGS 1984 Web Mercator Projection: Auxiliary Sphere Datum: WGS 1984 Seeds of Wisdom LLC 2025

Figure 9: Areas of concern that community members have identified in context with arroyo basins, arroyos, and the Gallinas River.



Benefits of Urban Trees

The “Land of Meadows” does not exist in isolation. This historic town nestles between the foothills of the Sangre de Cristo Mountain Range at the tail of the Rocky Mountains and the vast native rangeland including its own National Wildlife Refuge. Also known as where 'The Great Plains meet the Rocky Mountains,' the name evokes the dynamic contrast between tall Ponderosa Pines and rolling grass meadows. Post-fire planting should focus on native and adaptable trees and shrubs, immersing the urban forest within the immense and beautiful natural world.

Shade

Trees create shade. Their shade protects the longevity of roads and buildings. As a primary component of green infrastructure, they cool asphalt, reducing the heat waves caused by urban concentrations of the built environment, otherwise known as the urban heat island effect. Trees act as air purifiers and humidifiers, providing more of these services as they grow. The moisture released from trees helps improve humidity levels and cools the air, further reducing the heat island effect, as well as helping with summer cooling costs. They help control stormwater, create and regulate rainfall, and reduce drought.

Las Vegas has a tree
cover of 14.4%

(Figure 31a)

Shade provides additional comfort and protection, increasing livability. Summer temperature and length will increase due to our changing climate. People exercise where there is shade. As such, more shade should offer the increased benefit of encouraging physical activity, leading to improved health outcomes.

Health

Trees improve physical and mental health. They reduce cardiovascular disease risk by capturing air pollution, filtering contaminants, such as carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. Biometrics such as blood pressure, lipid levels, obesity, and diabetes improve when people live around trees. Clean air eases complications associated with respiratory illness. Clean water lowers gastrointestinal illness, thyroid dysfunction, and cancers.

In a decade long study of 5 million people, a direct relationship was found between green space and health, especially by inpatient & emergency visits. These were equivalent to \$400 per person per year, which for a city with 13,000 residents, approximates to \$5.2 million (Browning 2021). Also, better access to recreation creates faster rates of healing, diminishes stress and anxiety levels, and overall makes people happier.

For more health benefits visit:
[HealthyTreesHealthyLives.org](https://www.healthytrees.org)

Prompted by the extensive international research and a need to simplify the message of urban forestry, Dr. Cecil Konijnendijk of Nature Based Solutions developed the 3-30-300 rule (2023), which states that everyone should see 3 trees from a window, live in a neighborhood with 30% canopy cover, and be 300 yards from a minimum 2.5 acre green space. This is equivalent to a 5 minute walk. Bridging these gaps to open space will provide people throughout the city with access to green space. It models the United Nations Sustainable Development Goal target 11.7, which by 2030 would offer “universal access to safe, inclusive and accessible, green and public spaces, particularly for women, children, older persons and persons with disabilities” (United Nations 2015). Addition UN goals can be found in the Appendix.

Visualize the 3-30-300 Rule on pages 73-74

Carbon Storage

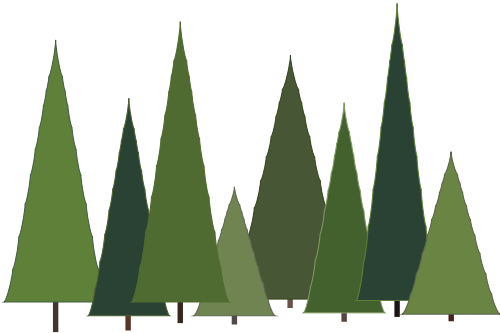
Trees aid in storing carbon dioxide, especially older healthy trees. Larger spaces, or hubs, provide the most support. Large groupings of trees within hubs, in tandem with grasslands, accumulate or sequester the most carbon. By planning now, we can assure that large hubs of 50 acres or more are available in & surrounding the city, with small neighborhood parks within walking distances of all residents.

KEY TAKEAWAYS

- Trees create shade, purify air, and cool surroundings.
- Fruit grows on trees.
- Trees give more as they grow.
- Trees improve health in children and adults.
- Trees influence where people gather and exercise.
- Trees improve real estate curb appeal.
- Design influences how trees support a community.

Windbreaks

Trees also provide windbreaks. This becomes a useful design strategy to reduce wind tunnels between buildings. Trees help balance temperature changes caused by wind. Windbreaks also help with heating costs in the winter by insulating against cold winds.



Erosion Reduction & Soil Retention

Much more flooding and resulting deposition of sediment has occurred post-fire, especially where stormwater collects in low points along roads and in the expanded floodplain. Roots and mycorrhizal fungal hyphae strands aggregate soil structure, stabilizing soil from eroding away in a storm. Without plant roots, soil washes easily away, depositing soil in the reservoir and clogging water systems. Additionally, roots absorb moisture. During deluges, they reduce flooding by storing stormwater for gradual daytime transpiration. This compounded effect protects homes built near floodplains.

Habitat

The conceptual framework of large hubs and neighborhood parks (page 35) is at the heart of wildlife habitat planning. Trees offer shelter and food for wildlife, protection from wind and predators, while helping direct the movement of wildlife. Trees and shrubs can guide large animals away from unnecessary and deadly traffic collisions. Habitat bridges also support movement, and should be considered to further safeguard large and small animals from accidents.

Property Value

When well-placed, trees can improve home sales by increasing privacy, offering sources of fruit, and developing the exterior aesthetic of the property. They create visual and sound buffers, absorbing noise, such as vehicular traffic. When trees line the streets and create shade corridors leading to places people want to go, they can increase tourism and improve walkability within a city. This strengthens local business because neighbors can easily access them while enjoying a pleasant stroll through the neighborhood.

Benefits of Urban Trees

Children

Schools recognize improvements in performance when students are exposed to nature, especially with trees. This has been coined Attention Restoration Theory, indicating that being around trees enhances critical thinking skills due to “a renewed ability to direct and control attention” (Williams 2018). This restoration is in part due to the soft fascination of a natural setting, which allows the mind to create new associations between ideas, resulting in “newly associated ideas and greater cognitive flexibility” (Williams 2018).

“The solution is to take a comprehensive, holistic approach to managing land and water resources, rather than managing individual species or systems. We need to determine not only what we are protecting these resources from, but also what we are protecting them for. We need a proactive approach that focuses on a clear vision of the future. We need green infrastructure.”

-Mark Benedict (2006, 199)

Safety

Neighborhoods with trees statistically have lower crime rates. Buildings with trees around them have historically less crime, including less violent crime, domestic violence, theft, and murder (Kuo 2001). Residents are also more likely to continue to live in communities with trees compared to their counterparts without trees.

Place making

Trees are place makers. They provide shade which encourages gathering, relaxing, and exercise. They promote shared activities that reduce loneliness. Trees are pillars of the community, strengthening neighborhood connections over time. They define a sense of place and convert a space into an essential part of people's lives.

Trees help give a house, a town, and residents within it, the sense of home, safety, and belonging.



CALL TO ACTION

Contact the local tree board to learn more about The Right Tree for the Right Place.



Tree Survey

KEY TAKEAWAYS

- Tree inventories support tree care.
- Trees need help to live a long life.
- Local trees have declined since 2021.
- Las Vegas has a variety of eco-zones.
- Diversity of tree species and age class protects the overall canopy.
- Trees vary in their needs for water, soil and sunlight.
- Age class diversity requires continually planting young trees.
- Aging Siberian and American Elms in poor health represent the canopy majority.
- More trees need to be planted.
- Older trees need more care.
- Drought maps can help planting projects.

Tree inventories provide valuable information to the Parks Division, such as which trees are doing well and under what conditions. They provide first assessments for hazardous limb failures. With these data, the Parks Division can remediate situations quickly and efficiently and send the right crews with the right tools to perform a task. Performing a tree survey teaches community volunteers how to care for trees by showing them the situations leading to tree success. Data analysis, quantification of values and services, and diversity assessments leads to improved decisions relating to our canopy.

History of the Las Vegas Tree Inventory

In order to analyze tree inventory data, we first need to collect it. The initial inventory began in 2017 through an urban forestry grant under the direction of Jennifer Dann, former State Urban Forester, in which 200 trees in every county seat in New Mexico were inventoried. This effort continued in collaboration with members of the Las Vegas Tree Board, Tierra y Montes Soil & Water Conservation District, and New Mexico State Forestry Las Vegas field office.

Current Inventory

The updated inventory expands upon this work by including more trees and revisiting those previously recorded, gathering data such as name, size, condition, location, height, conflicts, and maintenance recommendations. Each dot represents one tree (Figure 10). Currently there are 2,388 trees inventoried, including 29 dead trees. Within Tree Plotter there are 228 proposed planting sites, and 194 stumps or removed trees, which could become planting sites. These can be found when the legend is displayed by 'status'. The legend offers options for display, such as by species, primary maintenance, condition, and diameter at 4.5-feet or DBH.

Measuring Height

Collection of height data requires a specialized tool, the hypsometer. Using the three-point method, this tool takes into account distance from the tree at user's eye level, measurement from eye level to the base of the tree, and then measurement from eye level to the top of the tree. The tool then performs immediate trigonometry to provide height. Knowing tree height helps City staff send the right tools and equipment to maintain the tree.

Primary Maintenance

City staff are able to filter critical safety concerns, large tree immediate maintenance, removals, and available planting locations for new trees. With this data, maintenance crews can prepare and address primary concerns quickly, safely, and effectively.

Data is collected in PlanIt Geo's browser based platform Tree Plotter, available at:
<http://pg-cloud.com/NewMexico>

Las Vegas Tree Survey Points



Sources: Esri, TomTom, Garmin, FMO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community. Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community. Las Vegas Tree Plotter Points: PlanItGeo, 2025. Las Vegas City Line: San Miguel County, 2024. Las Vegas Parks Boundary: San Miguel County, 2024. Coordinate System: WGS 1984 Web Mercator. Projection: Auxiliary Sphere. Datum: WGS 1984. Seeds of Wisdom LLC 2025.

Figure 10: Over 2,300 trees were surveyed using PlanIt Geo's TreePlotter application.



Tree Survey



Current Tree Inventory

The 2024-2025 inventory inspected 1060 trees, and created a first record for an additional 978 trees in Las Vegas parks and along streets. Trees along the river corridor were not part of the scope of this series, although some were inventoried previously. Street trees were counted if they were on the right-of-way side of a sidewalk or within ten feet from the street where no sidewalk currently exists.

From Tree Plotter, data is then imported into i-Tree Eco v6.0.27, software developed by the United States Department of Agriculture Northern Research Station for ecosystem service analysis. A total of 2,308 trees passed into analysis. Analysis is based on Las Vegas Municipal Airport weather station details from 2023, the latest year available.



CALL TO ACTION

Organize a tree planting in your community supported by Tree Stewards or the Tree Board.

Replacement value for 2,308 trees:
\$7.61 million

Pollution removed:
1339 pounds per year

Carbon stored:
2,017 tons of carbon (\$873,000)

Carbon captured:
26.92 tons per year (\$1,860)

Oxygen produced:
71.8 tons per year

Stormwater runoff averted:
up to 208,300 gallons per year
(i-Tree Eco 2025b, 2, 16)

Stormwater runoff collection potential for the entire city:
3 million gallons/year of water
(i-Tree Landscape 2025b)

Tree Species Composition in Las Vegas

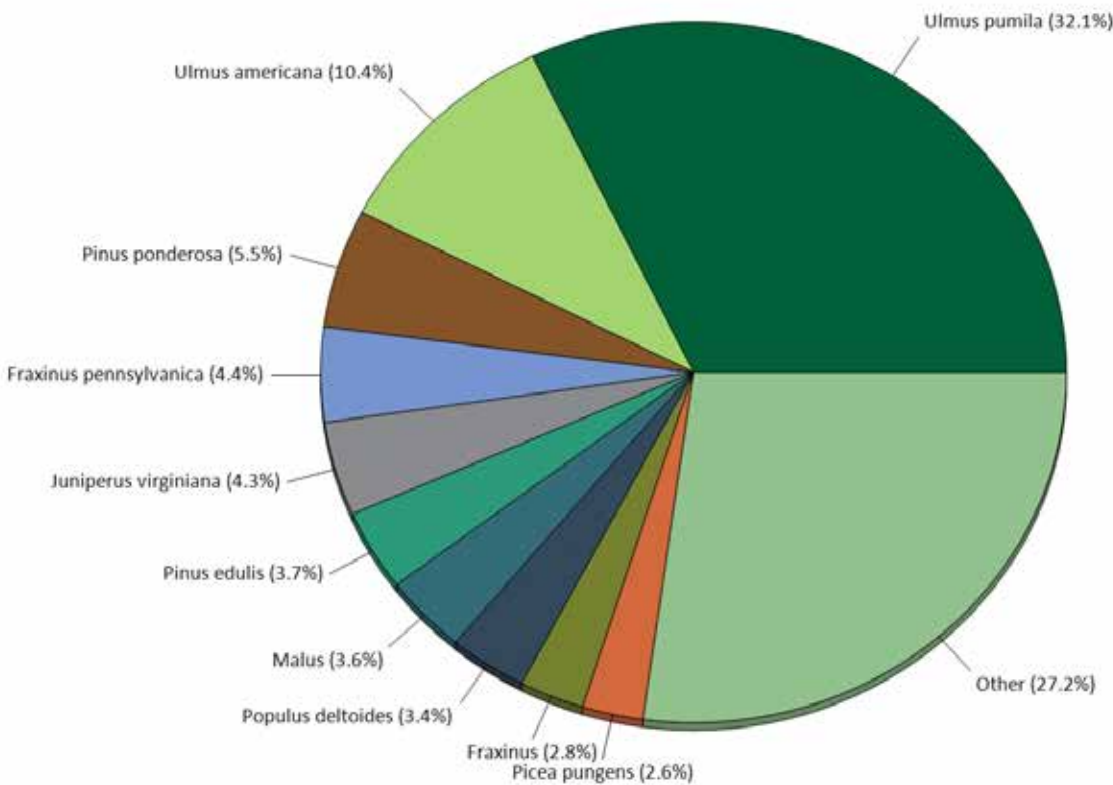


Figure 11: Elms dominate the landscapes of Las Vegas. Graph credit: i-Tree Eco 2025b

Figure 11 illustrates the top species within the parks and along streets in Las Vegas. The genus *Ulmus* comprises 42.5% of the total tree canopy. *Ulmus americana* (American Elm) is a large, stately shade tree and the second most prevalent tree at 10.4%. However, 75.7% of *U. americana* have poor health and 21.8% are dying (i-Tree Eco 2025d).

Ulmus pumila (Siberian Elm), a Class C noxious weed, makes up 32.1% of the total canopy; which is the most prevalent tree species in Las Vegas. *U. pumila* is an invasive species, outcompeting and displacing “native plants and make them a threat to natural areas” (i-Tree Eco 2025b, 6). Fortunately, other species designated in New Mexico as Class C noxious weeds only hold a minor presence in Las Vegas: *Ailanthus altissima* (Tree of Heaven) at five individuals, and *Elaeagnus angustifolia* (Russian Olive) at three individuals. Through sheer numbers, *U. pumila* contributes the most to overall ecosystem services, sequestering 18 tons of carbon per year. However, the condition rating of *U. pumila* is 85.4% poor and 8.1% dying (i-Tree Eco 2025d), reducing their capacity to provide ecosystem services safely. Additionally, the lack of biodiversity in the canopy reduces the robust range of ecosystem services the urban forest can provide. Therefore, urban forest management should include protocols to perform reduction pruning and plant appropriate replacements, phasing out invasive species by prioritizing removal of those in dying/poor condition.

Tree Survey

Figure 12 shows that the city's tree size class follows a bell curve, with a few young trees and even less adults. This is indicative of the recent reduction in planting efforts and the mortality of young trees planted just before the fire. Additionally, the curve shows a sharp decline in trees larger than 30-inches diameter, indicating that older trees require more support for longevity. “Half of the carbon is stored in the largest one-percent diameter trees” (Montaigne 2019), we need to do all that we can for pro-forestation efforts to retain existing trees and support them to reach the immense value of their potential. Forms of support for mature and heritage trees include: deeper & broader watering, nutrients, mycorrhizal inoculation, reduced compaction around root zones, and proper pruning, such as eliminating topping and lion-tailing as pruning methods.

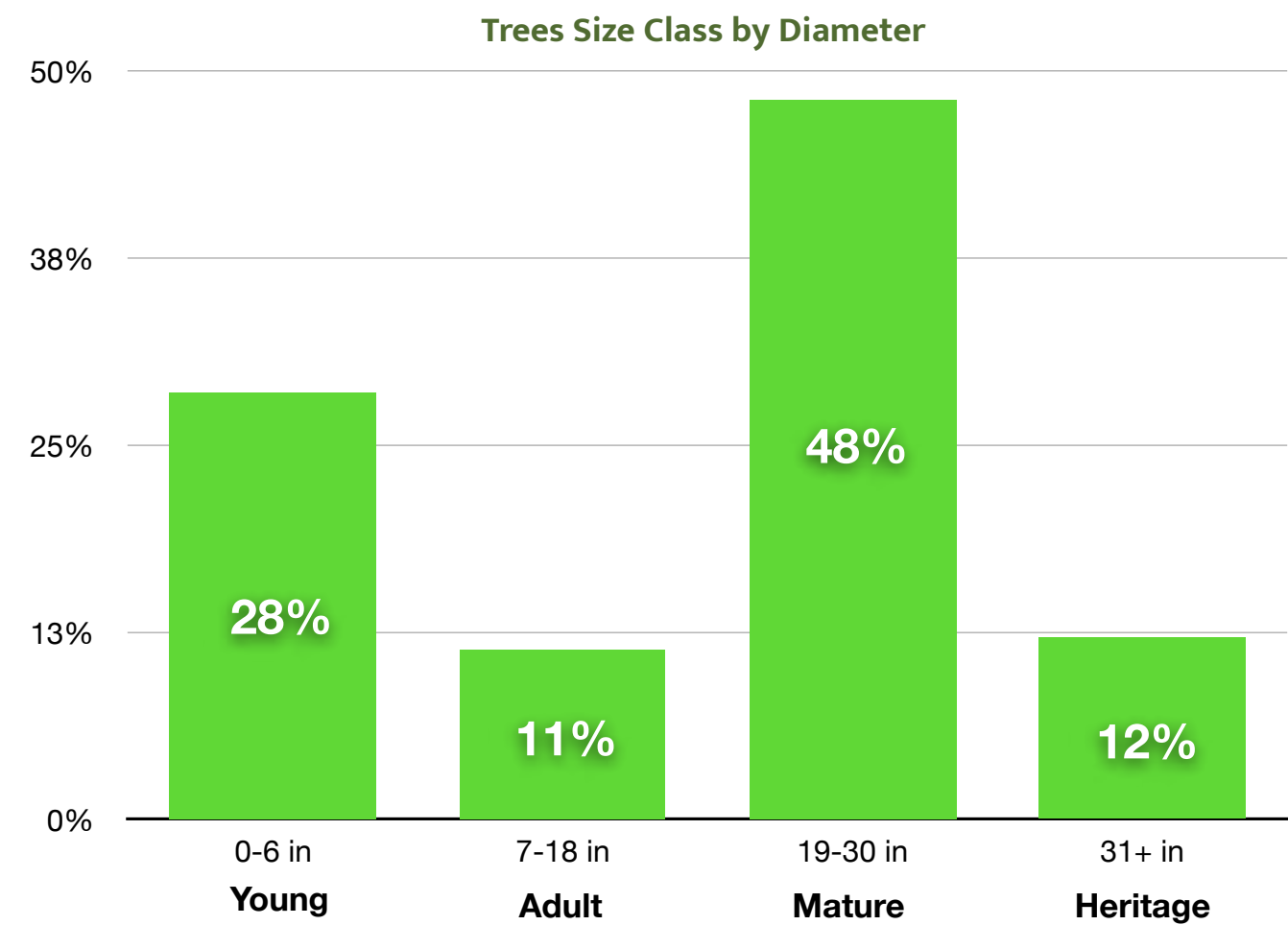


Figure 12: Adult trees are under-represented in the canopy.

There should be a variety of age classes. Trees should be continually planted so that as aging trees start to decline, large trees still exist in the community. Tree growth varies based on species, wood density, water absorption, and growth regulators. Determining actual age is an invasive process that requires coring into the tree. Size can approximate, but is not a true indicator of age. Due to periodic efforts to plant more trees, and because trees are usually planted from one to three-inch caliper, diameter size classes can be somewhat reflective of age class.

Pollutant Removal For Inventoried Trees

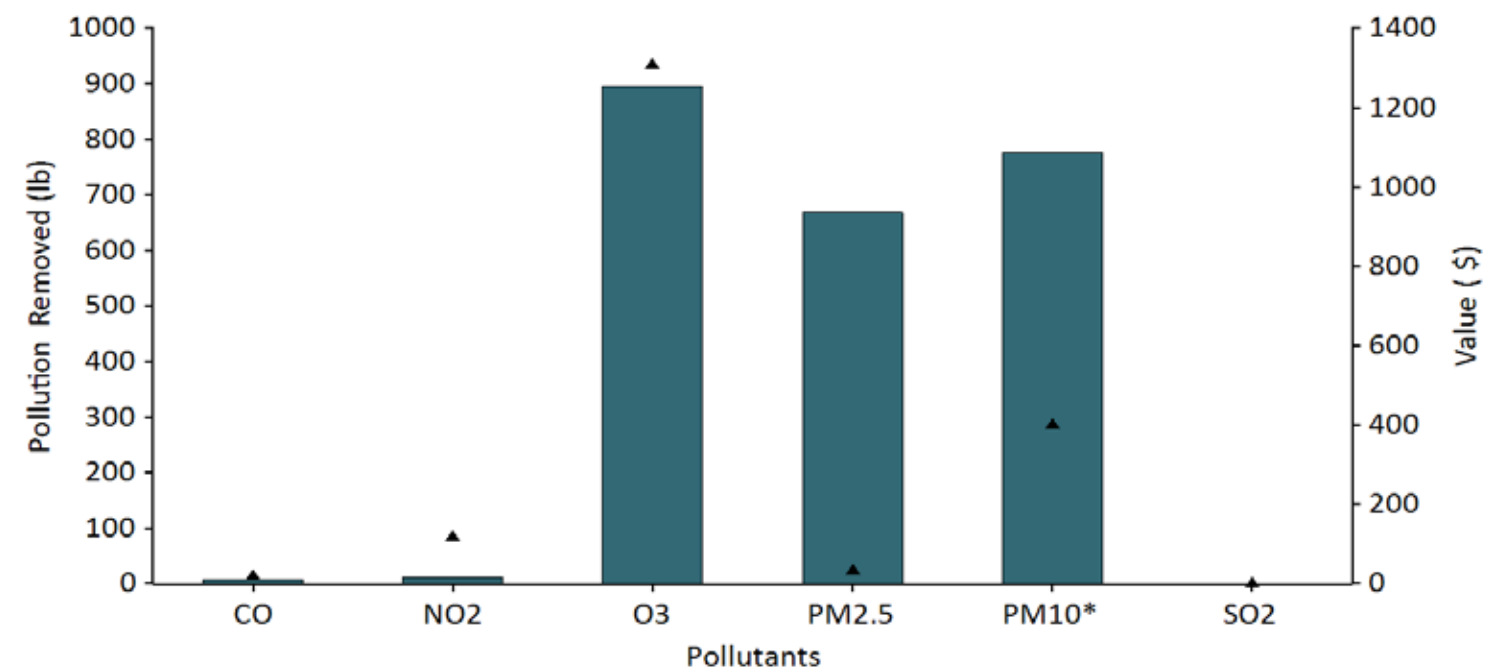


Figure 13 Annual pollution removal (points) and value (bars) by urban trees in Las Vegas. Graph credit: i-Tree Eco 2025b

Air quality is essential to livability within the urban center. Smoke decreases air quality, and fires increase particulate matter in the air. Trees “improve air quality by reducing air temperature, directly removing pollutants from the air, and reducing energy consumption in buildings” (i-Tree Eco 2025b, 9). Figure 13 shows that the inventoried trees reduce 1339 pounds of pollution, especially ozone, particulate matter less than 2.5 microns (P2.5), particulate matter less than 10 microns (P10), carbon monoxide (CO), nitrogen dioxide (NO2), and sulfur dioxide (SO2). The reduction of pollutants has an estimated air improvement yearly value of \$3,300 (i-Tree Eco 2025b, 16). Tree impacts on air quality will improve health outcomes, especially in conditions like chronic bronchitis, heart attacks, asthma, and respiratory symptoms. More trees may reduce missed days from work or school due to health complaints.

Tree Forecast

The overall tree condition in Las Vegas parks and streets requires substantial investment. Of all trees inventoried, 3.1% are rated as 'Excellent,' 19.1% are 'Good,' 42.9% are 'Fair,' 26.9% are 'Poor,' and 8% are 'Dying' (iTree Eco 2025d). The urban forest is in a critical moment; without immediate attention to the existing tree canopy, an estimated 40% of inventoried trees will be dead in 15 years, and half the canopy will be gone in 20 years. Forecast indicates that without intervention, in 30 years only 894 trees of the 2,308 existing will remain (iTree Forecast 2025).

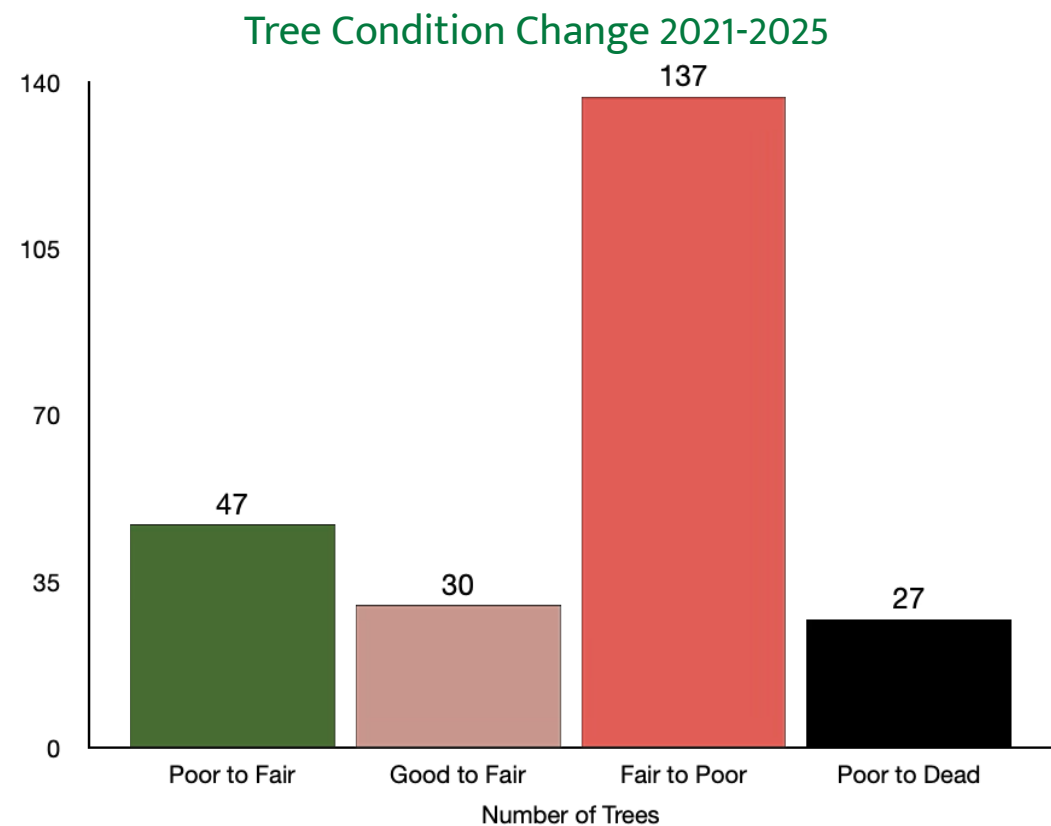


Figure 14: Overall health of trees has decreased between 2021-2025.

i-Tree Forecast modeling considers the current condition of the trees, species, pest vulnerability, and site characteristics to create a default mortality calculation of 3% of Excellent, Good and Fair trees (healthy trees) dying each year, 13.08% Poor trees dying per year, and 50% of Dying trees per year. This is as conservative forecast considering actual decline rates since the fire (Figure 14). Although the fire created cascading effects on the urban trees, comparing inventory years points to an increasingly aggressive urban canopy decline.

This projection modeling presumes some trees will decline due to pest infestation. Simulations have not accounted for major pest infestations, such as the pine and piñon bark beetles (such as *Ips* sp., and *Dendroctonus* sp.) or the potential for Emerald Ash Borer (*Agrilus planipennis*), from which New Mexico ash trees have not yet experienced infestation. With the myriad of tree insects, and with the challenging conditions of the urban setting, only 222 or 9.6% of the inventoried trees are not susceptible to a pest, root disease, rust, or other biotic stressor (i-Tree Eco 2025e). Although some of these do not kill a tree, they can leave it weakened and vulnerable to secondary infections.

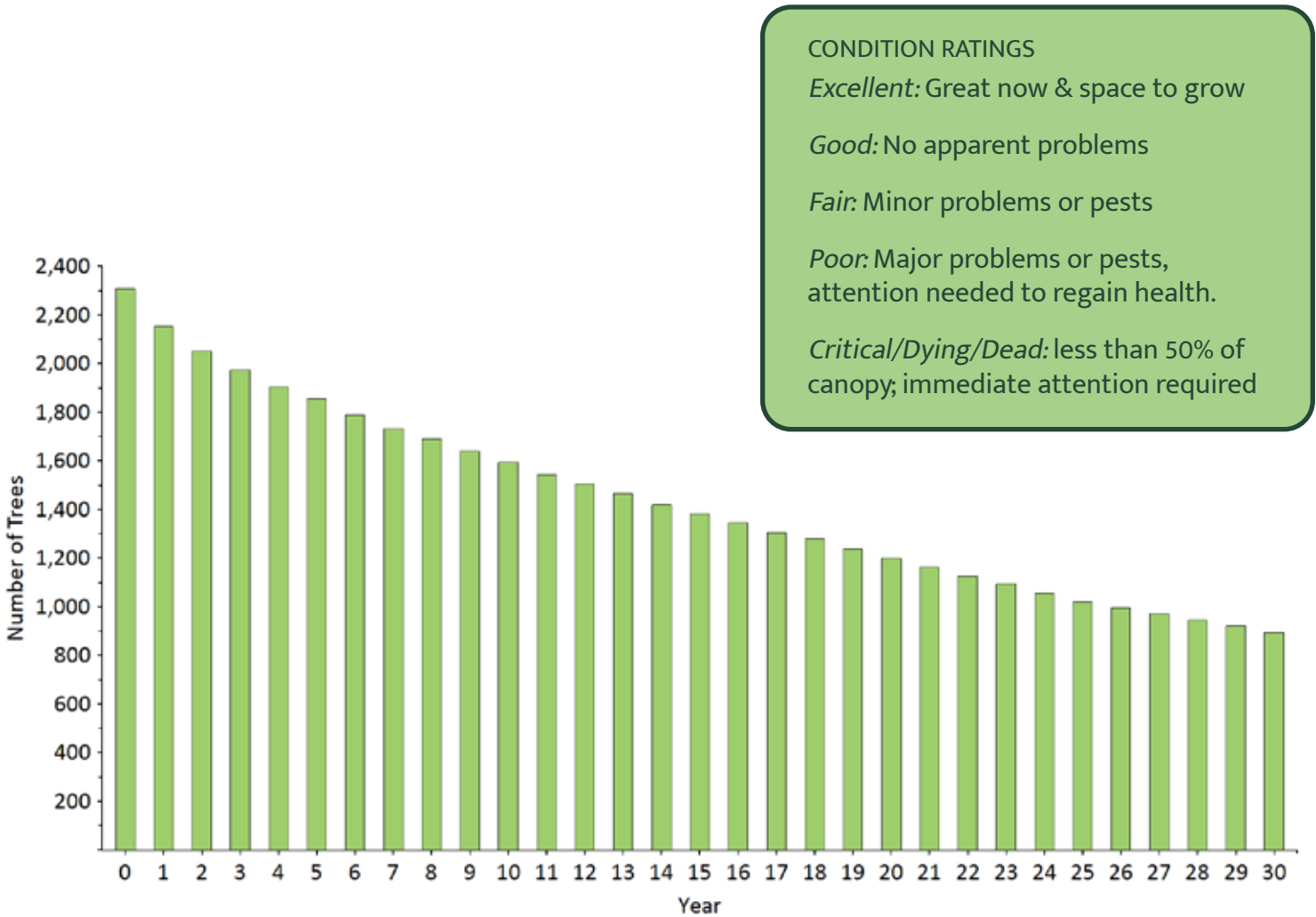


Figure 15: Over the next 30 years the number of trees will decrease around 70%.

Tree Diversity

Figure 15 shows the projected quantity of trees over the next three decades. Tree species have wide variation in the ecosystem services they offer. Developing canopy diversity allows for a range of benefits while protecting trees from insect and fungal infestations. Canopy diversity can be encouraged and implemented by selecting under-represented trees. For example, if a tree species does well, but has low representation, it may be a preferred candidate for installation. Ideally, bioregionally native species are favored, but due to limited availability, it may not be feasible for some species. For additional information about tree species and their condition at each park, review "Tree Condition by Park" located in the Appendix.

Dramatic differences of ecological zones and microclimates, and recognizing the constraints of a site leads to more appropriate tree selection. For example, riparian species along the riverwalk will not perform well in upper drylands in rocky soil. Species such as *Populus deltoides wislizenii* (Rio Grande Cottonwood) or *Salix gooddingii* (Gooding's Willow) should be reserved for wetland areas.

Forecast with Park Plantings

i-Tree Forecast (2025) allows the ability to see how additional tree planting and care can influence the future canopy. Figure 16a details planting quantities based on new tree places available in each park as well as replacements of existing dead and poor condition trees. The scenario anticipates planting projects spread out over several years in each park, with more care given to existing trees to reduce tree mortality of healthy trees to 2%. Forecast still shows that after planting these 1,117 trees in parks and streets throughout the city over 30 years, the tree canopy will still be less than it is today (Figure 16b).

In order to maintain the current number of trees in parks and streets in 30 years, 2100 trees (70 trees per year) need to be planted. If improved care of trees reduces mortality rates of healthy trees to 2%, 1500 trees or 50 trees per year for 30 years would need to be planted just to maintain the current number of trees. This indicates that caring for existing trees could save planting 600 trees over 30 years. Best Management Practices for tree care have a major impact on tree longevity. Some of these are illustrated beginning on page 88.

Figure 17 illustrates a map of City Parks.

Distribution of Additional Plantings in Parks per Year

Stratum	DBH (inches)	Number	Start Year	Duration (years)
Carnegie Park	2.00	2	2	16
City Hall Dog Park	2.00	2	15	1
Commerce Soccer Field	2.00	5	10	3
East Side Streets	2.00	10	6	20
El Creston Circle	2.00	1	15	5
Hanna Park	2.00	3	9	10
Harris Pond Park	2.00	2	10	9
James Marrujo Park	2.00	24	6	1
Keyes Park	2.00	10	7	4
Lincoln Park	2.00	2	2	10
Lion Park	2.00	7	12	1
Memorial Park	2.00	6	12	1
Municipal Building	2.00	2	15	3
NM Highlands University Campus	2.00	2	2	25
Pancho Padilla Soccer Field	2.00	10	8	7
Plaza Park	2.00	2	13	4
River Walk	2.00	5	1	10
Rodriguez Park	2.00	20	1	5
South Pacific Park	2.00	19	5	1
Tony Martinez Welcome Center	2.00	3	20	1
Truder Park	2.00	8	15	1
Veterans Park	2.00	2	15	2
West Side Streets	2.00	20	2	20

Figure 16a: This spreadsheet outlines specific tree planting quantities per year over the next 30 years for each park.

Forecasted Tree Count by Year Including Additional Plantings In Parks

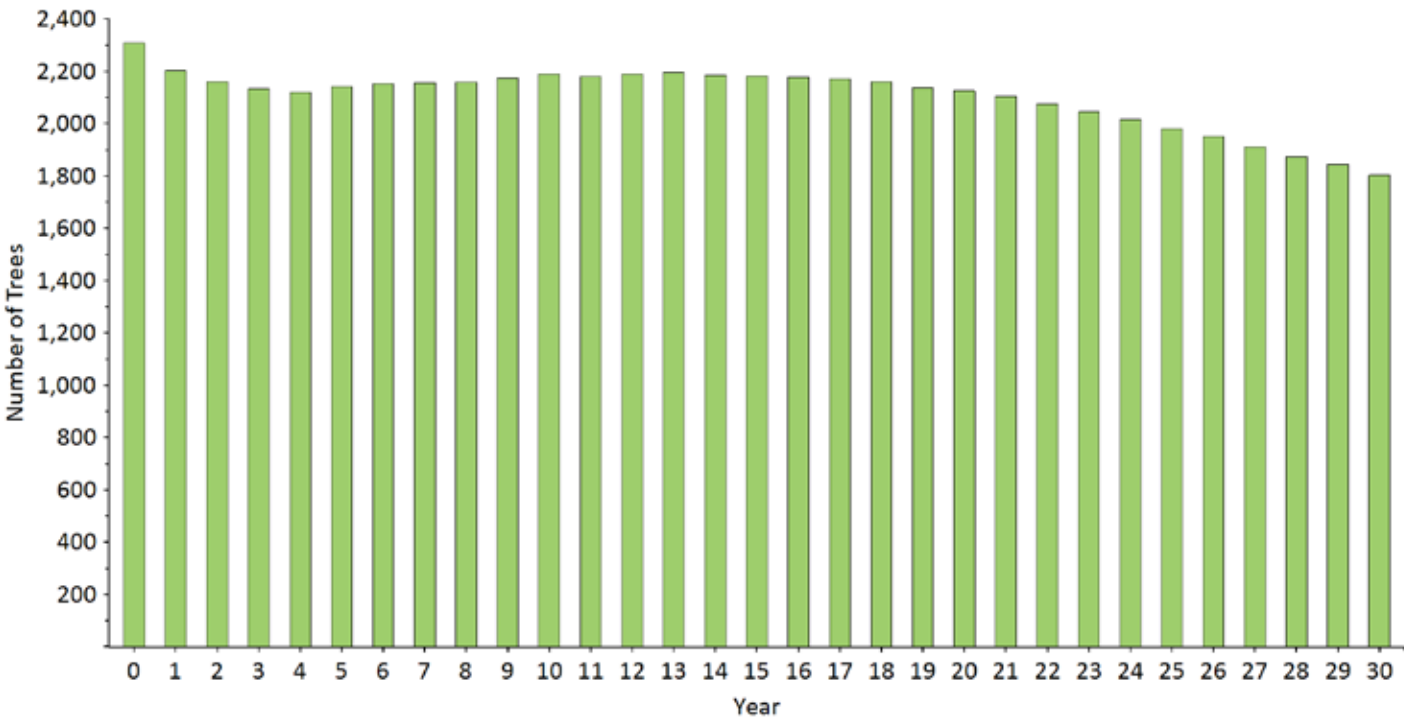


Figure 16b: With proposed tree plantings, reduction of trees is improved, but more are needed.

The Project Cost Estimate on page 68 has recommendations for the first 481 tree planting locations: 348 new trees, 23 dead, 107 poor, and 3 invasive replacements.

In order to improve the canopy, trees need to be continually planted with adequate irrigation. The City of Las Vegas can not do this alone. Private residents and land development must support this initiative by planting and watering trees. With this overarching support, not only can the tree canopy be retained, it CAN GROW!

Las Vegas Parks

- 1. Storrie Lake
- 2. Harris Pond
- 3. Litherland Park
- 4. Hanna Park
- 5. Pancho Padilla Soccer Field
- 6. Veterans Park
- 7. Keyes Park
- 8. Locomotive Park
- 9. City Hall Dog Park
- 10. Truder Park
- 11. Carnegie Park
- 12. James Marrujo Park
- 13. Commerce Soccer Field
- 14. Lion Park
- 15. Lincoln Park
- 16. Gallinas River Walk
- 17. Memorial Park
- 18. Plaza Park
- 19. Bridge Street Breezeway
- 20. South Pacific Park
- 21. Pajarito Park
- 22. El Creston Circle
- 23. Tony Martinez Jr. Welcome Center Park
- 24. Rodriguez 'Sportsplex' Park
- 25. Las Vegas National Wildlife Refuge

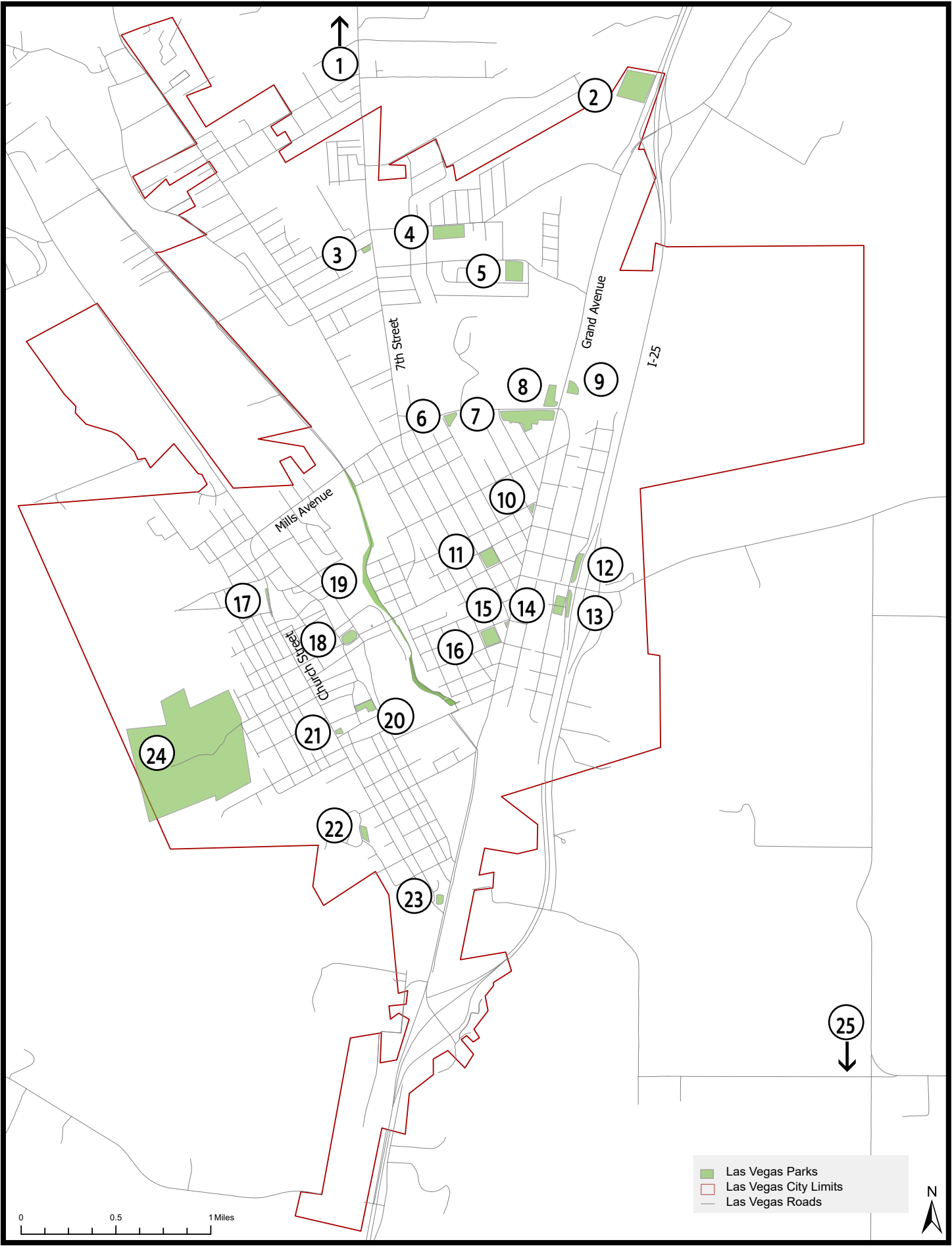


Figure 17: Map of parks

Drought Modeling

Trees are the most visible members of our plant communities, especially in urban spaces. When tree decline and mortality eventually occurs, typically it is at the end of the tree mortality spiral. When signs of tree stress become apparent, treatments may not suffice. Factoring drought stress into plant selections is key to future tree canopy.

In Northern New Mexico, leading causes of tree stress in traditional forest environments include lack of precipitation and increased heat, in other words, drought (Lucero 2024). As Las Vegas is surrounded by traditional forest canopy, co-occurring signs and symptoms affect the urban canopy, including water stress. When trees are experiencing water-related drought stress, water holding capacity and resins that help mitigate predation are reduced, leading to increased defoliation and mortality (Lucero 2024). Having diagnostic tools to predict changes in weather and anticipate sources of future tree stress is valuable in preserving community canopy and financial investment. Landscape management can mitigate future water and temperature crises by incorporating green infrastructure on a city wide scale. The best time to plant is usually in autumn, as snowfall and lower temperatures retain moisture in the soil for root growth.

Utilizing regional, state and national tools are critical as each year presents its own challenges. Predicting water stress over time using independent climate mapping tools assists in long-term planning. Available projections can estimate weekly to many decadal outcomes. Standard practice for long-term climate projections is calculated by taking historical data over at least a 30 year period and developing models that reflect expected changes in emissions outputs. Current data can be compared to historical norms to estimate climatic differences that are actively occurring.

Climate Mapper: Long-Term Projections

The two map categories developed through Climate Mapper (Figure 18a-d, Figure 19a-d) estimate the mean total soil moisture differences and mean temperature differences (NOAA 2025a). Both of these map categories utilize historical data (1971-2000) to estimate mid-century (2040-2068) and late-century (2070-2099) climate scenarios. Projected greenhouse gas scenarios are used to outline estimates of emissions in future years based on historical data. Scenarios are categorized as ‘lower’ and ‘higher’; ‘lower’ defined as a *decrease* in current emissions at 4.5 representative concentration pathway (RCP) and ‘higher’ defined as an *increase* from current emissions at 8.5 concentration (RCP).



Annual Total Soil Moisture

Soil moisture is a highly valued contributor to canopy health (Yu 2021). Measuring Total Soil Moisture (TSM), the total amount of water contained in the upper few meters of soil plus snow water equivalent (Hegewisch 2025), can be impactful for regional climate forecasts: if the soil is dry, fires can quickly get out of control, especially during the windy spring season when mountain snow accumulation has not yet percolated into the soil or aquifers. In Figures 18a and 18b, both the lower and higher RCPs estimate the same mean loss of TSM (0.2 inches) in mid-century scenarios. All scenarios have similar projections until mid-century (Snober 2013). In Figure 18c, soil moisture is best. This could be due to the lower emission concentrations, which causes the pathway to maintain the rate throughout the mid-century and eventually decreases in the late-century (Snober 2013). According to Figure 18d, Las Vegas could experience a significant decrease as a result of climate change at the end of the 21st century based on higher emissions models (Hegewisch 2025). Overall, despite variations in specific TSM estimates, a theme becomes clear: **overall annual total soil moisture is likely to decrease in future years** (Hegewisch 2025), impacting community canopy health.

Change in Total Soil Moisture

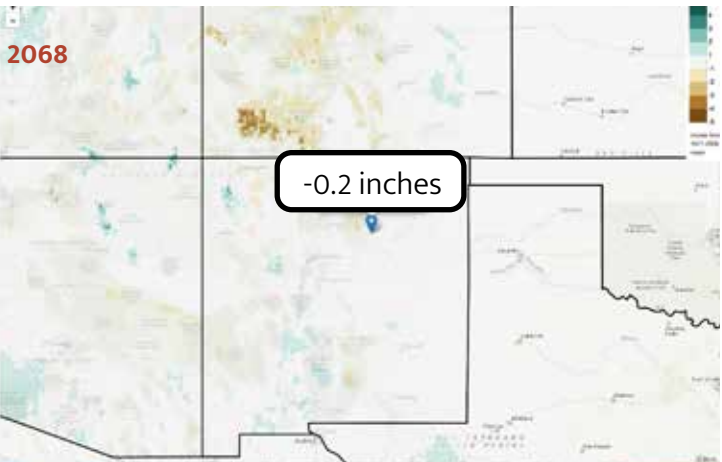


Figure 18a. Projected Total Annual Soil Moisture with **lower** emissions. Reduction of total soil moisture in Las Vegas could have an average difference of 0.2 inches from 1971-2000 vs 2040-2068.

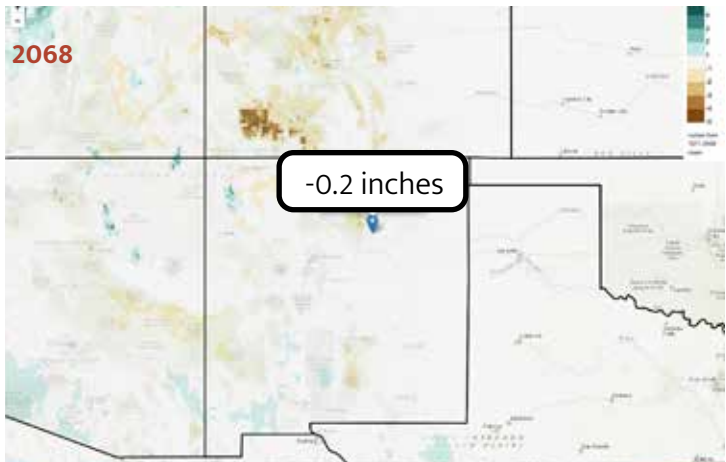


Figure 18b. Projected Total Annual Soil Moisture with **higher** emissions. Reduction of total soil moisture in Las Vegas could have an average difference of 0.2 inches from 1971-2000 vs 2040-2068.

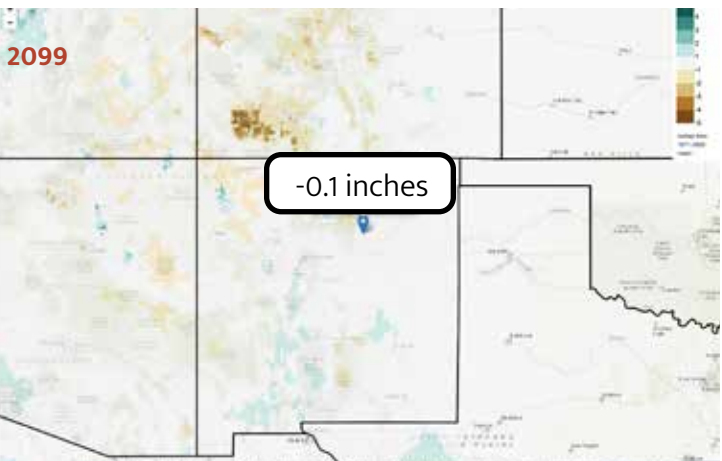


Figure 18c. Projected Total Annual Soil Moisture with **lower** emissions. Reduction of total soil moisture in Las Vegas could have an average difference of 0.1 inches from 1971-2000 vs 2070-2099.

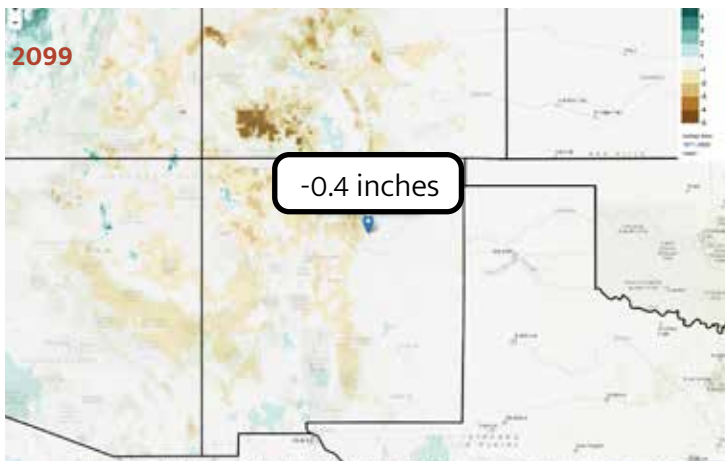


Figure 18d. Projected Total Annual Soil Moisture with **higher** emissions. Reduction of total soil moisture in Las Vegas could have an average difference of 0.4 inches from 1971-2000 vs 2070-2099.

Change in Mean Temperture

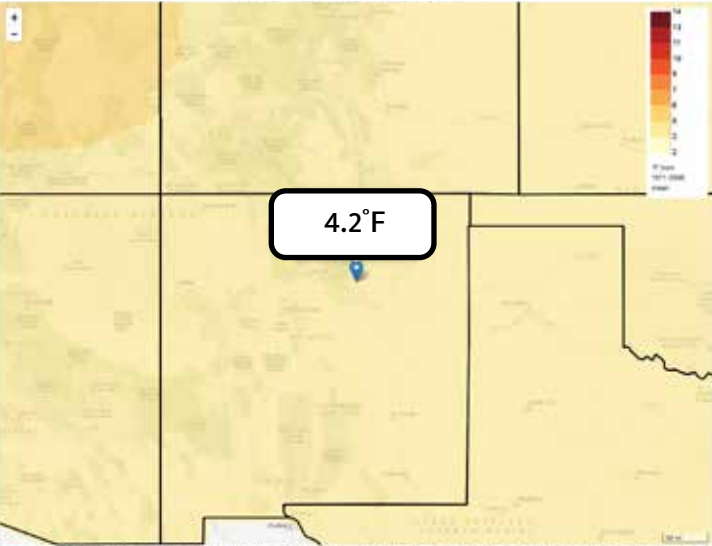


Figure 19a. Projected change in mean annual temperature with **lower** emissions. Increase of mean temperature in Las Vegas is estimated to be 4.2 degrees Fahrenheit from 1971-2000 vs 2040-2068.

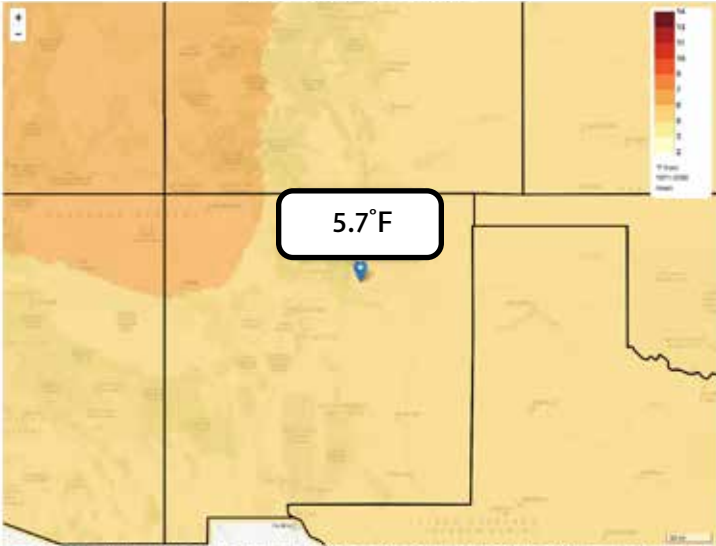


Figure 19b. Projected change in mean annual temperature with **higher** emissions. Increase of mean temperature in Las Vegas is estimated to be 5.7 degrees Fahrenheit from 1971-2000 vs 2040-2068.

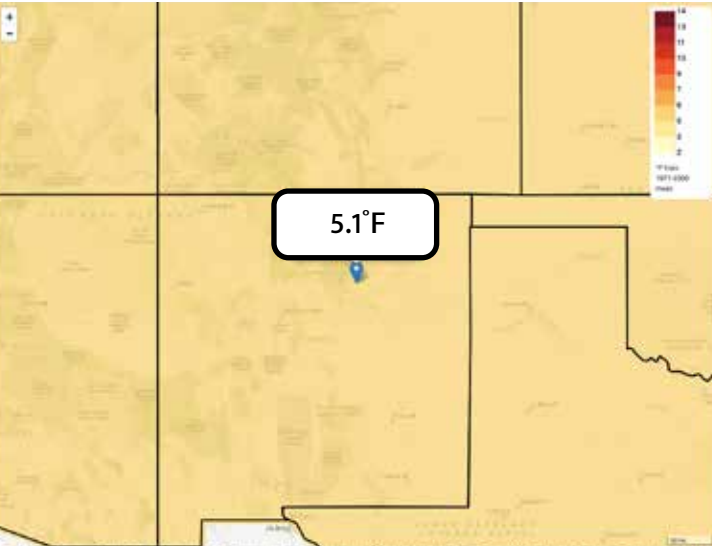


Figure 19c. Projected change in mean annual temperature with **lower** emissions. Increase of mean temperature in Las Vegas is estimated to be 5.1 degrees Fahrenheit from 1971-2000 vs 2070-2099.

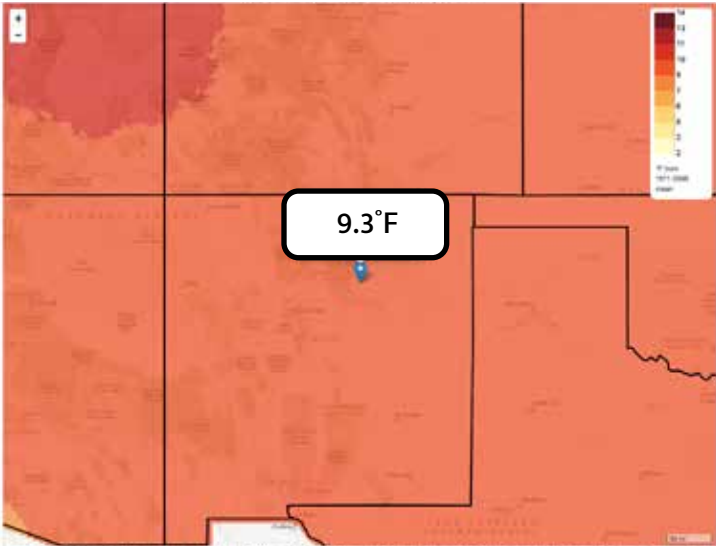


Figure 19d. Projected change in mean annual temperature with **higher** emissions. Increase of mean temperature in Las Vegas is estimated to be 9.3 degrees Fahrenheit from 1971-2000 vs 2070-2099.

Annual Temperature

Global temperatures will rise based on current greenhouse gas emissions (Cook 2013). Future temperature increase can be estimated through Climate Mapper. Mean temperature refers to the daily average of highs and lows over a period of time. Figure 19a shows that lower emissions for mid-century projections could lead to an estimated increase of 4.2 degrees Fahrenheit. Figure 19b shows that higher emissions could lead to an overall increase of 5.7 degrees Fahrenheit. According to Figure 19c, conservative temperature projections show that New Mexico could experience at least an overall mean increase of 5.1 degrees Fahrenheit in late-century estimates. Figure 19d shows that utilizing the higher scenario could increase temperatures to 9.3 degrees Fahrenheit in late-century projections. While individual scenarios vary and cannot necessarily be accurately forecasted, **mean temperature of Las Vegas is likely to rise at least 4 degrees Fahrenheit.**

Palmer Hydrological Drought Index

The Palmer Hydrological Drought Index (PHDI) is a standardized method to measure the hydrological impacts from drought on county level from the late 19th century to the current date (NOAA 2025b). Compared to previous iterations, the PDHI accounts for changing conditions that affect complicated process like recharge rate and evapotranspiration. Green indicates positive values; the higher the positive value, the more wet that period of time is. Conversely, brown indicates negative values, which describes increasing levels of drought.

Figure 20 shows that San Miguel County experiences seasonal drought fluctuations, generally associated with late winter/early spring snowpack and summer monsoon events. May 2025 data indicates that San Miguel County is entering a typical seasonal recharge period. However, drought periods are increasing in intensity and frequency with fewer recharge events.

Satellite Drought Indicator Maps

Satellite drought, groundwater, and soil moisture indicator maps are updated weekly. Their corresponding forecast maps are updated monthly and can help guide planting projects. The NASA GRACE (Gravity Recovery and Climate Experiment) archive maps (Getirana 2020) indicate that the groundwater reserves are depleted below 20% and have not seen reprieve of this deficit since 2018.

NASA GRACE maps are available at:
<https://nasagrace.unl.edu>

These figures are estimates and cannot accurately predict specific future outcomes. Tools showcase overarching themes in global climate change narratives, offering an opportunity to implement planting strategies on a local level. Local green infrastructure improves global—and local—climate.

San Miguel County, New Mexico Palmer Hydrological Drought Index (PHDI)

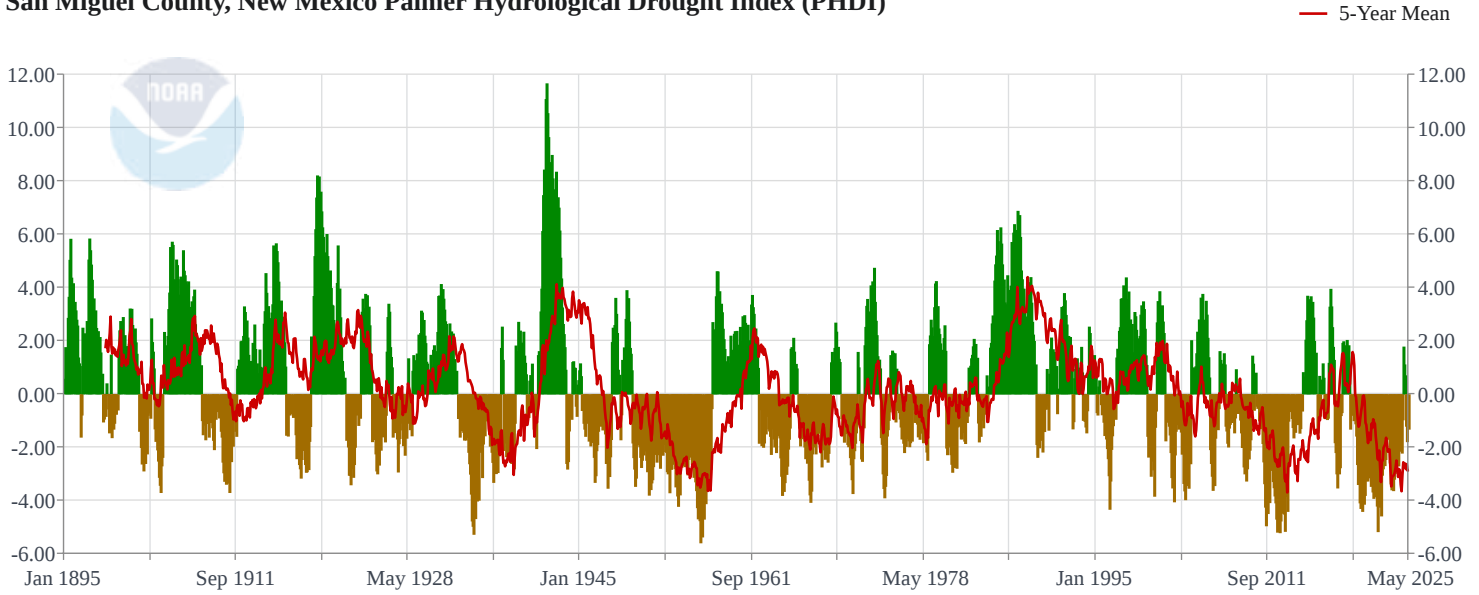


Figure 20. San Miguel County Palmer Hydrological Drought Index (PHDI) recording monthly observations of median hydrological events. The most recent hydrological event, drought, is similar in intensity to drought events during the mid-1950s, but does not show the same intensity and frequency of recharge events that would occur in the past (NOAA 2025b).

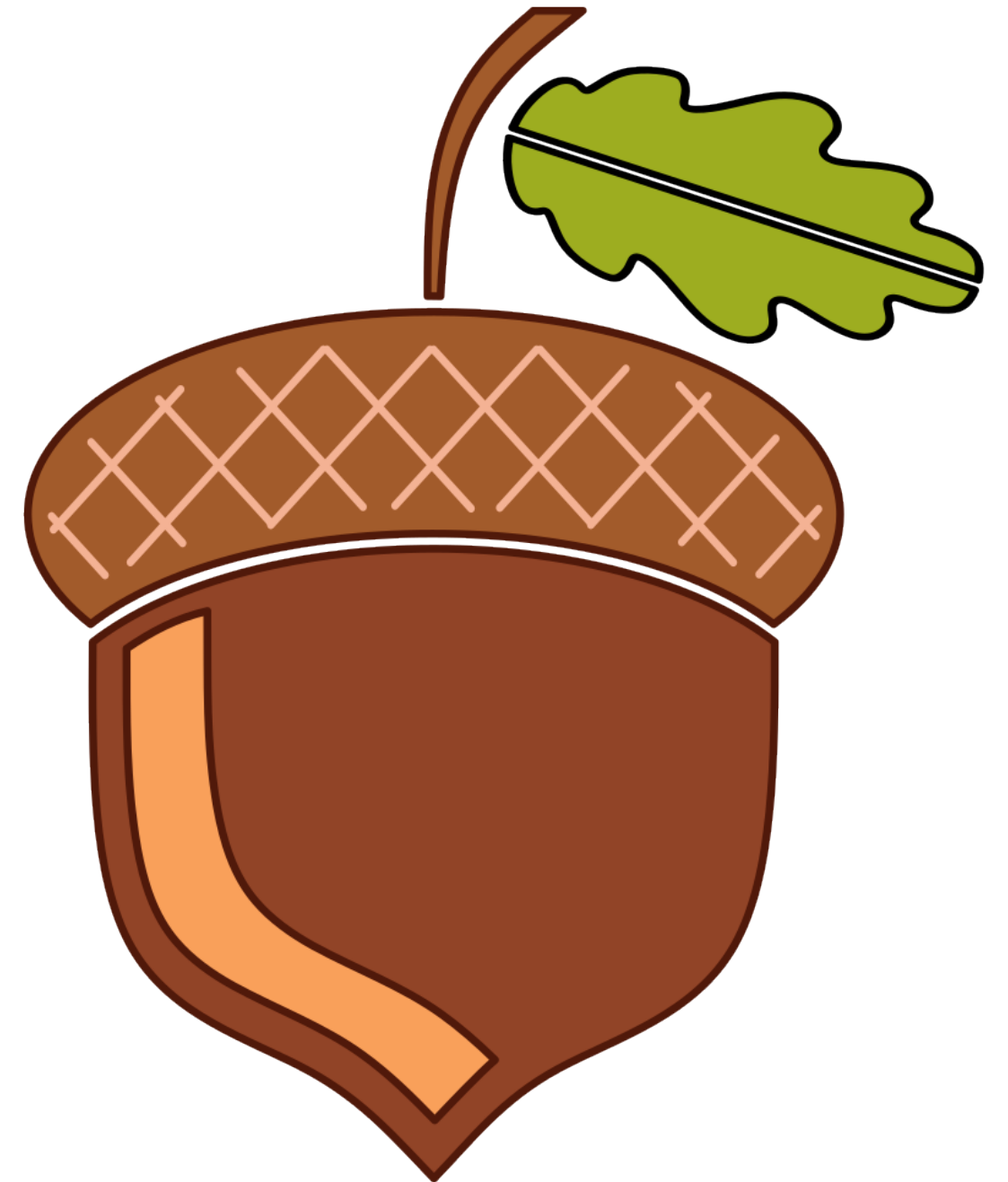


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*“Rugged and high sierras,
with deep canyons below;
Dotted with fertile valleys,
is Nuevo México.
Fields full of sweet alfalfa,
richest perfumes bestow,
State of the apple blossoms,
is Nuevo México.*

*O fair New Mexico, we love, we love you so
Our **hearts** with pride will o'erflow, no matter where we go,
O fair New Mexico, we love, we love you so,
The grandest state to know,
New Mexico.”*



Heart

Cultural Legacy and Traditions

The Pecos Puebloans visited the Montezuma / Las Vegas Hot Springs beginning in about AD 800 to “soak their bodies in the health-restoring waters” (Ruth 1985). About a thousand years later, in 1835 the city was founded, originally as ‘Señora de Los Dolores de Las Vegas’ or ‘Our Lady of Sorrows of the Meadows’ (City of Las Vegas 2022). The Las Vegas Land Grant amounted to 481,653.65 acres in 1854 (Sena 2008). The city is built into the land that surrounds it and has retained much of its cultural originality. From its early days the city has been populated by residents connected with the land through agriculture and ranching. The town was at one point the largest in the southwest and hosted a street car, opera house and many cowboys. It remains a source of pride to drive into town with a cattle trailer. This culture is ever present in the City as its residents continue to work the land, raise cattle, manage the irrigation ditches or acequias, and take ownership of where they live and the events that happen there.

Originally two towns divided by the Gallinas River, West Las Vegas (Old Town) and East Las Vegas (New Town), they eventually merged and became what is Las Vegas today, though still retaining some historical characteristics of each.

There are 89 registered historic sites within the city limits of Las Vegas. The original and continuing water source for the croplands, the Acequia Madre, was constructed in 1848. It also retains its listing on the historic registry (Marciel 2024a).

“Plaza Park is just about perfect for me”

- Las Vegas Community Member Response



Las Vegas Plaza 2025



Las Vegas Plaza 1889. Photo: NM Palace of The Governors Museum Photo Archive

People and Place

Current population of Las Vegas, NM: 13,166 people or 1683 per square mile
(United States Census Bureau 2024)



The Harvest Festival is an example of the rich cultural connection Las Vegans have to the land and locally grown & raised food. All receive generous helpings of sweet corn on the cob cooked al horno, roasted green chile, and tortillas filled with pork chicharrones.

Current size of Las Vegas, NM:
5214.7 acres or 8.1 miles²
(Kinic 2023)

Raymundo Melendez
Education and Outreach Program Assistant
New Mexico Highlands University
At Las Vegas Harvest Festival 2024

“Querencia, ‘place’: love of place, that sense of place defined by the texture of biting into a recently plucked green chile, the smell of tortillas cooking over a piñon fire on my grandmother’s old wooden stove, the color of a ripe tomato waiting to be sliced.”

~Juan Estevan Arellano, 2014

Eric Romero Ph.D.
Director of Native American/Hispano Studies
New Mexico Highlands University
At Las Vegas Harvest Festival 2024



Alongside the Breezeway, a mural honors local treasure Antonia Apodaca (1923-2020), renowned accordion player who shaped the Northern New Mexican ranchero folk genre.



Diana Springer, community gardener and Steve Frazier, community garden manager stand next to the community garden and art park in the Railroad District.



Acequias in Las Vegas

NMFAP
8.2



“Washing Wheat - San Juan, NM” Edward S. Curtis, 1905. Library of Congress

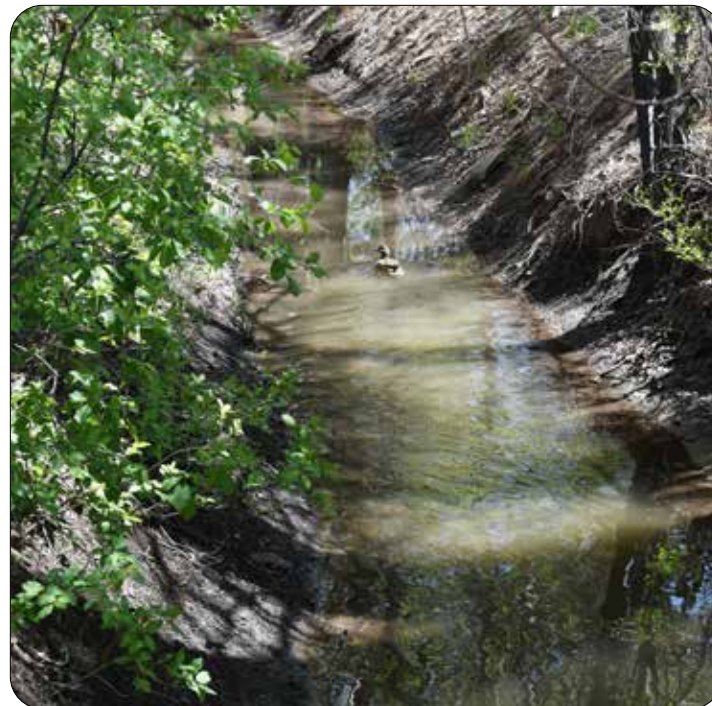
Additionally, acequia culture provides community validation, encourages experience as an avenue to pass down knowledge to the next generation, alleviates isolation by working together for a common goal, and truly form “a cornerstone of the local economy and culture” (New Mexico Legal Aid 2025).

The acequia culture teaches the community “about working together to steward our land and resources, especially in the face of climate change. The traditional acequia system ensures that everyone shares in the abundance when water is bountiful. We also share in scarcity so that no one bears the burden alone” (Lopez-Brody 2024). Keeping the acequia culture alive and thriving requires finding new and innovative ways to get the next generation involved. Also, laws must be in place to protect use and water rights.

Acequias have a long and rich history in New Mexico. As one of the oldest water structures still in use, these irrigation ditches connect communities together and supply water to both farmers and ranchers. The Rio de Gallinas Acequias date back to 1848 and 1872 (Olivia 2017).

In order to function properly, each acequia has its own governing system. The community members who share the water are called *parciantes*. The *parciantes* elect the commission to oversee the whole system in each community. They also elected the *mayordomo*, or ditch boss, who takes care of the daily functions. Together they work to make sure the *parciantes* get what they need and resolve issues.

The acequias are key to community resiliency and prosperity. As Juan Estevan Arellano (2014, 5) describes “acequias are what give us a sense of place, and the water becomes the blood that brings communities together”. They make it possible to live in rural semi-arid areas and water crops. They provide habitat for animals and encourage biodiversity. They also help direct water, which prevents flooding as well as recharging underground aquifers.



Acequia Madre. West Las Vegas.



Mallard. Acequia Madre, West Las Vegas.

The Acequia Madre is essential for diverting water from the Gallinas River to crop land downhill. Highlighting the Acequia Madre in Las Vegas, by utilizing its bank as corridor for pedestrian connection to other trails, will keep it present as a physical reflection of the connection of people it provides.

When the Volunteer Fire Department set up on Bridge Street, they “chose the site because the Acequia Madre runs underneath! This allowed them to pump water from the acequia into the horse drawn fire trucks” (Main Street de Las Vegas 2024). The acequia is a corridor, unseen in this case, that permitted dedicated citizens the ability to save lives and property since 1882.

Conceptual Framework

NMFAP
9.1

This section aims to develop the vision statement presented at the beginning of the plan into a shared future vision of what the urban forest in Las Vegas could become (Figure 21). The land of Las Vegas is unique, both in environment as well as in heritage, and the connection between the people of Las Vegas and the land is grounded in history. The heart of what the urban forest could become reflects this real desire for livability for the people living here now and for the future generations. This section incorporates what we want to see in the Las Vegas community. Written in present tense, the vision for the future is now. By visioning what we want to see, we can more easily incorporate these principles and designs into actual projects.

A major goal of this plan is to help the community move past the negative effects of the fire by actively managing the urban environment for good. In this way, the community as a whole can heal and conceptualize generations of livable future.

Making the outdoors livable, post fire, renews people's participation and interest in local natural spaces. In Las Vegas, this means that rain gardens safeguard from flooding, watching a baseball game is enjoyed in shaded bleachers and places are accessible to all ages & all mobility ranges, from stroller to wheelchair. It also means that watering the garden or having trees in the park does not compromise water for household purposes, because “trees also preserve watersheds and help improve the quality and quantity of drinking water” (Benedict 2006, 64).

The outdoors in a livable city:

- Enhance community
- Support connectivity
- Offer generational access
- Provide economic opportunity

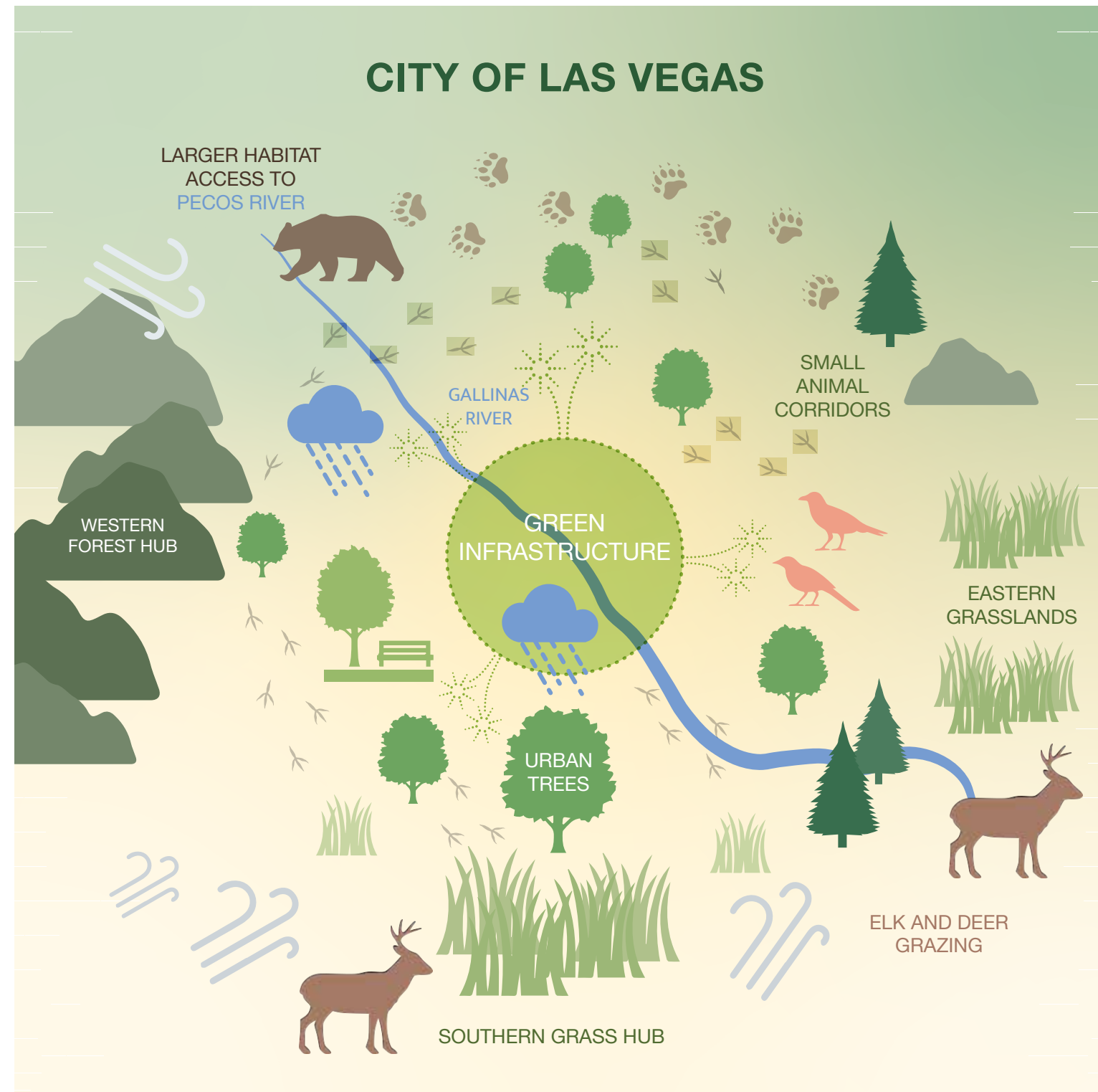


Figure 21: Conceptual framework illustrating hubs, corridors and neighborhood parks with directed wildlife movement.

Three Components of Connectivity

Hubs: Large places over 50 acres in size.

Corridors: Pathways, streets, waterways as links between large & small spaces.

Neighborhood Parks: Small parks, pocket parks and community gardens.

Hubs, Corridors and Neighborhood Parks



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community
Las Vegas City Line: Seeds of Wisdom LLC 2024
Park Boundaries: Seeds of Wisdom LLC 2024
Hypothetical Trails and Paths: Seeds of Wisdom LLC 2025
Gallinas River Walk: Seeds of Wisdom LLC 2024
State of New Mexico Parcels: San Miguel County 2023
Land Grant Parcels: San Miguel County 2023
San Miguel County Parcels: San Miguel County 2023
City of Las Vegas Parcels: San Miguel County 2023
Federal Land Parcels: San Miguel County 2023
Geographic System: WGS 1984 Web Mercator
Projection: Auxiliary Sphere
Datum: WGS 1984
Seeds of Wisdom LLC, March 2025

Figure 22: Existing parks and proposed trails for community connectivity.



Community Hubs

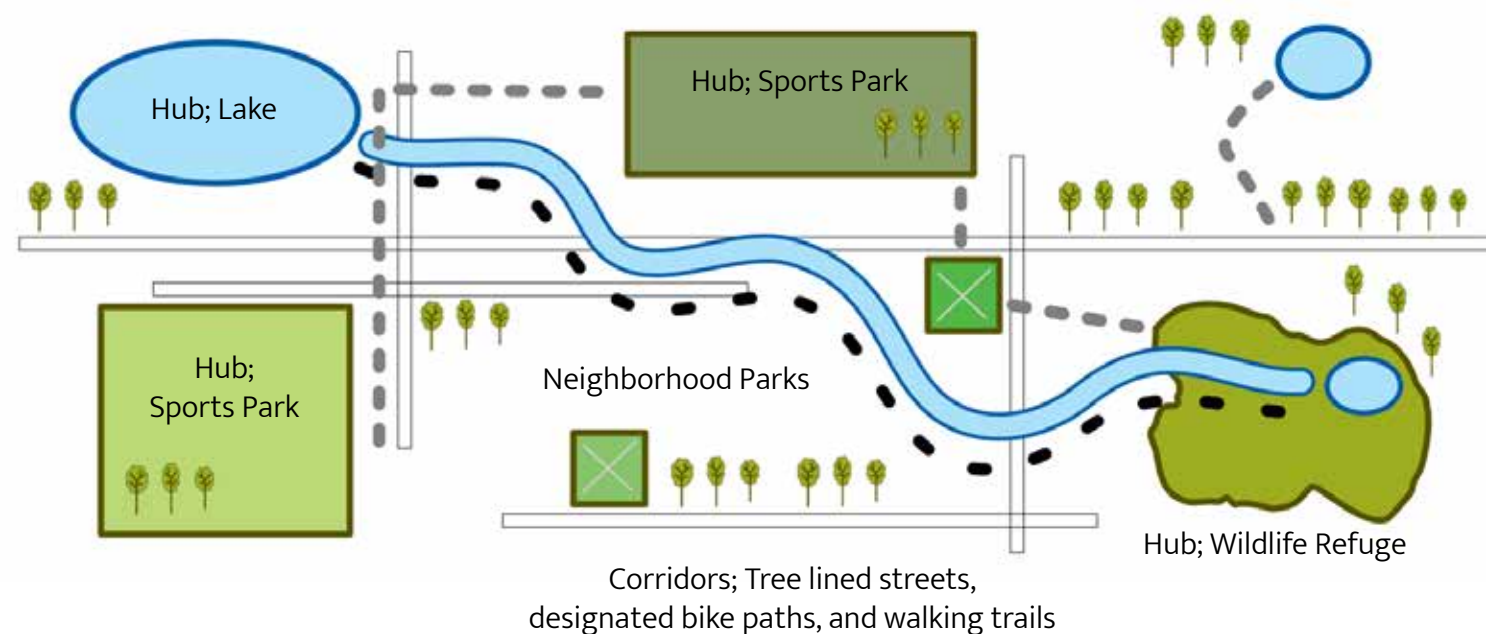


Figure 23. Conceptual Framework for Hubs, Corridors, and Neighborhood Parks.

Large open spaces, or hubs, are destinations to which people, animals, and plants belong, thrive, and call home (Figure 23). Hubs are best designed to be a minimum of 50 acres (Benedict 2006, 19). They “anchor green infrastructure networks and provide space for native plants and animal communities, as well as an origin or destination for wildlife, people, an ecological processes moving through the system” (Benedict 2006, 13). They are essential pillars in city-wide urban forestry design and successful green stormwater infrastructure function. They also provide for the range requirements for many birds and small mammals common in urban environments competing for territory and resources. As example, a small Abert's Squirrel (*Sciurus aberti*) has an "average territory size [of] 18 acres, with a range between 5-22 acres" (Beshur 2018). A system of hubs, corridors, and parks, (Figure 22) integrates habitat within a community.

Las Vegas is unique. It is surrounded by the expansive Sangre de Cristo Mountain Range forest hub, a lake hub, and a grassland hub. Having intact hubs increases plant species variety and prevents genetic bottlenecks. Even small genetic variability supports species adaptation in a changing climate.

Development without consideration for environmental impacts inadvertently creates fragmentation of forest and other biome continuities. Instead of disrupting these larger hubs, the urban tree canopy can reconnect them. By such re-integration, we retain balance and reduce the edge effects such as increased heat and dryness. Forest edges become “generally hotter, drier, and more susceptible to wind damage than the forest interior” (Howell 2012, 56). Preserving hubs within the city is key to maintaining connections.

Las Vegas is endowed with the beautiful **Storrie Lake** hub, which has large storage capacity for stormwater and offers recreational opportunities.

The **Las Vegas National Wildlife Refuge** performs an essential role as a grassland hub, serving uninterrupted habitat range to wildlife, such as Elk. Piping overflow from Storrie Lake provides water for wildlife, which in the semi-arid desert is essential not only for endemic species, but also for migratory birds, such as Sandhill Cranes.



Storrie Lake
Photo Credit:
Joseph Dunkelberger, 2025

In November 2024 Storrie Lake received a large amount of water from the Gallinas River, causing this corridor to near its capacity of 21,000-acre feet of water (Scherer 2024). To prevent Storrie Lake from overflowing its banks, water was diverted to McAllister Lake at the Las Vegas National Wildlife Refuge using this Storrie Project Irrigation Canal. This water carries with it seeds from the Lake and connects the lakes to one another.



McAllister Lake
Las Vegas National Wildlife Refuge
Photo Credit:
Tom Lamberth, 2025

Community Hubs

NMFAP
7.1.5

KEY TAKEAWAYS

- Communities of animals and plants live among us.
- Design for whole networks of communities.
- Hubs, corridors and parks create a network.
- Large places offer range for more variety of plants and animals.
- Rodriguez Park has the potential to be retained as a hub within the city.

Rodriguez Sports-plex (128 acres) Figure 24a-e illustrates natural resource design within this wetland. Elements, such as fire breaks, can be incorporated on city property as a destination for sports enthusiasts.

The wetland leads to Arroyo Pajarito behind Rodriguez Park. Already established by the Tierra y Montes Soil and Water Conservation District, this site is sanctuary for wildlife and residents. Along the Pajarito Arroyo is a nature trail where birds nest and forage along the waterway. Some of the birds in this area of town include Hummingbirds, Killdeer, Western Meadowlark and Piñon Jays (TYMSWCD n.d.). Trails as corridors provide opportunity for residents to connect with the smaller wildlife that pass through town or call Las Vegas home.



Rodriguez Park Wetland

The wetland (Figure 24e) holds moisture even after a very dry winter, protecting residences alongside from flooding. However, during severe flooding events, it is currently not enough. Need dictates an expanded wetland at this site, allowing water to slow, infiltrate and be cleaned before it moves behind residences. This also protects the Gallinas River from inundation.

A bridge over the wetland leading to the neighbors farther south would encourage pedestrian access into this sports-plex, reducing parking congestion. Barbed wire fencing along the arroyo should be removed. Where necessary for directing people, fencing is converted to wildlife fencing, such as post and rail fences, that have a lowest run at 18-inches above grade and a highest run of 40-inches above grade. This will “allow animals to jump over and crawl under easily without injury” (Paige 2012). This removes barriers for wildlife, reduces fragmentation, and improves community connectivity (Sawyer 2012).

The Rodriguez Open Space Trail System is on the back portion of Rodriguez park, offering recreational trails adjacent to the steep ridge line. Several corridors connect here, and this site provides an exceptional opportunity for incorporation of urban forestry principles relating to the interface of systems. Large animals can be directed away from the center by creating on-contour fire breaks above the walking and bicycle trails. None should extend to or cross the **Pajarito Arroyo** (~3.2 acres), which enters into the city via the south of the park and is the path of least resistance for water movement.

Ideally, the arroyos within the city, such as Pajarito or **Hermanos Arroyo** (~ 3.5 acres) have adjacent trails for pedestrian access to the Gallinas Rivertrail and downtown center.

The Sports-plex includes having a place to exercise in a less structured way than team sports. Activities such as bicycling, mountain biking, skating, ice skating, running, walking, hiking, bird watching,

dog walking, and all-terrain vehicle driving all take on their own requirements for competing spaces. These unstructured recreational areas adjoin to urban forestry initiatives.

For example, all-terrain vehicle and mountain biking trails can also serve as on-contour fire breaks between the mountains and town. Bird watching and picnicking occurs in an expanded wetland that improves water quality while reducing velocity of stormwater entering into the arroyos. These “play a particularly important role in preventing flooding in the watershed, storing water during heavy rains, slowing runoff into streams and reducing the overflow during peak floods” (Benedict 2006, 67).

Food forests are requested by many survey respondents. Fruit trees are a practical and beautiful choice. They provide delicious and nutritious local fruit for people and birds alike. Because many semi-dwarf varieties are available, these are a terrific option for small home gardens as well as shared gardens.

On a larger scale, a community fruit orchard can supplement school nutrition programs. Orchards provide a great location for a fruit tree pruning workshop, expanding on a community engagement activity sponsored by members of the Tree Board.

“I feel that an ideal park would include a small pond, similar to Harris Park, along with swing sets, a jungle gym, walking area, and covered picnic tables. Handicap accessible, of course, with fruit trees, perennial flowers, good trash cans, a recycling bin or even recycling center that encourages crafts with recycled materials.”

- Las Vegas Community Member Response

Rodriguez ‘Sportsplex’ Park

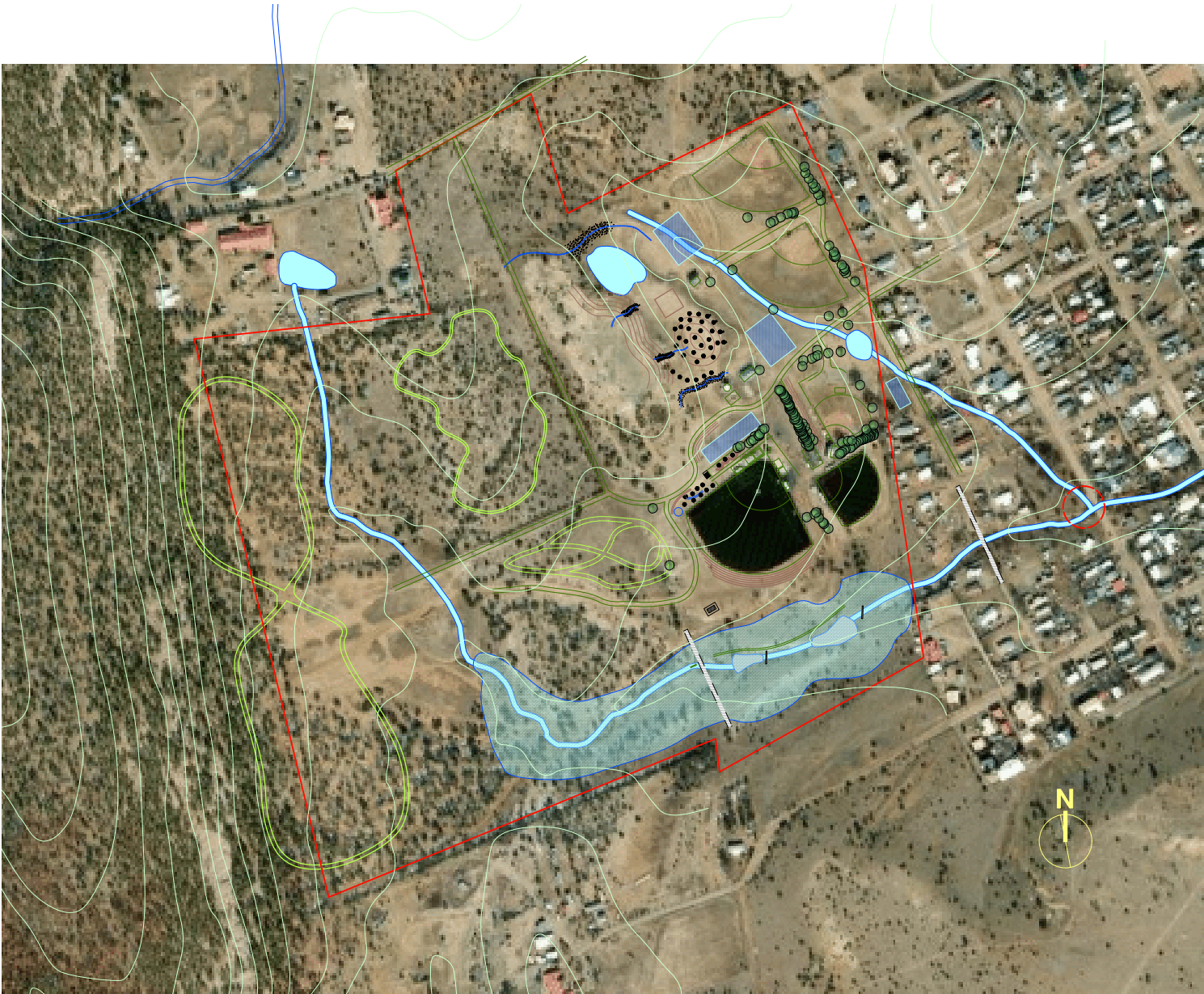
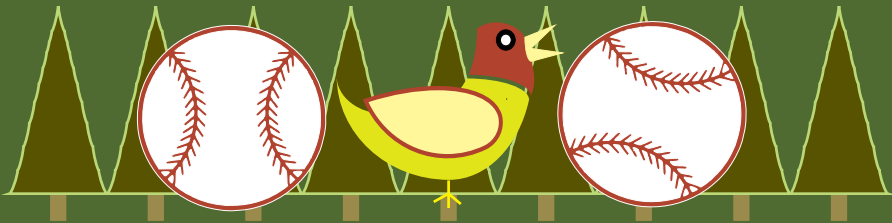


Figure 24a: Existing and proposed natural resources in Rodriguez Park.

Opportunities

Rodriguez Park is situated between two active tributaries of the Arroyo Pajarito. These present a serious flood risk for the neighborhoods just below park elevation and downstream from the arroyos. The park offers significant potential for stormwater catchment and retention throughout the year, protecting the residential neighborhoods of West Las Vegas from destructive flooding. The ample space affords opportunity to grow many trees with this stormwater. Roots absorb water, and leaves break force of raindrops. As a public green space, Rodriguez presents a unique opportunity to create a shaded community hub that offers both sports and recreational activities as well as improved wildlife conservation habitat. This is an opportune moment for integrating proven contemporary stormwater retention and urban forestry infrastructure.

Northeast Corner of Park

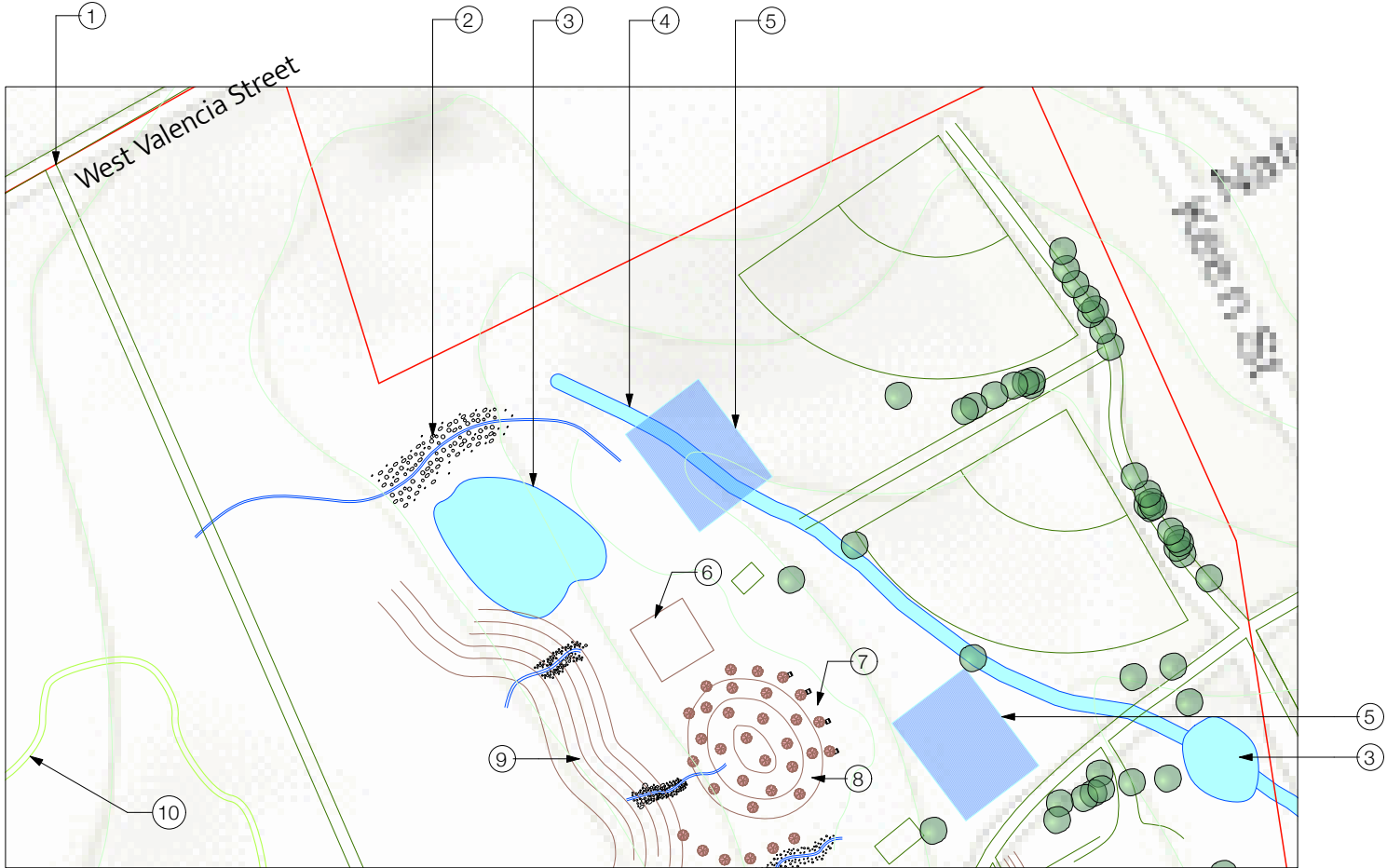


Figure 24b: Northeast park design concepts for access, stormwater, and community orchard.

- Existing Inventoried Trees
- Proposed Trees

- Create second entrance of park at West Valencia Street. Use as entry for motocross & ATV vehicles. Maintained access road also serves as a fire break.
- Utilize and stabilize existing erosion as waterfall features.
- Shallow retention pond catches Arroyo Pajarito stormwater.
- Arroyo Pajarito.
- Subsurface stormwater detention reservoir.
- Permeable children’s playground.
- Shaded picnic tables, offers a beautiful vista of Las Vegas.
- Sculpted bowl with community fruit trees.
- Terraced and seeded hillside.
- Walking/ jogging trails.





Figure 24c: Suggested green stormwater infrastructure designs.

- ① Subsurface stormwater detention reservoir.
- ② Shallow retention pond catches Arroyo Pajarito stormwater.
- ③ State owned parcel with existing large culvert (currently contributes to neighborhood flooding).
- ④ Terraced and seeded hillside.
- ⑤ Retention cistern.
- ⑥ Dry river bed delivers stormwater to shade trees in bullpen viewing area.
- ⑦ Shade trees with berms shade bleachers.
- ⑧ Utilize and stabilize existing erosion as waterfall features.
- ⑨ Sculpted bowl with community fruit trees.
- ⑩ Shaded picnic tables, offer a vista of all of Las Vegas.

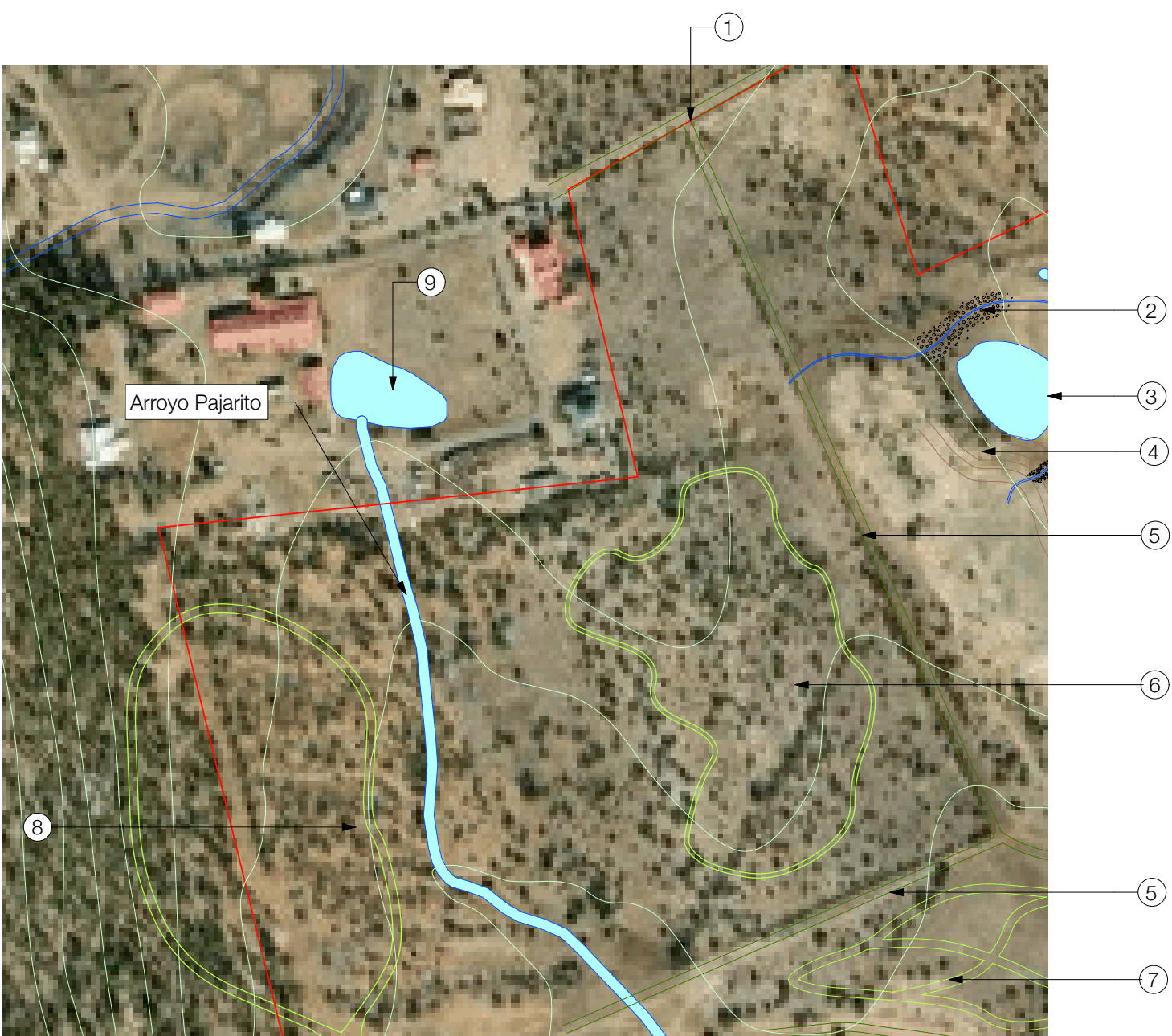
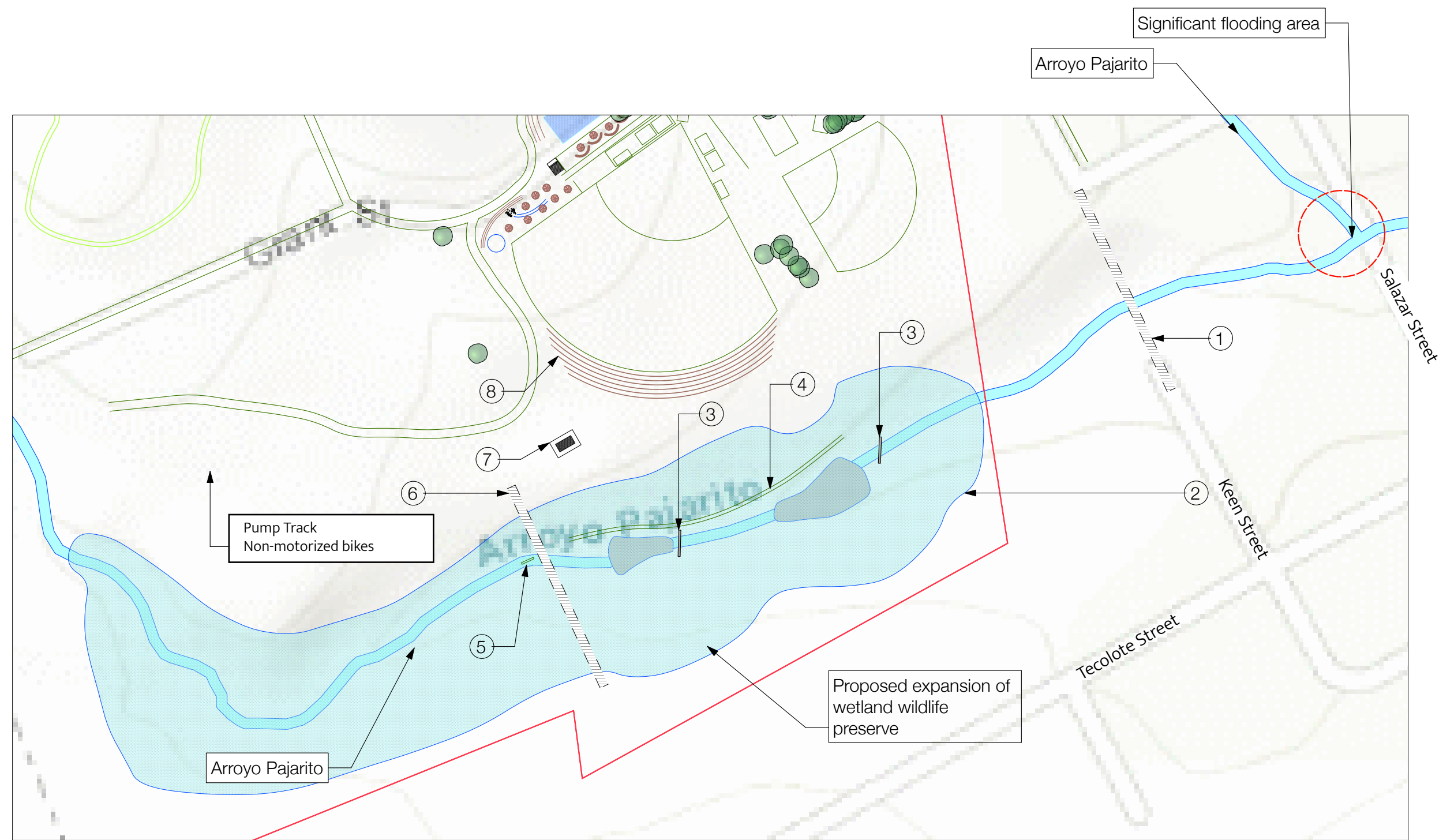


Figure 24d: Designs featuring nature-based, community oriented solutions..

- ① Create second entrance of park at Valencia Street. Use as entry for motor sports vehicles. Road also serves as a fire break.
- ② Utilize and stabilize existing erosion as waterfall features.
- ③ Shallow retention pond catches Arroyo Pajarito stormwater.
- ④ Terraced and seeded hillside.
- ⑤ Utilize road as firebreak.
- ⑥ Walking / jogging trail.
- ⑦ Pump track for non-motorized bikes.
- ⑧ Motorsports track with collection basin at lower level to prevent runoff into arroyo
- ⑨ Existing pond on neighboring private land.





- ① Pedestrian bike / walk bridge over Arroyo Pajarito at Keen Street.
- ② Expand wetland conservation area.
- ③ Existing concrete dams in Arroyo Pajarito.
- ④ Existing Tierra y Montes Soil and Water Conservation District trail.
- ⑤ Existing washed out culvert, former road. No longer passable for vehicles.
- ⑥ Pedestrian observation bridge over wetland area.
- ⑦ Shaded pavilion / picnic area.
- ⑧ Terraced and seeded hillside retains runoff from ball field.

Figure 24e: Design suggestions to support vulnerable wetland and reduce flood risks. .

Significant flooding occurs immediately downstream at the confluence of the two above illustrated tributaries of the Arroyo Pajarito. This is readily evidenced by homeowners’ continuing to surround their homes and property with precautionary sandbags, in dreaded anticipation of repeat flooding. The objective of expanding the Tierra y Montes Soil and Water Conservation District wetland is to retain more stormwater, grow the urban forest canopy, and provide improved habitat for local wildlife.



Corridors for CONNECTIVITY

KEY TAKEAWAYS

- Corridors connect places together for people, animals and plants.
- Connecting future places takes coordinating.
- Some places may not be available later if not planned for now.
- Corridors make for Safe Routes to Schools.
- Accessibility creates healthier communities.

Corridors are connections. They are avenues by which people access churches, schools, and recreational activities. How a city builds its corridors determines the way people move through their community, with whom they interact, their health, and ultimately their wealth and longevity. Trees are essential to creating comfortable and welcoming walking routes. For this reason, making a concerted effort to encourage tree canopied pedestrian & bicycle pathways, and shaded connections to businesses, churches and schools is imperative for a city-wide urban forestry plan.

Streets are corridors. The tree survey inventoried 50 acres of street trees. Where sidewalks or defined planting strips do not currently exist, there is a real opportunity to incorporate wide planting areas with rain gardens and trees. This will allow room for trees to grow, while making good use of stormwater. Where streets connect to the wildland-urban interface zone, trees should be planted in groupings instead of lining streets. This will create buffer zones, reducing likelihood of canopy fires. Wide sidewalks, especially where relating to Safe Routes to School or accessibility to parks, will enhance walkability.

Corridors guide people, plants, and stormwater. However they also help disperse invasive seeds. Invasive species, such as *Ulmus pumila* (Siberian Elm), have used the arroyo and river corridors for seed dispersal. Removing these, especially at the top of the watershed and within active waterways and wetlands, protects the native species. Especially important for the open spaces and wetlands, this allowance for native reach supports resiliency, making it possible for these species to “emigrate to more favorable habitats if conditions change” (Howell 2012, 62).

Safe Routes to School

Creating Safe Routes to School allows children to walk & bike safely, with zero injuries. Not only do children who exercise before school reach physical activity recommendations, but “some educators report that walking and bicycling students arrive at school on-time, energized and ready to learn” (SRTS n.d.). This federally driven initiative incorporates many methods to remove barriers to increase availability, safety, and education relating to accessing schools.

Actionable measures:

- Create routes to schools, parks, churches, and places of business.
- Incorporate green infrastructure to reduce speed along routes.
- Create rain gardens in chicane bump-outs along streets.
- Reduce heat along routes by growing trees using rain gardens.
- Protect concrete & asphalt from crumbling by shading it with trees.
- Build 10-foot wide sidewalks.
- Separate bicycle and vehicular traffic lanes when possible.
- Expand roads for dedicated bicycle lanes when separating lanes isn’t possible.
- Widen sidewalks at crossings.
- Offer bicycle parking with two points of contact for stability.
- Create signage, lighting and crosswalks to safely cross streets.
- Incorporate ADA compliance into trails and crossings.

The **Pecos Arroyo** (48.3 acres) is vulnerable to impairment. This waterway weaves along the entire east side of the city, along the I-25 freeway. It not only contends with confinement by this major road, but development has begun to impede it as well. The confinement creates vulnerability for flooding within the city. With proper management, removal of invasive species and retaining its floodplain, this arroyo with an adjacent nature trail could become a major corridor of connection (Figure 22).

Consideration could be given to create additional corridors along Railroad Historic District parks to other hotels along Grand Avenue, past Harris Pond to Storrie Lake. The potential corridor extends to an additional 70-acre hub for an expanded floodplain of the Pecos Arroyo as it runs adjacent to Las Vegas, before it becomes pinched by I-25 and development. In this way, it can become the east stretch of a green corridor, connecting lakes and parks the entire length of the city. Perhaps, with careful planning, this trail system will reach to the Las Vegas Municipal Airport, supporting long distance activities, such as biking and horseback riding.

Creating a corridor along the Gallinas River Walk from **Montezuma Pond** (~ 3.4 acres) to the National Wildlife Refuge has been a goal for the community as indicated by the Hermit's Peak Watershed Alliance. If the pond returns to its previous use as an ice skating rink, it becomes a year-round destination. The location of the pond could increase protection to the city from flood by incorporating an EcoBloc water catchment system under the parking lot at the pond.

Water corridors such as the Gallinas Riverwalk, the arroyos, and the Acequia Madre both culturally connect people and physically support recreation and healthy lifestyle.



CALL TO ACTION

Walk to work, school or around your neighborhood.

Share where you would like more walkability.

Generational Access

Respondents to the plan survey indicated that the most popular outdoor place is the **Gallinas Riverwalk Park**, with 73% of survey respondents making use of it. Extending along 2.9 miles of Gallinas River, from El Camino Road on the north side of town to Independence Ave / Prince Street on the south end, the river itself extends the entirety of town.

In order for the riverwalk to provide generational access to the landscape and adjacent schools, Jersey barriers and fencing that blocks access to the corridor are removed. Intended as temporary flood protection, these impede trail access as well as seating along it. Locations where fencing could be removed include: Douglas & 12th Street, Rosenwald Avenue, Sulzbacher Avenue, and San Francisco Avenue.

Each bank of the floodplain should be 550 feet wide, allowing for FEMA floodplain, and “an additional 300-feet of transition to edge on either side” (Benedict 2006, 129) which then connects with other similar habitats along arroyos and streams. Leaves reduce force of water droplets, thereby reducing erosion. A healthy forest of upland species on either bank surrounding the Gallinas, both within and outside of the city, leads to improved conditions and less flooding

The Hermit’s Peak Watershed Alliance has been working with the City to restore the integrity of the river channel in town. In fact, it “has completed two phases of river restoration” (HPWA 2023). Groundwork Studio completed the park design which "extended from Prince to Mills, and was meant to build on the river restoration efforts and previous trail improvements to further steward the river environment while providing educational and recreational opportunities” (Bell 2025). This shovel-ready project offers completed construction documents, per principal landscape architect Amy Bell. Funding is required for implementation.



Post-fire Jersey Barriers along Riverwalk

Accessibility

Creating handicap accessibility to the parks and along the streets helps enhance quality of life and allows family members the opportunity to take part in activities. Opportunities for engagement, such as “swing for wheelchair,” and “an accessible playground for multiple age groups” and a “paved walking path” (Las Vegas, NM Community Connection! 2025) around each site, with a standard metric of one mile loop, allow people with rollators or wheelchairs to get daily exercise and fresh air. This path extends along the streets from which people enter a park.

“Riverwalk and Storrie Lake need more trees and shrubs.

-Las Vegas Community Member Response

***(I’d like to see..)
“A park that prioritizes native wildlife and locally threatened species of plants and pollinator priorities are taken into consideration.***

Anything else can apply here but choosing native alternatives will save us water, money, energy, man hours, while doing something positive for the land AND the people”

- Las Vegas Community Member Response

Hubs are linked by corridors to smaller gathering places or neighborhood parks. As illustrated in the 3-30-300 rule, these parks are recommended within a 15 minute walking radius from a home or place of work. Parcels throughout the city should be retained to act as stepping stones leading to the larger hubs, such as Rodriguez Park to the west, Montezuma Hot Springs and ice skating pond to the north, and the Las Vegas National Wildlife Refuge to the south.



Community Parks

Harris Pond (9.6 acres) offers opportunity for fishing and picnicking. Connecting community to this lake requires shade pavilions around the pond, updates of the practice field into a multi-use one, and making play safe for children by especially replacing “entire parks old barbed wire fencing with a newer style fencing” (Rudolf 2024).

Pancho Padilla Soccer Field/ Mountain View Park (4 acres) is a youth soccer field in a sunken basin with wetland species growing in the southwest corner of the field and *Pinus ponderosa* (Ponderosa Pine) trees lining a couple upper banks. It has easy connection opportunities to Hanna Park via two pedestrian routes, with little modification.

The park could become a tree filled playground using water harvesting. It is located in an area prone to flooding near a park already used for junior soccer practice. It is a ‘blank canvas,’ without any bleachers, seating or benches and has been identified as a field that “gets saturated and filled on north and south ends where drainage pipes come off of Mountain View and Las Vegas Drives” (Rudolf 2024).

Elements in this stormwater playground include:

- Underground water collection using EcoBloc system for infiltration and watering trees
- Pour-in-place safety surface with permeable substrate under play sets
- Multi-age and ability swings and play equipment
- Interesting earth-scape play equipment, such as an Acorn Swing
- Many trees and lots of shade
- Multi-tiered landforms for slope exercise and visual intrigue during flooding
- Expanded wetland for healthy water
- Elevated pier for safe access across stormwater
- American Disabilities Act inclusion,
- Multi-generational fun
- Running track around site with mileage marking for goal-setting,
- Educational components with environmental interpretation signs



Keyes Park (7.7 acres), has outstanding water harvesting potential. It is located over a tributary to the Pecos Arroyo. Green infrastructure would reduce the severe flooding that occurs along Mills Avenue, exacerbated by the water spilling down First Street and Second Street. Figure 25 offers a concept design for Keyes Park, which harvests water off Grand Avenue, Mills Avenue, and Park Place. It creates shade around the ball fields by harvesting stormwater throughout the park to grow trees.

An additional feature of the design is underground stormwater collection, such as Graf EcoBloc Inspect. This system is slated for placement in two locations. One is above the first baseball diamond, at the top of the park, at Grand and Mills avenues. This will collect water going down Grand Avenue before it submerges Mills. The second is indicated under the parking lot below the basketball hoops. This will help with runoff along Mills, before it reaches First Street, inundating the already diminished wetland at the corner of Mills and First Street. An ambulance building was recently constructed on the open space of this remnant of the Pecos Arroyo tributary. Unfortunately, this further confirms the need for delegation of natural resource sites in anticipation of growth in order to plan for development in a strategic manner.

If lined, these Lego-like EcoBlocs reserve water for a dedicated irrigation line for the park trees, which ensures that trees receive water from this dedicated system first. If unlined, it reduces stormwater off the streets, percolating it into the soil for groundwater aquifer integration and passive mature tree root access.

Hanna Park (4.7 acres), a medium size community park, serves Northside residents and its design also incorporates the EcoBloc system under the parking area. Some water enters into the improved trench drain, into the expanded channel for water to infiltrate for existing and additional trees. Installing additional trees creates shade on the playground.

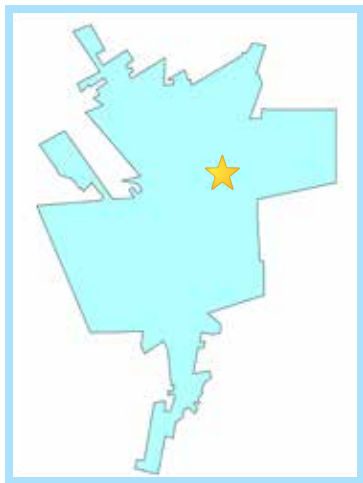
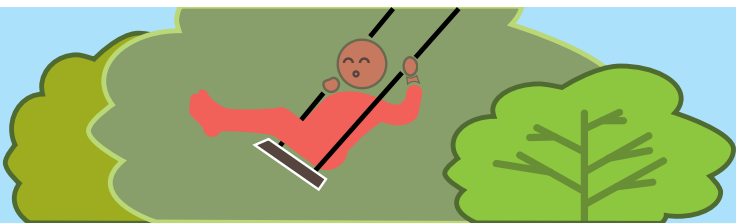
Stormwater from Legion Drive enters into the park to water trees west and north of the soccer field. This culminates in the southeast corner of the soccer field, where a shallow basin holds additional water and supports shade trees, with canopies tall enough to sit under during a game (Figure 26)

Water falling off the shade structure enters into a natural dry river bed, supported by lagunitas to water existing *Pinus nigra* (Austrian Pine) trees adjacent to the structure. This water weaves around and under the sidewalk for additional tree support. The meadow has a series of soft grassy hills, which capture water spilling in the southeast corner.

A second phase to the park’s stormwater collection incorporates another EcoBloc system under the soccer field if it is needed.



Keyes Sports Complex Park



Challenges:

Excessive downhill stormwater is flowing into park from Park Place.

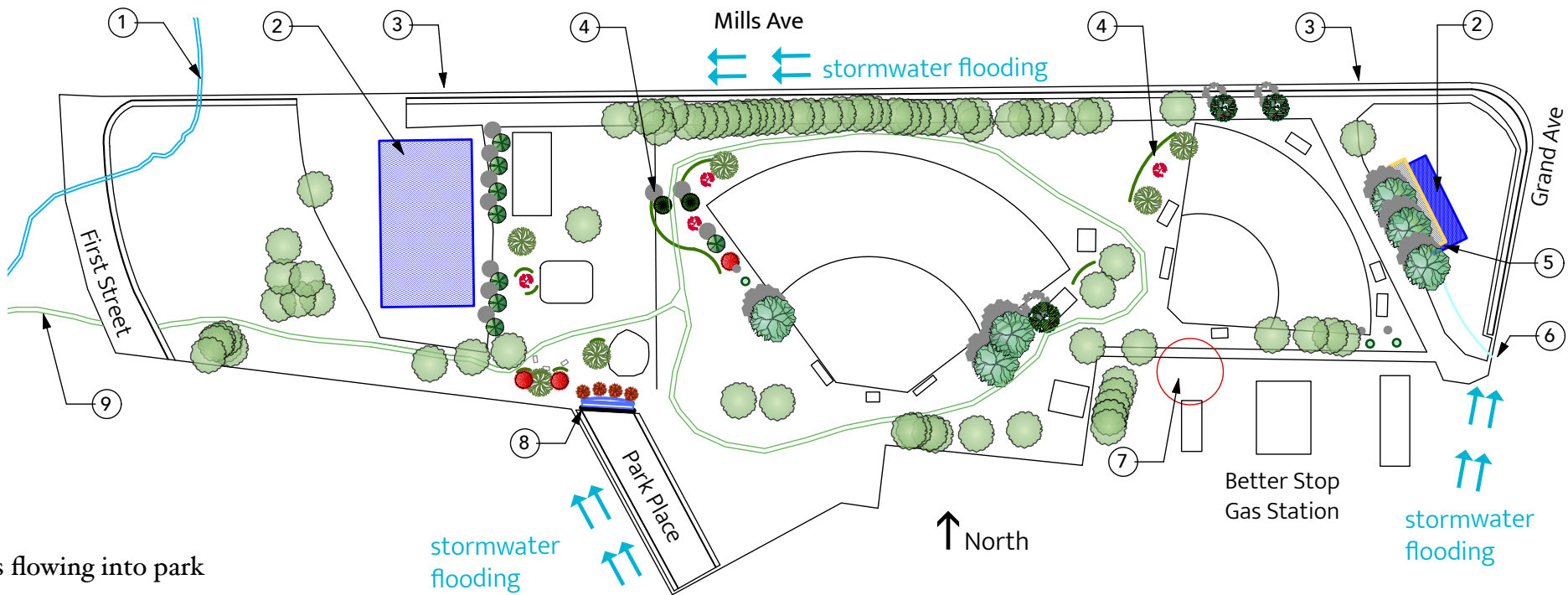
There is an active tributary of the Pecos Arroyo running through NW corner of park, at First Street and Mills Ave where the new ambulance facility is to be located. It has inadequate drainage, causing significant flooding.

Flooding occurs in the small parking lot on the east end of main ball field at Grand Ave and Mills. Attempts to redirect stormwater flow along a ditch have failed. Ditch is silted and clogged.

There is significant stormwater flooding coming from the neighboring Better Stop convenience store and gas station, (©)causing potentially toxic run off to flow into park, where children play sports.

Park can be better integrated with neighboring Robertson High School.

Lack of shade in East parking area.



Berm Concept Illustration

- Inventoried Existing Tree
- Austrian Pine
- Bur Oak
- Chinquapin Oak
- Crimson Spire Oak
- Frontier Elm
- Kentucky Coffee Tree
- Magnifica Hackberry
- Princeton American Elm
- Rocky Mountain Juniper
- Texas Red Oak

Proposed Remedies:

Place subsurface stormwater detention reservoirs beneath parking lots.

Redirect stormwater from Park Place into retention basin with new tree plantings.

Add trees to park.

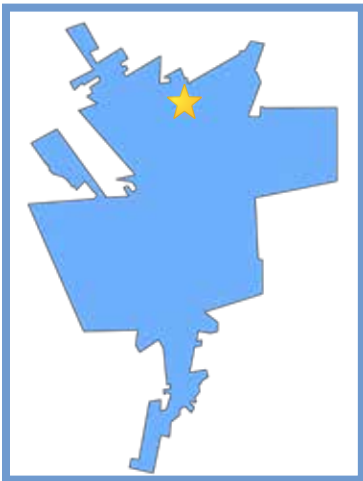
- ① Improve drainage and flow of existing active Pecos Arroyo tributary.
- ② Subsurface detention basin reservoir.
- ③ Use existing storm drains to channel water into detention basins.
- ④ Berms and swales to capture surface stormwater in park.
- ⑤ Solar awning generates power for park lights & pumps while creating shade.
- ⑥ Redirect drainage from Grand Ave. to a detention basin. Include a sediment trap.
- ⑦ Contain gas station runoff to prevent toxins from entering park.
- ⑧ Capture run off from Park Place with block wall basin, inoculated logs and catchment basin.
- ⑨ Running / Jogging loop trail extended to nearby Robertson High School.

Additional Recommendations:

Repair and restore currently defunct irrigation system.
Existing trees require structural pruning.
Update picnic tables.
Add more bleachers for spectators.
Create more shade around bleachers.
Update playground equipment.
Update lighting.

Figure 25: Design suggestions to reduce road pollution, retain stormwater, and grow community canopy

Hanna Park

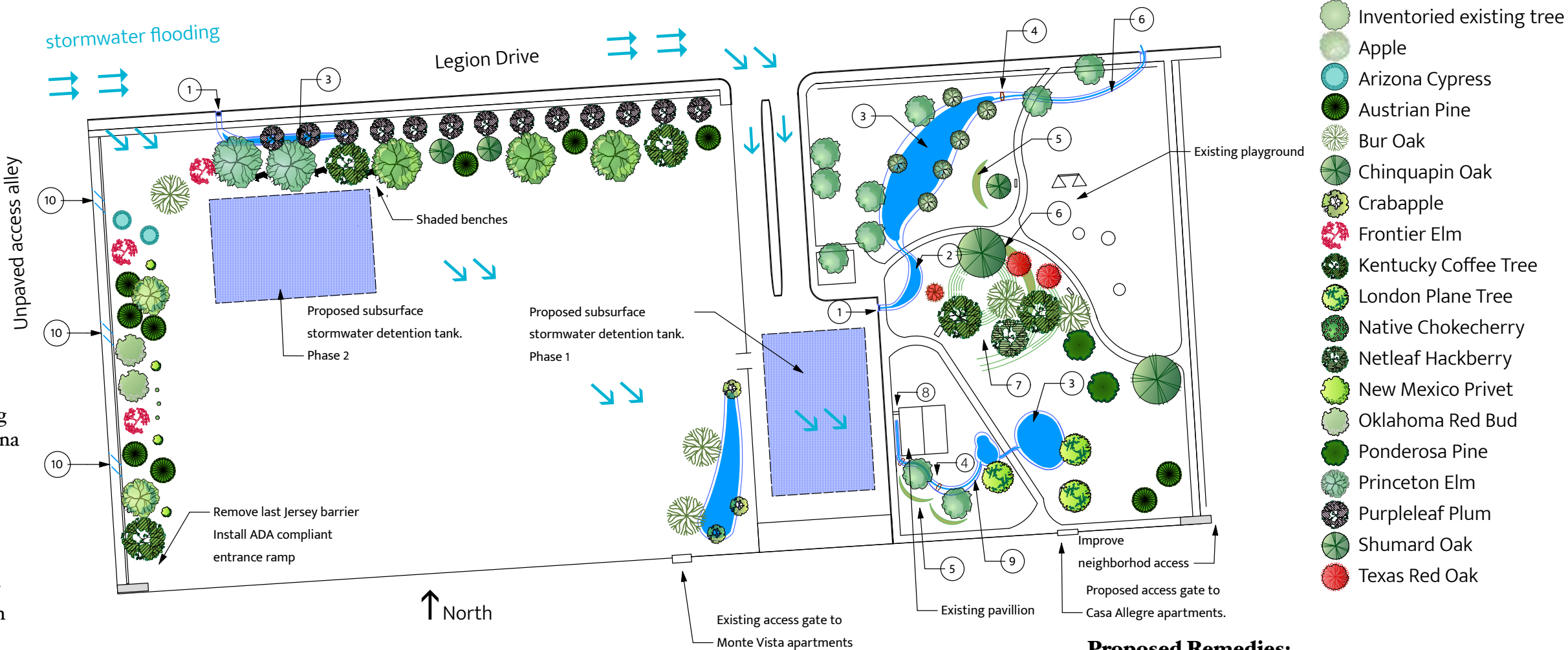


Challenges:

Excessive stormwater is flowing downhill along Legion Drive. Stormwater is collecting in Hanna Park parking lot, where there is inadequate drainage, causing water to pool and stagnate.

Solutions:

Improve infrastructure to redirect stormwater to improve the health of existing trees through attractive and safe water harvesting.



- Inventoried existing tree
- Apple
- Arizona Cypress
- Austrian Pine
- Bur Oak
- Chinquapin Oak
- Crabapple
- Frontier Elm
- Kentucky Coffee Tree
- London Plane Tree
- Native Chokecherry
- Netleaf Hackberry
- New Mexico Privet
- Oklahoma Red Bud
- Ponderosa Pine
- Princeton Elm
- Purpleleaf Plum
- Shumard Oak
- Texas Red Oak

Proposed Remedies:

- ① Curb cut with sediment trap.
- ② Expanded existing drainage ditch.
- ③ Retention pond.
- ④ Lagunita.
- ⑤ Swales.
- ⑥ Berm.
- ⑦ Sculpt land for retention of overflow stormwater.
- ⑧ Capture rainwater from roof of pavillion.
- ⑨ Dry river bed.
- ⑩ Channel alley stormwater into trees.

Additional Recommendations:

Current irrigation system is inoperable and must be overhauled and upgraded.
Install subsurface retention basins to collect stormwater for irrigation.



Replace existing inadequate culverts with pedestrian rated trench drain.
Figure 26: Water harvesting design suggestions.

Existing natural drainage ditch expanded to shallow retention pond

Neighborhood Parks

School yards could have their own small parks. The trees create shade for children during recess, and clean the air surrounding the school. When trees are visible from windows, creativity, learning capacity, and test scores all improve. This means that by incorporating green space into schoolyards, we can help the future generation both in physically, emotionally, and mentally.

Small gathering places can utilize stormwater, preventing flooding downhill. Although mature parks do not have much space for large earthworks, small projects can be installed as space becomes available. These could include small divots in land grade, lagunitas near trees, underground infiltration cisterns under parking lots, and acequia style channels alongside roads, complete with sediment traps to reduce contamination of water sources downstream. The City may choose historic parks such as Carnegie Park (2.7 acres) and Lincoln Park (2.8 acres) for these small scale applications of Best Management Practices.



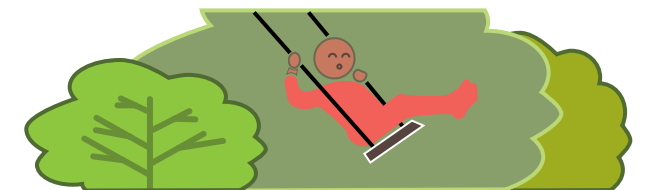
The beautiful **South Pacific Park** (1.6 acres), can mitigate stormwater before it inundates the West Las Vegas Middle School, Arroyo Pajarito, and entrance into the Riverwalk corridor. Perfectly situated between several schools, it offers basketball, volleyball and a children's playground. This design (Figure 27) removes water off Chavez Street into a serpentine dry riverbed, with lagunitas next to trees. The trees provide a shaded canopy for picnicking and watching a basketball or volleyball game.



South Pacific Park



Additional ADA compliant trench drain grates with sediment traps remove contaminants off Chavez Street and support trees lining the west side of the basketball court. Installing trees helps see the hoop in after-school games, which is directly in line with the setting sun. Supporting new canopy in this area protects adjacent houses from an overarched basketball throw. From Chavez Street, stormwater heads down North Valley Street and South Valley Street. To the north, stormwater enters a French drain and impermeable pipe, which then passes the updated sitting wall for the volleyball game. It connects with the uphill dry riverbed, which cascades down a rock waterfall. The impermeable pipe is converted to a permeable pipe and pumice wick, where it supports the trees shading the afternoon volleyball game.

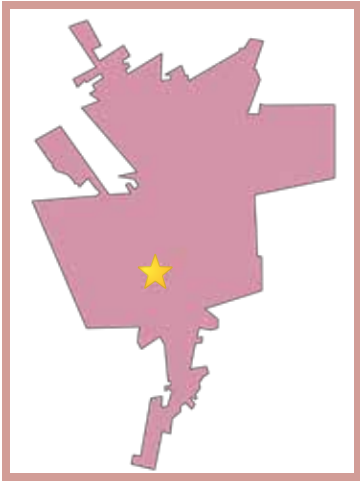


Along the South Valley Street, stormwater enters into the park at the bottom of the street. The former concrete storm drain is replaced with daylighting the water into a series of three Zuni bowls, which collects water and allows percolation into the ground for trees. Inoculated logs within the bowls make them appear less shallow, and support mycorrhizal connections to the root systems of new trees. Overflow diverts water under the sidewalk into a series of three wide but shallow retention basins, which further make use of stormwater for tree growth, creating ideal locations for afternoon reading and habitat. Finally, remaining water is returned to the old storm drain pipe, where the water outfalls through the wall, continuing along South Pacific Street.

“Dwell as near as possible to the channel in which your life flows.”

-Henry David Thoreau

South Pacific Park



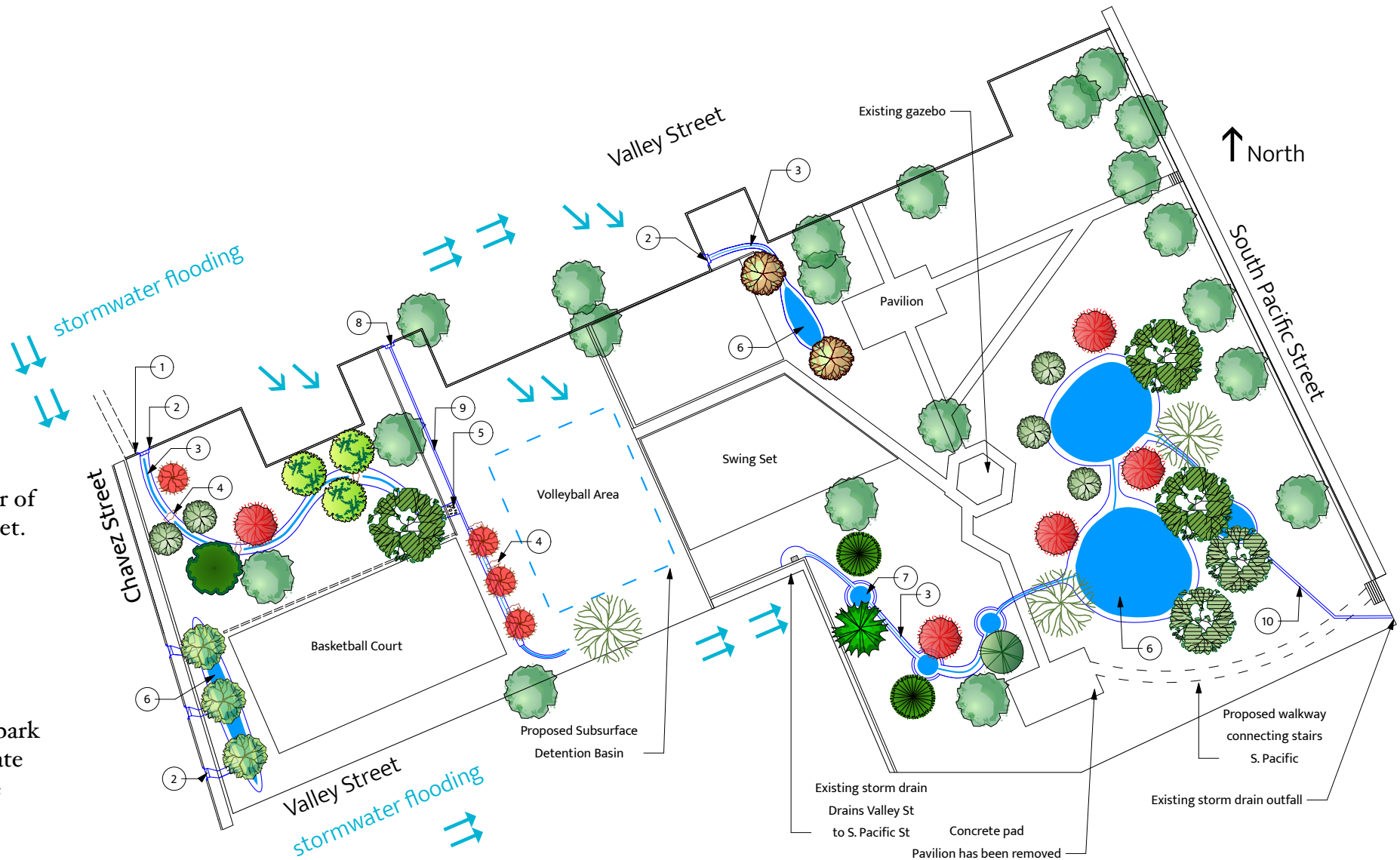
Challenges:

Significant flooding occurs at NW corner of park, flowing downhill from Chavez Street.

Park has a lack of trees, reducing shade benefits in this neighborhood.

Solutions:

The stepped and sloped terrain of this park presents an excellent opportunity to create descending water features that maximize stormwater catchment and retention to hydrate the existing trees and landscape. Additionally, stormwater harvesting will allow an increase of new tree plantings.



Proposed Remedies:

- ① Drainage ditch cross-pan directs water from Chavez St. into park.
- ② Curb cut with trench drain grates.
- ③ Dry river bed.
- ④ Lagunita.
- ⑤ Gentle cascading waterfall.
- ⑥ Retention pond.
- ⑦ Zuni Bowl.
- ⑧ French drain box.
- ⑨ Permeable pipe.
- ⑩ Permeable pipe connecting to existing outfall drain.

- Existing Trees
- Apple
- Emerald Sunshine Elm
- Bur Oak
- Chinquapin Oak
- Crimson Spire Oak
- Kentucky Coffee Tree
- Limber Pine
- Littleleaf Linden
- Mesa Glow Maple
- Netleaf Hackberry
- Ponderosa Pine
- Texas Red Oak

Additional Recommendations

Remove and replace current defunct irrigation system. Install subsurface stormwater tank below volleyball playing area. Update and replace benches, locating closer to sports areas. Place more picnic tables to encourage community use. Add new poles & sand to volleyball area. Upgrade existing basketball court backboards. Replace aged gazebo. Upgrade fencing around park.

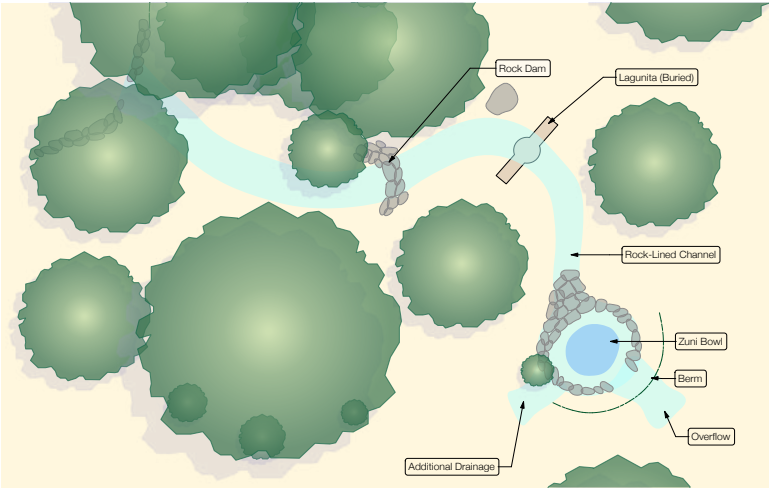


Figure 27: Concept designs to guide rainwater to trees.

Example of Zuni Bowl

Neighborhood Parks

Aligned with the vision for a future canopy, all parks receive attention, offer improved stormwater mitigation and support community engagement activities. Neighborhood parks include:

Old Town Plaza (1.6 acres) is a historical icon in the city. It already holds significant canopy, and adding new trees will help to retain shade as mature elm trees begin to be reduced and replaced. Air spading around the trees reduces the soil compaction, aerate the soil, increase water infiltration, and reduces further compaction. Air spading does not hurt roots, as it uses air to displace soil instead of excavation.

Veteran's Park (1.1 acre) flanks the slope along Mills Avenue. With the excessive stormwater that spills past it, adding curb cuts along 4th street with a trench drain grate for safety, as well as from Country Club Road makes use of stormwater for this green space next to Robertson High School. Additional trees west of the concrete pad shade the concrete, thereby increasing its longevity. Inclusion of on-contour berms & swales help with stormwater collection.

“Those little grills too. It’s nice to BBQ and not have to pay just for a few hours of hanging out or not have to drive 10, 20, 40 mins to do so.”

- Las Vegas Community Member Response



Example of disability-friendly trench grate.

Small pocket parks dot the landscape. These further allow for continuation of linkage and provide small places of repose for nearby neighbors to access green space.

El Creston Circle (1 acre) is a small park with a big view. Opportunity for water retention at the Northside of the park lends itself to tree planting, as well as harvesting stormwater prior to it spilling into the lower neighborhood. Many survey respondents request areas for their dogs to run without a leash.

Although the **City Hall Dog Park** (1.3 acres) is dedicated to canine friends. A fence around the park will permit them to run off-leash. Most dog owners want small dogs to have their own space to run, making recommendation for separate 'small dog' and 'large dog' areas. Additional sites will be considered.

“My ideal park would have a nature trail to walk. It would have maintained facilities, an accessible playground for multiple age groups. There would be a dog area. I would be there with my family (son and husband).

Our favorite right now is the one up at Creston Circle”

- Las Vegas Community Member Response

“(It) would also be nice to have an enclosed dog park so folks could let their pups run safely”

- Las Vegas Community Member Response



Locomotive Park (2.3 acres) offers a popular place to show cars and pile snow during heavy winter storms. Three *Pinus edulis* (Piñon Pine) trees line the parking area, and people showing cars often huddle in this shade. Adding shade and seating will make this pastime more enjoyable. Across from Keyes Park, this area contains a former tributary to the Pecos Arroyo. With permeable paving and an unlined EcoBloc system, stormwater and snow will percolate into the aquifer. If lined, it connects to irrigation for watering of the proposed shade trees.



Locomotive Park

Memorial Park (0.4 acre) is a thin parcel between Church Street and New Mexico Avenue. Existing drainage corridor will be cleaned to aid in water channeling to the Hermanos Arroyo. This can be made permeable for integration as a water source for park trees. Additional curb cuts will support this effort to reduce and clean water entering into the Hermanos Arroyo.

Train Caboose or the Tony Martinez Jr. Welcome Center Park (0.7 acre), is a grassy corner, with a meticulously sculpted 'WELCOME' hedge and healthy *Pinus edulis* (Piñon Pine) trees. It can capture a substantial amount of stormwater before it reaches Grand Avenue by reducing the concrete bump leading into the parking area. The parking lot could be converted into a permeable EcoBloc system to infiltrate water into the aquifer, with some water allowed to percolate.

Neighborhood Parks

Pajarito Park (0.36 acre) on the corner of New Mexico Avenue and Perez Street provides a great chance to clean stormwater with a rain garden before it enters into Pajarito Arroyo. A social path meanders through the corner parcel.

Truder Park (0.3 acre) has potential for stormwater collection prior to it draining onto Grand Avenue if the triangle is removed and the asphalt of this is converted into a rain garden. A curb cut at Washington and 2nd Street will help infiltrate water. This also is a good site for crows, due to its tall trees. Redbuds (*Cercis canadensis* var. *texensis* ‘Oklahoma’) will make a nice understory to the tall elms, further helping to dissipate rainfall with their wide leaves.



Truder Park

“Ideal park has a skatepark for kids basketball courts jungle gym equipment and a slide as well as free water available. A small dog park section would be great as well!”

-Las Vegas Community Member Response

Lion Park (0.1 acre) offers a small stop across the street from the proposed Community Garden site within the revamped Railroad Avenue Historic District of Lincoln Avenue and Grand Avenue. By repairing the water fountain and structure, as well as adding some Redbuds (*Cercis canadensis* var. *texensis* ‘Oklahoma’) will visually connect this corner parcel to Truder Park. Like Truder, these understory trees will offer habitat, vibrancy, and reduce impact from rainfall. Removing the curb at the ADA entrance allows stormwater the park from Grand Avenue.

Alongside the Railroad Avenue Historic District, just opposite the railway tracks is **James Marrujo Park** (2.6 acres). It runs adjacent Interstate 25, intending to offer green foreground to the freeway. Additional trees reduce heat along the wall, and on-contour berms & swales collect water leading to the Gallinas River. Future curb cuts help water enter into the park.



Marrujo and its adjacent park, **Commerce Soccer Field** (2 acres) unite with the Railroad Avenue Historic District. Tourists can ride the Southwest Chief Amtrak train to Las Vegas, stay at the beautiful Castaneda Hotel and walk over to the park, via a proposed pedestrian bridge for safe railway crossing. The soccer field “is retaining large amount of water from runoff from the Pecos Street Road Ramp” (Rudolf 2024), making it ideal for growing trees. These parks could offer beautiful land contours further blocking the freeway, and become the middle of a corridor that reaches south to the Gallinas River, as well as north along Commerce to Mills Avenue.



James Marrujo Park

“A green infrastructure network connects these ecosystems and landscapes in a system of hubs, links, and sites. Hubs anchor green infrastructure networks and provide space for native plants and animal communities, as well as an origin or destination for wildlife, people, and ecological processes moving through the system”

- Mark Benedict 2006, 13

Soil Conditions and Geology

According to the USDA Web Soil Survey (WSS), Custom Soil Resource Report for San Miguel County Area, New Mexico, there are 18 soil types within the Las Vegas city limits (Web Soil Survey 2025). For the purposes of this plan, the major soil types have been highlighted in Figure 28.

Philmont Silt Loam, plateau interfluves, gently sloping (Ph2) has the greatest coverage within the city limits, covering 25% (NRCS 2025). Of relevance is this soil's ability to retain water due to its high clay content. Clay is composed of negatively charged microscopic sheets (Cassidy 2025). These sheets allow water to enter the space between and be retained, preventing water from moving deep into the soil, but also helping to hold moisture longer than sandy soil. Clay's negative charge gives it the ability to strongly bond with positively charge particles such as the nutrients used by plants. This property makes it potentially difficult for plants to extract those nutrients from the soil. The area is also made up of rolling hills. The hills can be utilized during rainwater infrastructure planning to guide stormwater with little alteration to the landscape. (Ph2) includes the ecological site type R070AA002NM, Clayey Uplands. This site type is now referred to as Ecological Site GX070A01X002, New Clayey Upland and retains much of the same description as Old Clayey Upland (Miller 2021b). The Clayey Uplands ecological site supports a majority of grasses, with shrubs being less abundant and woody plants rare. Soils depth is "moderately deep to deep" (Bishop 2023) and retains a high amount of water, which moves slowly through the soil. The dominant species are Blue Grama (*Bouteloua gracilis*), Western Wheatgrass (*Pascopyrum smithii*) and Bottlebrush Squirreltail (*Elymus elymoides*) (Bishop 2023). Within this site big and small game can be found, including Prairie Dogs, Rattlesnakes, Coyotes and even Pronghorn Antelope!

Colmor-Onava complex, fan remnants (CO2) is a soil type of importance in Las Vegas because it contains loam material and drains well, meaning it can support trees and a diversity of herbaceous plants. The soil type occupies much of the western side of Las Vegas around parks such as Rodriguez Park. The soil has a deep depth, up to 80 inches, before reaching bedrock, making it ideal locations for planting trees with larger root systems. (National Resources Conservation Service 2025).

Toril-Mion-Litle complex, (TM1), breaks, occupies the second largest area within Las Vegas, covering 17.2% of the city. Depth to bedrock in this complex is 14-24 inches, which leaves little room for other soil horizons where plant roots grow. Trees should be started smaller in these areas if possible or rock should be fissured for root and water penetration. The Lithic Limestone ecological site type which resides in the (TM1) contains plateaus, alluvial fans and benches. Characterized by cool season grasses such as dominance by New Mexican Feathergrass (*Hesperostipa neomexicana*) and also including Sideoats Grama (*Bouteloua curtipendula*) (Miller 2021a), the site can vary depending on factors such as grazing and precipitation. If there is an abundance of rain, grazing is less degrading than years where precipitation is lacking (Miller 2021a). Grazing and disturbance also have an effect on the degree of tree cover on this site.

For more information about soil testing:

<https://aes.nmsu.edu/resources/soil.html>

Soil Types of Las Vegas

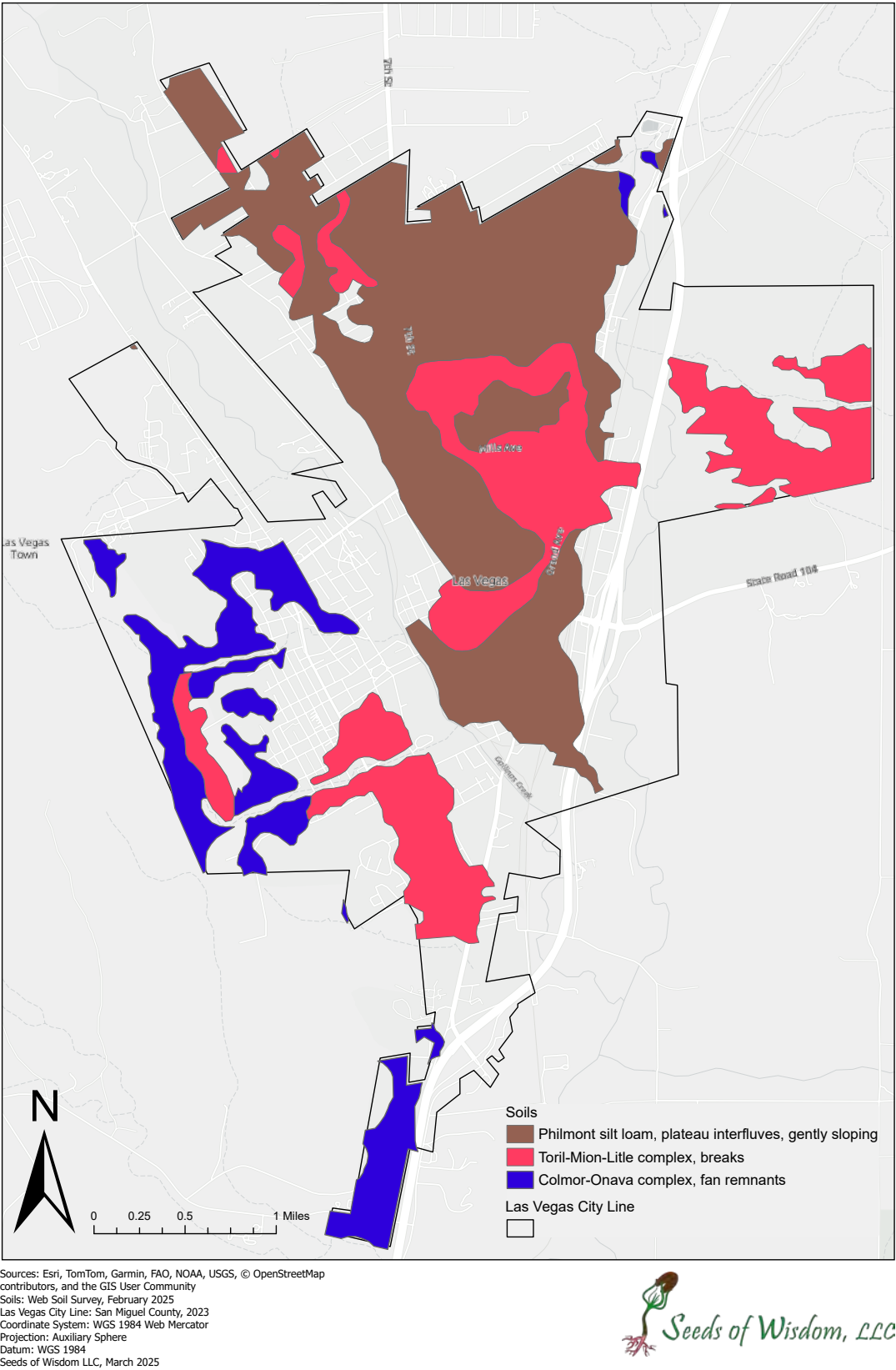


Figure 28: A simplified soil map based on the Web Soil Survey for the City of Las Vegas. Displayed are the three largest percentages of soil cover within the city. Philmont silt loam (Ph2), in brown, Toril-Mion-Litle (TM1) complex, in coral and Colmor-Onava (CO2) complex, in blue.

Soil Conditions and Geology

Geology

Las Vegas and the surrounding area has many geologic features which can be easily seen driving through town. The underlying geology formed 70-80 million years ago when the region was an inland sea (Price 2010). Sediments then eroded from the mountains and spread into the region.

Erosion-formed sedimentary rock canyons surround the plains east of town. Storrie Lake, just north of town, is a man-made lake with an earthen dam, diverting water from the Gallinas River. Along Storrie Lake fossils of shark teeth and other ancient organisms can be found, a reminder of the region’s ancient past. The lake is now a state park, providing opportunities for fishing, boating and camping. Limestone concretions can be found dotting the landscape.

KEY TAKEAWAYS

- Soil condition and composition influences plant health.
- Where there is a lot of rock, choose adaptable saplings.
- Creating soil veins in the rock will help roots penetrate.
- Colmor-Onava complex soils have deeper profiles, allowing larger trees to be planted.
- Clay soils hold more water but can take nutrients away from plants.
- Soil amendments will help trees succeed in areas where soil is lacking ideal properties.



Example of Lithic Limestone along the Pajarito arroyo. Notice the clean breaks and block shapes of the rock higher on the slope.



Ecological Site Type

The Las Vegas area is mostly made up of Clayey Uplands and Lithic Limestone, with other ecological site types covering only a small area of Las Vegas. Ecological sites can best be seen outside of the city, in the plateaus and canyons of the meadows displaying an expanse of short grasses and forbs or on the rocky slopes west of town, where sediment is being carried off the mountains and settling in flatter areas. South and east of town, “the gray thin-bedded shale and fragmented limestone is the Late Cretaceous Graneros Shale and overlying Greenhorn Formation, known for its oyster and ammonite fossils” (Donahue 2024, 77).

Much of the Las Vegas city exists within Great Plains Short Grass Prairie matrices. These matrices support grasses, such as Blue Grama, Sand Dropseed and Purple Three-awn (NM DGF 2016), and low growing shrubs. In the context of an urban forest, species should be chosen based on their ability to survive conditions such as an abundance of clay and short depth to bedrock. Trees that are planted should follow best management practices for good drainage and soil remediation. Where there is bedrock, chosen species may need to begin with shallow root systems. Chipping into the rock may be possible to allow roots and irrigation to penetrate into the cracks.



CALL TO ACTION

Identify your soil type. Start a compost pile where you would like to plant the Right Tree in the Right Place.

Habitat

State and Federally listed Threatened & Endangered species in San Miguel County include the Bald Eagle, Peregrine Falcon, Gray Vireo and Baird’s Sparrow (BISON-M 2025).

Species of Greatest Conservation Need for the county include three species of mammals, thirty-four birds, one reptile and one amphibian (BISON-M 2025). This information was obtained through the Biota Information System of New Mexico (BISON-M).

Bird watchers delight in spotting birds such as:

Pinyon Jay,
Orioles,
Grey Catbird,
Cassin’s Kingbird,
Western Kingbird,
Eastern Kingbird,
Western Wood Peewee,
Say’s Phoebe,
Eastern Phoebe,
Mountain Bluebird,
Western Bluebird,
Western Meadowlark,
Yellow-headed Blackbird,
Broad-Tailed Rufous Hummingbird,
Black Chinned Callope,
Killdeer,
as well as several migratory birds, such as Sandhill Cranes!



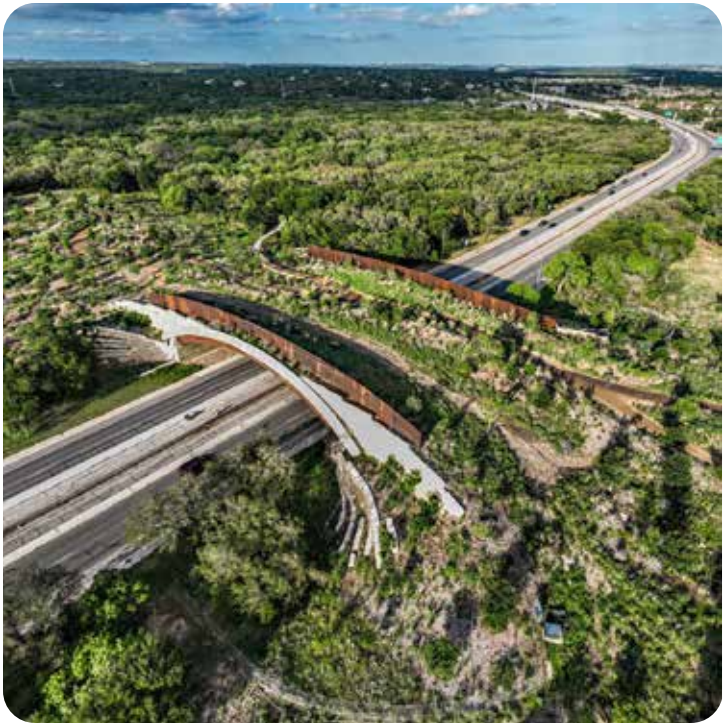
Pinyon Jay *Gymnorhinus cyanocephalus*

The Las Vegas National Wildlife Refuge, within the meadows east of town on 8,672 acres, offers home and sanctuary to elk and small mammals such as the badger and prairie dog. The refuge is an important area for many species of birds, from shorebirds to raptors to ground-birds like turkeys, as well as migrating birds like the sandhill crane and sandpiper (LV NWR n.d.). The refuge provides habitat for rest and foraging. Early fall morning air is filled with bugling elk who generally spend their summers in the mountains and overwinter at lower elevations. This places Las Vegas in the path of animals moving between the mountains and meadows. The urban forest should offer clear and safe corridors for animal migration, which would reduce their interaction with fences and cars and other human created obstacles in the city.

A robust urban forest complements the efforts made at the Refuge by providing habitat for animals moving between the mountains and meadows or migrating south. The city is already supporting these efforts by diverting excess water from Storrie Lake to the refuge to fill the lakes and ponds. This overflow provides a drinking source necessary for all animals on the refuge, especially migratory birds parched from wildfires.

Land Bridges

Las Vegas and surrounding San Miguel County can protect animals, large and small, inhabiting the surrounding mountains by helping them escape wildfire and drought. Future planning could include a land bridge connecting mountains to the wildlife refuge. While land bridges have been implemented in the USA for nearly half a century, the concept still remains relatively uncommon in highway infrastructure. Land bridges provide critical safe passage for wildlife. Several highway signs close to Las Vegas caution motorists that large animals frequently cross the interstate. A 300-foot wide habitat overpass bridge could allow passage of animals across I-25, and help to direct their movement. Underpasses also help with planned migration, for animals, people, water, and trees. Land bridges reduce bottlenecking of native tree species. This allows climate-adapted traits to reach the other side of a freeway.



The Robert L.B. Tobin Land Bridge connects both sides of Phil Hardberger Park, San Antonio, TX. Photo credit: Aerial Airborne Photography 2022,



Evidence of wildlife presence within city limits. Fresh “buck rub” on Locust tree (*Robinia* species) with vacant bird nest. Tierra y Montes Soil & Water Conservation District Pajarito Arroyo - Rodriguez Park, Las Vegas

By preserving habitat in town, and promoting access out of town, Las Vegas can provide not only spaces for people to enjoy, but also usable habitat, enhancing the greater benefit of the urban forest.

Water Supply

Surface Water

Surface water sources supply nearly 90% of water used in Las Vegas, with the rest of the water pumped from wells in the Taylor Well Field southwest of town (KRWG 2012). Las Vegas uses approximately 1.5-1.6 million gallons per day between business and residents.

Reservoirs

Peterson Dam (NM00022), completed in 1911, was built on the Gallinas River and has a maximum storage capacity of 255 acre feet. Normal storage is 211.2 acre feet, and because its spillway is 210-foot wide (Ragon 2025), the maximum discharge is 18,900 cubic feet per second. Its surface area is 12 acres, and drainage area is 2.14 square miles. The dam is 210 feet long and 50 feet high. It has a condition rating of ‘fair’ and due to impact potential above the city, it has a potential hazard classification of ‘high’. Last inspection date is listed as 06/29/2020 (pre-fire) (US ACE 2021).



Post-fire monsoon season caused the reservoirs to become inundated with sediment, ash, and forest debris, severely overwhelming the city's water treatment facilities. This had an acute negative lasting impact on the quality and availability of the city's potable water supply.

Most rainfall occurs in July, August and September, due to the monsoons (NWS 2018).

Peterson (left) and Bradner (right) Dams

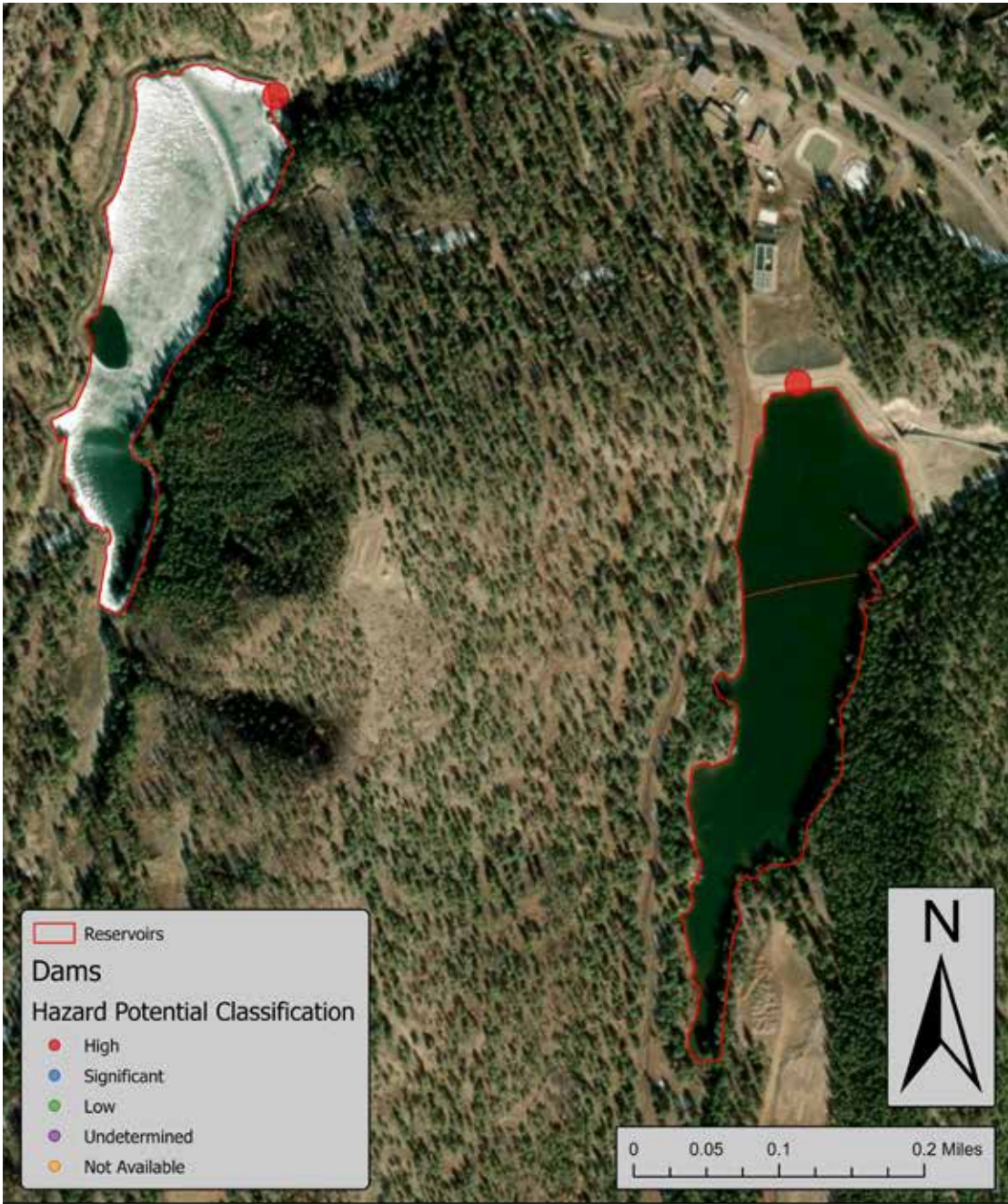


Figure 29: Hazard levels associated with reservoir dams above City.



Bradner Dam (NM00019), completed in 1950, was built on the Lime Canyon waterway and has a maximum storage capacity of 392 acre feet. Normal storage is 300 acre feet. It has a spillway of 34-foot wide, allowing for a maximum discharge of 2,965 cubic feet per second (Brock 2025). Its surface area is 12.8 acres, and drainage area is 0.41 square miles. The dam is 550 feet long and 70 feet high. It has a condition rating of ‘satisfactory’ but, due to its location above the city, it has a potential hazard classification of ‘high’. Last inspection date is listed as 03/18/2019 (pre-fire) (US ACE 2021).

In order to secure clean drinking water to residents, repair to these reservoirs is essential. In August 2024, \$98 million was allocated to design and install a new water treatment plant for Las Vegas. In June 2025, the State of New Mexico entered into an agreement with the City to expedite this project.

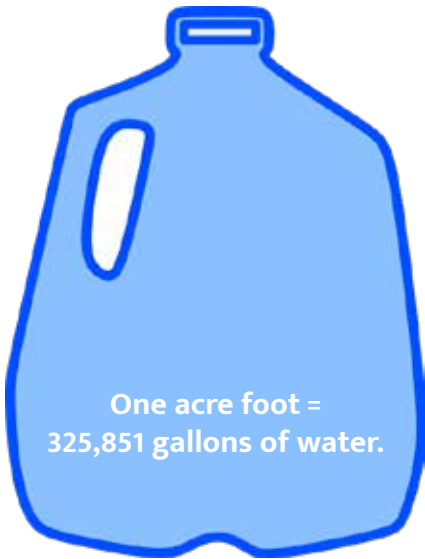
Water Supply

Lakes



Storrie Lake Photo Credit: Joseph Dunkelberger, 2025

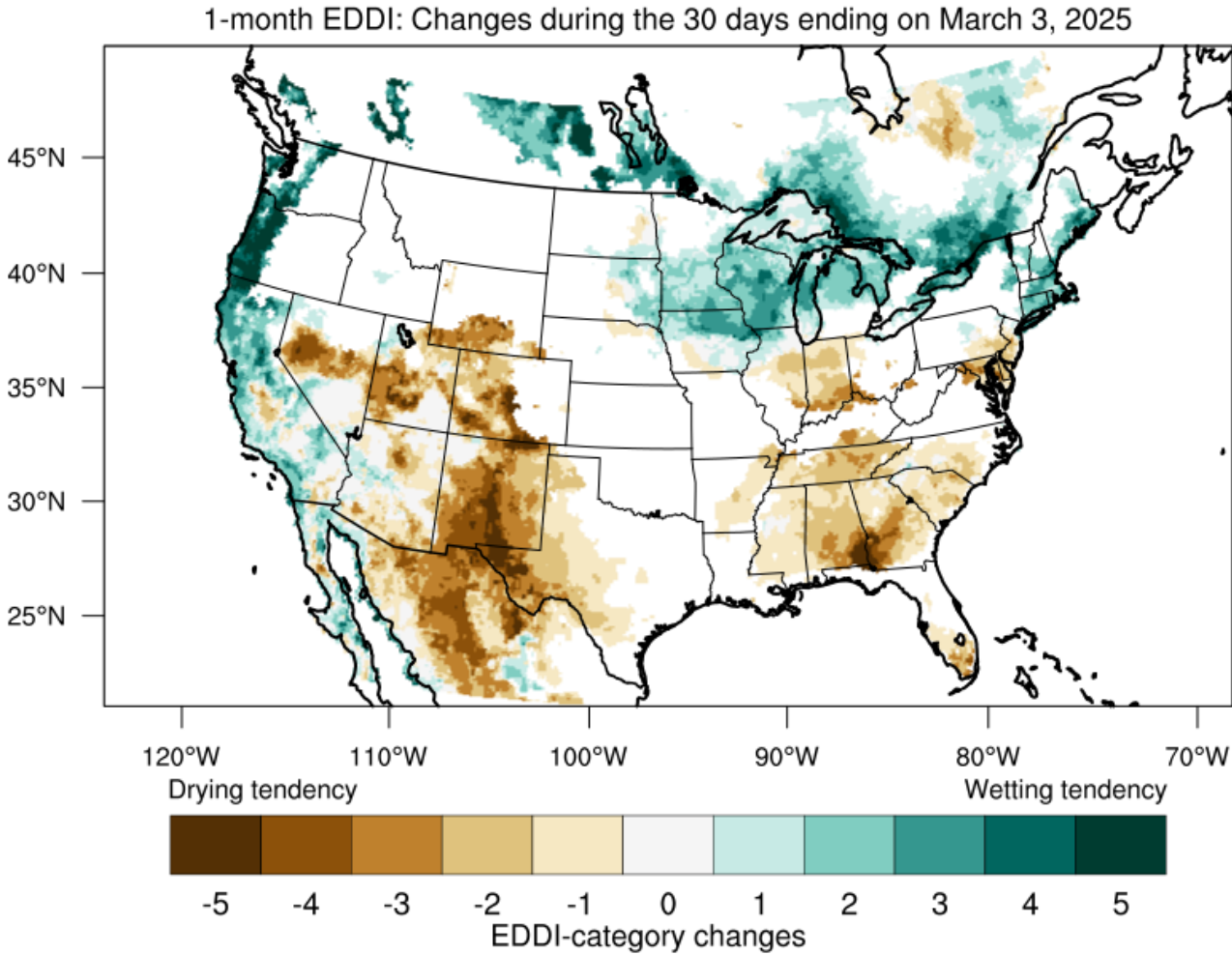
Storrie Lake offers a diversion from the Gallinas River with a maximum capacity of 21,000 acre feet. In Spring 2025, it filled with 717 million gallons of water due to post stormwater runoff. McAllister Lake receives the overflow from Storrie Lake into the Las Vegas National Wildlife Refuge to support habitat and native plants (Scherer 2024).



McAllister Lake Photo Credit: Tom Lamberth , 2025

Aquifers

Aquifers are groundwater sources deep within the rock substrates. Las Vegas constructed the Taylor Well Field to access the aquifer in response to the 1950's severe drought. This provides a supplemental water source when surface water sources are not sufficient (ISC 2016). It sits southwest of Las Vegas near the town of Romeroville and pulls water primarily from the Santa Rosa Sandstone aquifer (Stephens 2005). Aquifer water guides roots deep and supports mature trees. Aquifers should be protected from over-extraction, as over-pumping can increase the chance of sinkholes. Figure 30 illustrates a monthly Evaporative Demand Drought Index map from the National Oceanic and Atmospheric Administration (NOAA). It can be used as a gauge for current drought conditions, which may "offer early warning of agricultural drought, hydrologic drought, and fire-weather risk" (NOAA 2025c), as well as reduced aquifer recharge.



Only regions that start or end above the 70th percentile (i.e., ED0-ED4) are shown.

Generated by NOAA/ESRL/Physical Sciences Laboratory

Figure 30: Aquifers are experiencing lower levels of recharge due to demand and drought.

Water Supply

Impervious Surfaces as Stormwater Collection

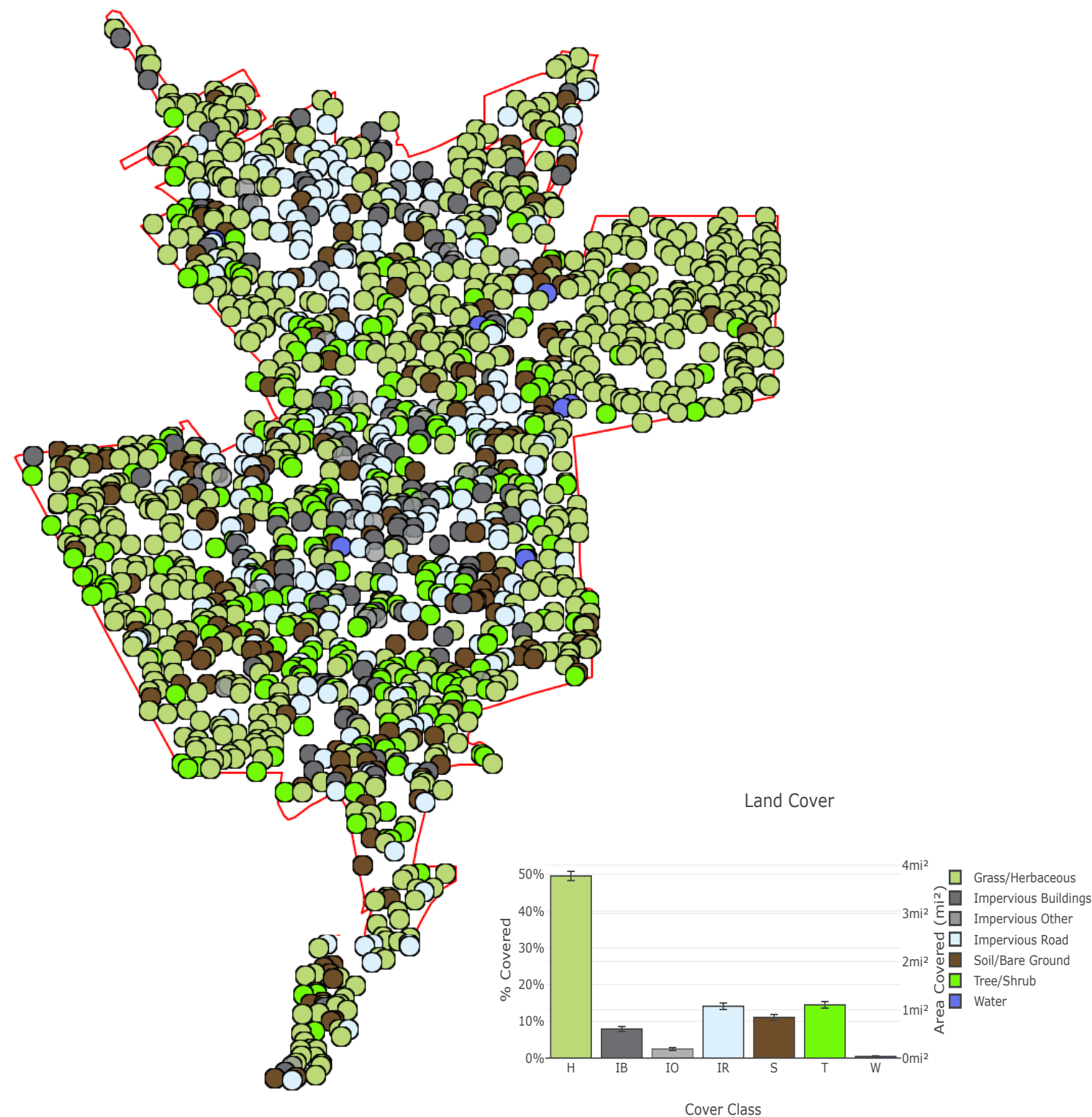


Figure 31a: Sampling points define land cover.

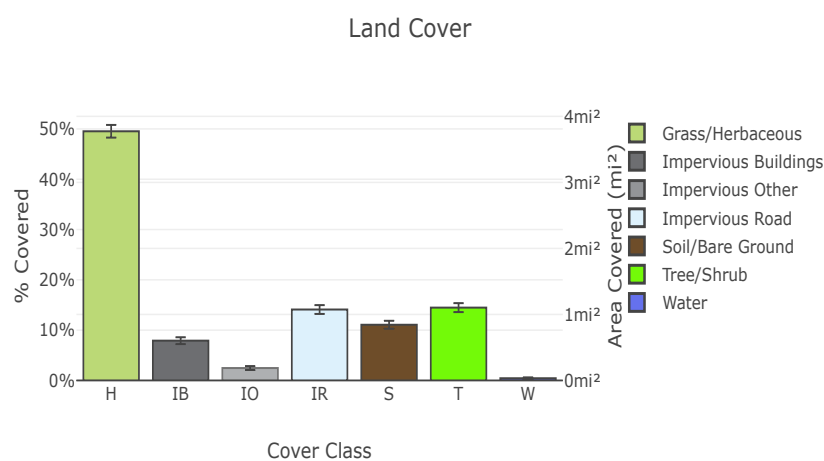


Figure 31b: Land cover data can help plan for the future.

The parks and streets of Las Vegas, NM hold a tree cover of 7.4%. This could be attributed to the number of ball fields in the parks, which do not have trees. This indicates that a large percentage of trees are owned and maintained on private property, as tree cover for the city is 14.4% (iTree Canopy 2024). **Trees** are indicated in **neon green**.

This city wide i-Tree Canopy map shows 1581 points randomly sampled from aerial imagery. The quantity of points provides low standard error, which is between 0.02%- 1.26% for coverage of 6 classes: grass, impervious buildings, impervious road, bare soil, trees and water.

Nearly 50% of Las Vegas has **grass cover** indicated in **light green** which holds stormwater well, provides a nutritious food source for wildlife, and reduces erosion on slopes. **Bare soil** makes up 11% of the land. This should be protected from wind erosion, which increases air pollution. Additionally, these areas may be ideal locations for construction or water harvesting. **Impervious buildings** and impervious roads are areas where water does not infiltrate into the ground, due to the nature of asphalt and concrete. These are places that drain water based on where gutters or canals direct water off a roof and where the slope on asphalt leads rainfall. Grey and green infrastructure can work together to build a more livable city. The **impervious roads** indicated in **light blue** represent the chance to harvest water off streets. These, coupled with impervious buildings and sidewalks, account for the 24.5% or 1.86 square miles or 1190 acres of collection opportunity.

The city-wide tree canopy intercepts between 27.9 - 52 million gallons a year in stormwater, transpires 66.5- 80.9 million gallons per year, and potentially offers 365.4 million gallons of moisture through the combination of soil evaporation and plant transpiration, also called evapotranspiration. Also, 54,574 pounds of air pollution, including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulates less than 2.5 microns and particulates less than 10 microns are also removed, totaling \$18,031 in yearly air purification (i-Tree Canopy 2025, i-Tree Landscape 2025b).

In only one standard rain event of 0.1-inches, these roads and buildings could harness 3.23 million gallons of water!

If the rain event provides 1/4-inch of water, impervious surfaces could help collect 8.08 million gallons of water!

Green Water: Moisture Through Transpiration

Forty percent of all inland rainfall comes from trees (WWAP 2018, 4). This ‘green water’ is created through the process of transpiration. Transpiration occurs when plants exhale water vapor balancing the amount of moisture inside the plant with the air surrounding it. Evapotranspiration includes the moisture that evaporates from the surrounding soil.

The Western Regional Climate Center defines the average prevailing wind direction as south for Las Vegas (2002). This is due to the wind coming from the southwest and then moving around the Sangre de Cristo mountains. This also accounts for the wind carrying dry air, resulting in clear skies with low chance of rain.

Occasionally, the wind also comes from the north or north-northeast (Shoemaker 2010), which often brings rain or snow from the northern Rocky Mountains and Colorado. Meteorologist Todd Shoemaker (2010) has noted during high wind events, the wind originates either from the west, moving across the Sangre de Cristo mountains or from the southwest, moving both through and around the mountains. This wind could carry moisture from the forest trees, as it does from the north.

Now that large portions of the forest west of the city are denuded from fire, it is uncertain whether Las Vegas will continue to receive 16 inches of average rainfall a year or how the forest will buffer wind. Long term observations will help understand how the fire will affect wind patterns and precipitation rates in Las Vegas.

Winter dryness dramatically impacts the chance for spring or summer fires, because cold air does not hold as much moisture vapor as warm air. The lack of moisture vapor in the air is called Vapor Pressure Deficit (VPD). Inland precipitation is prompted by transpiration, and drought causes many trees, such as *Pinus edulis* (Piñon Pine), to close their transpiring pores (stomata). This exacerbates the lack of moisture vapor, suggesting that “wind events and delayed onset of winter precipitation are the dominant promoters of wildfire” (Williams 2019). Before the Hermit’s Peak / Calf Canyon Fire, fuel moisture “stood at 11%, indicating they were primed for a surface fire” (Southwest Fire Science Consortium 2023). While flames consumed the 345,718 acres during the fire, “the region faced critical fire weather on 46 occasions; of these 38 days fulfilled the criteria for Red Flag Warnings” (Southwest Fire Science Consortium 2023).

Trees Give Water

Through interception, reduction of water droplet force, root infiltration of stormwater, and storage, inventoried “trees and shrubs of Las Vegas, NM help to reduce runoff by an estimated 208 thousand gallons a year with an associated value of \$1.9 thousand” (iTree Eco 2025b, p.14), based on the dry year of 2023, when rainfall recorded was merely 10.0 inches.

Trees help not only reduce stormwater runoff, but they also increase air humidity and provide moisture for tree growth downwind. The inventoried trees can intercept 1.16 million gallons of water per year. They transpire up to 6.4 million gallons of water a year, and potentially provide 15 million gallons of water a year in evapotranspiration (i-Tree Eco 2025c). This stormwater truly can become a primary source of irrigation for tree growth, both here and downwind.

Wind carries moisture, making it useful for trees downwind from where it originated. Trees likewise transpire their moisture into the air. This daily feedback loop means that “forests are cloud-makers both from water vapor evaporated from the leaves by day, and water transpired as part of life process” (Mollison 1990). Improving capability for wind driven moisture through transpiration is essential and “may play a larger role for downwind regions than changes in interception” (Wang-Erlandsson 2014). This is a major reason why replanting the burnt forest is so essential. All life that requires water downwind need the forest to survive. It also emphasizes the need to counteract the effects of forest fire in the urban setting, because “drought in one area may relate directly to deforestation in an upwind direction” (Mollison 1990). This is becoming apparent in the urban forests downwind from the burn scar, where brittle branches break in the wind. Urban trees downwind from forest fire need additional care and support.

Designing For Wind

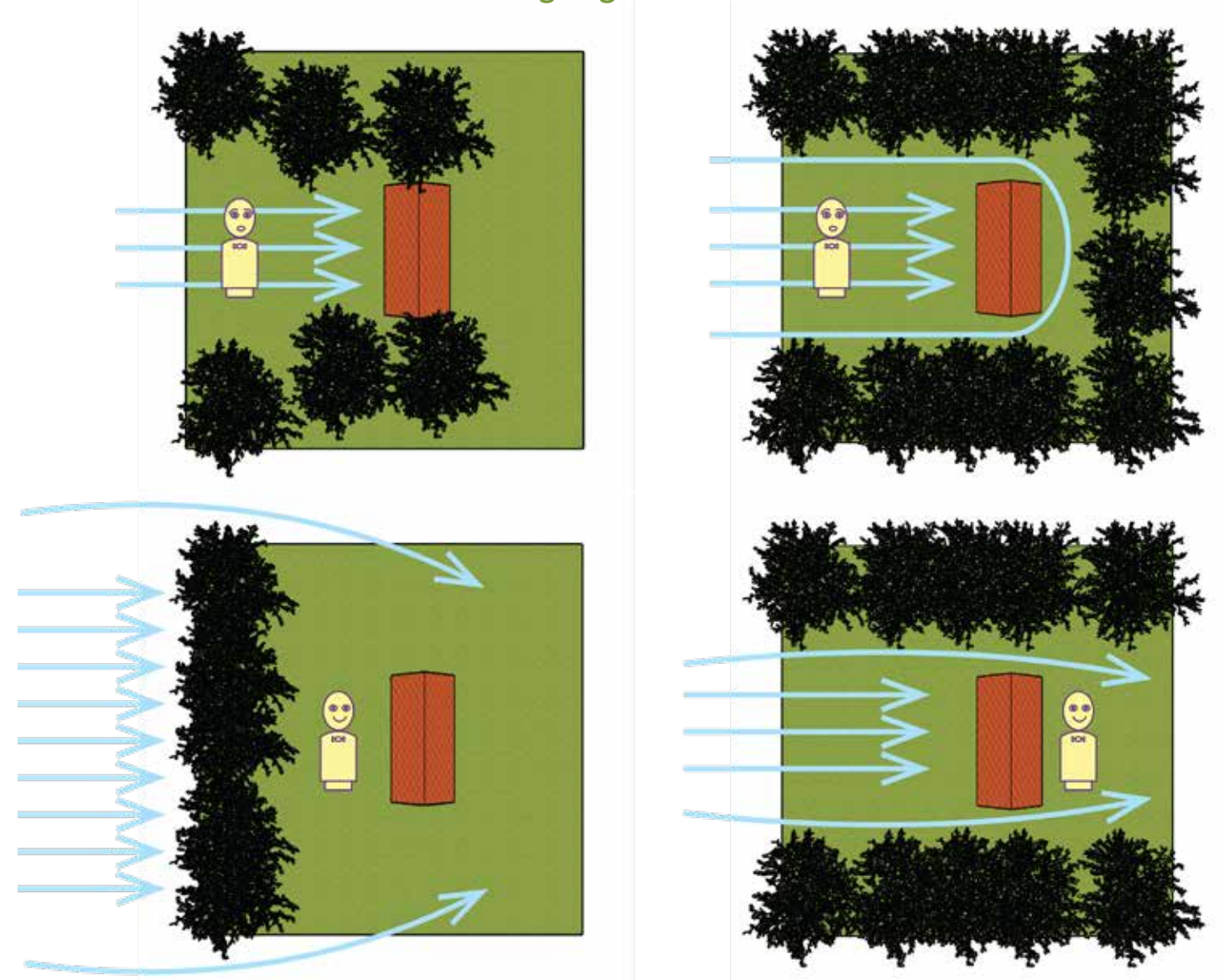


Figure 32: Tree placement influences wind force.

Park Irrigation Plan

Existing Infrastructure

The Parks Division, formed around 2001, manages 23 sites, including parks, sports fields, trails and ponds within the city boundaries. The planted trees, shrubs, flowers and especially the turf require irrigation to survive. The existing irrigation throughout the park system needs extensive updates. The October/November 2024 Park Audit completed by Park Manager Jeff Rudolph indicates that “electrical, irrigation lines, valves and sprinkler heads have been altered and/or eliminated” in nine parks or sports complexes. At least thirteen sites need new controllers, and some require entirely new systems, meaning that limited parks crews are tasked with watering 60% of the parks by hand. Although effluent water is used in some parks, and is absolutely a valuable resource once sanitized, at least six are still using potable water, two of which need the connection in place or repaired.



Improving current infrastructure requires more than just materials. Staff are needed to not only improve the systems but also maintain them. It is clear from the audit that more people are needed on the parks team. Maintaining all 23 locations falls upon four maintenance crew workers. This is insufficient for the amount of upkeep and care needed for the park system to function, and the audit recommends the addition of “four more maintenance workers to the budget” (Rudolph 2024). Training is required in order

to handle more specialized tasks, especially related to tree care and irrigation but also turf and integrated pest management. Additionally, an urban forestry professional or certified arborist as well as a team of three to five irrigation professionals, with two as specialists, would also help foster internal growth in the division. These skilled careers should be reflected in the pay grade assigned to them.

Tool Upgrades for City Parks Division:

- A 10-inch wood chipper
- Two zero-turn grooming mowers
- Three trucks
- A dump trailer or half-caged trailer
- Two mower hauling trailers
- Insulated water truck for hand-watering newly planted trees and winter watering

Good tools make for easier, faster and more precise work. A yearly budget should also be included for the replacement, repair and maintenance of standard hand tools, power tools, and arborist tools. Personal protection equipment, especially chainsaw chaps are essential to providing a safe work environment. Irrigation supply boxes need to be created, and the team needs training to use the supplies. Although the parts are expensive, it will save a lot of water and trees if the team can fix problems with an irrigation system quickly and efficiently. The Parks Division should retain their location in Rodriguez Park in order to have a central locations for their operations. Renovations to this park should include further updates to the Parks Division Headquarters and adjacent yard.

Turf

Currently trees within turf are programmed for turf irrigation. The existing turf is a Sports/ Park Blend of Tall Fescue, Kentucky Bluegrass, and Perennial Ryegrass, which requires additional water since these are cool season grasses. The blend works well for sports fields, but in areas that are not sports fields,

Evapotranspiration rates provided by California Department of Water Resources (QWEL 2018.)

Zone	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7

exploring native, more drought-resistant warm season grasses, such as Texoka Buffalograss or Sundancer Buffalograss may provide the desired effect. The drawback to warm season grass is that they do go dormant and appear yellow in cold months. If temperatures increase to beyond Zone 6, and the site is not too alkaline, trials may offer consideration to Zoysiagrass as a turf option.

Over-spray versus Drip Irrigation

Water needs for turf are very different than the water needs for trees because trees have deeper, longer and larger diameter roots. Many parks rely on over-spraying trees with the same sprinkler system that is used for lawns. This is not allowing for 18” - 24” of infiltration depth. Additionally, over-spraying waters the air first, and a lot of the water does not reach the soil surface.

If sprinkler systems are already in place, sprinklers should be aimed to water the soil, not the tree trunks of the trees. Watering trunks softens the bark, causing the bark to weaken and slough off. Over time, basal crown rot can develop through wood decay, causing pre-mature mortality of the tree.

Drip irrigation is more water efficient than using a garden hose, soaker hose or sprinkler system. It allows for regulating the quantity of water. Additionally, the emitters gradually drop water into the soil, allowing deeper infiltration.

Programming for Drought

Training roots for drought requires watering deeply and widely but not too often. Even turf grass should not be watered every day, unless it is being seeded. Short and frequent watering cycles result in short, shallow root systems, which quickly desiccate when water is not available. Different plants obviously require different watering cycles, and trees should have their own dedicated zone(s) based on size and water requirements.

Watering Mature Trees

Watering for turf is insufficient for mature trees and leads to dying upper canopies. However, excessive over-watering of turf could oversaturate the short root system of the current turf. Because some parks have existing trees and turf, it is impractical to redo these systems, especially in Lincoln, Carnegie and the Old Town Plaza. Once or twice a month, these sprinklers should be run until saturation to allow for deeper tree watering.

One alternative is to place and fill four to six TreeIB 1500 slow watering bags around mature trees 5 times a year as a way to provide deep watering to these trees. These parks would dramatically improve their tree canopy by the use of this system without changing the existing infrastructure.

The formula for assessing quantity of water for a tree based on size (Schuch 2025, UC 2025):

Gallons = Evapotranspiration Rate (ETo) x Plant Factor (PF or 0.5 for all trees) x πr^2 (or radius of canopy in feet x radius of canopy in feet x 3.14) x 0.623 gallons/inches.

Evapotranspiration rates change based on several factors, including sunlight, temperature, humidity, wind, soil exposure and plant density.

Plant Factor accounts for the variability in type of plant. Most trees, especially fruit trees, have the co-efficient as 50%, but very drought tolerant species may have as low as 20% rate. Evapotranspiration rates help guide programming schedules based on how much water specific sites need. Trees should be watered in the evening, as roots uptake water in the evening and transpire during the day. At the very least, do not water between 10am-6pm during the heat of the summer, as a good portion of the water will evaporate during this time before reaching the root system.

Park Irrigation Plan

Programming Schedules

Irrigation controllers can simplify landscape watering. The water quantity formula and evapotranspiration rates help decipher the exact amount of water a tree will need, but in general trees will want about 36-52 gallons per week. At the very minimum, a new tree should receive 6 gallons of water twice a week. Water trees in the evening.

This can be accomplished many different ways. Two of the most common irrigation products are emitters, which regulate by the gallon per hour, and bubblers, which regulate by the minute.

DRIP EMITTERS:

- Step 1: Place two loops of irrigation tubing with emitters around the tree. The first loop should be placed so that water still infiltrates into the existing root ball, and the second loop should be placed at the edge of the basin to encourage outward root growth. Tubing is available with in-line emitters, or these can be added to unperforated tubing.
- Step 2: Connect tubing to main irrigation line.
- Step 3: Program controller for 45-60 minutes, twice weekly.
- Step 4: Cover lines with wood chip mulch. Do not add mulch 6-inches from the trunk.

BUBBLERS:

- Step 1: Lead main irrigation line through a shallow trench to the inside the tree basin.
- Step 2: Connect a riser so the bubbler reaches above the surface.
- Step 3: Add three 1/4-gpm (gallon per minute) bubblers spaced around the tree at least 4-feet from the trunk.
- Step 4: Program the controller for 24-35 minutes twice weekly.
- Step 5: Topdress with wood chip mulch. Do not add mulch 6-inches from the trunk.

New trees need water twice a week through the first growing season because their root systems are small and accustomed to nursery care, and transplanting trees can sever roots and shock the tree. Providing extra care while they are adjusting to their new location will help them settle into the site, leading to more success later.

In the past few years, Las Vegas unfortunately has had extreme water restrictions, preventing even the minimum watering to be possible. This is in large part why the Best Management Practices in the plan dedicate in large part to alternatives and additional practices to make the best use of water for landscapes.

As trees mature, they generally require less frequent but deeper and wider watering. Established trees can receive water once a week for twice as long as young trees, and mature trees should receive deep watering at least once a month. Trees adapted to our semi-arid climate prefer to have their root systems dry out between watering. A general guideline is to “water 2 ft from trunk up to 10 ft beyond canopy” (SFeMTB).

Very large mature trees are not only place makers for a community, but they also offer immense value for livability. These pose particular challenges for watering. Although not requiring frequent irrigation, they should be watered very deeply, with water percolating into the soil under the entire canopy.

Winter Watering

From October until April, irrigation systems are deactivated. Pressure reducers, back flow preventers, valves and irrigation lines should be air blown with a compressor so that water does not freeze in the system causing pipes to break. No lines above the frost line (3 feet) should retain water through the winter. As such, new trees will need to be hand watered during the cold months. A hose with soaker attachment attached to a hose bib, water truck, or underground cistern can direct placement. The standard is to water a tree planted or transplanted within the past year twice a month through two winters. Water established trees once a month, unless they are natives to a depth of 18-24 inches. A moisture meter probe provides a guiding metric.

During severe drought, even native plants could use additional water. Trees have different mechanisms for survival in drought, and overly stressing a tree can lead to compromised growth and premature mortality.

KEY TAKEAWAYS

- The Parks Division needs supplies to work efficiently.
- Calculate how much water your tree needs.
- Watered plants deeply to improve drought tolerance.
- Water trees in the winter.
- Water trees in the evening for better absorption.
- Water new trees twice a week to 18 inch depth.
- Use stormwater & soil building to reduce water needs.
- Do not water tree trunks.
- Trees downwind from fire need care.



CALL TO ACTION

All trees need water in dry winter months.

Irrigation standards

Irrigation systems can vary quite a bit, but some standards are required for even the most simple system.

- Every system should be equipped with a back flow preventer, which prevents water from returning into the pipes. Some hose bibs already have these as part of the assembly.
- Every system should have a controller to program time.
- Any hose attached to a water source should have an end cap, nozzle or shut-off.
- Do not water any zone more than three times a week, even turf grass, unless you are seeding.
- Clearly state or mark in purple any systems using reclaimed water.
- Separate reclaimed water main and potable water by 10-feet.

The public utility monitors for leaks and will send a consumption alert letter if there is a leak. This allows the opportunity to fix a leak before the bill is sent out. If the leak is fixed, the resident can apply for the water credit through the public utility office. Perhaps in the future, the EyeOnWater application may be implemented, where a homeowner can receive a direct alert when a leak is suspected. This application also helps a homeowner better understand how much water is being used.

Additional standards can be found at:
www.harvesth2o.com/adobe_files/LIDS.pdf

Irrigation program adoption

In order for an irrigation program to become adopted by the Parks Division, the infrastructure must be developed. Allocation of funding is recommended to overhaul the existing systems while retrofitting all parks for effluent water use, in accordance with the recommendations in the 2024 Audit. This should be done with the intention to expand valve boxes to include tree-dedicated zones.

Goals for 25 Year Plan

This plan provides several goals for the next 25 years and includes conceptual designs and technique specifications to streamline their route to success. The goals relate to broad impacts, such as the 3-30-300 rule, are guided by best management practices, and at times offer actual georeferenced locations for implementation.

We intend to address state and international goals locally in the Plan through several strategies.

1. Improve the density of trees in the urban area.
2. Improve the diversity of trees in the urban area.
3. Offer lists of trees that are native, adaptable or provide food.
4. Utilize stormwater to grow and maintain trees.
5. Develop strategies to improve walkability as a function of the urban forest.
6. Develop design concepts for the equitable access to green space.
7. Utilize stormwater for the protection against flooding, cleaning of pollutants prior to entering into the river, and for restoring the underground water table or aquifer.
8. Conceptualize the sustainable use of stormwater to improve the health of the existing urban forest.
9. Offer arboriculture and passive water harvesting best management practices for the health and growth of the urban forest.
10. Offer incentives to property owners for stormwater harvesting and tree planting efforts in the private sector.
11. Encourage food forests for local food security.

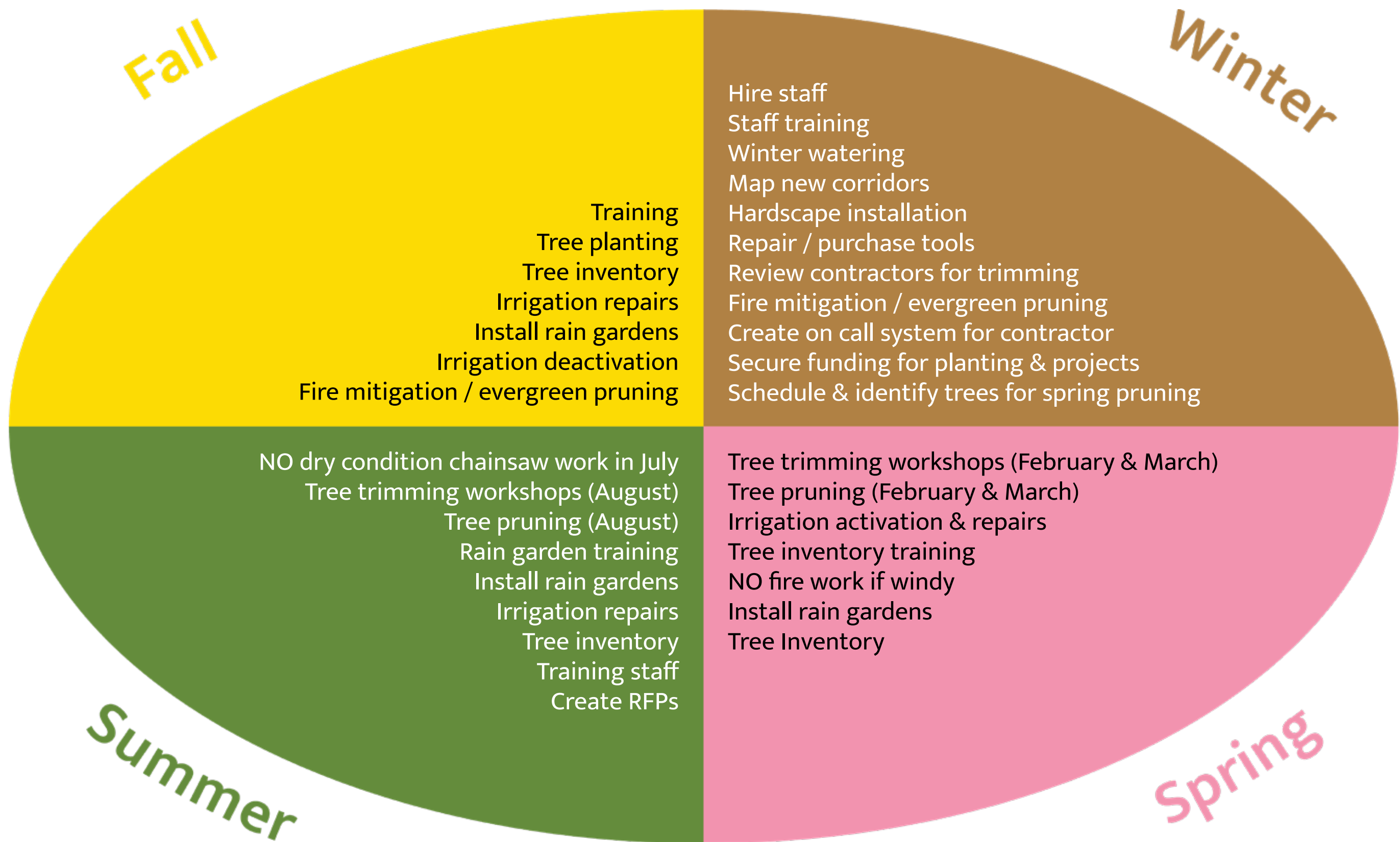
Trees clean air.

Here are some ways that trees support air quality improvement (Novak 2000)

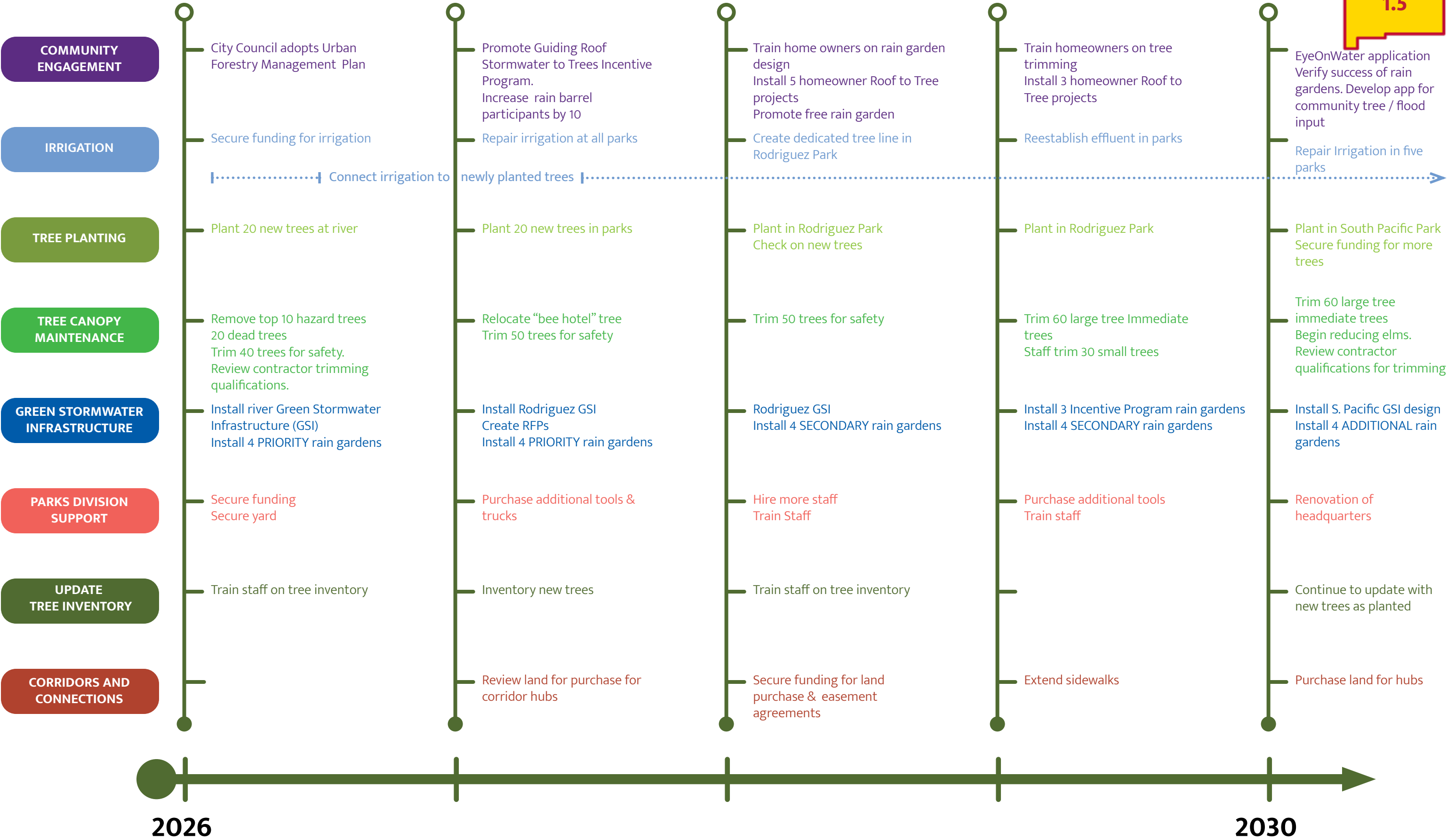
Strategy	Result
Increase the number of healthy trees	Increase pollution removal
Sustain existing tree cover	Maintain pollution removal levels
Sustain large, healthy trees	Large trees have greatest per-tree effects
Use long-lived trees	Reduce long-term pollutant emissions from planting and removal
Use low maintenance trees	Reduce pollutant emissions from maintenance activities
Plant trees in energy conserving locations	Reduce pollutant emissions
Plant trees to shade parked cars	Enhance pollution removal and temperature reduction
Supply ample water to vegetation	Improve tree health
Utilize evergreen trees for particulate matter	Year-round removal of particles



Year-Round Action



COMMUNITY ENGAGEMENT	GOAL: Community feels empowered to plant, grow and care for their trees without taxing the water table. Trees are not topped. People can see 3 trees from their home. STRATEGY: Offer tree and stormwater incentives and train community in rainwater harvesting and tree care.
IRRIGATION	GOAL: Park trees have multiple sources of water, including stormwater, effluent water, and potable water as backup. STRATEGY: Update systems for tree growth and improve use of irrigation resources.
TREE PLANTING	GOAL: Increase tree canopy by 40% to reach a 20% City-wide canopy cover. STRATEGY: Plant more trees and replace dead/dying poor ones.
TREE CANOPY MAINTENANCE	GOAL: Trees are not topped. Trees live longer, have good structure with dense, healthy, canopies. STRATEGY: Create a tree pruning schedule so that each tree is pruned every five years. Teams are trained on structural pruning.
GREEN STORMWATER INFRASTRUCTURE	GOAL: 70% of stormwater goes to system of water harvesting before entering arroyos & river. STRATEGY: Install rainwater harvesting systems to clean water bound for the river to remove sediment and pollutant loads.
PARKS DIVISION SUPPORT	GOAL: Staff trained and have the tools to do the job safely. STRATEGY: Provide Parks Division with operation funding.
UPDATE TREE INVENTORY	GOAL: Tree inventory is a useful tool for efficiency of work orders, funding, and decision making. STRATEGY: Trees are inventoried as they are planted or when trimmed.
CORRIDORS AND CONNECTIONS	GOAL: Residents can access parks and open space within 15 minutes from home. STRATEGY: New pedestrian and bicycle pathways are developed.



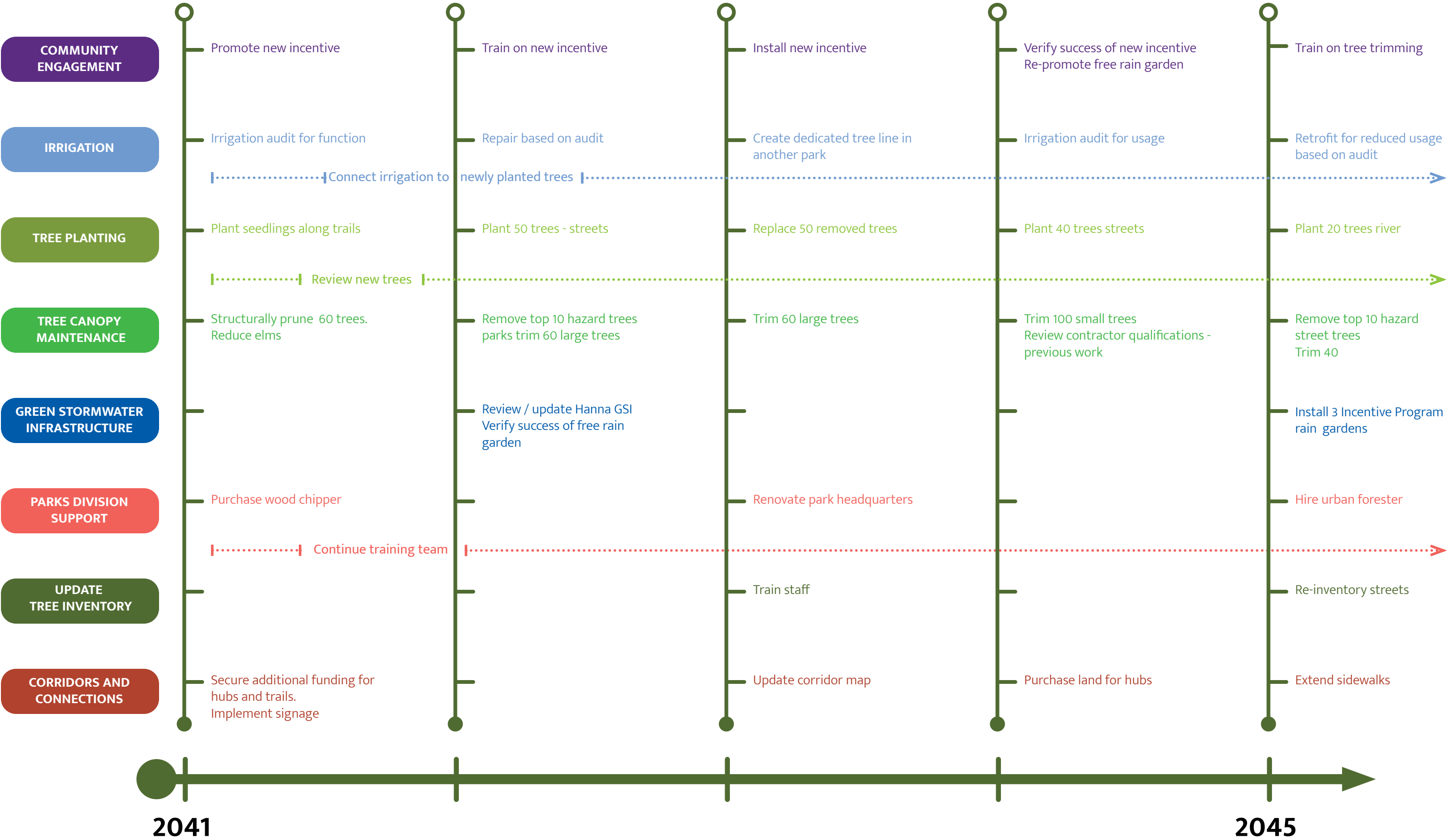
25 Year Implementation Plan Guide, Years 6 through 10



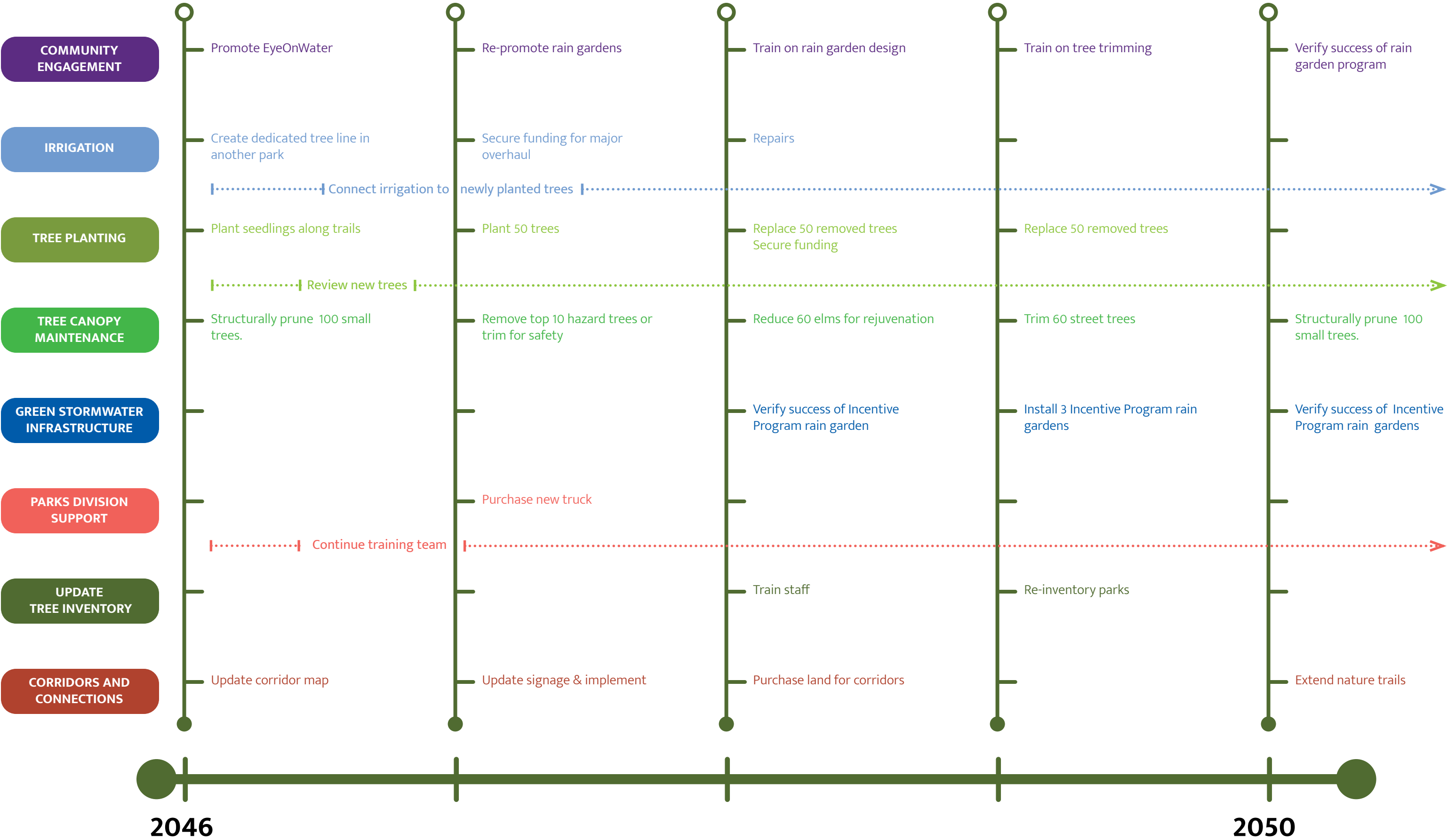
25 Year Implementation Plan Guide, Years 11 through 15



25 Year Implementation Plan Guide, Years 16 through 20



25 Year Implementation Plan Guide, Years 21 through 25



2046

2050

Project Cost Estimate

An initial guideline based on tree inventory data & stormwater opportunity

Natural Resource Projects Cost Estimate for parks & streets (does not include structures or equipment)																							Updated March 12, 2025 by Seeds of Wisdom, LLC	
Park Name	Tree Count	Large tree prune	Small tree prune	Tree Care cost (includes additional to all trees)	Additional Trees	Total new trees	Dead/dying replacement	Poor Replacement	Invasive replacement	Total new and replacement tree cost	Stormwater Potential	Active Water Harvesting Cisterns	Stormwater install cost	Design / Arborist / Engineer cost	Invasive species removal	Invasive species removal cost	Irrigation install or repair	Additional (repair irrigation + walkability + connection)	Connection to effluent needed	Benches, trash cans, tables, signs	Additional component costs	City Pass through cost	Total	
Parks																								
Carnegie	78	31	10	126300	10 large	10	5	19	0	40800	10		90000	9400		0	9000	15000		7	8400	1.2	358680	
Lincoln	101	57	21	207300		5	4	11	0	24000	14		70000	12400		0	4500	15000		15	18000	1.2	421440	
South Pacific	20	7	0	29500	18 large	18	0	1	0	22800	18		90000	18400		0	16200	15000	30000	20	24000	1.2	295080	
Hanna	10	4	3	16600		30	0	0	0	36000	25	2	125000	22000		0	27000	15000	30000	5	6000	1.2	333120	
Riverwalk																								
Gallinas Riverwalk	96	31	0	135100		50	3	13	0	79200	100		500000	76000		0	45000	40000		30	36000	1.2	1093560	
Sports Complexes																								
James Marrujo	69	4	8	53000		20	2	2	0	28800	88		440000	64800		0	18000	25000		40	48000	1.2	813120	
Keyes	78	8	6	68000	22 large, 8 medium or narrow	30	1	6	3	48000	20	2	140000	22000		0	29700	30000		20	24000	1.2	434040	
Richard Padilla Soccer Field (Padilla Sports Complex)	31	20	8	70200		65	0	5	0	84000	45	2	265000	48000		0	58500		30000	40	48000	1.2	724440	
Commerce Soccer Field				0		15				18000	45		225000	36000		0	13500	25000		30	36000	1.2	424200	
Pocket Parks																								
Old Town Plaza+ medians	44	18	10	73400			1	7	0	9600	3		15000	3800		0	0	15000		10	12000	1.2	154560	
Memorial	24	0	3	15000			3	3	0	7200	10		50000	9000		0	0			15	18000	1.2	119040	
El Creston Circle	0	0	0	0			0	0	0	0	15		75000	11400		0	0	15000	30000	12	14400	1.2	174960	
Veterans	16	9	2	32500			2	2	0	4800	10		50000	11000		0	0	15000		25	30000	1.2	171960	
Truder	11	2	0	11600			1	7	0	9600	5		25000	13000		0	0			50	60000	1.2	143040	
Bridge Street Breezeway				0			0	0	0	0	0		0	0		0	0				0	1.2	0	
Lion	14	3	0	15900				7	0	8400	5		25000	9000		0	0			30	36000	1.2	113160	
Pajarito				0					0	0	3		15000	3800		0	0			10	12000	1.2	36960	
Litherland Park				0						0	5		25000	4000		0	0	30000		5	6000	1.2	78000	
Tony Martinez Welcome Center	15	1	2	11900			0	0	0	0	5		25000	8000		0	0	15000	30000	25	30000	1.2	143880	
Locomotive				0		5				6000	5		25000	8000		0	4500	10000		20	24000		93000	
Trails and Open Space																								
City Hall Dog Park	8	3	0	12300			0	2	0	2400	10		50000	8000		0	0			10	12000	1.2	101640	
Rodriguez	148	3	10	98300		100	1	5	0	127200	200	4	1080000	240000		0	90000	320000	30000	500	600000	1.2	3102600	
Harris Pond	52	28	2	101600			0	17	0	20400	30	2	190000	26000		0	0			40	48000	1.2	463200	
Montezuma Pond				0			0	0	0	0		2	40000	20000		0	0			100	120000	1.2	216000	
SUBTOTAL FOR PARKS																								
\$10,009,680.00																								
Streets (stormwater TBD)																								
New Mexico Avenue	69	24	4	102200		0	7	22	0	34800			0	0		0	0			0	1.2	164400		
South Pacific	42	24	3	85800		0	0	15	1	19200			0	0		0	900			0	1.2	127080		
12	9	0	0	5400		0	8	0	0	9600			0	0		0	0			0	1.2	18000		
11	71	19	6	91300		0	5	11	0	19200			0	0		0	0			0	1.2	132600		
10	31	8	6	39800		2	4	7	0	15600			0	400		0	1800			0	1.2	69120		
9	12	4	7	18600		4	0	5	0	10800			0	800		0	3600			0	1.2	40560		
8	181	57	28	256700		41	12	53	0	127200			0	8200		0	36900			0	1.2	514800		
7	149	46	22	208800		38	15	28	0	97200			0	7600		0	34200			0	1.2	417360		
6	122	54	17	211600		0	12	43	0	66000			0	0		0	0			0	1.2	333120		
5*	38	21	2	75700		0	2	3	0	6000			0	0		0	0			0	1.2	98040		
4*	32	17	6	62900		0	1	2	0	3600			0	0		0	0			0	1.2	79800		
3*	44	28	6	97600		0	1	2	0	3600			0	0		0	0			0	1.2	121440		
2*	28	16	2	57200		0	5	7	0	14400			0	0		0	0			0	1.2	85920		
Tilden	16	7	1	27300		1	3	5	0	10800			0	200		0	900			0	1.2	47040		
Jackson	55	21	15	88500		5	9	19	0	39600			0	1000		0	4500			0	1.2	160320		
Lincoln	23	6	0	28800		0	4	28	0	38400			0	0		0	0			0	1.2	80640		
Douglas	107	11	48	101300		11	9	30	4	64800			0	2200		0	13500			0	1.2	218160		
National	12	7	0	24700		0	3	1	0	4800			0	0		0	0			0	1.2	35400		
Columbia	7	0	5	5200		0	1	2	0	3600			0	0		0	0			0	1.2	10560		
Washington	32	18	3	64800		0	7	1	0	9600			0	0		0	0			0	1.2	89280		
Baca	29	3	0	24900		3	3	9	0	18000			0	600		0	2700			0	1.2	55440		
Friedman	20	15	1	49700		2	4	13	0	22800			0	400		0	1800			0	1.2	89640		
PARKS AND STREETS TOTAL																								
8152298510785003482310735772006711436350006840000315900\$12,998,400.00																								

Incentive Programs

Supporting tree planting and water harvesting efforts



Current Incentive Programs

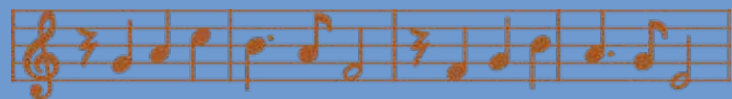
Program	Goal	Qualifications	Requirements	Governing Authority	Rebate	Application	
Rainwater Harvesting	Active Stormwater Collection	Provide copy of warranty deed showing property ownership and gutter installation is present.	- Applications considered on first come first served basis - Cost share is paid 25% by landowner and 75% by Tierra Y Montes SWCD - for materials only - Complete within 60 days of approval - Receipts submitted with project completion notification - Practices must be built to specification and maintained for a period of 5 years or a full refund will be required	Tierra Y Montes Soil Water Conservation District	Cash reimbursement: homeowner pays initial cost and is thereafter responsible for 25%, SWCD pays 75%	For information about the Rainwater Harvesting Program please contact: Arcenio "AJ" Lujan 505-425-9088 ajlujan@tymswed.org	

Proposed Incentive Programs

Program	Goal	Qualifications	Requirements	Governing Authority	Rebate	Application	Additional Information
Guiding Roof Stormwater to Trees	Passive Direction of Stormwater for Tree Growth	Proof of ownership or obtained approval from property owner	- Available planting space with no overhead obstructions - Homeowner must have roof or structure to collect rainwater - Homeowner must construct a guiding system to direct water from the structure to the planting site - System must be approved by governing authority prior to receiving tree - System must be installed within 90 days of application approval, weather dependent - Approval is subject to project feasibility determination by governing authority	TBD	Free 10-15 gallon tree. Homeowner will be given a few options for trees. Priority will be given to sites capable for large shade tree		
Community Rain Garden Incentive	Incentivize residents to harvest rainwater to mitigate issues of arroyos exceeding their capacity and flooding streets as well as grow street trees. Increase walkability by adding sidewalk if possible.	Property owner with minimum 625 square feet bare land adjacent to street and willing to provide the space as a rain garden. Program is especially interested in property along water route to and near arroyos.	- Property owner agreed to proposed changes to land - Property owner must provide proof of property ownership. - Rain garden site should be vacant land adjacent to the street - Property must be owned by requester or by the City of Las Vegas. - Plants will be selected from the recommended plant list and must include at least one tree. - Property owner or resident agrees to irrigate plants in rain garden for the first 2 years. - Property owner or resident agrees to maintain rain garden for the first 2 years. - Rain garden shall be designed to allow water to flow or infiltrate within 48 hours. - Rain water shall not remain stagnant for longer than 48 hours.	City	Incentive to obtain a no cost rain garden	TBD	City will provide initial design & installation of rain garden (plants, mulch and any infrastructure changes to curb) and property owner will provide irrigation for the first two years minimum for establishment.
Tree Trimming Classes	Educate residents on tree trimming techniques that sustain a health tree	None	None	Tree Board	Free	Sign up via email	A tree board member or representative will provide tree trimming classes in the early spring and late spring. Classes are free to attend and are meant to educate homeowners and tree care professionals on proper pruning techniques.

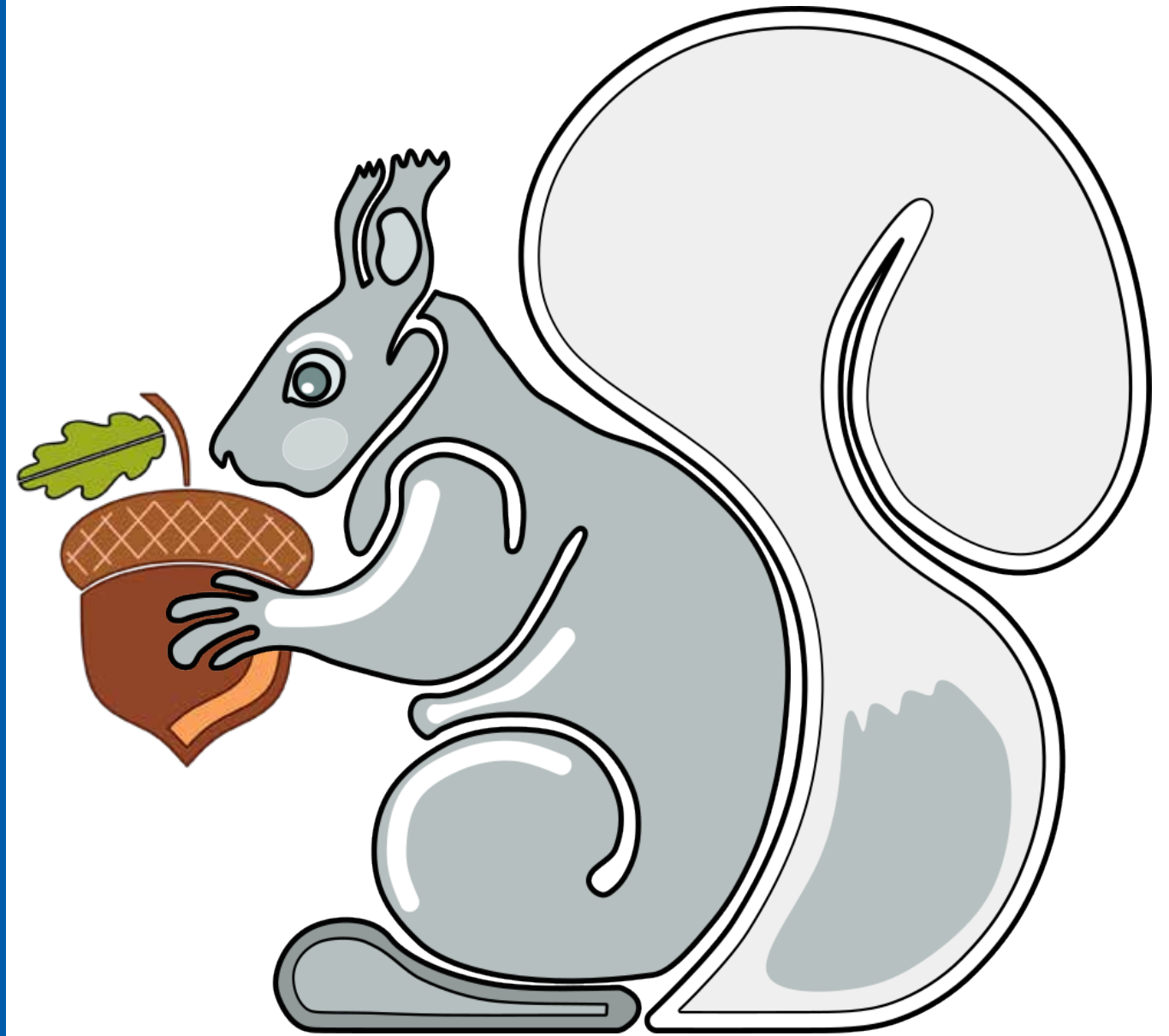


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*"Days that are full of heart-dreams,
nights when the moon hangs low;
Beaming its benediction,
o'er Nuevo México.
Land with its bright mañana,
coming through weal and woe;
State of our **esperanza**,
is Nuevo México.*

*O fair New Mexico, we love, we love you so
Our hearts with pride will o'erflow, no matter where we go,
O fair New Mexico, we love, we love you so,
The grandest state to know,
New Mexico."*



Hope

Tree Diversity

Present Care and Future Hope

A major goal of the plan is to develop standards for care of our trees. Although we focus primarily on parks and streets, these standards will hopefully permeate into the private sector, where the majority of urban forest trees reside. The reason for standards is simple. We may feel good will toward a tree, but without knowing the basics of care or understanding the impacts of our care on future health, it is easy to cause trees to decline early. This prevents them from reaching full maturity and providing ecosystem benefits. The estimated “life expectancy of trees in cities is 7-28 years” (Moomaw 2023). This is often due to poor selection, soil compaction, poor watering regimens, and damage, especially by weed-wackers, which often cause girdling of trunks, as well as poor pruning.

Trees are not easy to grow. From whip to street tree, a nursery needs to care for a tree for about 5 years. As such, they should be treated well during planting, removing girdling roots that will cause suffocation, watered appropriately so their roots expand outward, and protected from harm. We need to plant trees, but we also need to care for existing ones. Established trees should be allowed to reach full maturity, for their own right as well as for all who live around them. In the southwest, this means that roots must have access to stormwater. Through this plan we are providing many ways that stormwater can be integrated into design for infiltration.

Trees should be integrated into planning decisions. They should be recognized for the services they provided, and incorporated into plans. Trees help absorb stormwater; storm drains should be placed after a grouping of trees, instead of before them. Utilizing stormwater, trees can absorb what they can, overflow can drain toward subsequent trees.

Trees provide shade, protecting against the afternoon sun. Benches and walking paths should be placed

east of where a tree will send shade on a hot summer afternoon. Trees provide privacy, so they can be implemented where neighbors want a buffer from a soccer game. Trees clean air. They could be planted to protect playgrounds from car exhaust. They reduce heat, and if given space to grow, could be placed on the west side of buildings to increasingly offer respite on hot days. In order to plan for trees, and for the size they will become, urban foresters should be included in the City decision making process. We offer in this plan some locations where trees and stormwater harvesting are necessary. We also present simple low-impact strategies for guiding and improving stormwater retention. We hope that this will encourage future building planning to incorporate some of these same methods.



A Diverse Canopy

Developing a diverse canopy provides many benefits, including the protection of tree canopy in the event of a pest outbreak, root fungal infection, or due to changes in climate. Some genera may be less adapted to drought; others to flood. Over the decades, we have seen several types of trees perform better or worse depending on the winter cold or snow pack. By utilizing a broad palette of native and adaptable trees, the canopy is less susceptible to adverse conditions.

Design can be improved by studying, understanding and applying traits of trees in our community. Some, but not all, will do well in particular situations or will meet a specific criteria. For example, Bur Oak (*Quercus macrocarpa*) can withstand street pollutants and can be inundated with flooding as well as drought, making it a good option for inclusion in a rain garden. By knowing the particular nuances of different trees, we can make informed decisions of where they will thrive.

Different species also support different wildlife. Some birds have beaks that are just right for cracking a particular nut. Some butterflies emerge just as certain pollen typically becomes available. As land stewards, supporting diversity in the urban forest means that we are retaining or creating habitat conducive to supporting wildlife in its myriad of forms.

Simpson Diversity Index

Quantifying diversity helps make informed decisions about future planting & development projects. One method is the Simpson Diversity Index used to calculate smaller geographic scales. This recognizes and can be used to compare diversity between sites. For example, retaining native species along our riparian corridors is especially important, partially due to seed dispersal as well as native wildlife support. As such, utilizing the Simpson Diversity Index may be a good diversity indicator strategy along the river.

As example, Rio Grande cottonwoods (*Populus deltoides* var. *wislizeni*) are short lived trees unsuitable as street trees, but they do well along riparian corridors. These iconic natives, along with several other poplars, are well suited along the Gallinas River but not in the dry mountain ranges. The Salicaceae family also includes willows, so according to this index, we would calculate diversity based on the species, such as, *Populus deltoides* (Eastern Cottonwood), *P. fremontii* (Fremont Cottonwood) *P. wislizeni* (Rio Grande Cottonwood), *P. x acuminata* (Lanceleaf Cottonwood), and *P. angustifolia* (Narrowleaf Cottonwood), as well as several species of willows, such as *Salix gooddingii* (Gooding’s Willow) and *Salix amygdaloides* (Peachleaf Willow). Including *Acer negundo* (Box Elders) into the corridor will further increase diversity at the family level within the riparian zone.

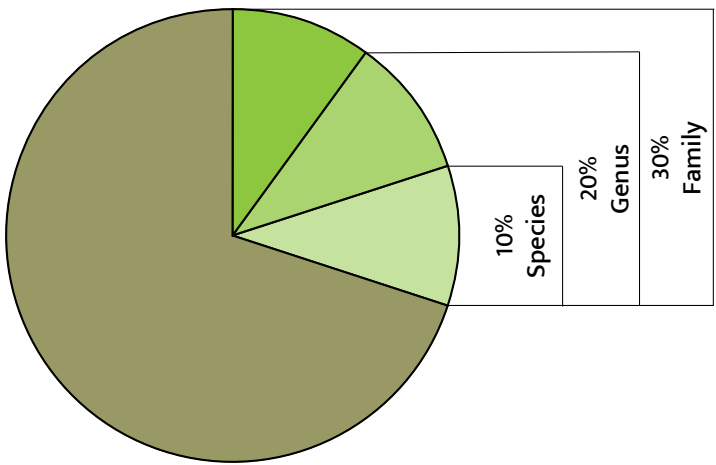


Figure 33: Diversity percentage guide..

10-20-30 RULE

Recognizing the value of diversity in the landscape, urban foresters created a guideline 45 years ago called the '10-20-30 Rule.' This states that no species should represent more than 10% of the canopy, no genus should represent more than 20%, and no family of trees should represent more than 30% of canopy structure. Recent studies recommend this be evaluated at the neighborhood level of 0.4 square miles (Irwin 2023), which would more accurately reflect diversity throughout the city.

KEY TAKEAWAYS

- Plant the right tree in the right place for the right reason in the right season.
- Caring for trees ensures future trees.
- Follow the plant hardiness zone.
- Different trees need different conditions.
- Different trees support different wildlife.
- Diversity of trees provides more benefits.
- Diversity of trees protects against threats.
- Plant trees that do well but are few.
- Larger trees provide more shade.
- If the space is large, plant a tree that will grow large.
- Do trials of new species; they may be future champions.
- Create a State of New Mexico Climate Ready Demonstration Site (see appendix for experimental tree list).

Tree Diversity

Aging Elms

The Elm family (Ulmaceae) includes Siberian Elms (*Ulmus pumila*), American Elms (*Ulmus americana*), a variety of hybrid elms, and Japanese Zelkova (*Zelkova serrata*), which are showing adaptability to drought. Many American Elms in the eastern United States succumbed to a fungal infection called Dutch Elm Disease, which was spread by the European Elm Bark Beetle (*Scolytus multistriatus*). Luckily for New Mexico, this disease has not been confirmed here (Sutherland 2006). However, our aging American Elms are declining due to drought and European Elm Scale (*Eriococcus spuria*), a white scale insect that secretes honeydew, supporting the growth of Sooty Mold on the trees. This is most prominent where large numbers of trees are planted together, allowing the insect to go unchecked, a common issue with a lack of diversity.

Siberian Elms (*Ulmus pumila*) are widespread, and “management...should be determined at the local level, based on feasibility of control and level of infestation” (Witte 2020). Of the 741 Siberian Elms, 314 are in fair condition, 315 in poor condition, and 67 are dying. While they resist drought, they kill off limbs to live during difficult times. This makes for an unsafe tree along streets and in parks.

An appropriate action plan may include reducing the size of trees through structural and reduction pruning, plant new trees nearby (that do not reside in Ulmaceae) and begin removals after new trees are established.

As part of a full circle management plan, the salvaged wood can be used in urban wood projects. Utilizing strategic urban forest management methods like these, canopy diversity can be improved without impacting shade in public areas. In this way, the diversity of species can be improved without impacting the availability of shade.

“All over town Siberian elms are aging out and should be replaced.”

- Las Vegas Community Member Response

Trials

Reaching the 10-20-30 Rule can be accomplished within the next 25 years by utilizing the i-Tree generated reports from the tree inventory to examine what trees are doing well but are underrepresented in the canopy.



Another approach is to plant trees in small numbers as trials, taking into consideration where they will most likely succeed. For example, the Mesa Glow Maple (*Acer grandidentatum* JFS-NuMex3) is a bigtooth maple that was selected by Rolston St. Hilaire of New Mexico State University for its alkaline soil tolerance. This native cultivar may be a good option for an east or north face where bright fall color is desired.

The State Forestry Division supports this effort through its Climate Ready Trees Program. For more information visit:

<https://www.emnrd.nm.gov/sfd/urban-and-community-forestry/climate-ready-trees/>

USDA Plant Hardiness Zones

Temperatures in the cold semi-arid desert (CEC 2025) often shift 30°F per day, due to cloudless nights which allow for heat to escape into the atmosphere, the lack of humidity, and sandy soils. Over the last several decades, the temperature lows and highs have shifted as well. In Las Vegas, 90°F in July used to be a quick anomaly before the summer monsoons. Since 2020, temperatures have exceeded 90°F several times and in at least three summer months.

In the past, winter temperatures easily dropped below -10°F for several days a year, with some night lows under -20°F. Now these are uncommon. Feb 3, 2011 was the recorded low of -23.1°F. In 2023 winter temperatures did not drop below 0°F at all.



Figure 34: Winter extremes determine plant zones.

Although climate change is pointing to warmer temperatures, there will still be fluctuations. For instance, January 21, 2025 nighttime temperature dropped to -11°F (Weather Spark 1940-2025).

Although this was only for one night, it complicates plant selection. Trees need to be able to withstand multiple summer months with 90°F, yet resist winter frosty nights. In 2023, local weather stations guided the national USDA Plant Hardiness Zone map update. Las Vegas, NM has been set to 6A-6B zones, which allows for dips to -10°F. For success, you can plant “a tree that is hardy to your zone or three zones colder” (Poizner 2024), as long as the tree species can also handle potentially 100°F in the summer.

Microclimates

Microclimates are sites that differ from the surrounding climate, due to elevation, wind, shelter, moisture, vegetation, or season. These make it possible to grow trees outside of the current zone and lead to more diversity in the landscape.

Monitor trials for success as these may drive future planting projects. For example, a tree suitable to a warmer climate may be adaptable to Las Vegas if it were surrounded by concrete (urban heat island effect), or near a south or west facing wall (radiant heat), or protected from wind in a sunny courtyard.

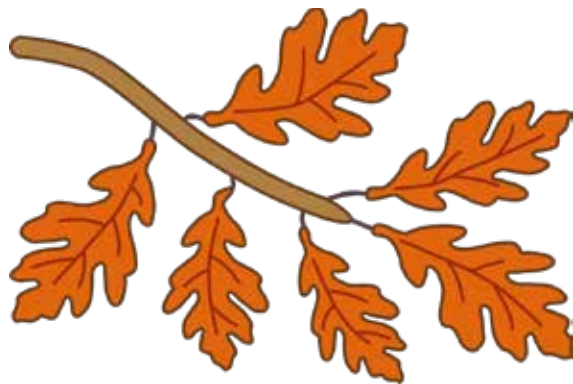
Trees suitable to a colder climate may still succeed in Las Vegas if planted in a cool corner of a courtyard, where north facing walls prevent sun exposure, or sheltered under the canopy of other trees, as these help cool the surround area and help hold moisture in the soil.

Las Vegas is in the plant hardiness zone of 6A-6B. Temperatures may still drop below -10 degrees Fahrenheit.

The 3/30/300 Rule

Space for trees to grow

By designing planting basins wide enough to harvest stormwater, they will be able to support tree growth. This will help trees mature, which in turn will benefit the entire city. Trees need non-compacted soil. A tree that has 1500 cubic feet of non-compacted soil is much more likely to survive (MacDonagh 2016). This equates to a 25 foot by 25 foot square, or the space under which a mature tree’s canopy will reach (Landcaster 2008). Even a small tree requires at least 300 cubic feet of soil volume, and a medium tree requires 600-1200 cubic feet. Most current sidewalk designs along streets do not provide adequate space, which contributes to urban tree decline. Most current sidewalk designs also lack curb cutouts, preventing water from entering the planting basin.



Rain Gardens can be integrated into street design along stormwater corridors before the water enters into the arroyos and storm drains. They should allow for a minimum size of 625 square foot basin to hold at least one tree. An Americans with Disabilities Act compliant sidewalk can be along the inside of the rain garden, perhaps including a gentle meander for aesthetics as well as to allow for space for the tree to branch. This basin not only cleans water and grows a tree, but it also allows people to enjoy walking along a sidewalk that is separated from vehicle traffic.

Green visibility, availability, and accessibility

The 3-30-300 rule addresses the need for trees for all the values they provide: around the home, within the neighborhood, and as an easily reached destination. It references “green visibility, green availability, and green accessibility” (Zheng 2024), stating that 3 trees should be visible from a home or office, each neighborhood should have 30% canopy cover, and accessible green space should be 300 yards from a home. By utilizing this as a reference and guidepost, planning becomes more straightforward.

The results of implementing the 3-30-300 rule allow for exposure to nature in three ways “(1) opportunities to see urban nature...(2) exposure to green spaces by living amongst trees and other vegetation; and (3) opportunities for accessing and using parks and other green spaces for recreational purposes” (Konijnendijk 2022). By incorporating trees into the landscape, especially where streets become inundated with stormwater, trees can help absorb the rainwater. In a three city study by Gianni Vesuviano and others, converting land cover drastically improved stormwater retention. They state, “The maximum percentage peak runoff rate reduction achieved in each study area was 73-75%, in places where an effectively impermeable land-use class was transformed to trees” (2025).

By incorporating new open spaces within 300 yards of people’s residence or work, neighborhoods would have more access to green space, while at the same time “may act to ‘equalize’ flood risk across neighborhoods and reduce total city-wide flood risk” (Vesuviano 2025). This is a major discovery in the effect of implementing the 3-30-300 rule and points to the how trees can make major contributions to issues that are directly affecting the livability of residents in Las Vegas.

Trees per acre by park

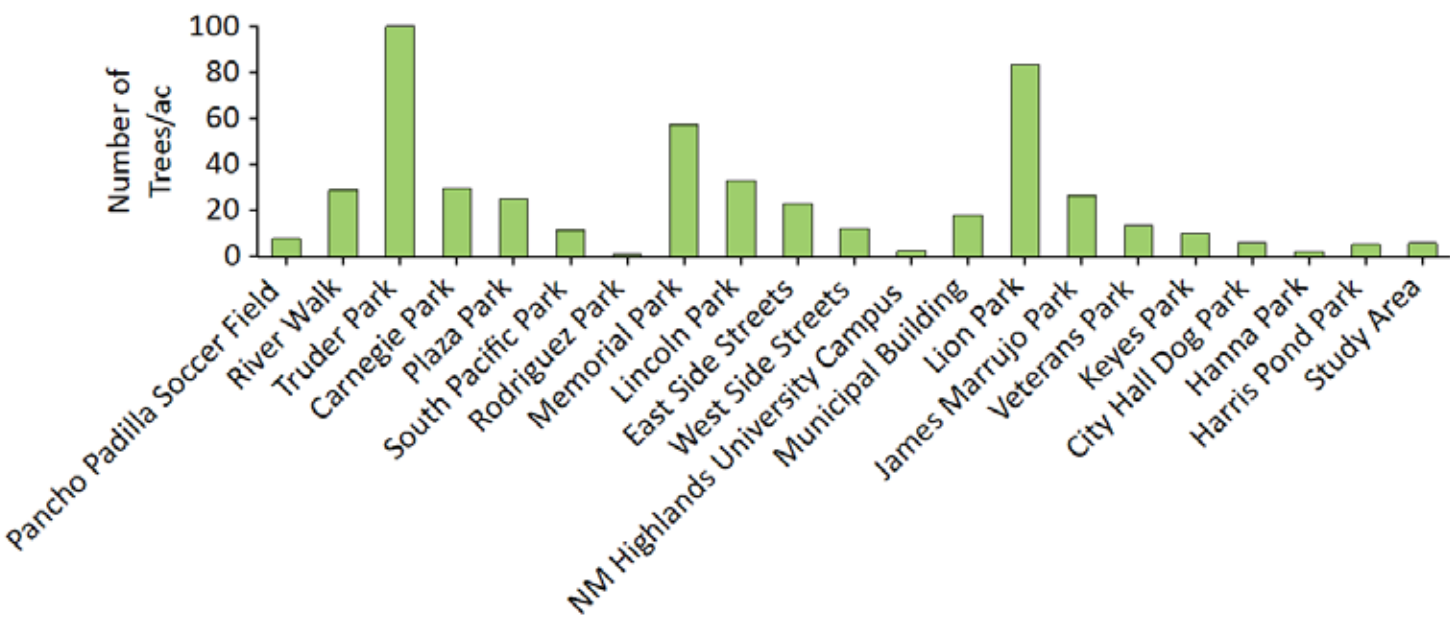
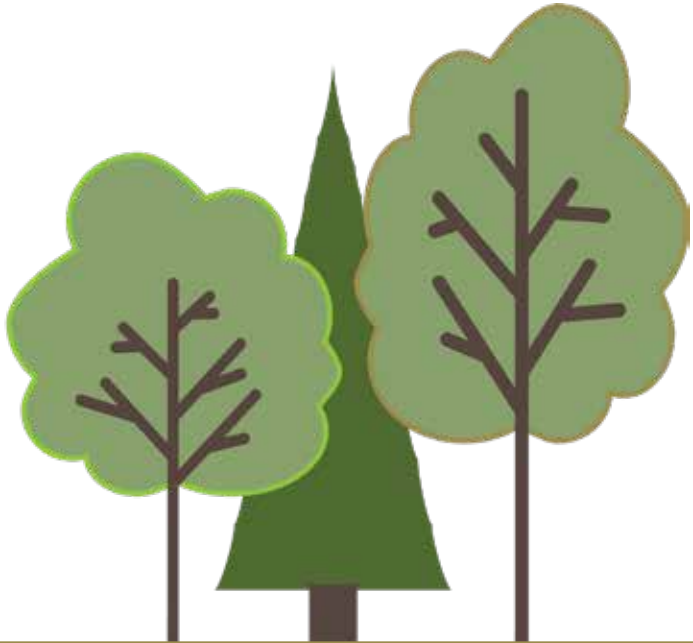


Figure 35: Summary of shade distribution within each park in trees per acre. See ‘Tree Condition by Park’ in appendix for more information.



The 3/30/300 Rule

3



3 trees
visible from every home

30



30% canopy cover
in every neighborhood

300



300 yards
from the nearest park
or greenspace

Snags

Snags, also known as standing dead trees, provide habitat and food for different species of cavity nesting animals. Snags offer soft, decaying wood in which animals can hollow out homes or predate on insects taking advantage of the dying tree. They offer places to perch via dead branches where birds can observe the surrounding environment. (Trees for Wildlife 2023).

In the urban setting, snags provide animals with housing and food they otherwise may not be able to access. They attract woodpeckers who make an initial hollowed out cavity in search of food (Harmon 1986). Holes are then taken up by secondary cavity nesters such as bluebirds and owls (Tree Care for Birds 2021).

Retaining a snag requires a well trained professional who will make decisions based on risk, type of tree, likelihood of failure, and consequences of failure. A site evaluation will determine if targets such as people or structures prevents retention of the snag.

Snags form naturally when a tree of at least 15 inches diameter dies. An arborist removes most of the vertical branches and trunk of a tree (American Arborists 2018) leaving behind a tall stump. Retaining the lower 15 feet safeguards cavity nesters from predators (Washington Department of Fish & Wildlife 2019) while generally keeping failure more predictable. Snags can also be created by topping in appropriate cases. Topping is only used when the tree is already dying. As evergreens do not grow back if there are no live needles, topping is appropriate for creating these snags.

Although mechanically girdling the trunk by removing the cambium layer just inside of the bark also creates a snag, girdling compromises structure, causing the tree to break where the girdling occurred, shortening the snag's lifespan and reducing the cost effectiveness of creating the snag (McComb 2016, 173).

Another aspect to consider is the distribution of snags. Clumping snags together can incite territorial animals to exclude the same species from using nearby snags (McComb 2016, 172). However, where many trees have died, retaining several snags helps support an existing population of cavity nesters. Keep in consideration areas of high traffic and snag distribution; in the urban environment a compromise must be made between distribution for wildlife and the safety of people (McComb 2016, 184).

Tree species should be a leading factor when deciding which dead trees to leave as snags. For example, the Juniper Titmouse (*Baeolophus ridgwayi*) creates a cavity nest in larger junipers. Slower rotting trees, such as these, will have the greatest benefit to the environment, providing habitat and food for many animals, insects, plants and fungi. Trees that rot quickly, such as cottonwoods and other poplars, do not provide longterm benefit as snags. Unless they are very wide, and can be left to fall, they may not warrant the financial cost of retention. For municipalities, it may cost the same amount to take down the entire tree.

Staggering snag retention over time offers the opportunity to continually retain some trees across the city, in various stages of decay. These decisions can be made during tree care maintenance.



Dead trees become homes for birds, small animals and insects.





El Campesino
Peter Lopez, 2013
Carved Tree Sculpture
Las Vegas Plaza

Waste as Resource

The core value of urban wood lies in sustainably making use of wood from local dying trees. Instead of contributing to landfill volume or atmospheric carbon, fallen trees can be re-purposed into local products. This helps the city save on disposal costs, generate revenue, and preserve embedded carbon. Also, quality wood procurement has become dependent upon healthy trees in other regions. A hyper-local model protects small businesses from global supply chain issues.

Urban wood systems bring community-wide benefits. They create local jobs in tree services, saw-milling, woodworking, and retail. Training programs can especially support those looking to expand career options. A shared workspace - such as a sawyer yard or maker hub - could be located on city-owned land such as a back lot at Rodriguez Park. This would reduce startup costs and encourage micro-enterprise growth.

Other cities and tribal communities offer successful examples. The Baltimore Urban Wood Project, supported by the USDA, reclaims wood from deconstructed homes and public trees, turning them into home goods through partnerships with retailers like Room and Board (Galvin 2020). In northern New Mexico, the Picuris Pueblo produces high-quality charcoal from fire salvage timber (TSS Consultants 2017). Las Vegas could use similar models, developing a system led by the City's Parks and Solid Waste Divisions to manage wood recovery, sorting, and processing.

Education and workforce development are essential to this plan. Luna Community College has trades training programs and woodshop facilities. New Mexico Highlands University offers fine arts instruction, and Las Vegas high schools have Career Technical Education (CTE) programs. These institutions can collaborate on mentorship programs, connecting students with experienced woodworkers and using urban wood as the central material.

Challenges include misconceptions about less popular woods like Siberian Elm. Outreach and demonstration projects showcase the viability of these resources. Though startup funding is needed for equipment, insurance, and space, cooperative ownership models and partnerships with existing organizations, such as the Northern Area Workforce Development Board and NMSU Extension Service, can help.

The University of New Mexico's Bureau of Business and Economic Research (BBER) can be commissioned to conduct an economic feasibility study to assess the long-term viability of an urban wood economy in San Miguel County.



Siberian Elm End Table
Matthew Ellis , 2022
Crafted from tree - Santa Fe River Park, NM.

"Nationwide, dry weight biomass from discarded urban trees has also been estimated at 22.2 million tons per year". (Nowak 2019).



Cottonwood Turned Wood Bowl
Gwen Muchmore, high school student project, 2022
Crafted from tree - Cornell Park, Santa Fe, NM.

Ultimately, an urban wood initiative in Las Vegas could turn waste into wealth while celebrating traditional values of sustainability, craft, and local self-reliance. With strategic planning and community investment, this model can create a resilient and distinctly Northern New Mexican economy rooted in tradition and innovation.

Recommended Tree List Utilization Instructions

The Recommended Tree List was created to guide the city, residents, and developers with proper tree selection. The list includes two sections: Deciduous Trees and Evergreen Trees. Each section has at least 20 categories to align with the International Society of Arboriculture's adage 'Right Tree, Right Place, Right Reason.'

Some categories are self-explanatory, while others may seem unfamiliar:

- **Experimental:** Tree species are not widely planted across Northern New Mexico but offer unique characteristics suitable for the urban environment. These may also be Climate Ready trials currently suited for warmer regions.
- **Sizable Culinary Fruit:** Fruit from tree is edible for humans, abundant enough to harvest and at least an inch in diameter. Many trees on the Recommended Tree List produce edible fruit and have been used by humans for time immemorial but do not meet the size or abundance described for this category.
- **Regionally Native:** Trees indigenous to San Miguel County, Northern New Mexico, and nearby surrounding states. These plants have evolved with local pollinators, animals and climate conditions to be resilient, which help rebuild the seed bank in sensitive areas.
- **Firewise:** Trees have fire-adapted characteristics suitable for urban environments. Firewise plants have high moisture content, high rates of re-establishment post-fire, open branching structure, low vegetation volume, and low resin. They also may have natural adaptation to low intensity fire.

Note on species selection: Some species that have not been included, such as the Engelmann Spruce (*Picea engelmannii*), Colorado Blue Spruce (*Picea pungens*) and White Fir (*Abies concolor*). These species are common in this area, but they are beginning to struggle with current climatic conditions. Their future survival, especially in urban environments, is cause for concern. Please continue to care for them if currently existing on or around your property.

In the interest of canopy health, certain species and cultivars that are adaptable to the region, but not native, have been included.

Additionally, Top Tree lists provide quick references for specific site constraints.



Recommended Tree List - Deciduous

(updated 2025)



Botanical Name	Common Name	Water Needs (Very Low, Low, Medium, High)	Pest/ Disease Potential	Alkaline Sensitive	Needs afternoon Shade	Needs Full Sun	Experiment (Test for success)	Sizable Culinary Fruit	Shade Tree	Street Tree	Narrow & Upright	Lowest Water Use	Firewise	Lowest Maintenance	Riparian	Regionally Native	Powerlines	Rain Garden	Preferred Urban Wood	Height x Width (in feet)	Comments
<i>Acer platanoides x truncatum</i>	Hybrid Norway Maple selections	M/H	☐	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	25 x 30	'Urban Sunset' cultivar for street tree potential. Fast growing.
<i>Acer ginnala</i>	Amur Maple	L/M	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	15 x 15	Good drainage needed.
<i>Acer glabrum</i>	Rocky Mountain Maple	M/H	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐	☒	10 x 10	Tolerates cold, may scorch in full sun
<i>Acer grandidentatum</i>	Bigtooth Maple	M	☐	☒	☒	☐	☒	☐	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☒	20 x 15	'Mesa Glow'
<i>Acer negundo</i>	Boxelder	L/M	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☐	☒	☒	25 x 30	'Sensation'-male selection is less attractive to seed-eating bugs.
<i>Acer tataricum</i> cultivars	Tatarian Maple selections	L/M	☐	☒	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	18 x 15	'Hot Lips'. Showy seeds; may develop chlorosis in highly alkaline soils.
<i>Alnus incana</i> subsp <i>tenuifolia</i>	Thinleaf Alder	H	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☒	20 x 8	Tolerant of poor soil, fixes nitrogen, good pioneer species
<i>Amelanchier alnifolia</i>	Saskatoon Berry	M	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☒	☒	☒	☐	☐	7 x 10	Many cultivars available.
<i>Amelanchier laevis</i>	Allegheny Serviceberry	M	☐	☐	☒	☐	☒	☒	☐	☒	☒	☐	☐	☐	☐	☐	☒	☐	☐	15 x 15	'Spring Flurry', upright oval street tree form
<i>Amelanchier utahensis</i>	Utah Serviceberry	M	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☐	☒	☒	☐	☐	6 x 10	Fast growth, suited for PJ habitat
<i>Amelanchier x grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	M/H	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	15 x 15	Showy hybrid cross with orange-red fall color.
<i>Catalpa speciosa</i>	Northern Catalpa	M	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	40 x 40	Messy seed pods. 'Hartland' cultivar more narrow and upright and fast growing.
<i>Celtis laevigata</i> var. <i>reticulata</i>	Netleaf Hackberry	L/M	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☒	☒	☒	☐	30 x 30	Susceptible to witches broom
<i>Celtis occidentalis</i>	Hackberry	L/M	☒	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	50 x 40	Strongly prone to nipple galls; 'Prairie Pride' is resistant to witches' broom.
<i>Celtis x 'Magnifica'</i>	Magnifica Hackberry	L/M	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	32 x 40	Insect resistant hybrid. Broadly oval.
<i>Cercis canadensis</i>	Eastern Redbud	M	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	15 x 25	Best with wind protection; tolerates part shade. Fixes nitrogen.
<i>Cercis canadensis</i> var. <i>texensis</i> 'Oklahoma'	Oklahoma Redbud	L/M	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐	15 x 15	Bright pink flowers, tolerates full sun, fixes nitrogen.
<i>Cercis occidentalis</i>	Western Redbud	L	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	10 x 10	Tends to grow as a shrub.
<i>Cercocarpus montanus</i>	Mountain Mahogany	VL	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☒	☒	☐	6 x 8	Drought tolerant and resprouts after fire
<i>Chilopsis linearis</i>	Desert Willow	VL/L	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☒	12 x 12	'Bubba', 'Hope', 'Lucretia Hamilton'
<i>Cladrastis kentukea</i>	Yellowwood	M	☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	30 x 40	Rare, summer blooming
<i>Corylus colurna</i>	Turkish Filbert	L/M	☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	30 x 15	Prefers well drained soil

Recommended Tree List - Deciduous

(updated 2025)

Botanical Name	Common Name	Water Needs (Very Low, Low, Medium, High)	Pest/ Disease Potential	Alkaline Sensitive	Needs afternoon Shade	Needs Full Sun	Experiment (Test for success)	Sizable Culinary Fruit	Shade Tree	Street Tree	Narrow & Upright	Lowest Water Use	Firewise	Lowest Maintenance	Riparian	Regionally Native	Powerlines	Rain Garden	Preferred Urban Wood	Height x Width (in feet)	Comments
<i>Cotinus coggygria</i> cultivars	Smoke Tree	L	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☐	☐	8 x 10	'Royal Purple' common variety
<i>Cotinus obovatus</i>	American Smoke Tree	L	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	15 x 20	Shrubby, variable fall color
<i>Crataegus ambigua</i>	Russian Hawthorn	L/M	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 20	Showy flowers, fruit and bark
<i>Crataegus crus-galli inermis</i>	Thornless Cockspur Hawthorn	L/M	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 20	Thornless. Subject to hawthorn scale
<i>Crataegus laevigata</i>	English Hawthorn	M	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 15	'Crimson Cloud', 'Paul's Scarlet'
<i>Crataegus phaenopyrum</i>	Washington Hawthorn	L/M	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 18	Thorns.
<i>Crataegus viridis</i>	Green Hawthorn	L/M	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 20	'Winter King' - white flowers and orange winter bark
<i>Cydonia oblonga</i>	Quince	M	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	20 x 15	
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet	VL/L	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☐	☒	☒	☐	☐	8 x 12	Very adaptable
<i>Gleditsia triacanthos</i> var. <i>inermis</i>	Honeylocust	L/M	☒	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	30 x 30	Thornless cultivars 'Sunburst' & 'Shademaster'. Succumbs to borer.
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	L/M	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	50 x 40	'Prairie Titan' and 'Espresso'- male (seedless) forms.
<i>Koelreuteria paniculata</i>	Golden Raintree	L	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	20 x 30	Summer bloom; can reseed.
<i>Maclura pomifera</i>	Osage Orange	L/M	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	20 x 20	Considered a living fossil. 'Whiteshield' and 'Wichita'- thornless male.
<i>Malus domestica</i>	Apple	M	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 8	Extensive varieties for taste. Some require cross pollination.
<i>Malus</i> spp.	Crabapple	M	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 10	Extensive fireblight-resistant varieties for shape and color
<i>Mespilus germanica</i>	Medlar	M	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	20 x 20	
<i>Morus microphylla</i>	Texas Mulberry	L/M	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☐	☒	15 x 20	Native to Southwest, fruit and flowers smaller than <i>M. rubra</i>
<i>Morus rubra</i>	Red Mulberry	L/M	☐	☐	☐	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	30 x 30	Native to continental USA. Messy fruit. Reseeds.
<i>Platanus x acerifolia</i>	London Planetree	M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	60 x 60	'Bloodgood', 'Morton Circle' resistant to anthracnose.
<i>Populus acuminata</i>	Lanceleaf Cottonwood	H	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☒	40 x 40	
<i>Populus angustifolia</i>	Narrowleaf Cottonwood	H	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☒	☒	☐	☐	☒	30 x 40	'Creeside' to reduce suckers.
<i>Populus deltoides wislizeni</i>	Rio Grande Cottonwood	H	☒	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒	☐	☐	☒	60 x 50	Do not plant near buildings.

Recommended Tree List - Deciduous

(updated 2025)

Botanical Name	Common Name	Water Needs (Very Low, Low, Medium, High)	Pest/ Disease Potential	Alkaline Sensitive	Needs afternoon Shade	Needs Full Sun	Experiment (Test for success)	Sizable Culinary Fruit	Shade Tree	Street Tree	Narrow & Upright	Lowest Water Use	Firewise	Lowest Maintenance	Riparian	Regionally Native	Powerlines	Rain Garden	Preferred Urban Wood	Height x Width (in feet)	Comments
<i>Prunus americana</i>	American Plum	L	☐	☒	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☒	☒	☒	☒	☒	10 x 15	Shrubby; suckers to form clumps. Good for wildlife.
<i>Prunus armeniaca</i>	Apricot	M	☐	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	15 x 19	Messy fruit.
<i>Prunus avium</i>	Sweet Cherry	M	☐	☒	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 15	Most need cross-pollinator, such as 'Bing' and 'Black Tartarian'
<i>Prunus cerasifera</i>	Purpleleaf Plum	M	☒	☒	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 15	Many varieties available.
<i>Prunus cerasus</i>	Sour Cherry	M	☒	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	12 x 15	Many cultivars available.
<i>Prunus domestica</i>	European Plum	M	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	10 x 10	Many cultivars available.
<i>Prunus persica</i>	Nectarine /Peach	M	☒	☒	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	15 x 15	Short-lived; late blooming cultivars
<i>Prunus serotina</i>	Black Cherry	M	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☒	30 x 20	Multistemmed
<i>Prunus virginiana</i>	Chokecherry	L	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒	15 x 15	Native, clumping. Purple standard- 'Canada Red', 'Sucker Punch'-no suckers
<i>Ptelea trifoliata</i>	Common Hoptree	L/M	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒	☒	☐	20 x 20	Leaves have strong smell when crushed. Host to Giant Swallowtail.
<i>Pyrus communis</i>	European Fruiting Pear selections	M	☒	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	40 x 25	Many cultivars, use fireblight-resistant forms.
<i>Pyrus ussuriensis</i> ‘Prairie Gem’	Prairie Gem Ussurien Pear	L/M	☐	☒	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	25 x 20	Fireblight-resistant form; can set fruit if pollinated by other pears
<i>Quercus alba x robur</i> ‘Crimson Spire’	Crimson Spire Oak	M	☐	☐	☐	☐	☐	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	40 x 10	
<i>Quercus buckleyi</i>	Texas Red Oak	L/M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	30 x 30	
<i>Quercus frainetto</i>	Hungarian Oak	L/M	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	50 x 50	‘Forest Green’ is narrow, upright with central leader
<i>Quercus gambelii</i>	Gambel Oak	L	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☐	☐	☐	☒	☒	☒	☒	8 x 30	‘Gila Monster’ is standard tree form, natural habit tends to be multistemmed.
<i>Quercus macrocarpa</i>	Bur Oak	L/M	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	50 x 70	‘Urban Pinnacle’ is narrow, upright with central leader
<i>Quercus meuhlenbergii</i>	Chinquapin Oak	L/M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	35 x 50	Resilient urban tree
<i>Quercus shumardii</i>	Shumard Oak	M	☒	☒	☐	☒	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	40 x 40	
<i>Rhus glabra</i>	Smooth Sumac	L	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☒	☐	☒	☒	☐	☐	20 X 20	Great for birds, wildlife, host to Hairstreak butterfly
<i>Robinia neomexicana</i>	New Mexico Locust	L	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒	10 x 5	Has spines, produces suckers and dense thickets.
<i>Robinia pseudoacacia</i>	Black Locust	L	☒	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	35 x 20	‘Purple Robe’. Spines. Susceptible to locust borer.

Recommended Tree List - Deciduous

(updated 2025)

Botanical Name	Common Name	Water Needs (Very Low, Low, Medium, High)	Pest/ Disease Potential	Alkaline Sensitive	Needs afternoon Shade	Needs Full Sun	Experiment (Test for success)	Sizable Culinary Fruit	Shade Tree	Street Tree	Narrow & Upright	Lowest Water Use	Firewise	Lowest Maintenance	Riparian	Regionally Native	Powerlines	Rain Garden	Preferred Urban Wood	Height x Width (in feet)	Comments
<i>Salix amygdaloides</i>	Peach Leaf Willow	H	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☐	30 x 25	Fast growing, good wildlife plant
<i>Salix gooddingii</i>	Goodding's Willow	H	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒	☐	☐	☐	40 x 25	Tolerates clay soil
<i>Sorbus aucuparia</i>	Mountain Ash	M	☐	☒	☒	☒	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	30 x 8	'Cardinal Royal' has showy blossoms and fruit.
<i>Styphnolobium japonicum</i>	Japanese Pagoda Tree	L	☒	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	20 x 30	Showy summer bloom; messy fruit. Invasive in central/eastern USA
<i>Tilia americana</i>	American Linden	M	☒	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	60 x 30	Tolerates some drought. Great for wildlife and pollinators.
<i>Tilia cordata</i>	Littleleaf Linden	M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	30 x 35	'Greenspire'
<i>Ulmus americana</i>	American Elm	L/M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	65 x 30	'Princeton', 'Accolade'
<i>Ulmus davidiana</i>	David Elm	L/M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☐	☒	☐	☐	☐	☒	☒	50 x 30	'Greenstone', 'Choicecity Select'
<i>Ulmus minor x parvifolia</i>	Frontier Elm	L	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☐	☒	☐	☐	☐	☒	☒	25 x 20	Shorter, red fall foliage.
<i>Ulmus parvifolia</i>	Lacebark Elm	L	☒	☐	☐	☐	☐	☐	☒	☒	☐	☒	☐	☒	☐	☐	☐	☒	☒	40 x 25	'Allee'
<i>Ulmus propinqua</i>	Emerald Sunshine Elm	L	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	35 x 25	
<i>Ulmus x wilsoniana</i> 'Prospector'	Prospector Elm	M	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	35 x 25	
<i>Zelkova serrata</i>	Japanese Zelkova	L/M	☐	☐	☐	☐	☒	☐	☒	☒	☐	☒	☐	☒	☐	☐	☐	☒	☐	50 x 50	'Green Vase', 'Musashino', 'Village Green'
<i>Ziziphus jujube</i>	Jujube	L/M	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	30 x 25	Requires cross-pollination; many cultivars, root sprouting/suckers may occur.

Recommended Tree List - Evergreen

(updated 2025)

Botanical Name	Common Name	Water Needs (Very Low, Low, Medium, High)	Pest/ Disease Potential	Alkaline Sensitive	Needs afternoon Shade	Needs Full Sun	Experiment (Test for success)	Sizable Culinary Fruit	Shade Tree	Street Tree	Narrow & Upright	Lowest water use	Firewise	Lowest Maintenance	Riparian	Regionally Native	Powerlines	Rain Garden	Evergreen	Preferred Urban Wood	Height x Width (in feet)	Comments
<i>Cedrus atlantica</i> ‘Glauca’	Blue Atlas Cedar	L/M	☑	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	40 x 60	Typically weeping form.
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany	VL/L	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑	☐	☑	☑	☐	☑	☐	7 x 10	Drought tolerant, rocky areas.
<i>Hesperocyparis arizonica</i>	Arizona Cypress	VL	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☑	☐	☐	☑	☑	33 x 15	Formerly <i>Cupressus</i> sp. ‘Blue Ice’ common variety.
<i>Juniperus chinensis</i>	Chinese Juniper	VL	☑	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☑	☐	☐	☐	☐	☑	☐	50 x 15	Extensive varieties for habit, size and color.
<i>Juniperus deppeana</i>	Alligator Juniper	VL	☑	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☑	☑	30 x 20	Showy bark in age, not as cold tolerant
<i>Juniperus monosperma</i>	One-seed Juniper	VL	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☑	☑	☐	☑	☑	10 x 10	
<i>Juniperus scopulorum</i>	Rocky Mountain Juniper	VL	☑	☐	☐	☐	☐	☐	☐	☑	☑	☑	☐	☑	☐	☑	☐	☐	☑	☑	20 x 9	Native species found at higher elevations.
<i>Juniperus scopulorum</i> cultivars	Rocky Mountain Juniper cultivars	VL	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☐	☐	☐	☑	☑	☐	☑	☑	15 x 5	‘Skyrocket’, ‘Moonglow’, ‘Blue Arrow’, ‘Wichita Blue’.
<i>Juniperus virginiana</i>	Eastern Red Cedar	VL	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☑	☑	30 x 10	Native to eastern USA.
<i>Pinus bungeana</i>	Lacebark Pine	L/M	☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	50 x 20	Bark sheds. Pyramid to rounded shape.
<i>Pinus densiflora</i>	Japanese red pine	M	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☑	15 x 40	Several varieties by shape and height.
<i>Pinus edulis</i>	Piñon Pine	L/M	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☑	☐	☑	☑	☑	☑	☑	10 x 10	NM State tree, prone to drought stress
<i>Pinus flexilis</i>	Limber Pine	L/M	☑	☐	☐	☐	☐	☐	☑	☑	☑	☐	☐	☑	☐	☑	☐	☐	☑	☑	30 x 25	Vanderwolf’s Pyramid’- blue pyramid
<i>Pinus heldreichii</i> (leucodermis)	Bosnian Pine	M	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☑	15 x 20	Varieties by height
<i>Pinus monophylla</i>	Single-leaf Piñon	L/M	☑	☐	☐	☐	☑	☑	☐	☐	☐	☐	☐	☑	☐	☑	☐	☑	☑	☑	20 x 35	Southwestern native with grey foliage, single needles
<i>Pinus mugo</i>	Mugo Pine	M	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☑	☐	☑	☐	15 x 25	‘Tannenbaum’ - compact tree form
<i>Pinus nigra</i>	Austrian Pine	M	☑	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☑	40 x 20	‘Oregon Green’- greener needles
<i>Pinus ponderosa</i>	Ponderosa Pine	M	☑	☐	☐	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☑	☐	☐	☑	☑	60 x 25	Prone to drought stress, may need additional watering.
<i>Pinus strobiformis</i>	Southwestern White Pine	M	☑	☐	☐	☐	☐	☐	☑	☑	☑	☐	☐	☑	☐	☑	☐	☐	☑	☑	30 x 20	Considered high quality lumber. Many cultivars available.
<i>Pinus sylvestris</i>	Scotch Pine	L/M	☑	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☑	30 x 20	Orange bark.
<i>Pinus thunbergii</i>	Japanese Black Pine	M	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	20 x 30	Varieties by height. Can be injured by severe winters.
<i>Platycladus orientalis</i> cultivars	Oriental Arborvitae selections	L	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	18 x 10	

Top Shade Trees

Common shade trees that survive high desert conditions with relatively broad canopies.

Botanical Name	Common Name
<i>Catalpa speciosa</i>	Northern Catalpa
<i>Celtis laevigata</i> var. <i>reticulata</i>	Netleaf Hackberry
<i>Celtis occidentalis</i>	Hackberry
<i>Gleditsia tricanthos</i> var. <i>inermis</i>	Honeylocust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Pinus nigra</i>	Austrian Pine
<i>Pinus ponderosa</i>	Ponderosa Pine
<i>Pinus sylvestris</i>	Scotch Pine
<i>Platanus x acerifolia</i>	London Planetree
<i>Populus deltoides wislizeni</i>	Rio Grande Cottonwood
<i>Quercus buckleyi</i>	Texas Red Oak
<i>Quercus macrocarpa</i>	Bur Oak
<i>Quercus meuhlenbergii</i>	Chinkapin Oak
<i>Tilia americana</i>	American Linden
<i>Tilia cordata</i>	Littleleaf Linden
<i>Ulmus americana</i>	American Elm
<i>Ulmus davidiana</i>	David Elm
<i>Ulmus minor x parvifolia</i>	Frontier Elm
<i>Ulmus parvifolia</i>	Lacebark Elm

Top Street Trees

Common street trees that survive alkaline high desert conditions with cultivars resilient to pests and diseases while providing winter interest and high canopy clearance (above 14 ft) for street traffic.

Botanical Name	Common Name
<i>Celtis occidentalis</i>	Hackberry
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Juniperus scopulorum</i> cultivars	Rocky Mountain Juniper Cultivars
<i>Maclura pomifera</i>	Osage Orange
<i>Platanus x acerifolia</i>	London Planetree
<i>Quercus alba x robur</i>	‘Crimson Spire’ Crimson Spire Oak
<i>Quercus buckleyi</i>	Texas Red Oak
<i>Quercus macrocarpa</i>	Bur Oak
<i>Quercus meuhlenbergii</i>	Chinquapin Oak
<i>Quercus shumardii</i>	Shumard Oak
<i>Ulmus americana</i>	American Elm
<i>Ulmus davidiana</i>	David Elm
<i>Ulmus minor x parvifolia</i>	Frontier Elm
<i>Ulmus parvifolia</i>	Lacebark Elm
<i>Zelkova serrata</i>	Japanese Zelkova

Top Low Maintenance Trees

Regionally native trees that are naturally low-maintenance.

Botanical Name	Common Name
<i>Amelanchier alnifolia</i>	Saskatoon Berry
<i>Amelanchier utahensis</i>	Utah Serviceberry
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany
<i>Cercocarpus montanus</i>	Mountain Mahogany
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet
<i>Juniperus monosperma</i>	One-seed Juniper
<i>Juniperus scopulorum</i>	Rocky Mountain Juniper
<i>Pinus edulis</i>	Piñon Pine
<i>Pinus flexilis</i>	Limber Pine
<i>Pinus monophylla</i>	Single-leaf Piñon

Top Low Water Trees

Regionally native trees that have extremely low water needs.

Botanical Name	Common Name
<i>Hesperocyparis arizonica</i>	Arizona Cypress
<i>Celtis reticulata</i>	Western Hackberry
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany
<i>Cercocarpus montanus</i>	Mountain Mahogany
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet
<i>Juniperus monosperma</i>	One-seed Juniper
<i>Juniperus scopulorum</i>	Rocky Mountain Juniper
<i>Morus microphylla</i>	Texas Mulberry
<i>Quercus gambelli</i>	Gambel Oak

Top Trees for Rain Gardens

Trees that are continentally and regionally native or adapted which have characteristics suitable for semi-arid rain gardens.

Botanical Name	Common Name
<i>Acer negundo</i>	Box Elder
<i>Celtis laevigata</i> var. <i>reticulata</i>	Netleaf Hackberry
<i>Celtis reticulata</i>	Western Hackberry
<i>Cladrastis kentukea</i>	Kentucky Coffeetree
<i>Gleditsia tricanthos</i> var. <i>inermis</i>	Honeylocust
<i>Prunus americana</i>	American Plum
<i>Prunus virginiana</i>	Chokecherry
<i>Quercus gambelli</i>	Gambel Oak
<i>Quercus</i> spp.	Oaks
<i>Robinia neomexicana</i>	New Mexico Locust
<i>Ulmus</i> spp.	Elms
<i>Zelkova serrata</i>	Zelkova

Top Riparian Trees

Tree species that are continentally and regionally native which typically grow near streams and rivers.

Botanical Name	Common Name
<i>Acer grandidentatum</i>	Rocky Mountain Maple
<i>Acer negundo</i>	Box Elder
<i>Alnus incana</i> subsp. <i>tenuifolia</i>	Thinleaf Alder
<i>Amelanchier alnifolia</i>	Saskatoon Berry
<i>Amelanchier utahensis</i>	Utah Serviceberry
<i>Populus acuminata</i>	Lanceleaf Cottonwood
<i>Populus angustifolia</i>	Narrowleaf Cottonwood
<i>Populus deltoides wislizeni</i>	Rio Grande Cottonwood
<i>Prunus americana</i>	American Plum
<i>Prunus serotina</i>	Black Cherry
<i>Salix amygdaloides</i>	Peach Leaf Willow
<i>Salix gooddingii</i>	Goodding’s Willow

Top Fruit Trees

Trees with sizeable, edible fruit.

Botanical Name	Common Name
<i>Amelanchier alnifolia</i>	Saskatoon Berry
<i>Cydonia oblonga</i>	Quince
<i>Malus domestica</i>	Apple
<i>Morus microphylla</i>	Texas Mulberry
<i>Morus rubra</i>	Red Mulberry
<i>Pinus edulis</i>	Piñon Pine
<i>Prunus americana</i>	American Plum
<i>Prunus armeniaca</i>	Apricot
<i>Prunus avium</i>	Sweet Cherry
<i>Prunus cerasus</i>	Sour Cherry
<i>Prunus persica</i>	Nectarine /Peach
<i>Prunus serotina</i>	Black Cherry
<i>Prunus domestica</i>	Chokecherry
<i>Prunus virginiana</i>	Common Plum
<i>Ziziphus jujube</i>	Jujube

Top Trees for Birds

Continentially and regionally native or selected adapted species that provide food, habitat, shelter or other vital resources for birds while having pest and disease resistant qualities.

Botanical Name	Common Name
<i>Acer glabrum</i>	Rocky Mountain Maple
<i>Acer grandidentatum</i>	Bigtooth Maple
<i>Alnus incana</i> subsp. <i>tenuifolia</i>	Thinleaf Alder
<i>Amelanchier alnifolia</i>	Saskatoon Berry
<i>Amelanchier utahensis</i>	Utah Serviceberry
<i>Celtis</i> spp.	Hackberries
<i>Cercis</i> spp.	Redbuds
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany
<i>Cercocarpus montanus</i>	Mountain Mahogany
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet
<i>Juniperus</i> spp.	Junipers
<i>Malus</i> spp.	Apples
<i>Morus microphylla</i>	Texas Mulberry
<i>Pinus edulis</i>	Piñon Pine
<i>Pinus ponderosa</i>	Ponderosa Pine
<i>Prunus americana</i>	American Plum
<i>Prunus avium</i>	Sweet Cherry
<i>Prunus serotina</i>	Black Cherry
<i>Quercus gambelli</i>	Gambel Oak
<i>Quercus</i> spp.	Oaks
<i>Robinia neomexicana</i>	New Mexico Locust
<i>Salix amygdaloides</i>	Peach leaf Willow
<i>Salix gooddingii</i>	Goodding’s Willow

Top Firewise Trees

Firewise continental and regionally native trees

Botanical Name	Common Name
<i>Acer glabrum</i>	Rocky Mountain Maple
<i>Acer grandidentatum</i>	Bigtooth Maple
<i>Amelanchier</i> spp.	Serviceberries
<i>Celtis laevigata</i> var. <i>reticulata</i>	Netleaf Hackberry
<i>Celtis reticulata</i>	Western Hackberry
<i>Cercis canadensis</i> var. <i>texensis</i> 'Oklahoma'	Oklahoma Redbud
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany
<i>Cercocarpus montanus</i>	Mountain Mahogany
<i>Crataegus</i> spp.	Hawthorns
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet
<i>Malus</i> spp.	Apples
<i>Pinus ponderosa</i>	Ponderosa Pine
<i>Populus</i> spp.	Cottonwoods
<i>Prunus</i> spp.	Plums, Apricots and Cherries
<i>Robinia neomexicana</i>	New Mexico Locust
<i>Salix</i> spp.	Willows

Top Trees for Powerlines



Trees 15' or less that are native or introduced and firewise.

Botanical Name	Common Name
<i>Acer glabrum</i>	Rocky Mountain Maple
<i>Amelanchier alnifolia</i>	Saskatoon Berry
<i>Amelanchier utahensis</i>	Utah Serviceberry
<i>Cercis occidentalis</i>	Western Redbud
<i>Cercis canadensis</i> var. <i>texensis</i> 'Oklahoma'	Oklahoma Redbud
<i>Cercocarpus ledifolius</i>	Curl Leaf Mountain Mahogany
<i>Cercocarpus montanus</i>	Mountain Mahogany
<i>Cotinus coggygria</i> cultivars	Smoke Tree
<i>Forestiera pubescens neomexicana</i>	New Mexico Privet
<i>Malus</i> spp.	Crabapple species
<i>Pinus mugo</i>	Mugo Pine
<i>Prunus americana</i>	American Plum
<i>Prunus domestica</i>	European Plum
<i>Prunus cerasus</i>	Sour Cherry
<i>Prunus virginiana</i>	Chokecherry
<i>Robinia neomexicana</i>	New Mexico Locust
<i>Quercus gambelli</i>	Gambel Oak

For more information on firewise plants, check out the State of New Mexico's plant lists:
<https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/FireWisePlantMaterialsNMSU.pdf>
https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/Wui_plantlist.pdf

Tree Selection and Placement

Tree Selection and Placement

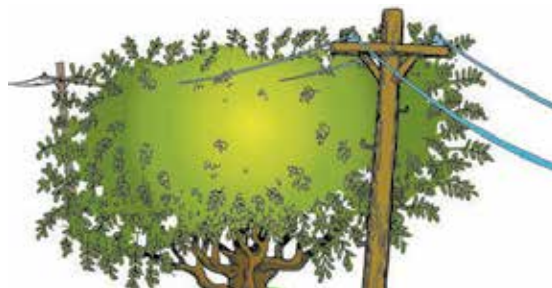
Understand the various factors to consider when selecting trees.



Tree selection and placement are important decisions a homeowner makes when landscaping or replacing a tree. Matching the tree to the site benefits both the tree and the homeowner.

Before asking, "What kind of tree should I plant?" consider the following:

- Why is it being planted and what function will it serve?
- What are the soil conditions?
- How will necessary maintenance be provided?
- What size tree is best suited for the location? How large will the tree be when full grown? Do overhead or below ground utilities prevent planting a tree? What clearance is needed for sidewalks, patios, or driveways?



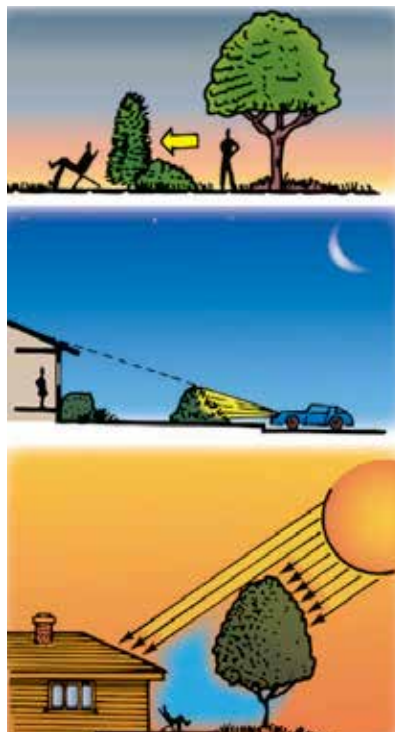
Form and Size

Selecting the right form (shape) to complement the desired function can reduce maintenance costs and increase the tree's value.

- Mature tree size determines the level of benefits received.
- Larger trees typically provide the greatest economic and environmental returns.
- Depending on the site restrictions, you can choose from hundreds of form and size combinations.
- Low spreading trees may be planted under overhead utility lines, while a tall evergreen may provide a screen.

Tree Functions

- Healthy trees increase property values.
- Deciduous shade trees cool homes in the summer and allow the winter sun to heat homes when they lose their leaves.
- Evergreens can provide a windbreak or a screen for privacy.
- Fruit trees or shrubs can provide food for owners or wildlife.
- Street trees reduce the glare from pavement, reduce runoff, filter pollutants, add oxygen, and improve overall appearance and quality of life.
- Trees also provide environmental benefits such reducing the amount of carbon dioxide in the atmosphere.



Site Conditions

Choosing a tree for the right site conditions is the key to tree survival and reduced maintenance. Consider the following:

Soil conditions

- The soil in dense urban areas and new subdivisions is often disturbed, shallow, compacted, and subject to drought. An arborist can take soil samples from your yard for testing to determine which trees are suited for your property and may provide recommendations to improve the soil condition.

Exposure (sun and wind)

- The amount of available sunlight will affect tree and shrub selection. Wind exposure is also a consideration.

Space constraints

- Available planting space can be limited by many factors, such as overhead or underground utilities, pavement, buildings, visibility, or other trees. Ensure there's adequate room to let trees grow above and below ground.

Hardiness zone

- Hardiness is the tree's ability to survive extreme temperatures of a specific region. Research plants for their hardiness information in your region.

Human activity

- The top five causes of tree death result from things people do. Soil compaction, under-watering, overwatering, vandalism, and the number-one cause — planting the wrong tree — account for more tree deaths than all insect- and disease-related tree deaths combined.

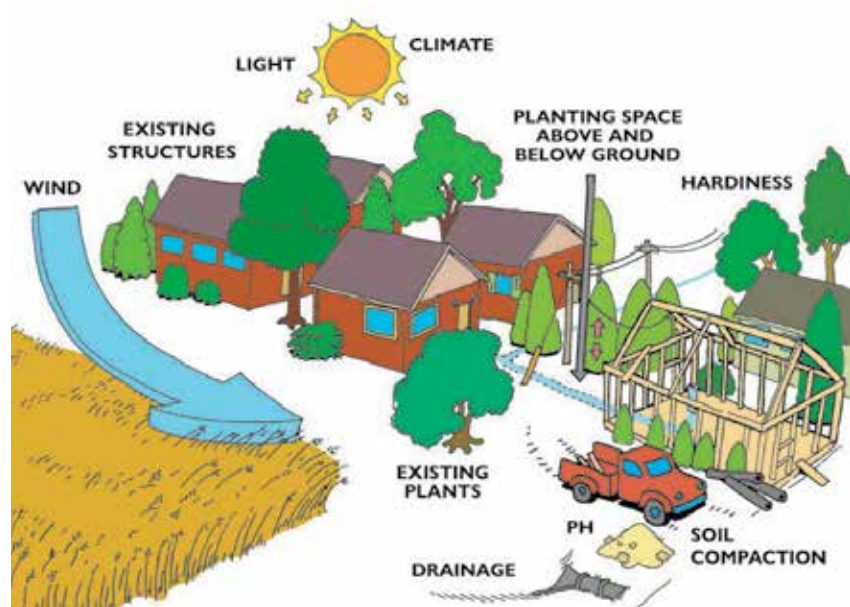
Drainage

- Roots require oxygen to develop; poor drainage limits oxygen availability and may kill the tree.

Insect and disease susceptibility

- Every plant has its particular pest and disease problems and the severity varies geographically.

Personal preferences and site constraints also play major roles in the selection process.



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New Tree Planting

New Tree Planting

Information on proper practices for planting a tree with a nine-step approach to successful planting and establishment.



Purchasing a tree is an investment, and how well that investment grows depends on the type of tree selected, the location, and the care provided.

When to Plant

- Ideally during the dormant season—in the fall after leaf drop or in early spring before bud break.
- Weather conditions are cool and allow plants to establish roots in the new location before spring rains and summer heat stimulate new top growth.
- Healthy balled and burlapped or container trees can be planted throughout the growing season.
- In tropical and subtropical climates where trees grow year round, any time is a good time to plant a tree, provided that sufficient water is available.

Planting Stress

Balled-and-burlapped trees lose a significant portion of their root system when dug at the nursery. As a result, trees commonly exhibit what is known as “transplant shock.” Transplant shock is a state of slowed growth and reduced vitality following transplanting.

Container trees may also experience transplant shock, particularly if they have circling (girdling) or kinked roots that must be cut. Proper site preparation, careful handling to prevent further root damage, and good follow-up care reduces transplant shock and promotes faster recovery.



Steps to Plant a Tree

Note: Before you begin planting your tree, be sure you have located all underground utilities prior to digging. **811 is the national call-before-you-dig phone number.** Anyone who plans to dig should call 811 or go to their state 811 center's website.

Carefully follow these nine steps to help your tree establish quickly in its new location:

1. The trunk flare is where the trunk expands at the base of the tree. **Ensure trunk flare is partially visible after the tree is planted.** Remove excess soil prior to planting if flare is not visible.
2. Dig a shallow, broad planting hole. **Holes should be 2–3 times wider than the root ball,** but only as deep as the root ball.
3. If wrapped, remove any cover from around the root ball and trunk to facilitate root growth. Remove wire basket or cut one or two rings off so it is low-profile and will not interfere with future root growth. Inspect tree root ball for circling roots and straighten, cut, or remove them. Expose the trunk flare if necessary.
4. Place the tree at the proper height. When placing the tree in the hole, lift by the root ball, not the trunk. The majority of tree's roots develop in the top 12 inches (30 cm) of soil. Planting too deep can be harmful to the tree.
5. Straighten the tree in the hole. Before filling the hole, have someone examine the tree from several angles to confirm it is straight.
6. Fill the hole gently but firmly. Pack soil around the base of the root ball to stabilize it. Fill the hole firmly to eliminate air pockets. Further reduce air pockets by watering periodically while backfilling. Avoid fertilizing at the time of planting.
7. If staking is necessary, three stakes or underground systems provide optimum support. **Studies have shown that trees develop stronger trunks and roots if they are not staked;** however, it may be required when planting bare root stock or on windy sites. Remove stakes after first year of growth.

8. Mulch the base of the tree. Place a 2–3 inch (5–7.5 cm) layer of mulch, but be sure not to pile much right against the trunk. **A mulch-free area of 1–2 inches (2.5–5 cm) wide at the base of the tree will reduce moist bark and prevent decay.**
9. Provide follow-up care. Keep the soil moist by watering at least once a week, barring rain, and more frequently during hot, windy weather. Continue until mid-fall, tapering off as lower temperatures require less-frequent watering.

Other follow-up care to consider:

- Minor pruning of branches damaged during the planting process may be required.
- Prune sparingly after planting. Delay corrective pruning until a full season of growth.
- If trunk wrapping is necessary, use biodegradable materials and wrap from the bottom.

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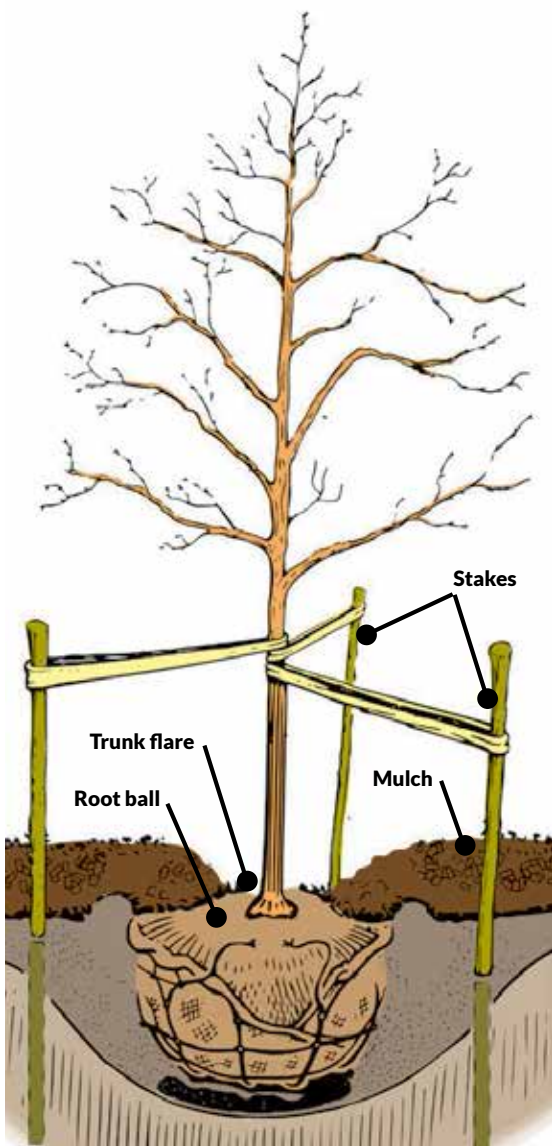
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Tree Pruning

Why Topping Hurts Trees

Learn why topping is not an acceptable pruning technique and discover recommended alternatives.



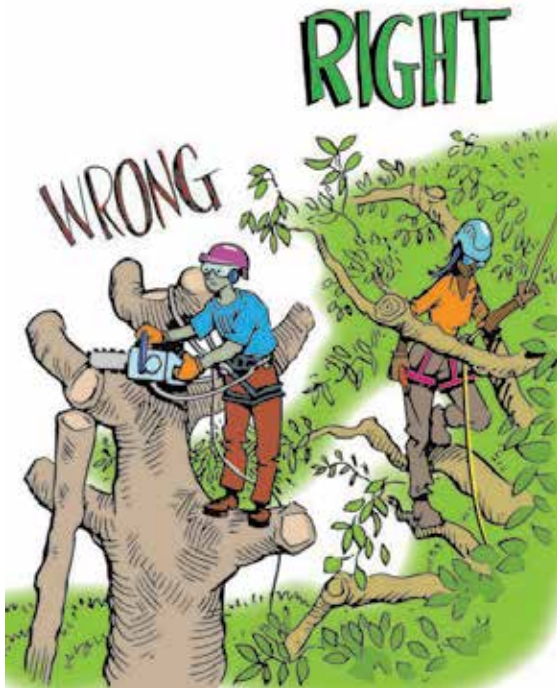
Topping is perhaps the most harmful tree pruning practice known. Yet, despite more than 25 years of literature and seminars explaining its harmful effects, topping remains a common practice.

What Is Topping?

Topping is the indiscriminate cutting of tree branches to stubs or to lateral branches that are not large enough to assume the terminal role.

Other names include “heading,” “tipping,” “hat-racking,” and “rounding over.”

Topping is often used to reduce the size of a tree. Homeowners may feel a large tree poses a risk to their property; however, topping is not a viable method of height reduction, and may increase risk in the long term.



Topping Stresses Trees

Leaves are the food factories of a tree; however, topping can remove 50-100% of a tree's leaf-bearing crown. Removing the leaves can potentially starve a tree and trigger various survival mechanisms. Dormant buds are activated, forcing rapid growth of multiple shoots below each cut. The tree needs to grow a new crop of leaves as soon as possible. If a tree does not have the stored energy reserves to do so, it will be seriously weakened and may die.

A stressed tree with large, open pruning wounds is more vulnerable to insect and disease infestations. The tree may lack sufficient energy to chemically defend the wounds against invasion, and some insects are actually attracted to the chemical signals trees release.

Topping Can Lead to Sunburn

Branches within a tree's crown produce thousands of leaves to absorb sunlight. When the leaves are removed, the remaining branches and trunk are suddenly exposed to high levels of light and heat. The result may be sunburn of the tissues beneath the bark, which can lead to cankers, bark splitting, and death of some branches.



Topping Can Lead to Unacceptable Risk

The survival mechanism that causes a tree to produce multiple shoots below each topping cut comes at great expense to the tree (see figure above). These shoots develop from buds near the surface of the old branches. Unlike normal branches that develop in a socket of overlapping wood tissues, these new shoots are anchored only in the outermost layers of the parent branches and are weakly attached.

The new shoots grow quickly, as much as 20 feet (6 m) in one year in some species. Unfortunately, the shoots are weakly attached and prone to breaking, especially during windy or icy conditions. While the original goal was to reduce risk by reducing height, risk of limb failure has now increased (see figure below).



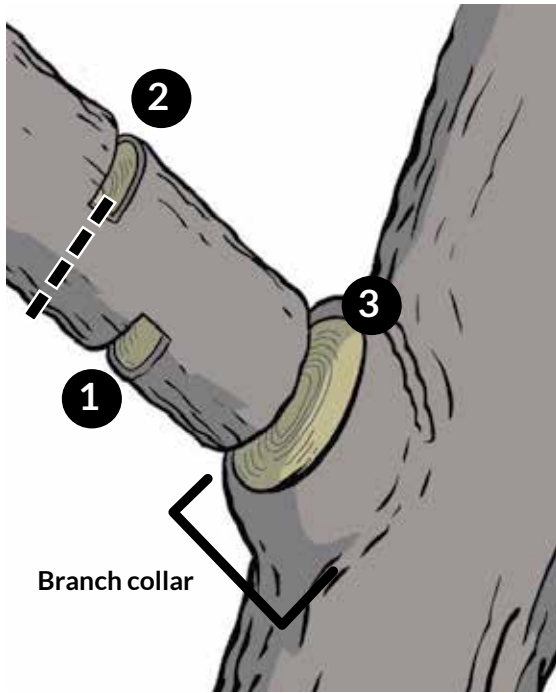
Topping Makes Trees Ugly

Topping destroys the natural form of a tree. Trees form a variety of shapes and growth habits, all with the same goal of presenting their leaves to the sun. Topping removes the ends of the branches, often leaving ugly stubs. Without leaves (for up to six months of the year in temperate climates), a topped tree appears disfigured and mutilated. **A tree that has been topped can never fully regain its natural form.**

Topping Leads to Decay

Correct pruning cuts are made just beyond the branch collar (see figure below). The tree is biologically equipped to close such a wound if the tree is healthy enough and the wound is not too large.

Cuts made indiscriminately between lateral branches create stubs or wounds that the tree may not be able to close. The exposed wood tissues begin to decay. Normally, a tree will “wall off” or compartmentalize the decaying tissues, but few trees can defend the multiple severe wounds caused by topping. The decay organisms are given a free path to move through branches.



How to Make a Pruning Cut:

1. Make an undercut about 12–18 inches (30–46 cm) from the limb's point of attachment.
2. Make a second cut from the top, directly above or a few inches farther out on the limb. Doing so removes the limb, leaving a stub.
3. Remove the stub by cutting back to the branch collar, but do not cut the collar. This technique reduces the possibility of tearing the bark.

Tree Pruning

If the tree has started closing over a stub, cut just the dead stub and not the live tissue.



Alternatives to Topping

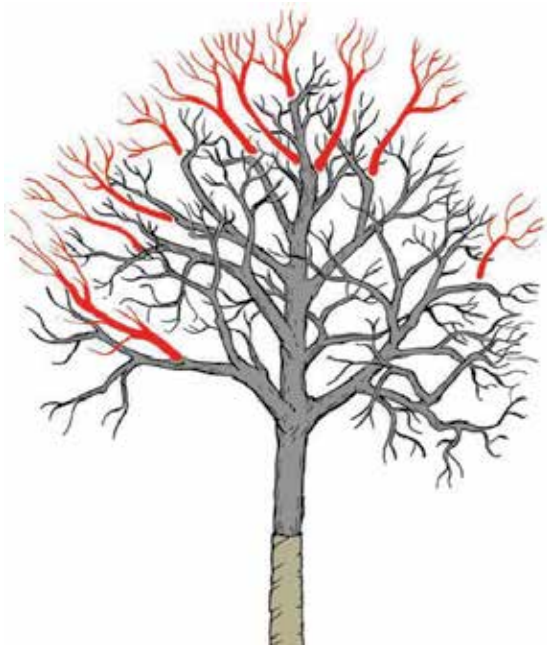
Sometimes a tree must be reduced in height or spread, such as for providing utility line clearance. There are recommended techniques for doing so. Small branches should be removed back to their point of origin. If a larger limb must be shortened, it should be pruned back to a lateral branch that is large enough (at least one-third the diameter of the limb being removed) to assume the terminal role. This method of branch reduction helps to preserve the natural form of the tree.

Sometimes the best solution is to remove the tree and replace it with a species that is more appropriate.

Topping Is Expensive

The cost of topping a tree is not limited to only the job cost. Some hidden costs include:

- Increased maintenance costs. If the tree survives, it will likely require corrective pruning within a few years (e.g., crown reduction or storm damage repair). If the tree dies, it will have to be removed.
- Reduced property value. Healthy, well-maintained trees can add 10–20% to the value of a property. Disfigured, topped trees are considered an impending expense.
- Increased liability potential. Topped trees may pose an unacceptable level of risk. Because topping is considered an unacceptable pruning practice, any damage caused by branch failure of a topped tree may lead to a finding of negligence in a court of law.



Proper branch reduction preserves natural form.

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Pruning is performed for specific reasons. Knowing the reason for pruning will guide the necessary cuts to achieve that goal. One of the most compelling reasons to prune a tree is to increase its lifespan. Topping, thinning, lion-tailing, and flush cuts are ways to REDUCE the health, vigor, beauty and safety of a tree. Simply raising a tree, or lion-tailing, does not improve its form and can worsen already vulnerable unions. Creating gaps in the canopy of a tree, or thinning, has the most dangerous effects on tree movement under wind stress.

Trees live longer, and are more beautiful, with minimal trimming, structural training, retention of branch collars, and reduction cutting when they need to be reduced in size. Structural pruning is by far the method that creates the least wind-hazardous form. The natural form of a tree should guide its shape.

Timing

Winter pruning: January - March

Summer Pruning: August

Evergreens, especially Piñons: October- Early March



CALL TO ACTION

Structurally prune young trees to avoid large cuts later.

an introduction to

STRUCTURAL PRUNING

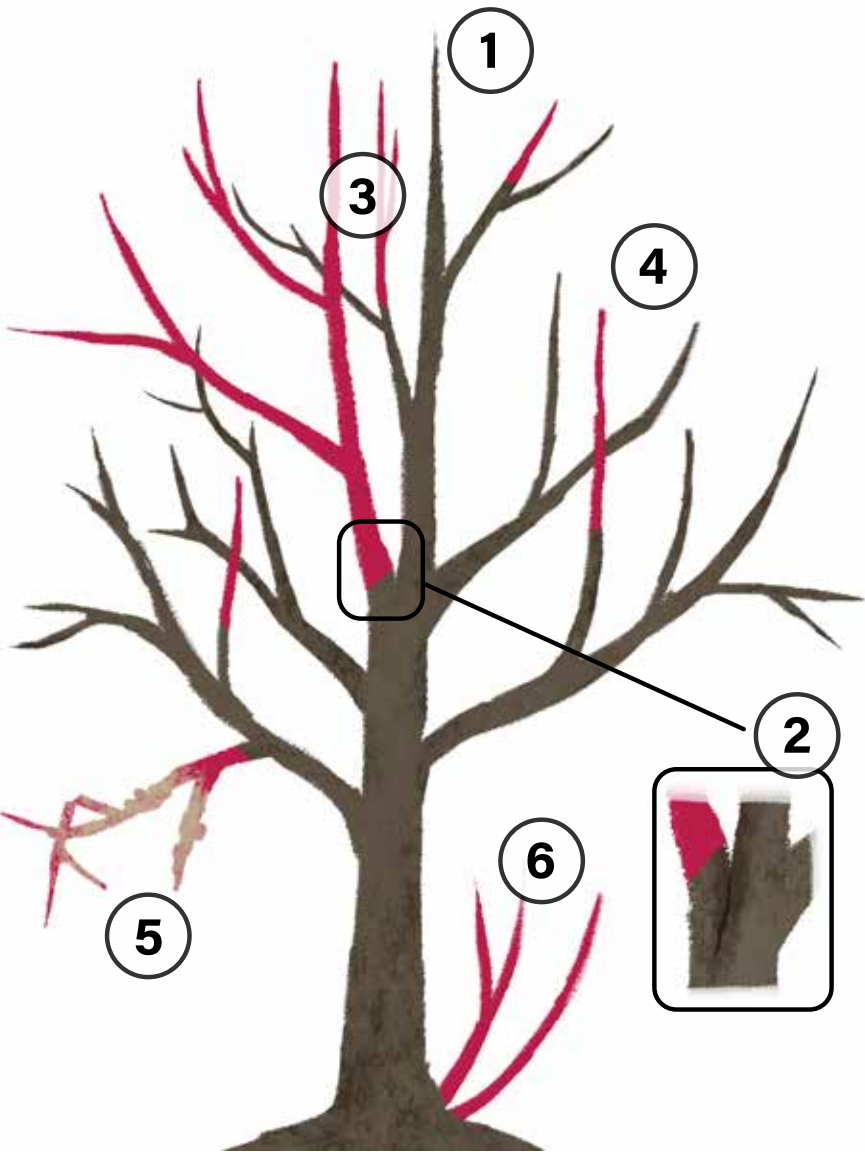


What is Structural Pruning?

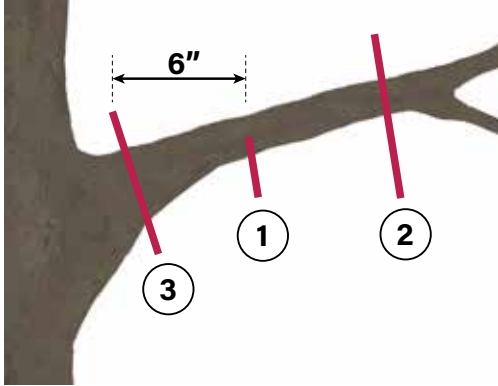
Structural pruning helps a tree develop strong structure, so that the tree lives longer, is more resilient, and holds its place in urban environments. A strong central leader and scaffolding branches off the main trunk are key, and pruning should also take into consideration final height requirements for the location.

Only prune what is necessary.
Prune up to 1/3 of the canopy per pruning cycle.
Prune to an outside node (where you want the branch to grow).

Key Elements



Branch Collar Cutting

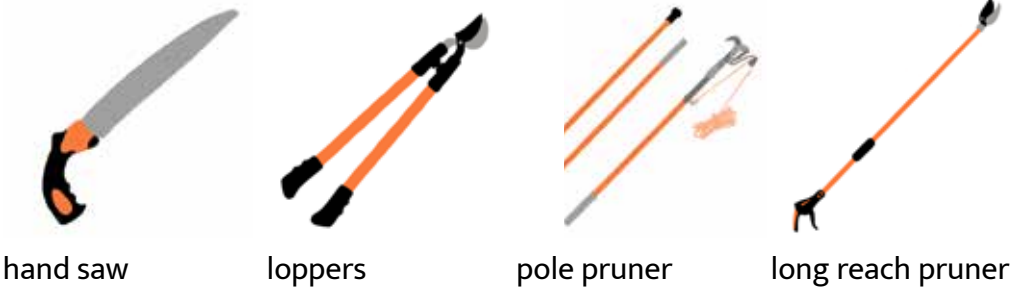


- 1 develop central leader & remove co-dominance
- 2 reduce poor unions & develop scaffolding
- 3 reduce aggressive branching
- 4 remove crossing branches & poorly located sprouts
- 5 remove dead, damaged & diseased limbs
- 6 remove suckers

Note!

Prune and train knowing the natural form of the tree.

Tools



Notes!
Keep tools sharp.
Disinfect tools to prevent disease transfer.

Making Cuts

How and where a cut is made affects how the tree heals. Cutting too close removes the branch union; cutting too far away leaves a stump, which prevents the cut from sealing.



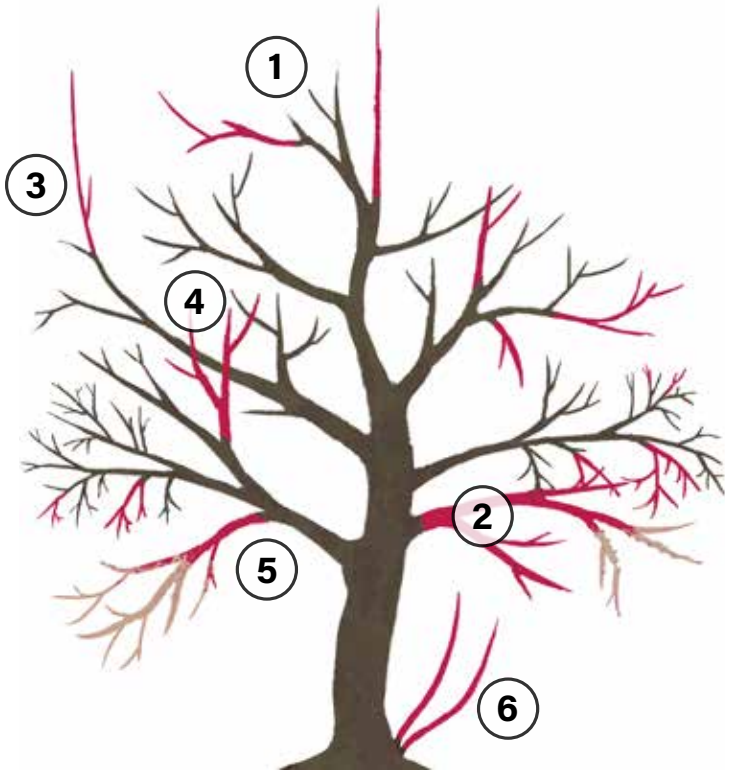
Structural Pruning for Fruit Trees

Fruit trees tend to be shorter and rounder in form so that fruit is easier to access, but key elements of structural pruning still apply.

- 1 develop modified leader: direct tree to grow more full and round
- 2 reduce poor unions & develop scaffolding
- 3 reduce aggressive branching
- 4 remove crossing branches & poorly located sprouts
- 5 remove dead, damaged & diseased limbs
- 6 remove suckers

Note!

Train branches to 45 degree angles. This helps with two things: sunlight reaching buds and branches supporting the weight of fruit.



Utility Line Conflicts

Avoiding Tree & Utility Conflicts

Many factors should be considered prior to planting. Here are some helpful hints for tree planting around utilities.



Think about the balance between the benefits of trees with those provided by utilities. We need both for livable communities and it's possible to have both with proper planning.

For trees to thrive they need room. The ultimate mature height and spread of a tree must fit within the available growing space. This includes not only above ground, but also the soil area below, which must be large enough to accommodate the rooting habits of the species.

Preventing tree-utility conflicts is a serious matter. It not only potentially involves tree roots or branches growing into utility facilities, but also tree parts or whole trees that can fail and damage utilities, particularly in inclement weather.

The potential consequences of tree-utility conflicts include disruption of critical services, like electricity, water, or natural gas. These conflicts can also involve widespread property damage, personal injury, and loss of life.

Underground Utilities

Electric, gas, water, and sewer lines installed underground can be compromised by tree roots. Roots commonly spread many times the breadth of the tree crown and can extend out farther than the height of a tree.

Electric Utilities

Modern electric lines are resistant to root damage, particularly if installed at a depth below where tree roots commonly explore. However, the life of underground lines is limited, and they will eventually need to be repaired or replaced. Excavation for that work can damage tree roots, harming or even killing trees.

Water and Sewer Utilities

New water and sewer lines made of steel or PVC are also generally resistant to root damage. Older cement, clay, or cast-iron pipes that have degraded may develop leaks. Moisture from the leaks attracts tree roots, which can penetrate and expand the cracks, further damaging the pipes.

Natural Gas Utilities

Natural gas operators often keep the area directly over, and 10 feet each side, of pipelines free of trees to protect them from potential tree root damage and allow for pipeline inspection and maintenance activities. Species that are sensitive to natural gas are sometimes planted over the pipeline to help expose gas leaks. Many providers also have tree height and diameter restrictions out as far as 25 feet further than the clear tree zone.

Locating Underground Utilities

The greatest danger to underground utilities occurs during planting. Accidental digging into underground utilities can cause costly repairs to restore interrupted service or result in injury or loss of life. Before digging call your utility company or locator service to make sure you have located underground utilities. Never assume that utilities are buried deeper than you plan to dig. Locating underground utilities before digging is often required by law.

Overhead Utilities

There are several types of utilities located overhead on poles. In general, the higher the lines on poles and more robust the structure, the greater the voltage and more space required from trees.

There are four main types of lines: communication, secondary, primary, and transmission.

Communication Lines

The lowest lines on poles are often communication lines. They are not designed to carry electricity but can become energized.

Secondary Lines

Above communication lines are secondary lines. These carry household voltage of 120/240 volts in North America. Many of these lines are insulated.

Most operators do not try to prevent vegetation contact with communication and insulated secondary lines. However, many utility providers will prune trees to protect them from abrasion and deflection.

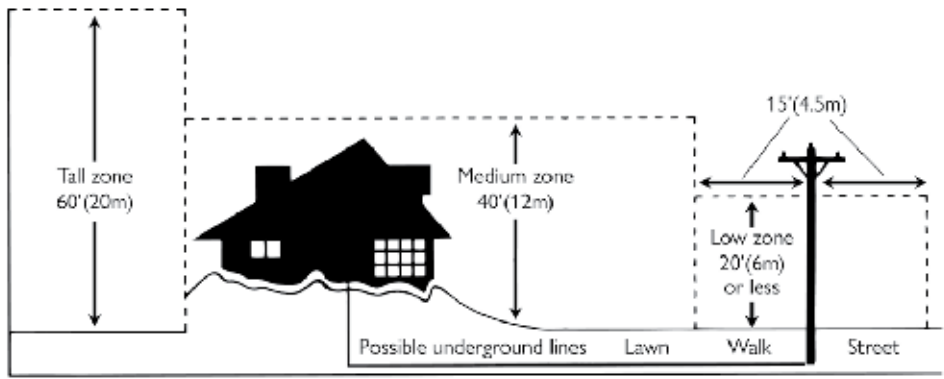
Some secondary lines are not insulated, and most electric utilities will systematically prune vegetation away from these types, but not enough to prevent contact before the next scheduled maintenance.

Primary Lines

Above secondary lines are primary lines. These are often located on top of single poles or on cross arms.

Transmission Lines

Transmission lines frequently carry hundreds of thousands of volts. It is best not to allow trees to develop with the potential to grow into them.



Tree Zones for Distribution Lines

Proper species selection and placement is important so trees have room to mature without having to be repeatedly pruned to keep them from interfering with utility lines. Species shape and size should fit into three zones relative to distribution lines: low, medium, and tall.

Tall Zones

The tall zone is at least 50 feet (15 meters) away from distribution lines. Trees with any potential mature height, including large species, may be selected for the tall zone. Make sure there is sufficient soil area to accommodate their expansive root systems. Planting sites greater than 8 feet (3 meters), including parks, meadows or other open spaces without below ground restrictions are appropriate.

Medium Zones

The medium zone extends between 15 and 50 feet (4.5 and 15 meters) from distribution lines. Species selected in this area should be medium sized, with a potential mature height of 40 feet (12 meters) or lower. Medium zone trees require wide planting areas or medians (4 to 8 feet - 1.3 to 3 meters wide), large planting squares (8 feet or 3 meters or greater), and other open areas of similar or larger size.

Low Zones

The low zone extends 15 feet (4.5 meters) on either side of distribution wires. Species selected for the low zone should have a mature height of 20 feet (6 meters) or lower. Low zone species may also be selected where soil volumes are too limited to support medium or tall zone trees.

Right Tree-Right Place

Planning before you plant ensures the right tree is planted in the right place. Proper tree selection and placement enhances your property value and prevents costly maintenance pruning and utility damage.

For further information on planting and helpful tips on street tree selection, refer to ISA's brochures on tree selection and new planting. If you have any more questions, please contact your local ISA Certified Arborist®, utility company, local nursery, or county extension office.

What Is a Certified Arborist?

ISA Certified Arborists® are individuals who have proven a level of knowledge in the art and science of tree care through experience and by passing a comprehensive examination developed by some of the nation's leading experts on tree care. ISA Certified Arborists must also continue their education to maintain their certification. Therefore, they are more likely to be up to date on the latest techniques in arboriculture.

Finding an Arborist

Visit [TreesAreGood.org](https://www.treesaregood.org) for free tools:

- The "Find an Arborist" tool can help you locate an arborist in your area.
- The "Verify a Credential" tool enables you to confirm whether an arborist has an ISA credential.

Be an Informed Consumer

One of the best methods to use in choosing an arborist is to educate yourself about some of the basic principles of tree care. Visit [TreesAreGood.org](https://www.treesaregood.org) to read and download all brochures in this series.



www.isa-arbor.com • www.treesaregood.org

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Proper Mulching Techniques

Proper Mulching Techniques

Mulching is one of the most beneficial practices a homeowner can use for better tree health.



Mulches are applied to the soil surface to maintain moisture and improve soil conditions. However, if misapplied, mulch may have little, or even negative, impact on trees.

Benefits of Proper Mulching

- Reduces soil moisture loss through evaporation.
- Controls weed germination and growth.
- Insulates soil, protecting roots from extreme summer and winter temperatures.
- Improves soil biology, aeration, structure (aggregation of soil particles), and drainage over time.
- Increases soil fertility as certain mulch types decompose.
- Inhibits certain plant diseases.
- Reduces the likelihood of tree damage from string trimmers and lawn mowers.
- Gives planting beds a uniform, cared-for look.

Trees growing in a natural forest environment have their roots anchored in a rich, well aerated soil full of essential nutrients and soil microorganisms. The soil is blanketed by fallen leaves and other organic materials that organisms break down to release nutrients into the soil. This environment is optimal for root growth and mineral uptake.

Urban landscapes and new developments, however, are typically harsher environments with poor-quality soil, reduced organic matter, and large fluctuations in soil temperature and moisture. Many benefits of the natural environment can be replicated, while maintaining a formal appearance, with the application of an organic mulch.



Types of Mulch

Organic Mulch

- Examples include wood chips, pine needles, hardwood and softwood bark, cocoa hulls, leaves, compost mixes, and a variety of other products usually derived from plants.
- Decomposes in the landscape at different rates depending on the material, climate, and soil microorganisms present.
- Requires more replenishing depending on how fast it decomposes.

Inorganic Mulch

- Examples include various types of stone, lava rock, shredded rubber, and other materials.
- Does not decompose or need to be replenished often.
- Does not improve soil structure or provide nutrients.

Not Too Much!

Too much mulch can be harmful. The recommended mulching depth is 2–4 inches (5–10 cm). Unfortunately, many landscapes are falling victim to a plague of over mulching.

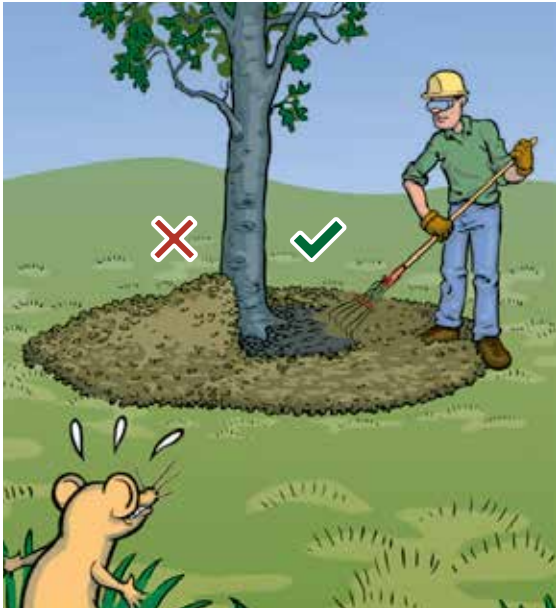
“Mulch volcanoes” are excessive piles of mulch materials applied around the base of trees.

While organic mulches must be replenished over time, buildup can occur if reapplication outpaces decomposition or if new material is added simply to refresh color.

Deep mulch can be effective in suppressing weeds and reducing maintenance, but it often causes additional problems.

Problems Associated with Improper Mulching

- Applying mulch against the trunk or stems of plants can soften the tissues, making them more susceptible to the development of insects and diseases (see figure top right).
- Mulch against the trunk can also lead to the growth of stem girdling roots. This type of root growth can reduce tree growth or eventually kill the tree.
- Thick blankets of fine mulch can become matted and may reduce the penetration of water and air.
- On wet soils, applying more than 2 inches (5 cm) of organic mulch can reduce soil drying, which can lead to excess moisture in the root zone, which can stress the plant and cause root rot. In these cases, it may be best to leave bare ground exposed or to use a thin layer of inorganic mulch.
- Some mulches, especially those containing fresh grass clippings, can affect soil pH and may eventually lead to nutrient deficiencies or toxic buildups. Anaerobic “sour” mulch may give off pungent odors, and the alcohols and organic acids that build up may be toxic to young plants.



Guidelines for Applying Mulch

The choice of mulch and the application techniques are important to the health of landscape plants. The following are guidelines for applying mulch:

- For well-drained sites, apply a 2–4 inch (5–10 cm) layer of mulch. Fine mulches, such as composed materials, should be applied in a 2–3 inch layer and coarse mulches, such as arborist wood chips, should be applied in a 3–4 inch layer.
- Apply mulch near, but not touching, the trunk and extend to the drip line, if practical. If it is not practical to apply mulch to the drip line, apply as far out as you can. Generally, a 3 foot (1 meter) radius ring is the minimum for most trees.
- If the species you are mulching has symptoms related to a pH problem, select a mulch that can aid in correcting.
- If mulch is already present, check the depth. If sufficient mulch is present, break up any matted layers and refresh the appearance with a rake. Some landscape maintenance companies spray mulch with a water-soluble, vegetable-based dye to add color to faded material.
- If mulch is piled against the stems or tree trunks, pull it back several inches/centimeters so that the base of the trunk is exposed (see figure top right).
- Fresh arborist wood chips, especially those that contain bark and leaves, are an excellent material to apply around trees and large shrubs.

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Hydration for New Trees

A) Placing treemat up to 2 months before the dry season of your region

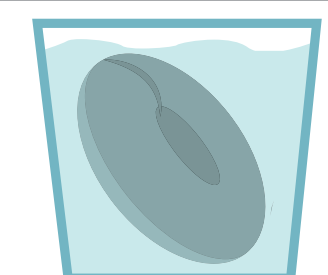


1. Place the TreeDiaper® product on top of soil around plants. Make sure the pellets inside the TreeDiaper® product are evenly distributed.

2. (Recommended, but optional) Cover with 2" of mulch to disguise and protect the TreeDiaper® product. **Do not cover with soil.** Landscaping staples can be used in a high wind region.

3. Water trees if wilting or yellow leaves appear or once every three to four (3-4) weeks if less than 1" of rainfall during that period.

B) Placing treemat during or less than two months before drought



1. Place the TreeDiaper® product completely submerged in water in a sink or bucket for at least 5 hours or overnight.

2. Follow steps 1-3 from procedure A.

C) Using treemat with an irrigation system

1. Follow procedure A or B.

2. Let drip irrigation water the top of the mat.



NOTE:

- **Always place the mat with the darker black woven side facing up!**
- Covering with mulch, pine needles, or leaves is recommended.
- Do not place any soil, dirt, fine sand, compost, or iron-based sticks or tomato cage on top of TreeDiaper® products. This may result in the loss of functionalities of TreeDiaper® products.
- Direct contact of fertilizers with the material in use or in storage may temporarily or permanently affect the performance of the product.
- Do not poke TreeDiaper® products with sticks. Damage to the surface integrity of the TreeDiaper® products may decrease functionality of the product.

If you have any questions, please email info@treediaper.com.
Version 2.0.17. Updated on 9/25/2017



Young trees have shallow root systems. A best management practice to aid in tree establishment retains water at the root systems. A tree donut, such as Zynnovation's TreeDiaper®, does just this. The concept is simple. Expanding polymers are sandwiched between landscape fabric. When it rains or when a sprinkler system is on, the polymers absorb water, which gradually percolates into the soil. This allows moisture to stay longer around these vulnerable roots while they establish in their new location.

This simple technology uses rainfall, drip irrigation or sprinklers to retain soil hydration longer. It does not block rainfall, but rather it harvests the water, making it available to roots.

For mature trees with deep root systems, a slow deep watering at or beyond the drip line will help. Additionally, mycorrhizal inoculates aid in root expansion to reach water and nutrients. TreeIB bags, placed overnight, allow for this deep percolation of water without losing it to runoff. With six large TreeIB bags, 2400 gallons of water could penetrate into the surrounding soil over the course of 8-12 hours. Done at least five times a year, allowing the bags to be moved from one tree to another, would significantly boost the health of mature trees.



<https://www.treediaper.com/>
Zynnovation LLC Ashland, VA

Tree Protection During Construction

Tree Protection Zone

Essential to any construction project is the preservation of existing trees. A Tree Protection Zone (TPZ) prevents activities that could damage trees, from root to canopy. Whether or not this is mandated by an agency, preserving trees for retention keeps trees healthy and the landscape around a new building established, more beautiful, and more useful.

Some tree species are more adapted to construction damage, but there are short- and long-term consequences to construction work that can affect trees. By recognizing this during the planning phase, steps can be taken to preserve trees in a way that retains their longevity, health, and the safety of the new construction (Matheny 2023).

Construction & Critical Root Zone

Root and crown loss should be limited, as trees have limited tolerance for stress (Matheny 2023). Reducing soil compaction, protecting trees, and minimizing tree and construction-related conflicts can be mitigated by maintaining the Critical Root Zone (CRZ) during construction.

The CRZ is the minimum distance required to protect tree roots during excavation or construction. These tree roots are required to support the health, survival and stability of a tree. At minimum, a physical barrier should provide a critical root zone of one foot for each inch of trunk diameter (Texas A&M Forest Service 2015). Another minimum measurement is half of the tree height when height is considered equal to the root zone. However, there is no universally defined calculation for CRZ.

Techniques

A tree protection barrier reduces, and ideally eliminates, direct and indirect tree damage. Many barrier options are available with varying positive and negative aspects including cost and security. Chain-link, wire mesh, wooden and plastic safety barrier fences are typical. Protection fencing should be sturdy, range from 4-8' tall, solidly secured to the ground with prominent signage (Matheny 2023). For cost-effective, short-term or physically appealing fencing for defining a recovering area, decorative rope fences may be used.

Mulch can be used to reduce compaction. One application method involves four or more inches of arborist wood chip mulch with a 3/4" plywood or 4"x 4" lumber placed on top (Matheny 2023) to distribute weight in high-traffic construction areas.

Tree Protection Zone Calculations

Unlike a critical root zone, tree protection zone (TPZ) can be calculated and specified. The International

KEY TAKEAWAYS

- Include an arborist in the design process.
- Assess the trees to retain the healthiest ones.
- Keep existing trees in the new design.
- Develop a plan for protection.
- Prune where needed in the right season in anticipation of project.
- Minimize conflicts between trees and future structure.
- Discuss the protection plan with all contractors on the project.
- Establish a Tree Protection Zone before construction begins.
- Cut rather than crush tree roots.
- Tie back branches (if able to retain) rather than prune.
- Care for existing landscape, during construction.
- Create and execute post-construction management plan.

Species Tolerance to Construction Damage	Relative Tree Age	Radius Multiplication Factor (xDBH)
High	Young or adult Mature Heritage	6 8 12
Medium	Young or adult Mature Heritage	8 12 15
Low	Young or adult Mature Heritage	12 15 18

Diameter = 2 x Radius
1 foot = 12 inches

As example:
Mature, **high** tolerant (such as Kentucky Coffee Tree) of 10-inches diameter:
10" x **8** = 80" / 12" = 6.667 feet radius x 2 —> 13 feet diameter of Tree Protection Zone

Mature, **low** tolerant (such as Blue Spruce) of 10-inches diameter:
10" x **15** = 150" / 12" = 12.5 feet radius x 2 —> 25 feet diameter of Tree Protection Zone.

Figure 36: Tree Protection Zone calculation table.

Society of Arboriculture offers guidance on this best management practice for protecting trees around construction sites.

A specified TPZ takes into account the planned construction area, existing infrastructure, tree health, location and species, and other relevant factors to improve tree health and survival (Matheny 2023). In this way, the zone is specific to the trees that it is preserving for retention.

Young trees of three inch diameter have a minimum tree protection zone (TPZ) of ten feet diameter or 5 feet radius from the trunk in every direction. Guidelines further detail distance based on type of tree, age and size.

As an example, a Spruce (*Picea* sp.) has few large roots, and as such, cutting one root can cause severe problems both for the tree as well as for surrounding structures.

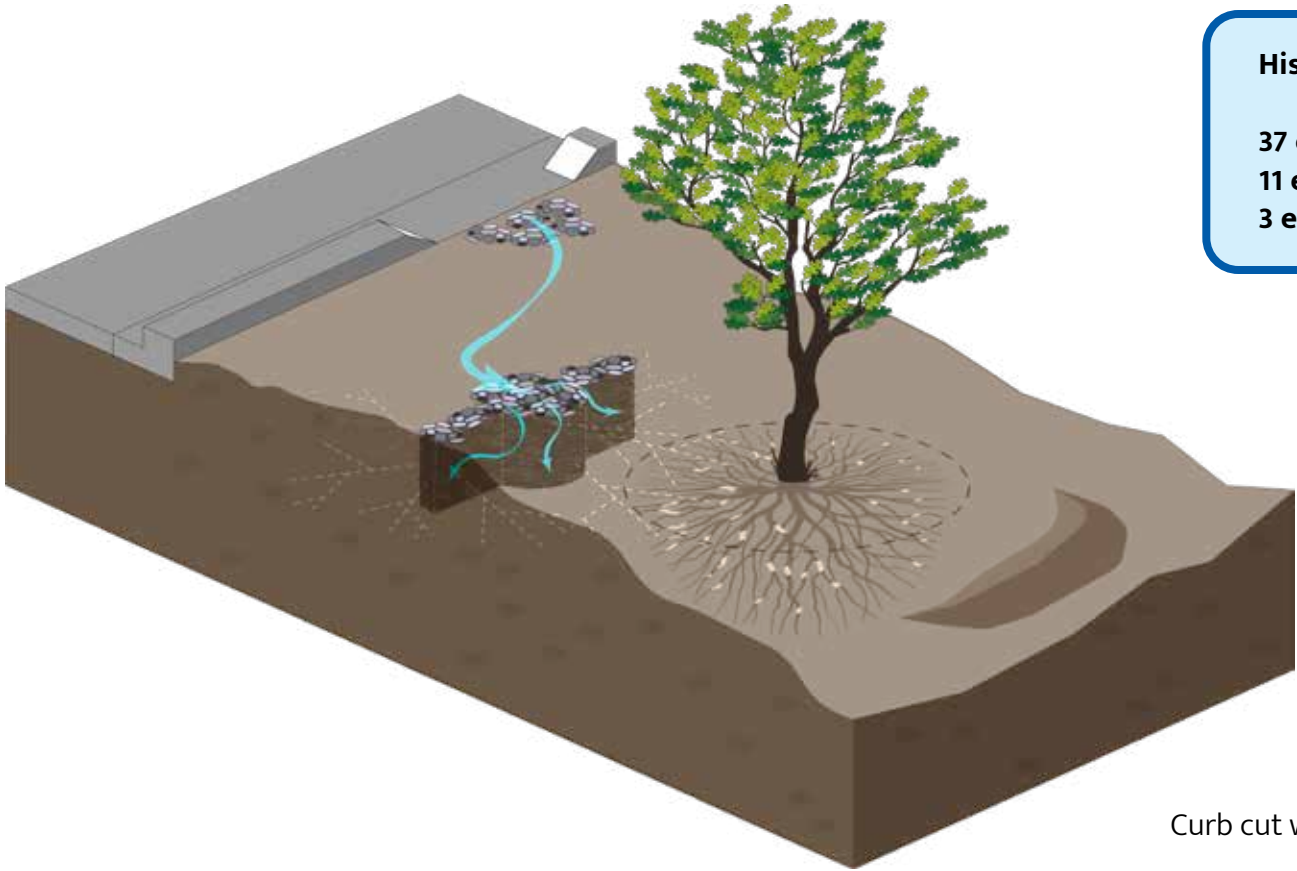
It has a low tolerance to construction damage. In contrast, Thornless Honeylocust (*Gleditsia triacanthos* var. *inermis*) and Kentucky Coffee Tree (*Gymnocladus dioica*) have relatively high tolerance to construction.

Construction Related Tree Damage

- Changing the grade,
- Excavating trenches, including utility line burials,
- Crushing roots,
- Pedestrian & equipment traffic,
- Vehicle parking,
- Burning,
- Storing heavy and/or hazardous materials,
- Improper disposal of liquids,
- Physical injury to trunk, branches & roots,
- Sunscald or wind vulnerability due to removal of surrounding trees and structures.

Rain Gardens

Rain gardens are shallow depressions designed to collect and absorb runoff. Incorporating rain gardens can create immense benefit to improving water quality and reducing pollution in the river and other waterways. They can be simple to install and engineered to hold the capacity of a standard rainfall event. They should not retain water longer than one day. A pre-construction percolation test determines if soil amending is needed to help infiltration. In narrow spaces, underground technologies increase water absorption without excessive drops in elevation. One example is the lagunita, a deep on-contour wood chip sponge inoculated with mycorrhizal fungal spores. Curb cuts, 2 to 4 feet wide with a 45 degree angled cut, allow water to enter into the garden.



Curb cut with lagunita

Rain garden designs can be geometric, rectangular, linear, rounded, terraced or meandering. They can be acequia style, guiding water along a corridor. They can be pass-through style, where water enters from one direction and exits another, or boomerang style, where the water exits the same entrance point once level has been reached. The change in grade moves water because water naturally moves to lower elevations.

Rain gardens can be rock lined or seeded. Logs inoculated with mushroom spores can be incorporated to clean water. Rain gardens are best used in conjunction with planting, especially trees. Plants should be selected to handle periods of drought, inundation of water, and withstand polluted water and soils.

Trees should not be at the lowest level of a rain garden, as water should not remain on the trunk. Lagunitas help create an underground lower grade, as stormwater continues to move downward into this structure below grade of the tree trunk. Overflows can direct water farther down the slope to the next location for a tree!

Historically, rainfall per year provides:

- 37 events of 0.1-inches
- 11 events of 0.5-inches
- 3 events of 1-inches

Likelihood of rain per year:

- 7 events with 0.25-inches
- 14 events with 0.50-inches
- 22 events with 0.75-inches

(National Centers for Environmental Information 2025)



Curb cut with sediment trap, Santa Fe. 2024 - Seeds of Wisdom, LLC.

KEY TAKEAWAYS

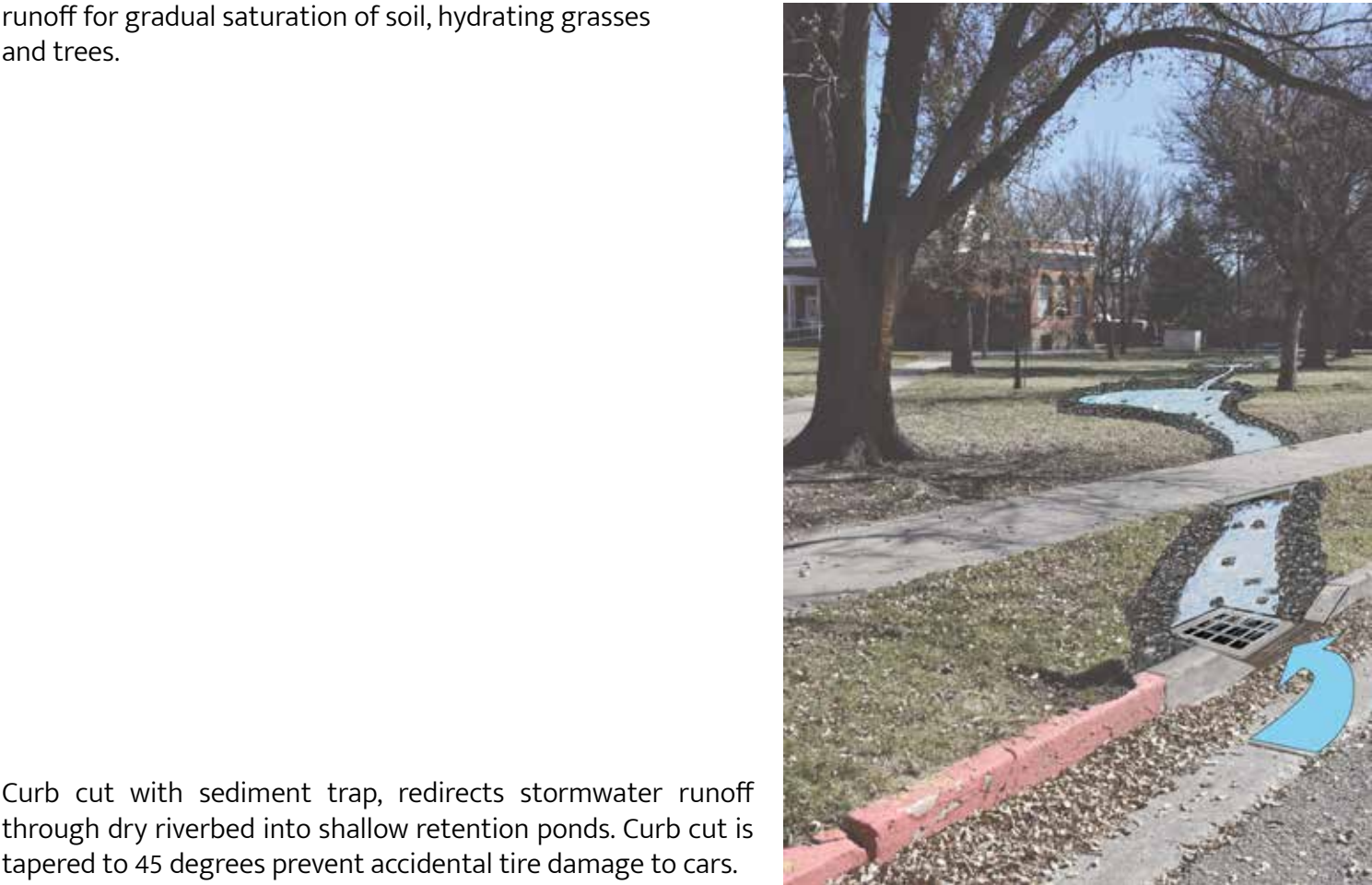
Rain gardens:

- come in all shapes and sizes,
- clean water before it enters into the river,
- slow the force and timing of entry into the waterway, grows plants, including trees,
- can incorporate subsurface structures for deep water infiltration and for safe narrow locations,
- can guide water from one place to the next,
- can be used in sequence of one another,
- should be prioritized by amount of flow, speed and hazard risk,
- are often created in conjunction with a curb cut & sediment trap.

Channeling Stormwater

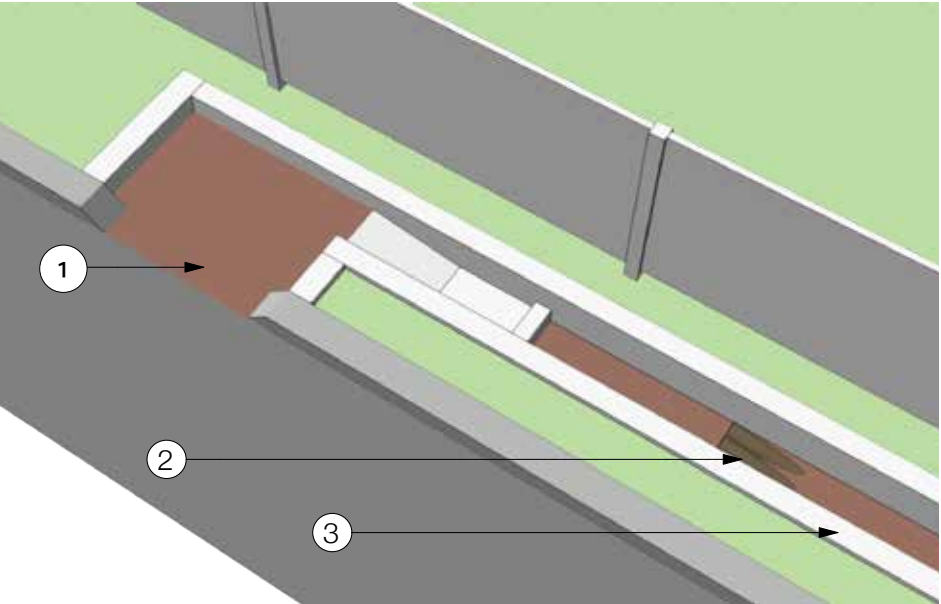


Shallow retention ponds capture directed stormwater runoff for gradual saturation of soil, hydrating grasses and trees.



Curb cut with sediment trap, redirects stormwater runoff through dry riverbed into shallow retention ponds. Curb cut is tapered to 45 degrees prevent accidental tire damage to cars.

Irrigation channel with inoculated logs.

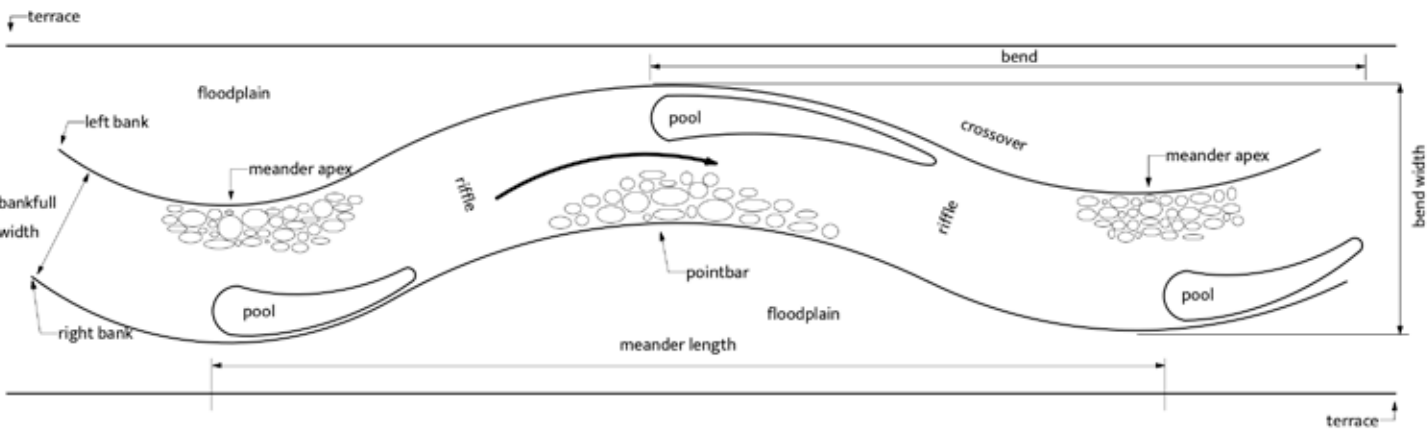


- ① Curb cut with sediment trap
- ② Inoculated logs
- ③ Block wall



Block wall channel.
Santa Fe River, Santa Fe.
Designer Unknown.

Example of Geomorphic Channel. Design and Concept by Bill Zeedyk



Meander length is approximately ten to sixteen times the bankfull width in river channels worldwide.

Induced meandering calculations can be found in Bill Zeedyk and Van Clothier's book:
Let the water do the work: Induced meandering, an evolving method for restoring incised channels, 2009

Recommended Priority Rain Garden Locations



①
Truder Park



②
River Walk at Moreno Street



③
Salazar Street, West Side
near Pajarito Arroyo



④
River Walk Runoff entrance
Valencia Street
Across from Parking lot

Priority Rain Gardens



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community
Las Vegas City Line: Seeds of Wisdom LLC, 2024
Opportunities for Rain Gardens: Seeds of Wisdom LLC 2025
Geographic System: WGS 1984 Web Mercator
Projection: Auxiliary Sphere
Datum: WGS 1984
Seeds of Wisdom LLC, March 2025



Figure 37a: Priority sites based on where flooding occurs regularly.



⑤
Rodriguez Park
Lower Parking Lot



⑥
Rodriguez Park Culvert



⑦
Bernalillo Street &
Hot Springs Boulevard



⑧
Cinder Road & Mills Avenue, East Side

Recommended Secondary Rain Garden Locations



9
7th Ave & Baca
Intersection



10
Harris Pond Parking Lot

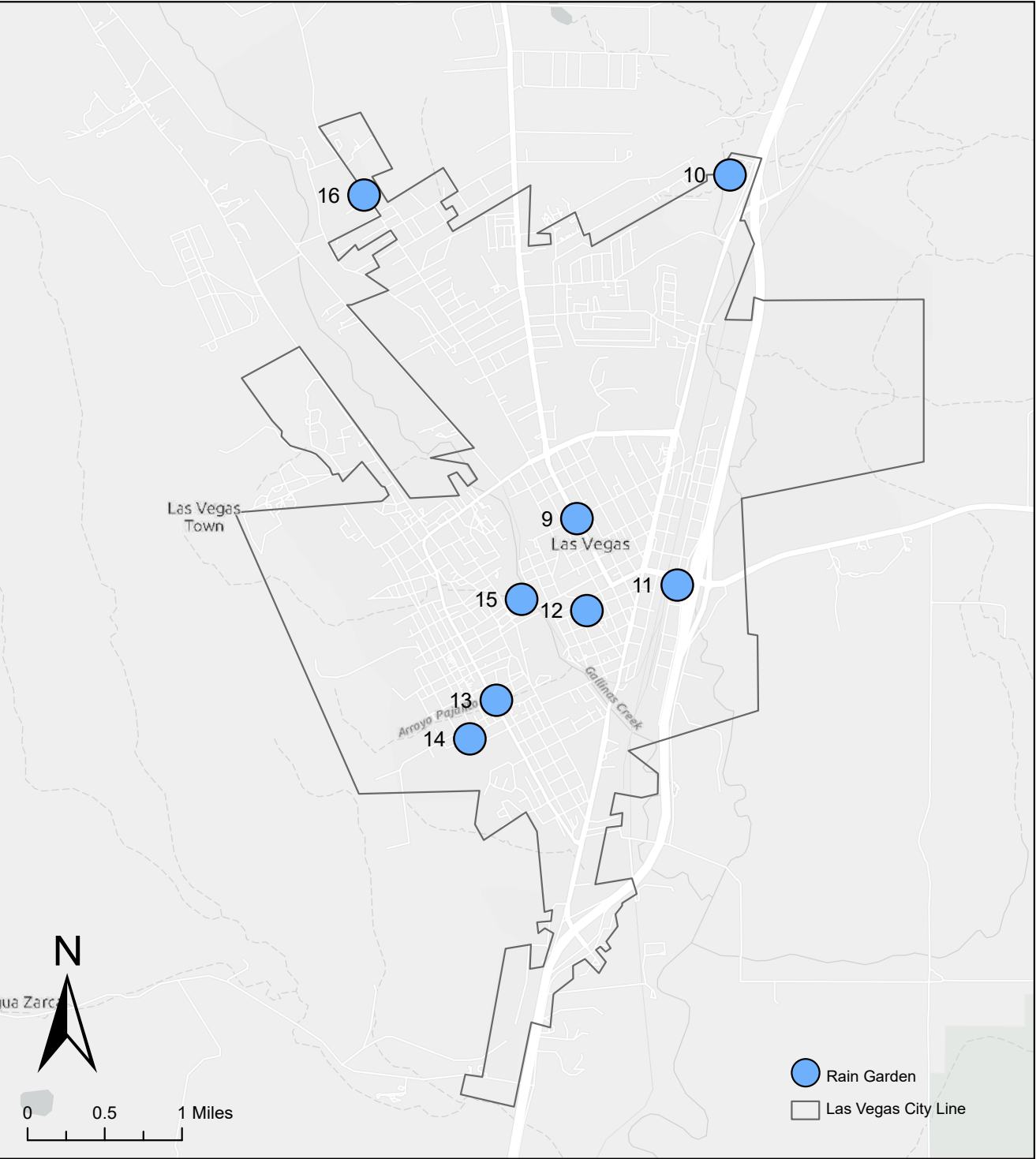


11
901 Douglas Ave

12
Commerce Soccer Field/
Marrujo Park



Secondary Rain Gardens



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community
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Datum: WGS 1984
Seeds of Wisdom LLC, March 2025



Figure 37b: Secondary priority locations for stormwater collection.



13
Pajarito Park



14
Romero & Kavanaugh
Street



15
Las Vegas Police
Department Public
Parking Lot



16
8th Street & Tupelo
West Side Pullout
Area

Recommended Additional Rain Garden Locations



17
Harris Pond
Picnic Area



18
Tony Martinez Jr.
Welcome Center Park

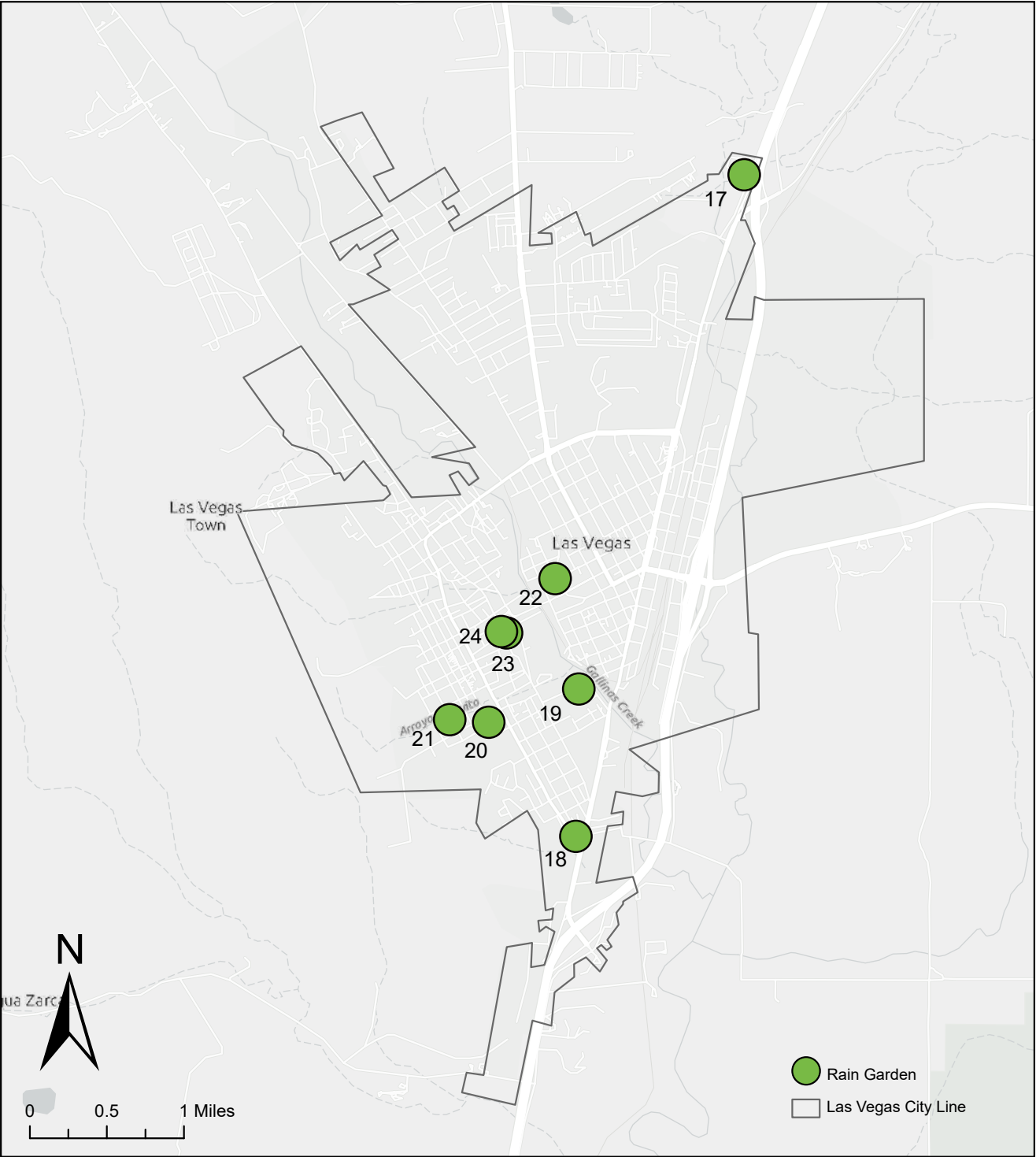


19
115 Independence Rd



20
Armijo & Kavanaugh

Additional Rain Gardens



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, TomTom, Garmin, (c) OpenStreetMap contributors, and the GIS User Community
Las Vegas City Line: Seeds of Wisdom LLC, 2024
Opportunities for Rain Gardens: Seeds of Wisdom LLC 2025
Geographic System: WGS 1984 Web Mercator
Projection: Auxiliary Sphere
Datum: WGS 1984
Seeds of Wisdom LLC, March 2025



23
1030 Salazar St



22
916 11th St
(ARMAS Building)



23
Moreno & S. Pacific St



24
Valencia St Parking Lot

Figure 37c: Supplementary locations for stormwater collection based on flood patterns.

Rain Gardens

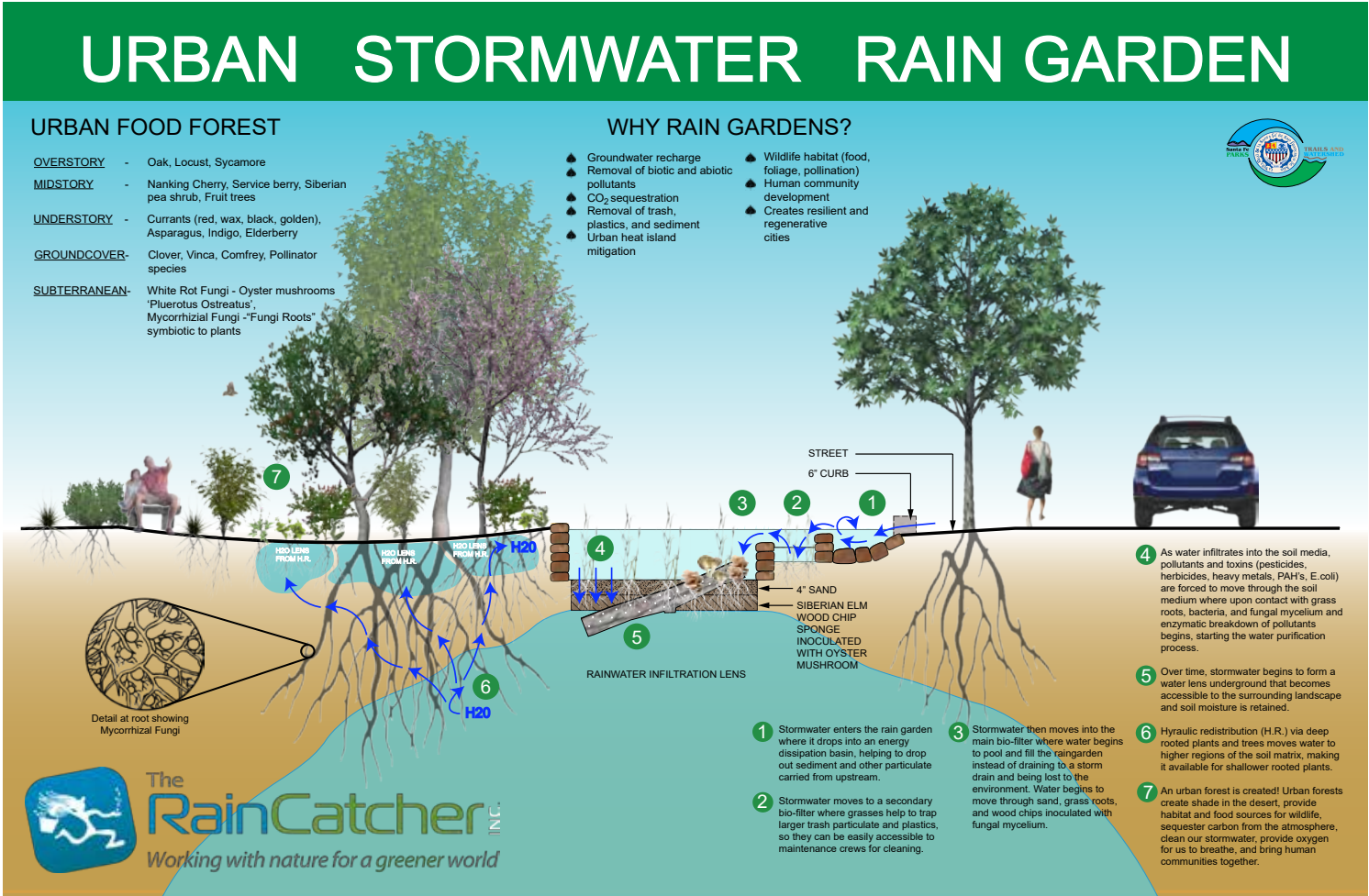


Rain Garden, West Las Vegas High School, 2019. Designed by Southwest Urban Hydrology, in collaboration with the Hermit's Peak Watershed Alliance. River Steward Grant funding provided by the NMED Surface Water Quality Bureau. Photo credit: Aaron Kauffman



CALL TO ACTION

Harvest stormwater with a rain garden,
and grow a tree in it!



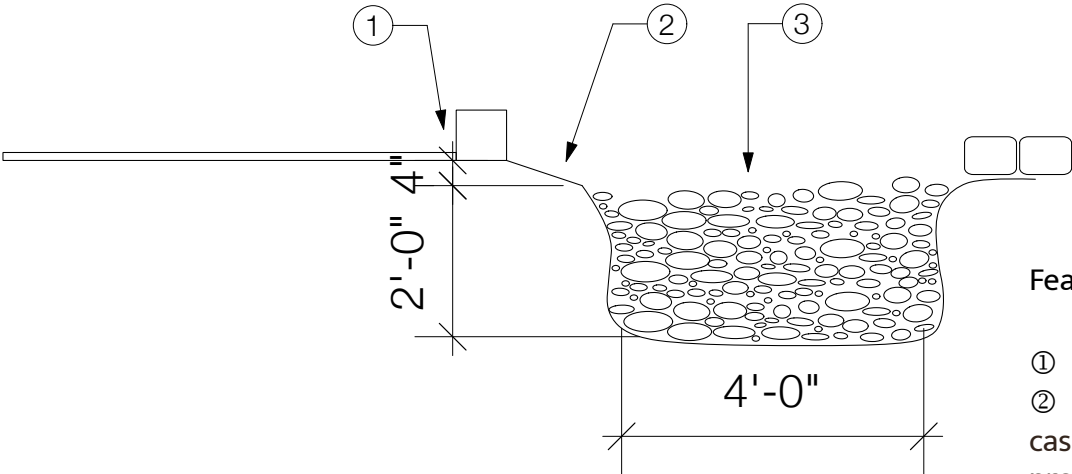
Rain Garden, Designed and installed The RainCatcher
East Alameda Street, Santa Fe, NM, 2023.



Sediment Trap

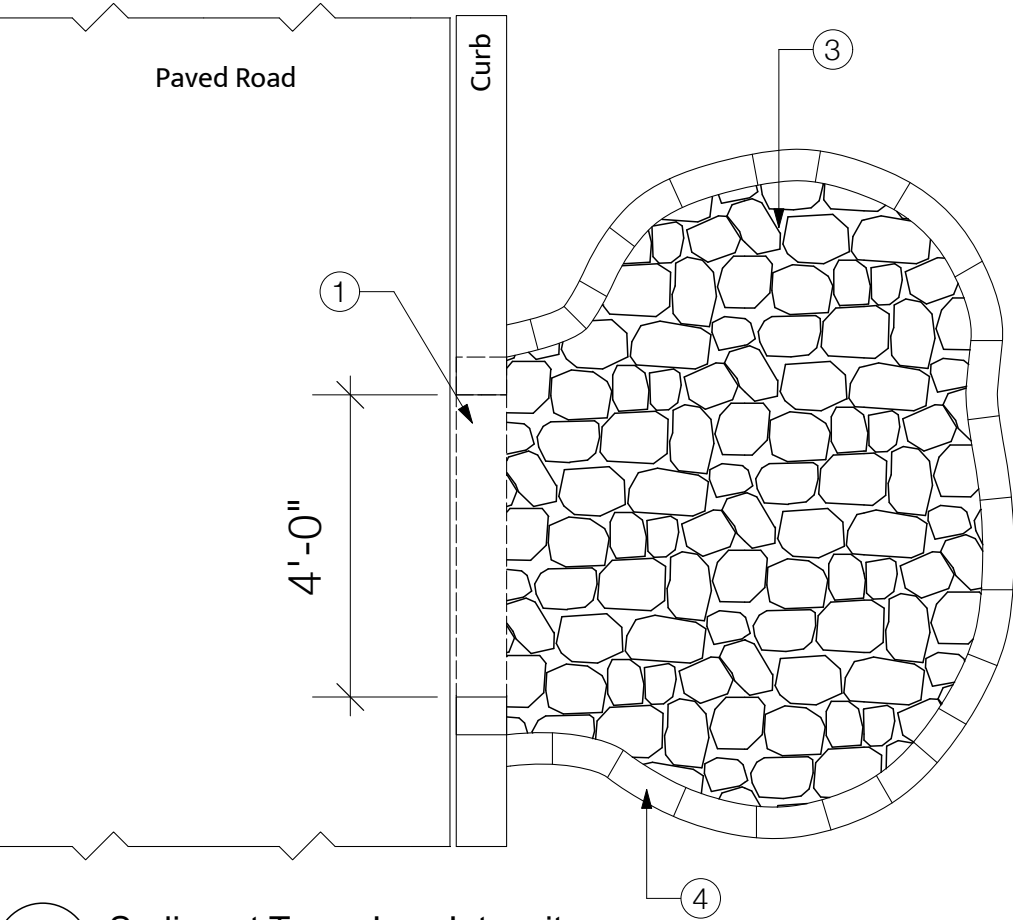
Sediment traps help remove oil, microplastics, de-icing material and other debris from streets. The amount of sediment and frequency of maintenance determines the capacity for collection. Although designs vary, all share that the trap is set below the street, material is blocked from entry into the garden, and water continues to flow.

SEDIMENT TRAP DESIGN FOR LOW INTENSITY SEDIMENT COLLECTION

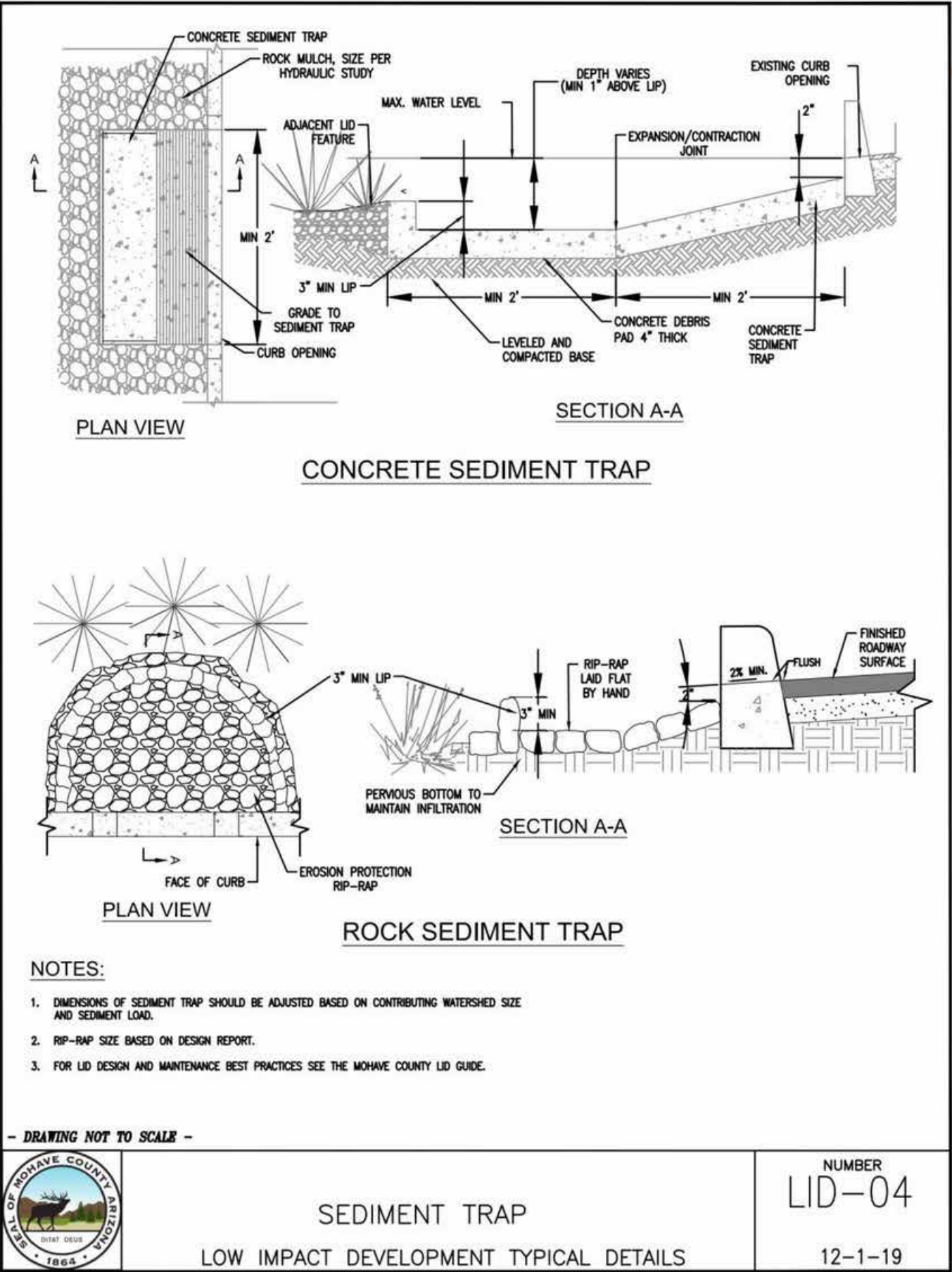


Features:

- ① Curb cut, 2-4' wide
- ② 4" below road stepdown, cascading downward to protect concrete
- ③ 2' deep hole with 4 - 8" river rock
- ④ Retention wall
- Accommodates a low amount of debris
- Economical
- Easy to clean out & maintain regularly
- Requires some construction



1 Sediment Trap - Low Intensity
Scale: 1/2" = 1'-0"



Sediment Trap - Mohave County, Arizona

Sediment Trap

SEDIMENT TRAP DESIGN FOR MIDDLE INTENSITY SEDIMENT COLLECTION

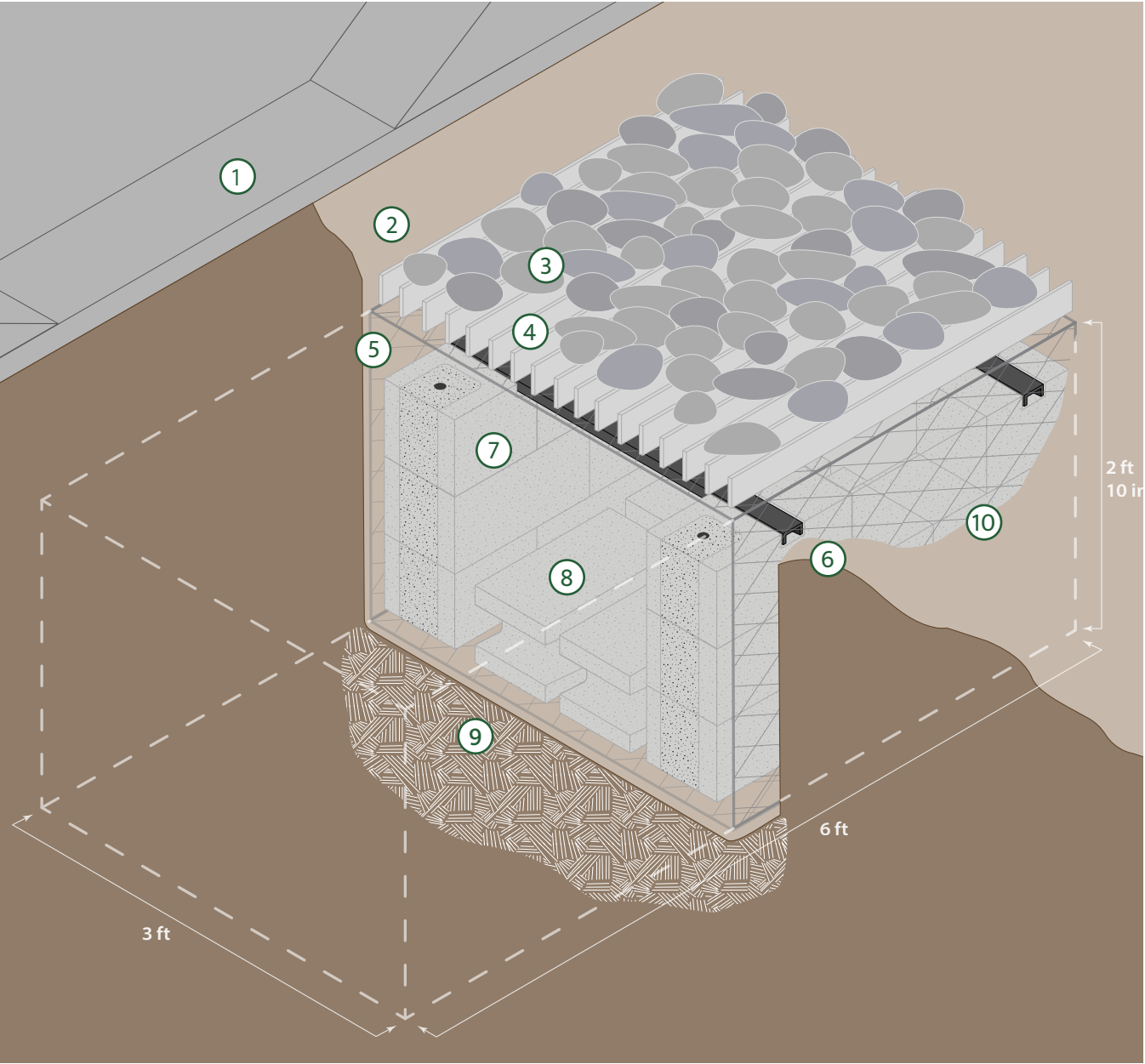
This sediment trap is intended for mid-level stormwater leading into a rain garden, where the quantity of street debris exceeds 50 gallons per maintenance cycle.

Set four inches below a curb cut, the sediment trap receives runoff from the street, which is then slowed and filtered by several materials. A wire gabion cage forms the outermost layer, while cinder blocks form the main structure below ground level.

Gaps between blocks at the bottom of the sediment trap allow water to percolate into the ground. Mycorrhizal inoculate helps decompose material, clean water, and extend nutrients to tree roots.

Sitting on top of this structure is a galvanized steel grate with a load rating of 600 pounds. For additional load-bearing capacity, c-channels are set into cinder blocks below the gabion top. The top of the trap is then covered with river rocks, which also help catch sediment, leaf litter, and other debris before it gets to trees, other vegetation, and the aquifer.

A sediment trap, hidden under these river rocks and integrated into the design of a rain garden, helps filter stormwater and runoff to provide trees with moisture that is essential to their survival and growth.



- ① **CURB CUT**
4 feet wide
- ② **SLOPE FROM CURB**
4-inch drop
- ③ **RIVER ROCKS**
- ④ **GABION WIRE CAGE**
- ⑤ **GALVANIZED STEEL GRATE**
For additional load-bearing capacity
- ⑥ **C-CHANNELS**
For supporting grate above; recessed into CMU walls
Alternate detail: flat steel can be used instead, with rebar stubs welded to pieces to help keep them in place
- ⑦ **CMU WALLS**
Filled with concrete and reinforced with rebar
- ⑧ **CMU BLOCK FLOOR**
Space between blocks on sediment trap floor allow some water to infiltrate into soil below
Flat side up to facilitate cleaning with square-point shovel
- ⑨ **MYCORRHIZAL INOCULANT**
- ⑩ **OUTFLOW**
Filtered water exits sediment trap through shorter section of wall

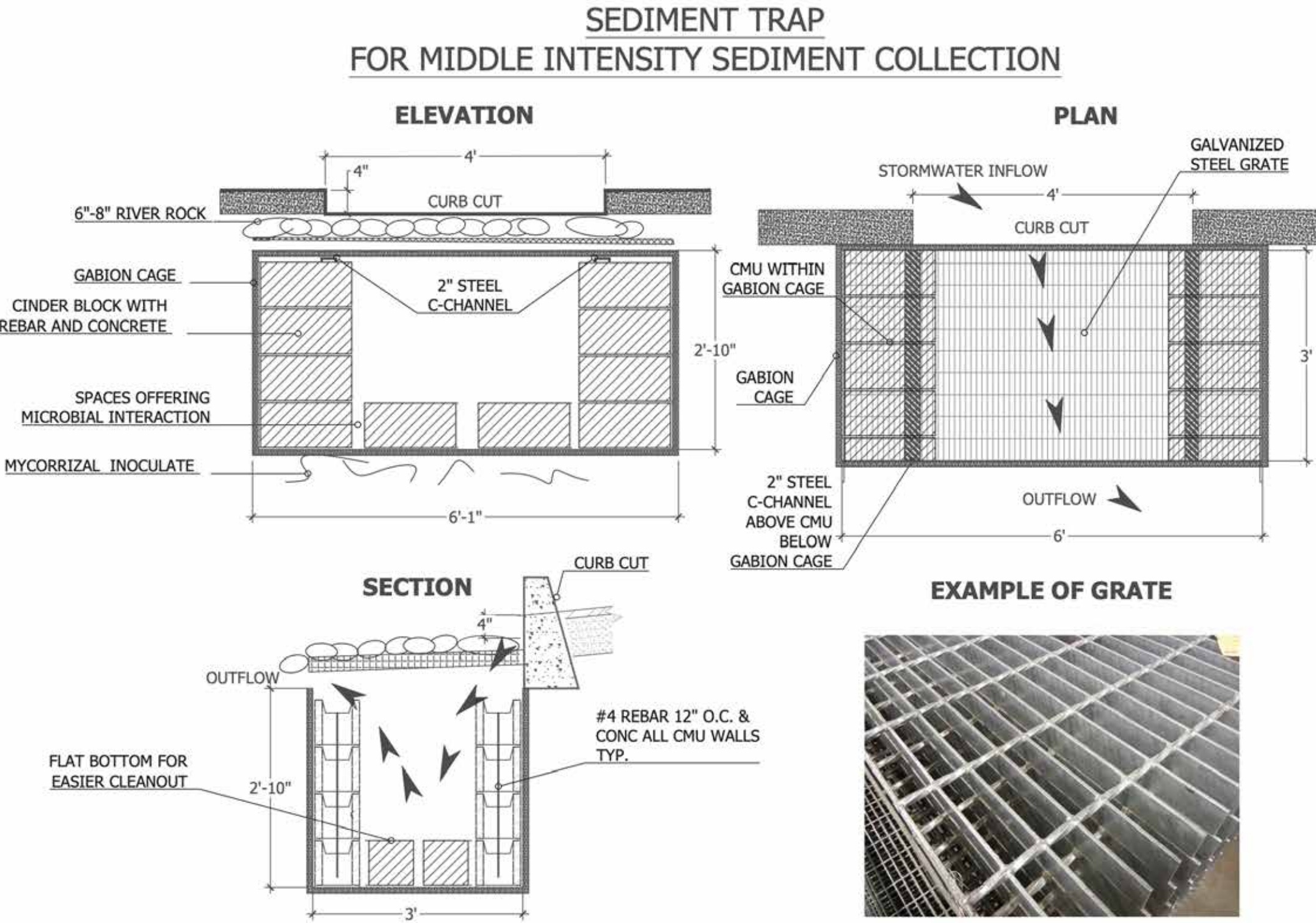
CUTAWAY VIEW: Construction materials and other key elements (full size of trap is indicated by dashed lines)

Sediment Trap

SEDIMENT TRAP DESIGN FOR MIDDLE INTENSITY SEDIMENT COLLECTION



Periodic clean-out



Seeds of Wisdom, LLC.
PO Box 33672
Santa Fe, NM 87594
plants@sowsfe.com
505-920-2455

PROJECT NAME AND ADDRESS
City of Santa Fe
Rain Garden Sediment Trap
Alameda Raingarden at Cathedral Place
PROPOSED REDESIGN

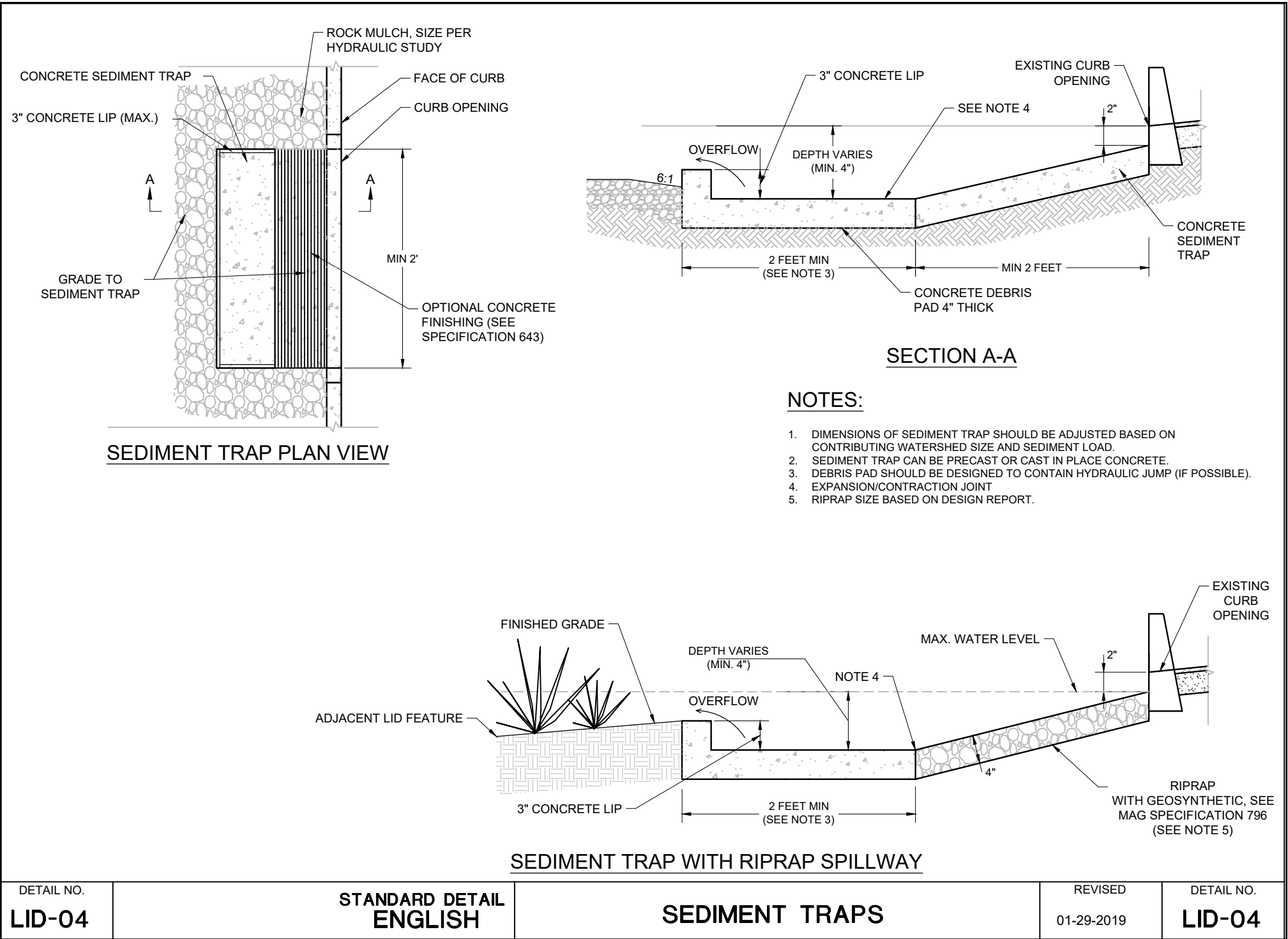
PLOT INFORMATION:
Drawn by: [blank]
4800 Full Sheet 8 1/2 x 11 1/2 inches
100% Title Block
Sediment Trap 20210511.dwg
Add the Name:
Date:

Sheet Title: CONSTRUCTION DETAILS
Date: 03/25/2021
Scale: 3/4" = 1' - 0"
Sheet Number: **01**

Sediment Trap



Terraced rain garden with directed curb cut, Indianapolis, Indiana 2016



Sediment Trap - Mohave County Arizona

Curb Core

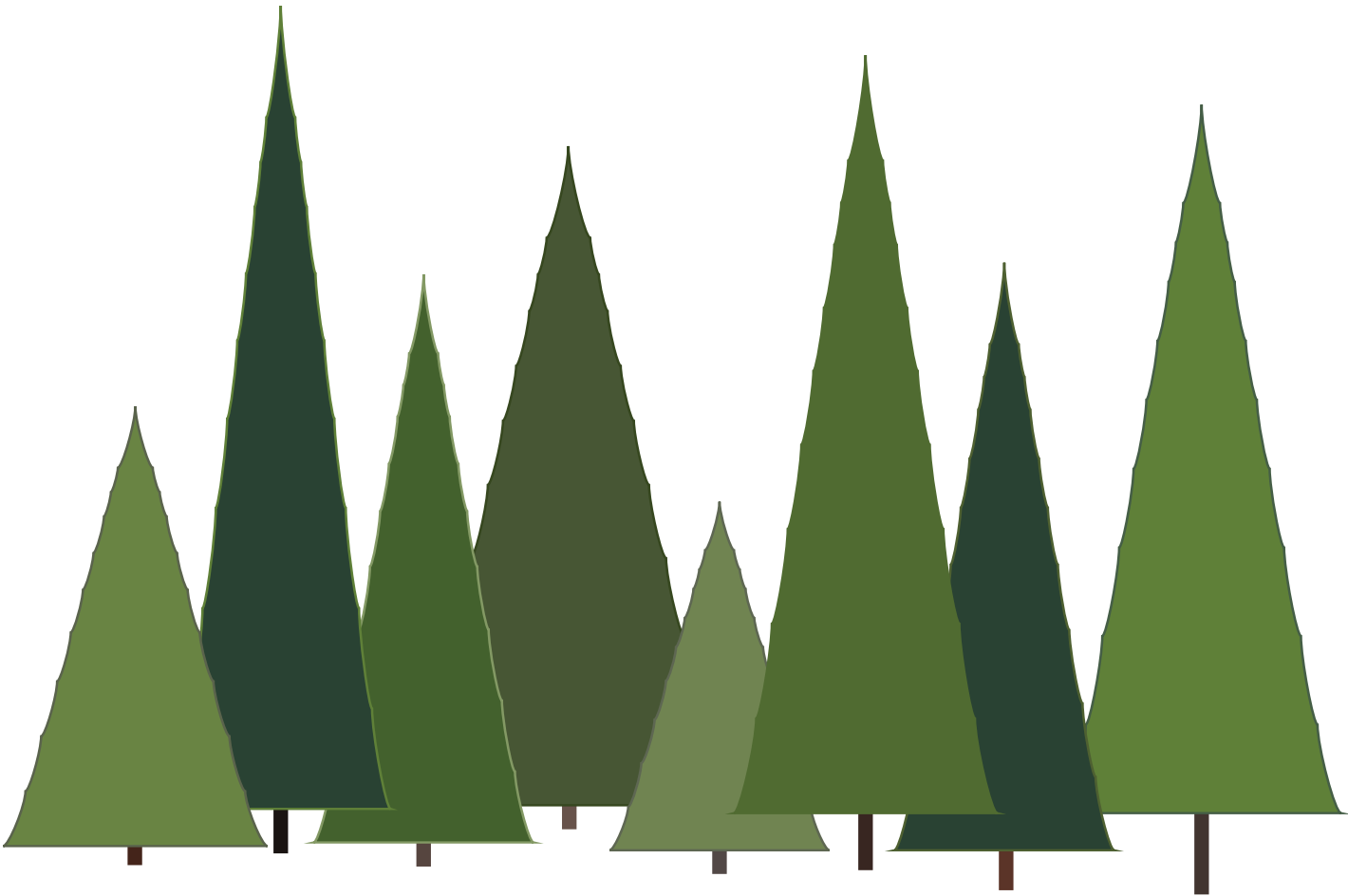
Where curb cuts are not practical, another method to direct water into a rain garden is through curb coring. This creates gaps in a curb without having to actually cut the curb. Four inches of open space or larger is best to allow the most water to enter into the garden, and the core should be angled for efficiency of water flow. Above the core, “a minimum of 2 inches of solid curb” (Landcaster 2020, 212) will protect the curb integrity. Curb cores can also be used to direct overflow water from one rain garden into the next location.



Curb core under sidewalk for overflow, Santa Fe, NM

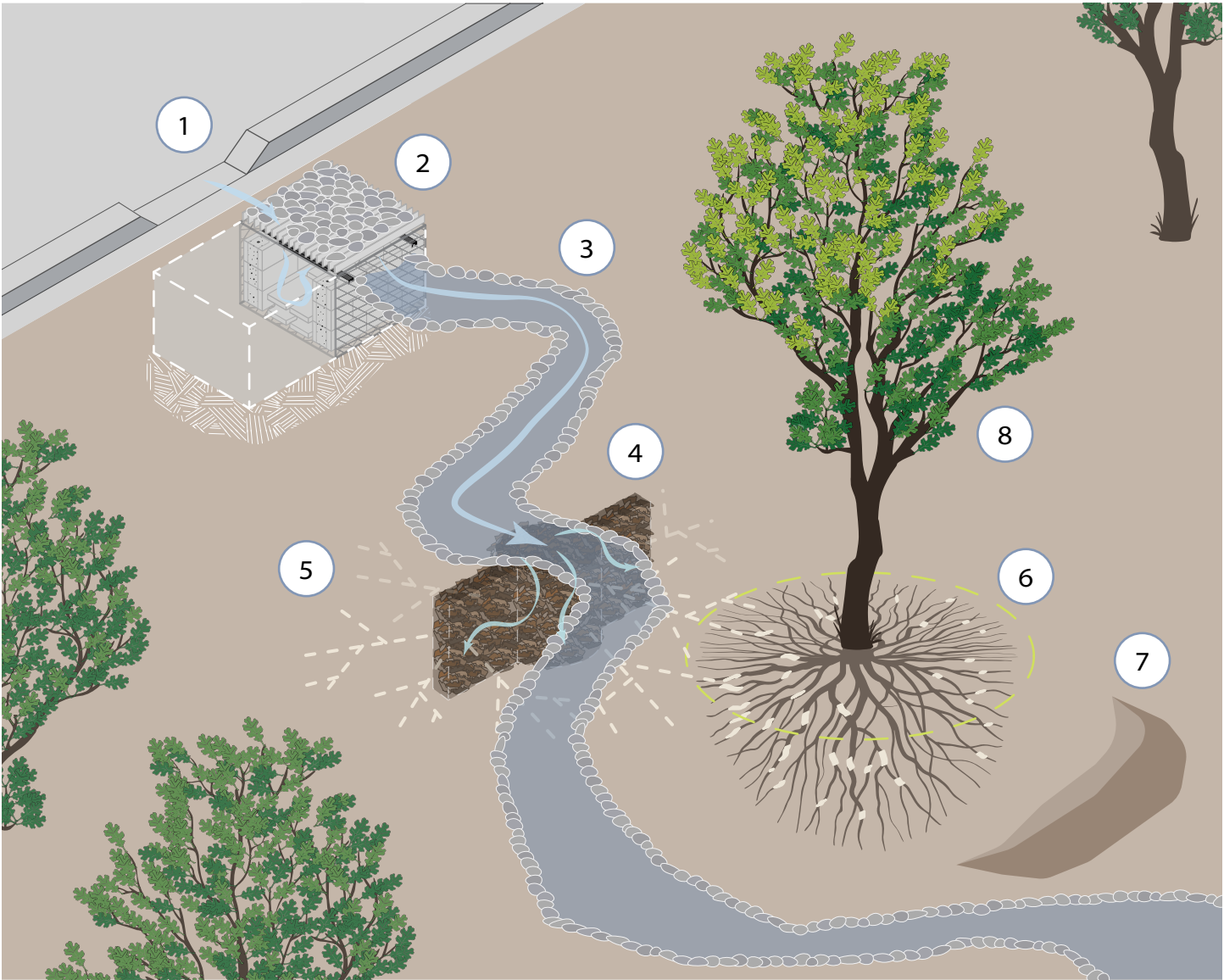


Left and above right:
Curb Cut - Brad Lancaster
2020



GUIDED RAINDROPS GROW TREES
LA LLUVIA BIEN UTILIZADA HACE CRECER LOS ÁRBOLES

Every drop counts for healthy landscapes! ¡Cada gota cuenta para mejorar sus paisajes!



- 1 CURB CUT • CORTE DE BORDILLO**
The curb cut allows runoff into the garden.
El corte de bordillo deja que le agua pluvial entra en el jardín.
- 2 SEDIMENT TRAP • TRAMPAS DE SEDIMENTO**
Oil & sediment settle into the trap as water flows.
Aceite y sedimento bajan en la trampa al pasar el agua.
- 3 (DRY) RIVERBED • CAMINO DEL RIO**
Slowing water allows infiltration into the soil.
Reduciendo la velocidad permite el agua a infiltrar la tierra.
- 4 LAGUNITA • LAGUNITA**
Wood chips act like a moisture absorbing sponge.
Madera astillada actua como esponja absorbiendo humedad.
- 5 MYCORRHIZAE • MICORRIZAS**
Fungi in the soil help roots extend to nutrients.
Los hongos en la tierra ayudan a que las raices alcancen a los nutrientes.
- 6 NON-COMPACTED SOIL • DE-COMPACTACIÓN**
Proper aeration of the soil lets roots breathe.
Aeración de la tierra adecuada deja que las raices respiren.
- 7 BERM & SWALE • BERMA Y ZANJA**
Catching runoff prevents erosion & holds seeds.
Atrapando el agua pluvial previene la erosión y guarda semillas.
- 8 TREE • ÁRBOL**
Trees create shade and reduce heat.
Los árboles crean sombra y reducen calor.



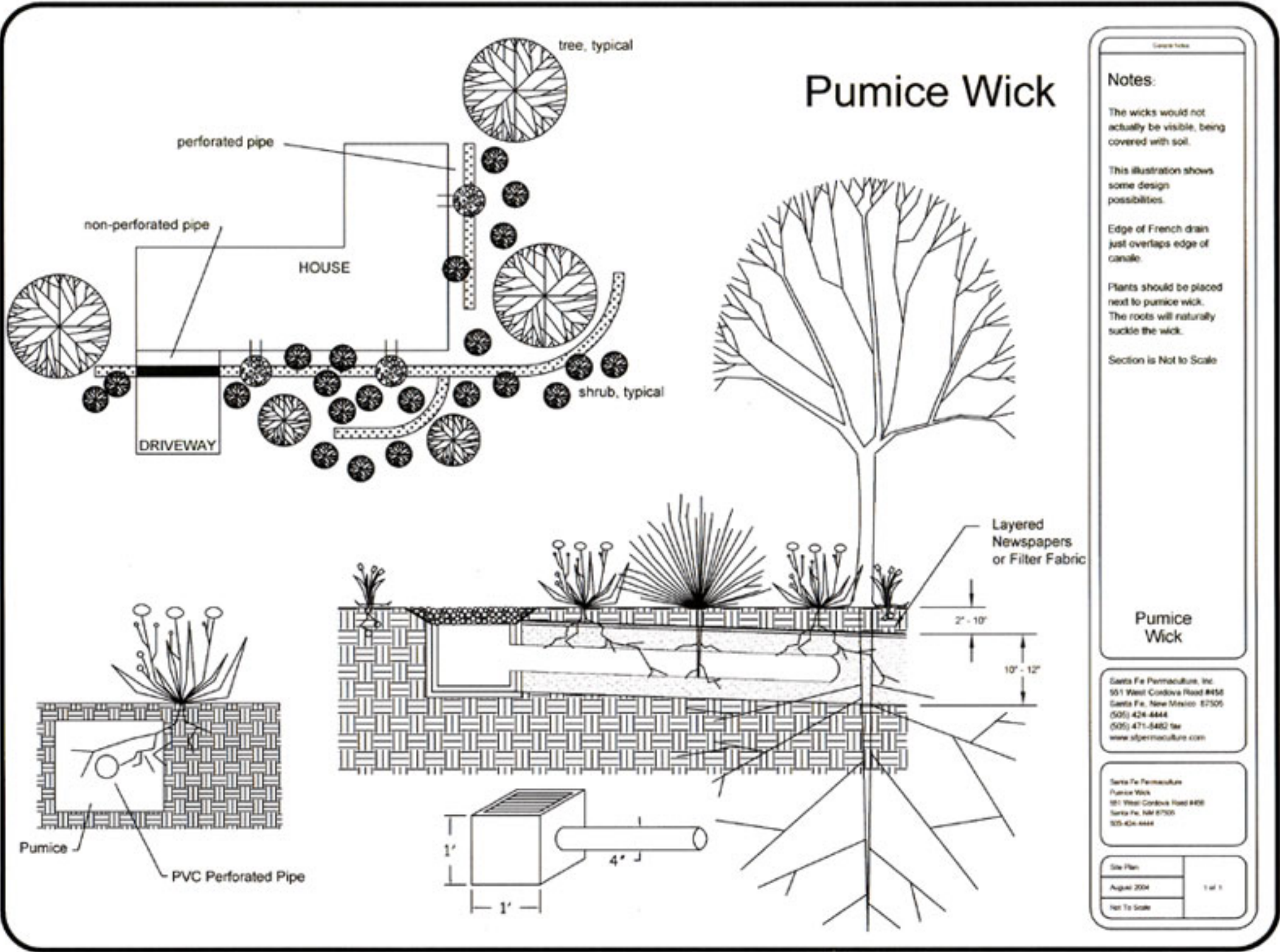
Above: On-contour form for Lagunita, to be filled with wood chips & mycorrhizae inoculate and topped with rocks. It is 6 feet long, 2 feet wide, and 2 feet deep.

Below: Rain Garden with Lagunitas, supporting 5 trees. Designed and installed by Seeds of Wisdom, LLC. For the City of Santa Fe, NM.



Cathedral Place Rain Garden on Alameda
installed 2017, poster updated August 2024

Pumice Wick



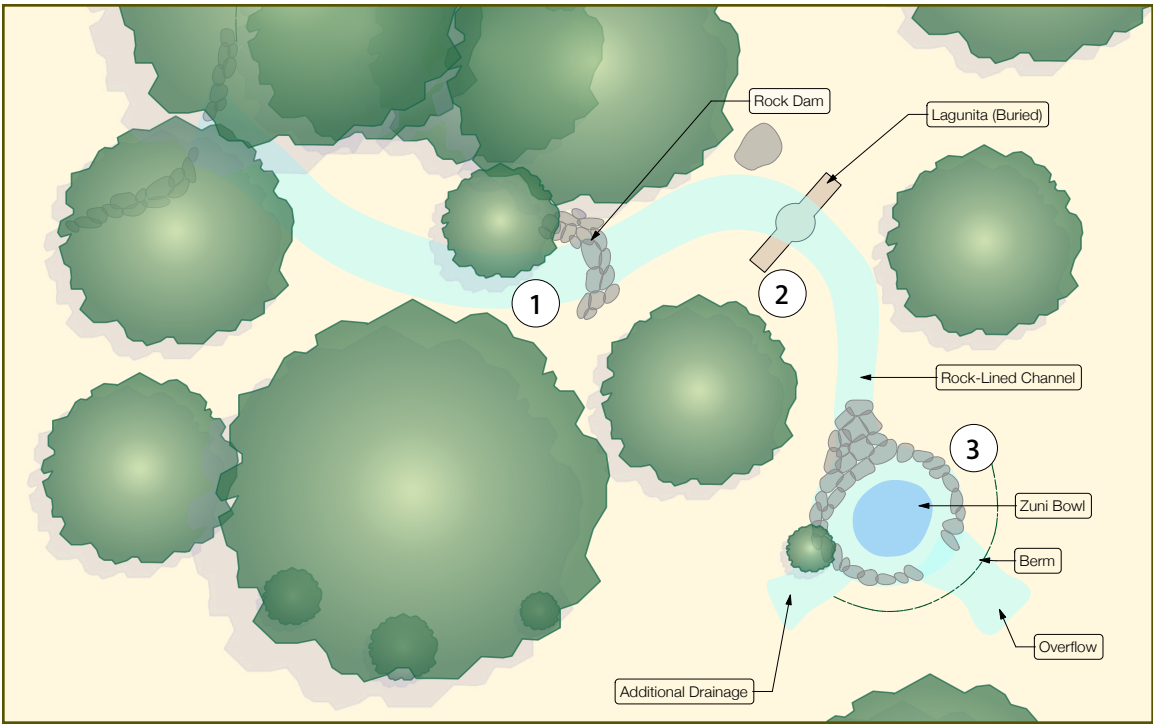
Design: Nate Downey & Melissa McDonald, Santa Fe Permaculture

Pumice Wicks are a great underground best management practice to guide water from a canale or gutter to the garden. Named for the porous volcanic rock that surrounds a perforated pipe, this allows water to percolate from the pipe into the surrounding area, where plants can grow on either side of it. Pumice wicks are an example of off-contour technology, as the system continues to move down in elevation, diverting water. Other rocks that can be used include 3/4-inch scoria rock and GroStone, a material made from recycled glass which also has the same properties. The pipe should be positioned on a gradual decline and connected to a drainage catch basin below the gutter. This basin has a sediment trap built into it to prevent debris from clogging the wick. Filter fabric is used above the wick to keep soil from entering into it.

Pumice or scoria rock can also be used underground without a gutter or perforated pipe such as inside a garden bed adjacent a stormwater channel. This 'Scorito' is made by lowering the soil grade so water enters into this trench before returning to the main channel. The Scorito makes it possible to grow shrubs that may not have access to the stormwater in a dry river bed.

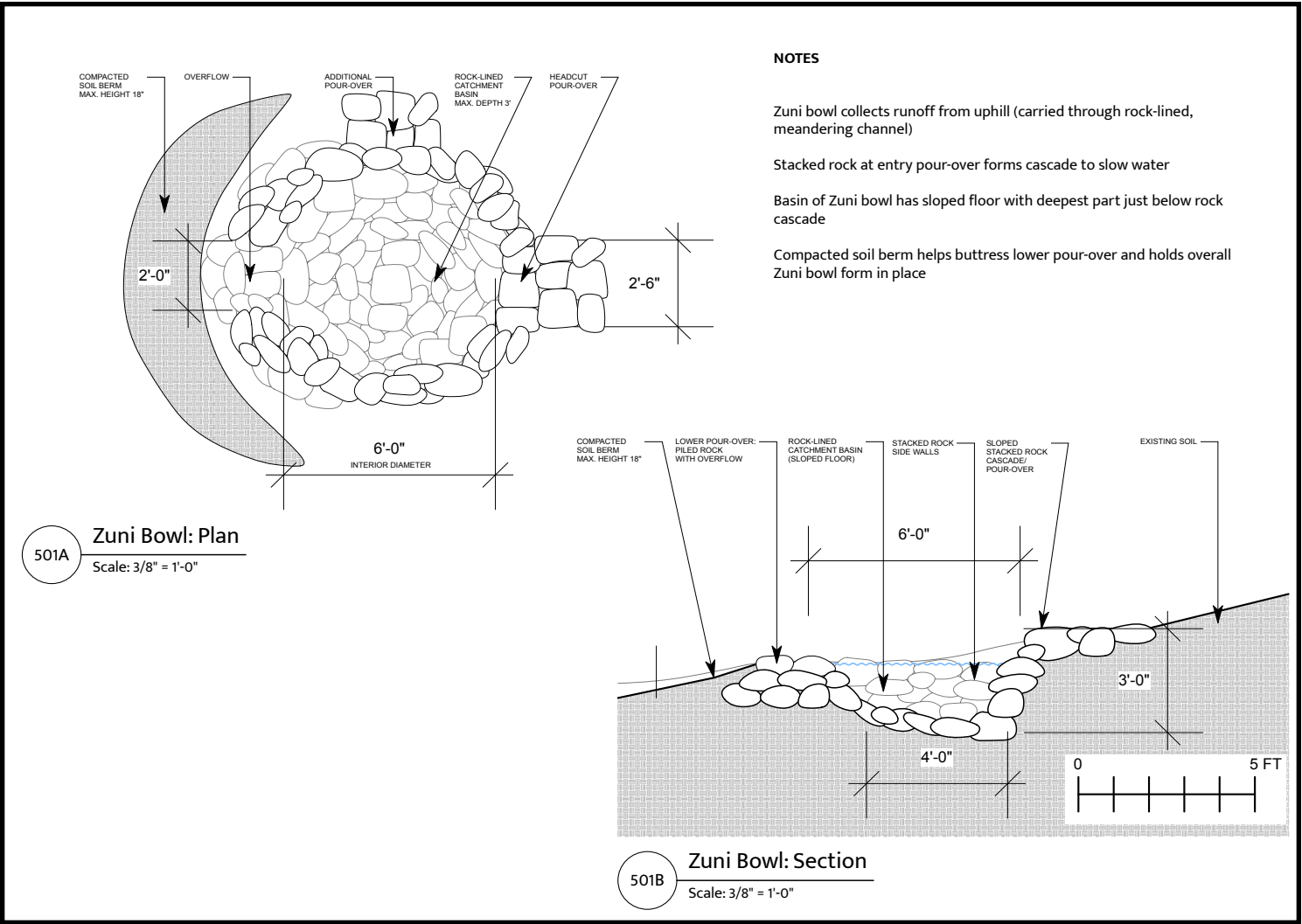
Zuni Bowl

The Zuni Bowl, also called a Rock-lined Plunge Pool, originated in Zuni Pueblo. It allows for water to cascade down into the pool, soak in, and then exit onto a rock mattress. Sand in the base can reduce the depth of the pool. Logs, either horizontal or vertical, can be added for additional filtration water retention, increase in microbial & fungal development and aesthetics.



Zuni Bowl
Designed and installed by
Seeds of Wisdom, LLC for
Santa Fe County.
Arroyo Hondo Fire Station,
Seton Village, NM.
2023

- ① Rock Dam
- ② Lagunita
- ③ Zuni Bowl



Zuni Bowl, designed by Seeds of Wisdom, LLC

“I was working on one of these gullies, and this crew had put in a rock structure that was built like a bowl. It had a pool for the water to fall in, armoring the banks. I made more of a pool for the water to soak in. From then on when we had a head-cut, we put one in”

- Bill Zeedyk (2024) in Zuni Pueblo, 1994-1996

Zuni Bowl
Designed and installed by The RainCatcher for
Santa Fe County Fairgrounds, Santa Fe, New Mexico 2022



Berms



On-contour berms naturally create indentations or swales above them. These can help hold moisture & seed, and can be used in conjunction with other best management practices, such as the Lagunita.

In order to successfully harvest water using a berm, it must be on-contour, meaning that the entire berm follows the same elevation. Rock ‘wings’ at the end of each side point upward but taper in height to allow water to overflow into the subsequent berm. This next berm is often positioned so that it has about a third overlap with the one above. Overflows can also be made in the middle of the berm if necessary.

Berms are usually about two feet high and if possible about “four times as thick” (Landcaster 2020, 94) Because they need to be tamped, care should be given to not tamp root systems. As such, location determines length and distance between each one.

Berm. Santa Fe, NM, Seeds of Wisdom, LLC



Berm & Swale design
Private Residence
Seeds of Wisdom, LLC
Left: Construction in process
Below: Completed design

- ① Lagunita
- ② Berm



Water harvesting calculations can be found in Brad Landcaster’s book:

Rainwater Harvesting for Drylands and Beyond, Volume 2 (2nd ed), 2020

Boomerang berm, Conceptual Drawing.
Keyes Park, Las Vegas, NM.



One Rock Dam / Check Dam



One Rock Dam
San Juan Trail
Santa Fe National Forest
Designer Unknown, Photo taken 2016.

One Rock Dams or Check Dams aid in slowing water and deposition of sediment suspended in stormwater. Over time, this best management practice reduces the profundity of an incised channel.

One Rock Dams are set into the soil on-contour across an entire channel. The lowest row or two are set three-quarter to half into the ground, respectively. Over time, the upper level fills, and another level can be added.

The characteristics of one rock dams are used in other best management practices as well. In dry river beds, these are the one-foot tall bumps or riffles offering a chance for water to pool in front of them.

Straw bale check dams can be also used to stabilize drier slopes, using rebar or wooden stakes to secure them. These do not last as long as rock structures, but their straw holds moisture and helps improve the soil as it breaks down.

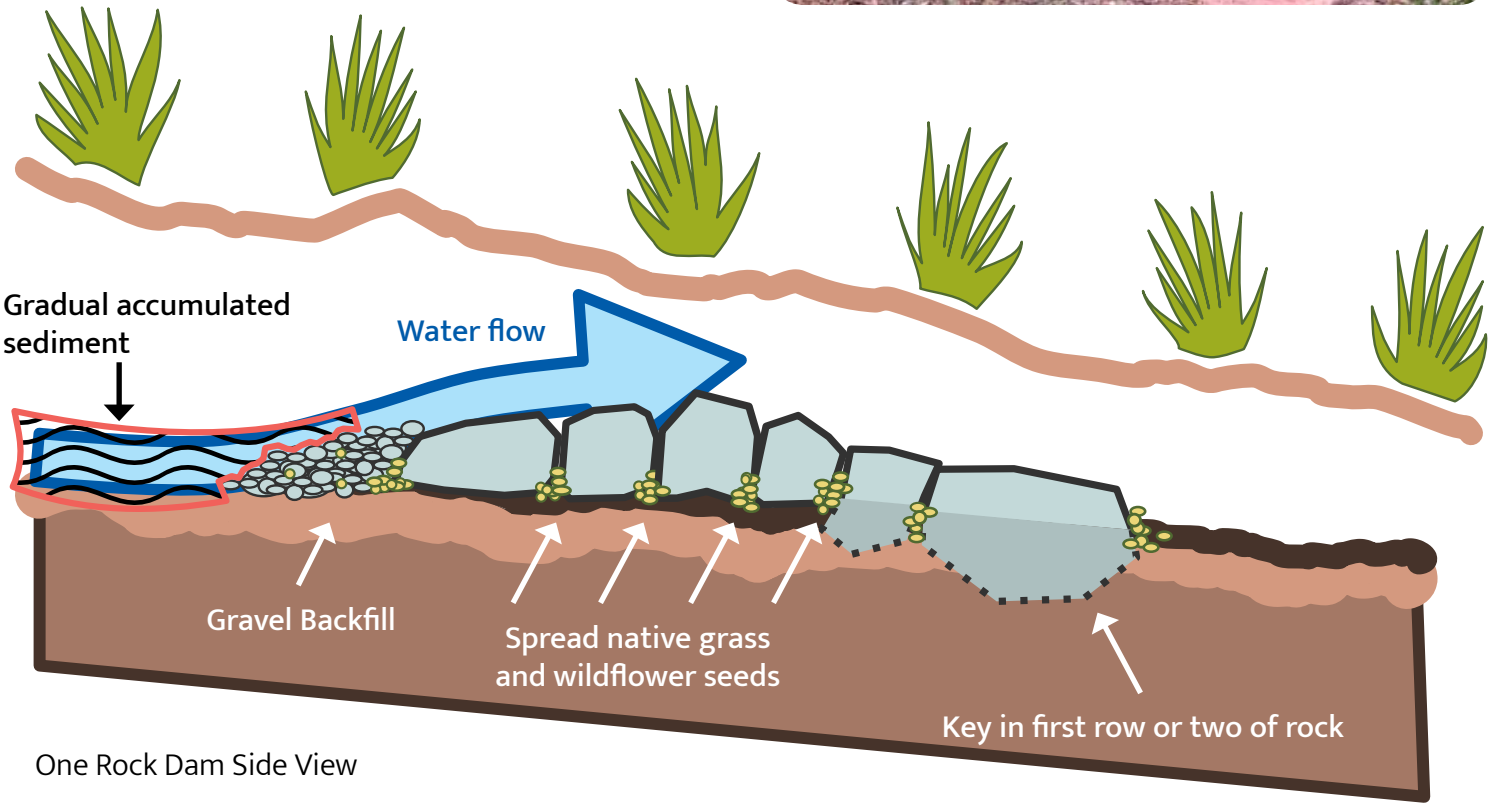
Media Lunas use rock with a boomerang shape and can become elegant additions to a sloped garden.

KEY TAKEAWAYS

- **On-Contour**
- **Water goes over spillway**
- **Anchors sediment**
- **Stabilizes slope**
- **Several structures are built in sequence**

Simple redundant structures support one another.

Rock media lunas, Residence, Santa Fe, NM.
Designed by Seeds of Wisdom, LLC.
Installed by Saldivar Landscaping. Photo taken 2021.



Geojute and Seeding



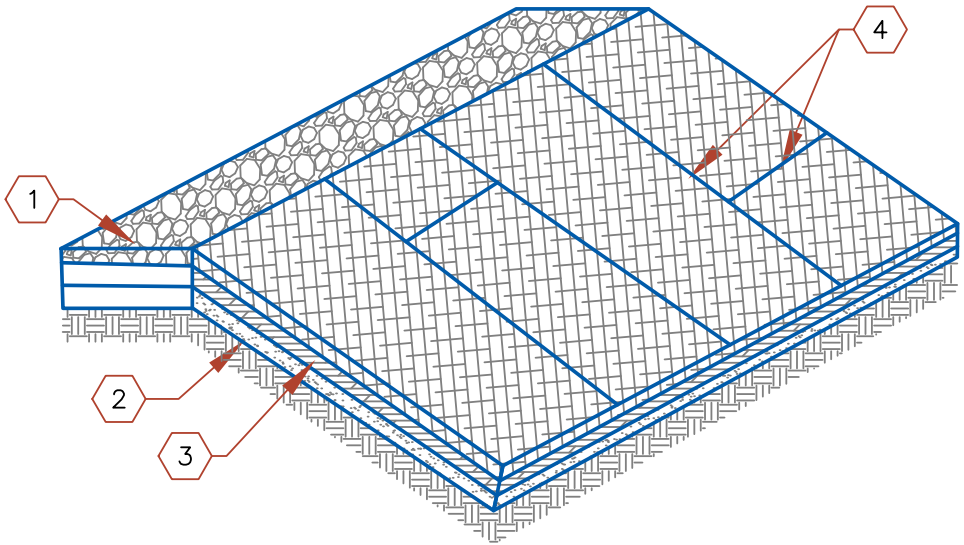
Geotextiles offer stability to a sensitive slope while holding seed and compost onto it. Although grass seed is primary, shrub and tree seed can also be added. Additionally, small sized plants can be carefully included between the burlap strands. This best management practice is intended to degrade over time. Only biodegradable materials should be used.



Geojute with straw bale check dams, leading to a rock rundown.
Residence. Santa Fe, NM
Seeds of Wisdom, LLC

- ① 2" Cobble / river rock at top of slope (If possible)
- ② Scratch surface and mix with compost. Broadcast seed as specified.
- ③ Add binder or trafficker as specified. Reseed to maintain as necessary.
- ④ Geojute fabric laid with 4" min. overlap edges, 6" min overlap at ends. Hold with 6-inch irrigation stakes as needed.

APPLICATION



Scoop & Dump

Prior to planting trees, compaction can be reduced by using a machine to Scoop & Dump. This best management practice, developed by Susan Day and Nina Bassuk adds 4-inches of compost onto the surface and then scoops 2-feet deep and dumps it. This soil profile rebuilding technique improves soil aggregation, and compost veins provide soil improvement while not breaking up existing fungal hyphae strands.

Roots have more room to grow, and soil holds more water for trees!



Chicane Construction
For City of Santa Fe, NM
Designed by Southwest Urban Hydrology
Installed by Seeds of Wisdom, LLC
2024



Air Excavation

Soil Compaction

Tamping soil can be a targeted and purposeful method of traditional infrastructure like roads, sidewalks and buildings. However, trees roots suffer greatly under it. Soil compaction is the process where soil structure becomes compressed and few, if any, air pores exist. This compromises the integrity and function of soil. Water is unable to percolate, and roots cannot absorb nutrients or expand outward, leading to unstable below-ground structure. This increases the likelihood of tree failure.

Untargeted soil compaction is more prevalent in urban areas due to increased foot traffic, construction, topsoil removal, and erosional effects from impermeable surfaces.

Soil compaction is compounded by the two most frequent planting errors: planting too deep and mounded mulch. When trees are planted too deep (above the root flare), they suffer from girdling roots, decreased growth, and nutrient deficiencies. Mulch mounding against the trunk ‘volcano mulching’ increases moisture around the trunk, reducing the protective ability of bark and contributes to preventable pest and diseases. These issues can be resolved through de-compaction techniques like air excavation.

How Air Excavation Helps Trees

Air excavation is a type of best management practice which utilizes compressed air to displace soil reducing compaction. The most popular and well-known brand of air excavation tool is called the ‘Air Spade’. A similar best management practice, Hydro-Excavation, uses water instead of air in similar style.



Vertical mulching using an air spade.
Design & Photo Credit: Guy Meilleur 2019, Santa Fe Plaza

Air excavation does not hurt roots, as it uses air to displace soil instead of excavation. Air excavation helps trees by relieving root stress. Trees use roots for anchoring, water and nutrient absorption, hormone signaling and storage (Kozlowski 1997). When soil is compacted, the roots can’t function normally and the tree isn’t able to thrive; contributing to the tree mortality spiral (Hilbert 2019).

Excavation Styles

There are generally five methods for utilizing an air excavation tool.

- Air tilling, or root invigoration, reduces shallow soil compaction near the surface (up to 6-8 inches) around the base of the trunk and/or extending beyond the dripline.
- Radial trenching involves excavating soil at a moderate depth (10-12”) in the critical root zone extending outward from the trunk to encourage deep root growth.
- Vertical mulching affects the deepest soil horizons (12” or deeper) by creating boreholes throughout the dripline and beyond.
- Root collar excavation is used for trees that have been planted too deeply causing soil graded above the root flare.
- Root pruning can be used to reduce conflict areas between trees and physical structures (Fite 2016).

Voids created from air tilling, radial trenching or vertical mulching are filled with topsoil amendments. Combining air spading techniques and soil recipes helps aerate the soil, increase water infiltration, reduce further compaction, , and improve soil microbiology. Always wear personal protection equipment when operating machinery.

Vertical Mulching Recipes

Recipe for decompaction:

Fill with 3/4” scoria rock
(for de-compaction only)

Recipe for soil building & decompaction:

10% biochar, 5% worm castings, and
85% composted mulch

Soil Food Web

Composting dramatically improves the health of soil as well as water holding capacity. It is one of the easiest ways to help a tree grow in our environment. This is why it is included in so many of the best management practices illustrated in this plan.

Building soil supports microbial and fungal growth. Microbes, such as bacteria, ciliates, amoebas and flagellates, help break down organic matter into usable forms for nutrient absorption. Fungi help root systems reach farther for nutrients and water. This is because the fungi develop long hyphae strands which connect to roots.

A compost bin is very simple to make by combining brown material with green material. Browns include leaves, straw, corn husks and wood chips. Green material includes coffee grounds, kitchen scraps and fresh leaves. These are mixed at a 2 to 1 ratio. Worm bins are especially easy to construct by using five strawbales to build four sides with a top. This helps keep the pile moist - like a wrung out sponge.

Subsurface Stormwater Detention

Subsurface stormwater detention basins help reduce flooding and its cascading hazards. These can be unlined systems to gradually seep into the ground, restoring the aquifer. However, lining allows for reuse of rainwater for irrigation purposes prior to it entering into the soil for groundwater restoration. By combining basins with green infrastructure technology and Best Management Practices (BMPs), community return-on-investment is high by utilizing rain as a water source where it falls.

Fourteen locations within the park system have been identified and included in the proposed project estimate of this plan. The basin should be connected to a dedicated tree zone using an exchange check valve system in the manifold. In this way, rainwater is the primary source of irrigation for the trees, and when the basin is low, the system will switch to the effluent water source as secondary. This will protect trees in the event of issues with the effluent system from the water treatment plant.

Subsurface detention basins can connect to gutters but also can collect rainfall directly where it falls. The Graf EcoBloc Inspect System, as example, is comprised of lego-like modular cartons which connect to level base plates. These can be incorporated below snow drop-off sites, parking lots, ball fields, playgrounds and swales/ ponding areas. The inspection robot reviews the corridors, which are jet washed as needed. Maintenance practices should reduce excessive sediment load on top of the system, even though landscape fabric is secured on top of the system.

Other manufacturers have similar products, including the R-Tank (illustrated by Fabco Industries, Inc., Construction EcoServices and Ferguson Waterworks) and Contech Engineered Solutions LLC's Urban Pond.



Graf EcoBloc Inspect Stormwater Detention System



<https://www.graf.info/en/>



Kamerawagen - "Camera Car"
EcoBloc inspect's robotic monitoring device



Space to Grow Playgrounds

Inspiration for Community Water Retention Solutions; Chicago Playground Transformation

Over the last decade, Chicago has been implementing the 'Space to Grow' program in response to outdoor safety for school-aged children. This program offers water education and stormwater infrastructure to reduce heat-related illnesses, impermeable surfaces, pollution and runoff. Also it increases overall water percolation, climate resilience and empowers community-led decision making through nature-based solutions. 'Space to Grow' captures up to 7 million gallons of water per typical storm event into subsurface stormwater detention basins. Nearly six city blocks (1.5 million square feet) have been transformed into greenspace and at least 650,000 square feet of permeable surface has been added.

In recent years, options for playground surface substrate materials has expanded and diversified to accommodate innovations in green stormwater technology, increased safety for children, and disability access. Each substrate listed has been used in the United States and generally meets safety requirements. Bonded engineered wood fiber or pour in place cork, especially offer ideal playground surfaces.

Available Playground Surface Substrate Materials

- Engineered Wood Fiber (EWF)
- "Playground" wood chips
- Bark mulch
- Sand
- Bonded EWF
- Pour-In-Place (PIP) Cork
- Perforated Rubber Mats
- Artificial Turf
- Rubber Tiles
- Synthetic PIP

KEY TAKEAWAYS

- Green stormwater infrastructure use in community spaces, like playgrounds, has a proven record of success. Partnerships can improve outcomes.
- Active water harvesting cisterns are suggested throughout the city
- Las Vegas could capture over 3 million gallons of runoff—exceeding twice the typical per day use by businesses and residents—in a single typical rain event.

Opportunities for Las Vegas

Parks suitable for stormwater detention basins:

- Hanna Park
- James Marrujo Park
- Keyes Park
- Richard Padilla Soccer Field
- Rodriguez Park
- Harris Pond
- Montezuma Pond



James Marrujo Park

Before & After Photos



Grissom Elementary School Hegewisch neighborhood, Chicago, IL. Stores 253,902 gallons.



Cook Elementary School Auburn Gresham neighborhood, Chicago, IL. Stores 217,978 gallons.



Davis Elementary School Brighton Park neighborhood, Chicago, IL. Stores 197,422 gallons.

<https://mwr.org/stormwater/space-to-grow>

Tree Ordinance Updates



Tree Ordinance # 26-01
Amending Las Vegas Municipal Code Chapter 409 Trees
Section 409-1 through 409-11

Reasoning behind amendments:

1. If the Las Vegas Parks Division replaces public trees currently in decline or dead trees, improves care to existing trees in good/fair condition to reduce expected mortality, and installs new trees, then canopy cover / tree count in 30 years will still be less than it was in 2025. In accordance with other cities, ordinances have been updated to protect trees and roots during construction and to address cost effective and land development tree planting strategies. The tree count and canopy for the city can improve as land is developed. This will help counter some of the heat island effects that are occurring in Las Vegas.
2. Residents may need support to install and care for trees. Included in the right-of-way care are recommendations for funding assistance from the city for care and removals. Retaining a compassionate, community-driven support system is essential in ordinance creation.
3. Green storm water infrastructure ordinances have been included in the 2026 update. Neither ordinances on drainage nor stormwater flooding address the use of stormwater as a community resource. Calculations indicate that in only one standard rain event of a 0.10-inch, the roads and buildings could harvest 3.23 million gallons of water! If the rain event provides 0.25-inch of water, impervious surfaces could collect 8.08 million gallons of water! The ordinances on Green Infrastructure begin to guide action and encourage adherence to best management practices, reducing erosional effects, and rallies community need in a positive direction.
4. There are no international, federal or state mandates, standards, ordinances or laws that advocate for the protection of trees. Tree City USA communities that have earned Growth Awards lead the country in investing in their urban forests. As part of the recovery process, having guidelines, resources and community-directed support is helpful. These ordinances are aimed to protect the financial, emotional and ecosystem investment in the community.

Whereas, the present section amends the entirety of the Tree Ordinance:

Now therefore, be it ordained by the governing body of the City of Las Vegas, New Mexico, the Chapter 409 of Las Vegas Municipal Code be amended as follows:

Chapter 409. Trees

- § 409-1. Definitions.
- § 409-2. Creation and establishment of Tree Board.
- § 409-3. Duty to prune; clearance; planting distance.
- § 409-4. Public tree maintenance.
- § 409-5. Tree topping.
- § 409-6. Abuse or mutilation of public trees.
- § 409-7. Protection of trees.
- § 409-8. Restrictions on activity affecting trees on public land.
- § 409-9. Interference with Tree Board prohibited.
- § 409-10. Violations and penalties.
- § 409-11. Green Stormwater Infrastructure.

[HISTORY: Adopted by the City Council of the City of Las Vegas 9-15-1999 by Ord. No. 98-14 (Ch. 23 of the 1972 City Code). Amendments noted where applicable.]

Tree Ordinance Updates

§ 409-1.1. Purpose.

The purpose of this Ordinance is to promote the health, safety and welfare of residents by ensuring that the natural environment has a balance of human-made and natural resources, including open space and tree canopy. Additionally, this Ordinance serves to promote water conservation by preserving natural areas, discouraging compaction of soil, encouraging native or drought tolerant trees and promoting the use of rainwater for the benefit of trees. The following considerations shall aid in implementing tree care for this purpose:

- A. To utilize the Las Vegas Urban Forestry Management Plan 2026 (or most recent) as a governing guide to tree planting, maintenance, and removal.
- B. To protect existing trees from damage caused by construction and require replacement of trees damaged or removed due to construction.
- C. To protect existing trees from harm caused by poor trimming practices, such as topping.
- D. To assist in planting more trees on streets, in parks, and at residences and businesses and support tree care around residences and businesses.
- E. To support and preserve natural areas, buffers, and encourage tree planting.
- F. To support existing tree growth through proper irrigation, soil development and management.
- G. To utilize rainwater as a primary watering source for trees.
- H. To prune trees only to the extent necessary for tree health and community safety.
- I. To protect community, roads, and infrastructure from hazardous tree limbs to as reasonable any extent possible.
- J. To support city departments responsible for tree health and care.
- K. To support tree authority personnel in enforcement of tree ordinances.
- L. To support the Tree Board.
- M. To maintain Tree City USA status by meeting the four national Tree City USA standards.

§ 409-1.2. Definitions.

The following words and phrases of § 409-1 through 409-11 shall have the meanings respectively ascribed to them by this section:

ADMINISTRATION — The Community Development Director or his/her designee is the representative of the Tree Board who is responsible for administration of the community tree program.

CALIPER — nursery measurement of a tree that is the diameter of the trunk measured at six inches above soil grade.

CRITICAL ROOT ZONE — The minimum distance required to protect tree roots during excavation or construction, measured from the trunk at one and one-half (1.5) feet for every inch of diameter at breast height.

DAMAGE — Any injury to or destruction of a tree, including but not limited to: improper pruning per American National Standards Institute (ANSI) A-300 2023 or later Tree Care Standards, uprooting; severance of all or part of the root system or main trunk; storage of material on or compaction of surrounding soil; a substantial change in the natural grade above a root system or around a trunk; surrounding the tree with impervious paving materials; or any trauma caused by accident or collision.

GREEN STORMWATER INFRASTRUCTURE — A low-impact development approach for managing stormwater runoff by using interconnected natural and livable systems, or mimicking such systems, which grow over time for a wide range of benefits and are intended to preserve or restore natural hydrology in a built environment.

NOXIOUS WEED — Any plant or plant part that is considered noxious or invasive by the New Mexico Department of Agriculture.

NUISANCE/HAZARD/DISEASED TREES — Dead, defaced, broken, dangerous, diseased trees with severe structural damage, or trees interfering with views of traffic or pedestrians.

PLANTING STRIP — The strip of land between the street and a sidewalk. The portion of the right-of-way that extends from the curb line of the street, whether or not this is marked by a curb construction, to the sidewalk or abutting property line. If the abutting property line reaches the road pavement, then the strip is defined as from the pavement line to the abutting fence, or ten (10) feet if no fence is present.

PROPERTY OWNER — The person owning such property as shown on the records of the San Miguel County Assessor's office.

PRUNE — To remove dead or living branches from a tree or plant by severing the branch just slightly above the branch collar

PUBLIC PLACES — Includes all streets, highways, parks and grounds owned by the City of Las Vegas.

PUBLIC TREES — Trees, shrubs, bushes and all other woody vegetation on land lying between the property lines on either side of all streets, avenues and boulevards within the City of Las Vegas.

RECOMMENDED TREE — A tree recognized by the Tree Board and/ or as indicated on the Recommended Tree List of Las Vegas, NM, latest edition. Tree should comply with proper location, based on the Best Management Practice of Right Tree Right Place, based on size, light and water requirements, and soil conditions. When choosing a tree, keep in mind its future size, water needs, and heat and cold tolerance. Consider proximity to other trees, buildings, sidewalks, power lines, and underground utilities.

RIGHT-OF-WAY — Land owned by the public for travel access or utility use, and includes the roadway, curb, parking strip, sidewalks and planting strip between the roadway and sidewalk.

SIGNIFICANT TREE — Deciduous tree that is at least six inches diameter or evergreen tree that is at least eight feet tall. Noxious Weed Trees must be at least twelve inches diameter and in good condition for consideration as Significant.

STREET or HIGHWAY — The entire width of every public way, to include all rights-of-way.

STRUCTURAL PRUNING — Pruning to ensure the long-term health and strength of trees by strategically and selectively removing and reducing branches in order to create a strong, central leader, scaffolding branches, and well formed crown and branch unions.

TOPPING — The systematic cutting back of limbs within the tree's crown to such a degree as to remove the normal canopy and disfigure the tree.

TREE — Any plant, shrub or tree over 36 inches in height measured from the ground level.

TREE BOARD — A group of people charged, generally by ordinance, with overseeing the needs of the urban forest.

TREE INVENTORY — a process by which an existing tree is located on a map with Latitude and Longitude coordinates, identified by its genus and species, measured for diameter at breast height, and condition assessed.

URBAN FOREST — Trees and related organisms in urban settings, whether small towns, villages, communities, or large cities.

Tree Ordinance Updates

§ 409-1.3. Authority, Compliance and Enforcement.

- A. Residents of the City of Las Vegas will comply with the tree ordinances listed in Chapter 409.
- B. The Community Development Director, or his designee, shall have full authority to plant, prune, maintain and remove trees and woody plants on streets, rights-of-way, city parks, and other public property.
- C. All City Departments will coordinate as needed for compliance with public properties not directly under the jurisdiction of the Community Development Director.
- D. Compliance and Enforcement of this ordinance will be enforced by the City of Las Vegas, Code Enforcement Officer and/or the Community Development Director. A person may file a written complaint alleging violations. The enforcement officer will record, investigate and take action on the complaint.

§ 409-1.4. Basic Performance Standards

- A. All tree care, including but not limited to planting, transplanting, root management, pruning, tree risk assessment, utility line clearance, and management of trees during construction will conform to the American National Standards Institute (ANSI) A-300 Tree Care Standards most recent edition 2023 or later.
- B. New public trees will be selected by utilizing the Recommended Tree List of Las Vegas, NM, as listed in the Las Vegas Urban Forestry Management Plan 2026, unless a more recent edition is available.
 - (1) Noxious weed trees will not be planted in public or private spaces.
 - (2) Dangerously thorny trees will not be planted near playgrounds, in rights-of-way, or near pedestrian movement and will be pruned to 7 feet for eye clearance.
 - (3) Tree species that are prone to splitting shall be discouraged from planting.
- C. For the health and safety of all persons engaging in tree care, tree care work shall comply with the American National Standards Institute (ANSI) Z133 Safety Requirements for Arboricultural Operations most recent edition, 2025 or later.

§ 409-2. Creation and establishment of Tree Board.

- A. There shall be created and established a Tree Board for the City of Las Vegas, New Mexico, which shall consist of nine to 15 members who shall be appointed by the Mayor with the approval of the City Council. The Community Development Director or his/her designee shall be a full voting member of the Committee. Vacancies caused by death, resignation or otherwise shall be filled for the unexpired term in the same manner as original appointments are made.
- B. Duties. The Tree Board shall perform the following duties:
 - (1) Provide guidance to the City of Las Vegas on tree species, selection and management of woody plants in public areas of the City. The Las Vegas Tree Board shall maintain an extensive list of recommended trees for planting in public areas. The purpose of the list is to provide guidance on the selection of appropriate trees to increase the diversity of tree species in the community forest. Said list shall be available to residents of the city upon request and/or on the city’s webpage.
 - (2) Create and review and recommend city policies regarding tree planting, maintenance and removal.
 - (3) Develop and/or acquire educational information and programs on tree species selection, planting, maintenance and removal.

- (4) Address issues concerning trees that City residents feel are important.
- (5) Consider and review any special matter or question relating to trees.
- (6) Make recommendations on the adoption and alteration of all rules, regulations and ordinances which it shall deem in the public interest and most likely enhance and beautify the community forest.

§ 409-3. Duty to prune; clearance; planting distance.

- A. It is the duty of the adjacent owner (not including the City) to prune trees located in the City right-of- way.
 - (1) When specifically provided for in a City budgeted line item under the Public Works Department, the City may aid in pruning of trees located in the City right-of-way in an amount up to that financial limitation.
 - (2) Trees will be pruned in such manner that they will not obstruct or shade the streetlights, obstruct the passage of pedestrians on sidewalks, obstruct vision of traffic signs, or obstruct view of any street or alley intersections.
 - (3) The City will remove City-owned trees, including those located in the right-of-way, which are determined to be hazardous by the Community Development Director, and/or their designee.
 - (4) It is the duty of the private property owner to prune trees located in their property, which may endanger those in the public right-of-way.
 - (5) The minimum clearance of any overhanging portion thereof shall be 10 feet over sidewalks, 12 feet over all streets, and 16 feet over truck thoroughfares.
- B. No street tree shall be planted closer than 30 feet from any street corner, measured from the point of the nearest intersection of curb or curblines.
- C. No street tree shall be planted closer than 10 feet from any hydrant.
- D. Trees shall not interfere with the function of streetlights.
- E. It is the duty of the adjacent owner to care for and retain a healthy appearance for the trees in the City right-of-way, including irrigating, mulching, fertilizing and repair following damage.
- F. If a right-of-way tree is in poor or dying condition or the adjacent owner has concerns about its health or safety, the adjacent owner shall inform the public works department of the tree for further assessment. The City shall provide, upon request, a list of current funding opportunities if said opportunities are available.
- G. Certain planting strips, sidewalks, and unimproved rights-of-way may be installed, improved and/ or maintained by the City at the Community Development Director or City Manager’s discretion in an amount up to financial limitation.

§ 409-4.1. Public tree maintenance.

- A. The Community Development Director, or their designee shall have the authority to recommend to the City Council promulgation of rules and regulations governing the planting, maintenance, removal, fertilization and pruning of trees on the street or other public sites in the City and shall direct, regulate and control the planting, maintenance and removal of all trees growing now or hereafter in public areas in Las Vegas, New Mexico.

Tree Ordinance Updates

B. The Community Development Director and/or their designee shall cause the provisions of this chapter to be enforced, as set forth in Chapter 409-10.

C. Signs will not be affixed to trees.

§ 409-4.2. Public tree planting.

A. Planting trees in city managed spaces such as parks, street rights-of-way, shall adhere to best practices stated in the ANSI 300 Planting Standard 2023 or most recent edition.

- (1) Minimum tree size for planting in public spaces or through tree incentive programs shall be sized at a minimum of a 10-gallon container or 2’ caliper ball and burlap.
- (2) Trees shall be irrigated for at least two years following planting while adhering to water restrictions as necessary.
- (3) All trees will be mulched with two inches of natural wood chips.
- (4) Tree protection, as identified in the best management practices of the Las Vegas Urban Forestry Management Plan (latest edition) shall be installed at the time of planting, such as mulching, staking, and fencing.

§ 409-4.3. Land Development tree planting.

A. Land developments and new construction projects are encouraged to plant trees along streets, within parking lots, and in parkways in order to retain the integrity of the community aesthetic, health of residents, and balance between the built and natural environment.

- (1) Land development and new construction project tree requirements are in addition to requirements to replace trees damaged or removed during the project.
- (2) Sufficient space shall be provided in the design to accommodate mature height and width of a tree.
- (3) One tree shall be planted for every five hundred (500) square feet of open space.
- (4) A minimum of 40% of trees planted in a development shall be designated as Shade Trees.
- (5) Effort shall be made to provide a minimum of 1,000 cubic feet of soil volume per tree.
- (6) Street trees shall be planted in the rights-of-way and where possible used in coordination with green stormwater infrastructure.
 - (a) One street tree shall be planted for every thirty (30) feet of street.
 - (b) Only trees with a mature height of 15 feet or less shall be planted under utility lines.
 - (c) Street trees are not required for new construction of single family homes under 2,000 square feet in total area.

B. Stormwater runoff shall be used to provide irrigation for trees to the extent possible and shall be incorporated into development design plans, as set forth in Chapter 409-11.

C. Design shall be reviewed by the Community Development Director and/ or designee for compliance to this ordinance.

- (1) Existing trees will be inventoried and considered for retention as part of the design review process.
- (2) Driveways shall be located for minimal tree removal.

§ 409-4.4: Public and Right-of-Way Tree Trimming and Permitting.

A. No pruning shall compromise health or structural integrity of the tree, including:

- (1) Topping by catastrophic canopy removal,
- (2) Lion-tailing that removes more than 2/3 of the lower branches of a tree, causing wind-related hazards,
- (3) Flush cuts that remove the branch collar by pruning flat against the trunk,
- (4) Introduction of infection due to poor sanitation.

B. Proposed pruning of public or right-of-way trees shall receive approval via a Tree Work Permit, by the City Community Development Director, or their designee.

- (1) Tree work permit shall provide the following information: applicant information, type of work, address, tree species and diameter, and reason for trimming.
- (2) The permittee agrees to comply with regulations as set forth by Chapter 409: City of Las Vegas Tree Ordinances.
- (3) The permittee agrees to not top the tree.

C. Tree Work Permit exemption applies to the following:

- (1) Work performed by or for the City of Las Vegas.
- (2) Work performed by or for the electric utility companies.
- (3) Pruning branches less than 2 inch in diameter at attachment to the trunk.
- (4) Young tree structural pruning, for trees with trunk diameter less than 6-inches, with no more than 25% of tree removed.
- (5) Crown raising for sidewalk or street clearance, measured at 7.5-feet above sidewalk or 14- feet above street.
- (6) Removal of dead tree limbs under 6-inches branch diameter, from 0-feet to 20-feet from the ground.
- (7) Removal of invasive species under 12-inch trunk diameter.
- (8) Reduction cuts or branch removals for traffic control and safety, including sight distance triangles at intersections, stop signs and street name signs.

D. Tree trimming adjacent primary power lines shall be reserved for licensed professionals with specialized equipment.

- (1) Tree work permit around power lines will require additional requirements, including general liability insurance and worker’s compensation insurance.
- (2) Electric utility companies shall have the right and authority to trim or remove trees or parts of trees which cause interference with electrical power lines.
- (3) Electric utility companies shall comply with Chapter 409: City of Las Vegas Tree Ordinances.
- (4) Homeowner or authorized representative should contact the electric utility company directly to request tree trimming around power lines.

Tree Ordinance Updates

§ 409-5. Tree topping.

It shall be unlawful as a normal practice for any person, firm or City department to top any tree on public property. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where other pruning practices are impractical, may be exempted from this section by the determination of the Community Development Director or his/her designee. If this language contradicts a utility franchise agreement, the utility franchise agreement controls.

Due to the extent of harm to the health of a tree caused by tree topping said tree may be deemed intentionally damaged beyond rejuvenation by the authority charged with enforcement. Violation penalty may incur cost for replacement based on structural replacement cost.

§ 409-6. Abuse or mutilation of public trees.

Unless specifically authorized by the Community Development Director or his/her designee no person shall intentionally damage, cut or carve any public tree or allow any liquid or solid substance, which is harmful to such tree, to come in contact with it or its root zone. Root Zone is the area around the tree, extending from the trunk out to the drip line.

§ 409-7. Protection of trees.

- A. All trees on any street or publicly owned property near any excavation or construction of any building, structure or street work shall be guarded with a substantial fence, frame, or box not less four feet from the outer perimeter of the trunk. No materials shall be stored inside fencing prior to or during construction.
- B. Construction fencing will be placed around the designated protection area, not less than 4 feet from the trunk of the tree or critical root zone, whichever is greater, made sufficiently stable, and of sound material to withstand destruction by storm events, or vehicles. A tree's root protection area is the minimum area around a tree that must be left undisturbed to ensure its survival and health, protecting the roots from damage during construction or other activities.
- C. No person shall deposit, place, store or maintain upon any public place of the City any stone, brick, sand, concrete, or other material which may impede the free passage of water, air or fertilizer to the roots of any tree growing therein except by written permit of the Community Development Director or his/her designee.
- D. Any significant tree which has been removed or damaged during construction will be replaced based on the caliper equivalent or addition of such equivalent to reach number of inches of diameter removed.
 - (1) If sufficient space is unavailable due to design, replacement trees will be provided to the Community Development Director for planting along a public right-of way and/or within a park.
 - (2) Deciduous trees planted from construction or development projects will be at least two-inch caliper.
 - (3) Evergreen trees planted from construction or development projects will be at least six feet in height.
 - (4) If more than ten trees are required, more than one species will be selected.

§ 409-8. Restrictions on activity affecting trees on public land.

- A. Scope of requirements. Property owners shall consult with the Community Development Director or his/her designee on any of the following acts:
- A. Cultivate, treat, prune, remove, or otherwise disturb any tree on public places.
 - B. Trim, prune, or remove any tree or portions thereof if such tree or portions thereof reasonably may be expected to fall on any public place.

- C. Damage, cut, tap, carve or transplant any tree, shrub or other plant located on any public place.
- D. Attach any wire, nail, sign, poster, or any other man-made object to any tree or other plant located on any public place.

§ 409-9. Interference with Tree Board prohibited.

It shall be unlawful for any person to prevent, delay or interfere with the Community Development Director or his/ her designee, the Tree Board, or any of its representatives or agents while engaging in the planting, cultivating, mulching, pruning, spraying and removing of any tree within public property.

§ 409-10. Violations and penalties.

Any person violating or failing to comply with any provisions of this chapter shall be guilty of a misdemeanor and, upon conviction thereof, shall be fined a sum of no less than \$50 and no more than \$500.00 and/or 30 days in jail.

- A. Each incidence shall be treated as a separate violation.
- B. Failure to provide a replacement in accord with the latest Recommended Tree List for trees removed or damaged in violation of this Chapter shall incur mitigation value equivalent to the structural value of the tree, based on the most recent tree inventory, in addition to violation penalty.

§ 409-11.1. Green Stormwater Infrastructure.

Water conservation and stormwater management shall guide landscape site planning, design, installation and management with the intention of stormwater filtration, retention for tree irrigation, and velocity reduction.

- A. Where practical, green stormwater infrastructure shall be used to reduce the velocity, sedimentation and pollution entering waterways including but not limited to rivers, acequias, arroyos, streams and wetlands
- B. Trees shall be included in design utilizing their capacity to reduce flow and decrease contaminants. Water conservation and storm water management shall guide landscape site planning, design, installation and management.
- C. Standards shall be followed based on best management practices with consideration for low impact development strategies implemented with redundancy for the growth of trees within the structures.

Tree Ordinance Updates

§409-11.2. City of Las Vegas Green Stormwater Infrastructure Ordinance for New Construction.

- A. Rainwater is a primary source of water for trees and natural resource areas, and as such encouragement of its use for the growth, support and management of these resources is henceforth indicated in this Chapter, where it does not conflict with Chapter 242- FLOOD HAZARD PREVENTION of this ordinance.
- B. The intention of use of green stormwater infrastructure additionally supports the protection of natural drainage ways, structures, and impervious surfaces such as but not limited to, those indicated for protection in Chapter 242 - FLOOD HAZARD PREVENTION.
- C. Standards shall be followed to not further degrade, and where possible improve erosion conditions in waterways.
- D. Soil shall be protected during construction from erosion, especially into a waterway or storm drain inlet, through the use of Best Management Practices such as but not limited to swales, silting, straw bales, berms, geotextiles, basins and traps.
- E. An active or historic acequia will not be disturbed by construction or building development.
- F. Oversized retention basins that hold more than one percent chance, twentyfour hour storm events are discouraged due to safety hazards as well as being less useful for urban tree planting efforts.
 - (1) Efforts should be made to design multiple basins to distribute stormwater flow for improved natural resource benefit.
 - (2) Unless indicated through provision for special design feature, basins shall empty or infiltrate into the soil within a twenty-four hour period following a storm event.
- G. Where practical, green stormwater infrastructure, such as rain gardens, shall include the use of at least one Recommended Tree per structure or per five hundred square feet of area, whichever is greater.
 - (1) Native and drought tolerant shrubs, perennials and grasses may also be considered.
- H. Rain barrels and/ or cisterns shall be connected to a hose bib, irrigation and/ or frost-free water hydrant for landscape use.
 - (1) A code-approved back-flow prevention device is required for all irrigation systems, including but not limited to grey water systems, cisterns, irrigation tubing and frost free hydrants, connecting to the city water system.
 - (2) Shut-off nozzles shall be installed at the end of all hoses connected to water sources, including but not limited to hose bibs, frost free hydrants, cisterns, and rain barrels over 100 gallon capacity.
 - (3) Shut-off nozzles are encouraged on rain barrels under 100 gallon capacity.
- I. Green Stormwater Infrastructure design, construction and maintenance funding may be provided at the discretion of Las Vegas, NM City Council through a stormwater utility fee, per the State of New Mexico Stormwater Utility Bill SB7 (2025).

If any section, subsection, or provision of this ordinance is held invalid, the remaining provisions shall not be affected and shall remain in full force and effect.

PASSED, ADOPTED and ENACTED this 8th day of April, 2026.



Mayor David Romero

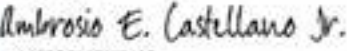
ATTEST:



Casandra Fresquez, City Clerk

Reviewed and approved as to legal sufficiency only:

Signed by:



A0F8DB21922465

Ambrosio Castellano, City Attorney

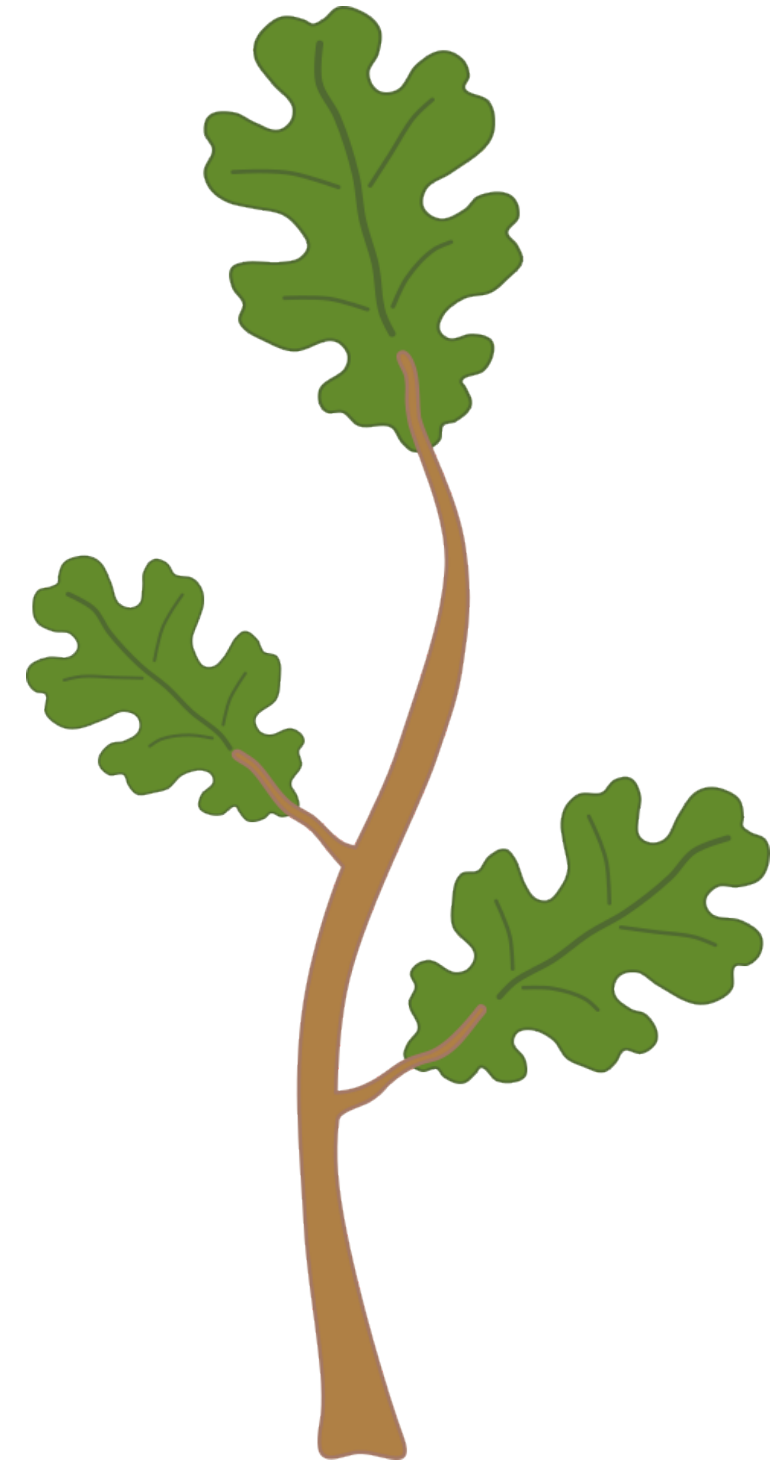


Approaching rain clouds
viewed from Hermit's Peak, 2024.



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Appendix

United Nations Sustainable Development Goals

The United Nations Sustainable Development Goals offer guidance on how to “build cities where all citizens live a decent quality of life, and form a part of the city’s productive dynamic, creating shared prosperity and social stability without harming the environment” (UN 2015). Many of these goals do not directly relate to this management plan. Here are some that do (UN 2015):

“2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

2.5 Maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.

6.6 Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

6.a Expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

11.4 Strengthen efforts to protect and safeguard the world’s cultural and natural heritage.

11.5 Significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

11.6 Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.7 Provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

11.b Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.2 Integrate climate change measures into national policies, strategies and planning.

15.1 Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements.

15.2 Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

15.3 Combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

15.4 Ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.

15.8 Introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

15.9 Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.”

Tree Condition by Species

Location: Las Vegas, San Miguel County New Mexico, (iTree 2025d).

Botanical Name	Common Name	Quantity	Average Condition %	Urban Wood Dry Tonnage
Abies concolor	White fir	5	76.90	0.68
Acer	Maple spp	8	70.00	5.18
Acer glabrum	Rocky mountain maple	1	62.50	0.05
Acer negundo	Boxelder	31	66.11	69.51
Acer rubrum	Red maple	4	67.50	0.11
Acer saccharinum	Silver maple	29	65.43	14.36
Acer saccharum	Sugar maple	3	82.50	0.15
Acer tataricum ssp. ginnala	Amur maple	7	55.43	1.00
Aesculus glabra	Ohio buckeye	1	82.50	0.02
Ailanthus altissima	Tree of heaven	5	66.50	1.94
Catalpa speciosa	Northern catalpa	12	67.92	3.54
Celtis laevigata v. reticulata	Western hackberry	15	75.83	1.21
Celtis occidentalis	Northern hackberry	5	66.50	0.36
Cercis canadensis	Eastern redbud	2	72.50	0.26
Cercis canadensis v. texensis	Western redbud	3	69.17	0.01
Chilopsis linearis	Desertwillow	1	62.50	0.46
Cornus	Dogwood spp	1	62.50	0.00
Crataegus	Hawthorn spp	13	73.77	0.03
Cupressus arizonica	Arizona cypress	1	82.50	1.52
Elaeagnus angustifolia	Russian olive	3	69.17	0.70
Forestiera	privet spp	7	79.64	0.34
Fraxinus	Ash spp	65	63.08	41.57
Fraxinus americana	White ash	7	73.93	0.85
Fraxinus pennsylvanica	Green ash	101	65.26	28.59
Fraxinus velutina	Velvet ash	4	67.50	0.12
Ginkgo biloba	Ginkgo	1	62.50	0.00
Gleditsia triacanthos	Honeylocust	30	64.22	7.68
Gymnocladus dioica	Kentucky Coffee tree	6	74.50	0.51
Ilex opaca	American holly	1	62.50	3.09
Juglans major	Arizona walnut	2	82.50	0.22
Juniperus	Juniper spp	12	85.50	1.46
Juniperus deppeana	Alligator juniper	5	80.90	1.38
Juniperus monosperma	One seed juniper	12	69.17	3.99

Tree Condition by Species

Robinia neomexicana	New mexico locust	6	62.50	1.34
Robinia pseudoacacia	Black locust	14	47.68	40.57
Salix	Willow spp	7	62.50	20.45
Salix gooddingii	Goodding's willow	1	82.50	5.10
Salix matsudana	Salix matsudana	2	62.50	13.72
Sorbus	Mountain Ash spp	3	63.33	0.07
Sorbus americana	American mountain ash	2	88.50	0.02
Sorbus aucuparia	European mountain ash	1	62.50	0.00
Syringa vulgaris	Common lilac	2	37.75	0.97
Thuja	Red Cedar spp	3	75.83	1.11
Tilia	Basswood spp	5	46.70	4.95
Tilia americana	American basswood	2	62.50	2.40
Tilia cordata	Littleleaf linden	8	78.00	6.18
Tilia tomentosa	Silver linden	1	62.50	0.05
Ulmus americana	American elm	239	52.23	677.85
Ulmus davidiana	The David Elm	16	67.50	2.74
Ulmus parvifolia	Chinese elm	2	78.50	0.16
Ulmus pumila	Siberian elm	741	59.82	2590.62
Totals		2308	63.37	4034.89

1 ton = 12,000 board feet of wood
48,418,680 board feet of wood in inventory
\$ 242,093,400 potential urban wood value



Big Tree State Champion
Tilia americana
American Linden
Las Vegas Plaza
Photo Credit: Joseph Dunkleberger, 2025

Tree Condition by Park

Las Vegas Trees By Park				
Las Vegas Parks	Scientific Name	# of Trees	Tree Dry Weight Biomass (ton)	Average Condition (%)
Pancho Padilla Soccer Field	Pinus ponderosa	31	4.04	68.31
	Total	31	4.04	68.31
River Walk	Acer negundo	3	9.76	69.17
	Juniperus scopulorum	4	0.01	94.50
	Malus sp.	2	0.00	94.50
	Picea pungens	1	0.01	94.50
	Populus angustifolia	5	14.23	50.70
	Populus deltoides	33	196.56	72.88
	Populus fremontii	3	0.88	94.50
	Robinia sp.	2	0.32	88.50
	Salix sp.	2	2.62	62.50
	Salix matsudana	1	12.16	62.50
	Ulmus parvifolia	1	0.00	94.50
	Ulmus pumila	25	114.76	67.30
	Total	82	351.33	72.59
Truder Park	Fraxinus pennsylvanica	1	0.24	82.50
	Pinus edulis	7	1.09	82.50
	Pinus ponderosa	2	0.11	82.50
	Ulmus pumila	16	58.91	64.41
Carnegie Park	Total	26	60.36	71.37
	Acer sp.	1	0.01	62.50
	Acer negundo	1	0.02	62.50
	Catalpa speciosa	1	0.07	94.50
	Fraxinus sp.	3	1.79	69.17
	Fraxinus americana	2	0.43	72.50
	Fraxinus pennsylvanica	12	4.19	67.50
	Gleditsia triacanthos	3	0.82	46.00
	Gymnocladus dioica	3	0.07	69.17
	Malus sp.	3	1.00	75.83
	Malus domestica	1	0.17	62.50
	Morus sp.	1	2.37	62.50
	Pinus ponderosa	3	3.71	82.50
	Picea pungens	4	3.03	67.50
	Prunus sp.	2	0.26	62.50
	Quercus macrocarpa	2	0.04	82.50
	Syringa vulgaris	1	0.76	62.50
	Tilia cordata	1	0.05	94.50

Plaza Park	Ulmus americana	24	51.38	58.38
	Ulmus pumila	12	52.55	54.25
	Total	80	122.70	63.71
	Acer negundo	1	0.15	62.50
	Acer saccharinum	1	0.78	62.50
	Fraxinus pennsylvanica	1	2.19	82.50
	Koelreuteria paniculata	1	0.07	82.50
	Malus sp.	5	0.79	82.50
	Platanus x hybrida	4	2.53	77.50
	Tilia sp.	1	4.86	62.50
South Pacific Park	Ulmus americana	17	90.68	61.94
	Ulmus davidiana	2	0.24	82.50
	Ulmus pumila	8	43.95	70.00
	Total	41	146.23	69.59
	Fraxinus americana	2	0.19	62.50
	Malus pumila	1	1.12	82.50
	Pinus ponderosa	4	1.39	77.50
	Picea pungens	1	0.38	82.50
	Prunus cerasifera	1	2.48	82.50
	Ulmus pumila	10	42.04	66.50
Rodriguez Park	Total	19	47.60	70.92
	Acer saccharinum	1	0.75	82.50
	Forestiera sp.	7	0.34	79.64
	Fraxinus pennsylvanica	9	0.46	69.17
	Gymnocladus dioica	2	0.41	72.50
	Juniperus monosperma	3	1.02	82.50
	Juniperus virginiana	73	6.13	69.62
	Koelreuteria paniculata	2	0.72	82.50
	Pinus edulis	1	0.02	82.50
	Pinus nigra	3	0.30	62.50
Memorial Park	Pinus ponderosa	17	1.68	71.35
	Populus deltoides	1	1.88	62.50
	Tilia americana	1	0.04	62.50
	Ulmus americana	2	0.15	82.50
	Ulmus pumila	26	26.68	70.96
	Total	148	40.57	71.08
	Abies concolor	1	0.21	62.50
	Gleditsia triacanthos	2	0.03	82.50
	Juniperus scopulorum	1	0.74	82.50
	Pinus edulis	5	0.37	66.50
Memorial Park	Pinus ponderosa	1	0.14	82.50

Tree Condition by Park

Lincoln Park	Robinia pseudoacacia	7	3.40	47.00
	Platycladus orientalis	6	4.88	82.50
	Ulmus pumila	1	0.02	82.50
	Total	24	9.78	67.98
	Acer sp.	3	0.07	75.83
	Acer glabrum	1	0.05	62.50
	Acer saccharinum	1	0.06	94.50
	Acer saccharum	2	0.11	82.50
	Catalpa speciosa	4	0.37	72.50
	Celtis occidentalis	2	0.28	62.50
	Celtis laevigata v. reticulata	15	1.21	75.83
	Fraxinus pennsylvanica	10	2.19	62.50
	Fraxinus velutina	2	0.07	72.50
	Ginkgo biloba	1	0.00	62.50
	Gleditsia triacanthos	2	0.30	72.50
	Gymnocladus dioica	1	0.04	94.50
	Malus sp.	1	0.52	82.50
	Pyrus sp.	1	0.25	82.50
	Quercus macrocarpa	2	0.01	72.50
	Tilia sp.	3	0.07	29.50
	Tilia cordata	5	0.22	80.90
	Tilia tomentosa	1	0.05	62.50
	Ulmus americana	25	49.58	63.30
	Ulmus davidiana	1	0.04	82.50
	Ulmus pumila	8	35.57	62.50
	Total	91	91.06	68.18
East Side Streets	Abies concolor	4	0.46	80.50
	Acer sp.	3	5.10	69.17
	Acer negundo	11	32.46	64.32
	Acer rubrum	4	0.11	67.50
	Acer saccharinum	4	8.01	62.50
	Ailanthus altissima	4	0.38	67.50
	Catalpa speciosa	4	0.27	68.13
	Cercis canadensis	1	0.26	62.50
	Celtis occidentalis	1	0.01	82.50
	Cercis canadensis v. texensis	3	0.01	69.17
	Fraxinus sp.	17	15.47	60.76
	Fraxinus americana	3	0.23	82.50
	Fraxinus pennsylvanica	35	16.88	58.29
	Fraxinus velutina	2	0.05	62.50
	Gleditsia triacanthos	16	4.85	61.31

Ilex opaca	1	3.09	62.50
Juglans major	2	0.22	82.50
Juniperus monosperma	4	1.69	67.50
Koelreuteria paniculata	1	0.03	62.50
Malus sp.	59	17.04	64.03
Malus domestica	3	6.77	75.83
Morus sp.	1	16.54	62.50
Picea sp.	2	0.10	72.50
Pinus sp.	1	0.41	82.50
Pinus aristata	1	0.02	82.50
Pinus cembroides	1	0.04	13.00
Pistacia chinensis	5	0.47	74.50
Pinus edulis	36	4.31	61.15
Pinus flexilis	1	0.60	62.50
Pinus ponderosa	50	21.22	62.59
Picea pungens	8	1.65	74.00
Pinus sylvestris	1	0.70	82.50
Platanus x hybrida	1	1.56	82.50
Platanus wrightii	1	0.00	13.00
Populus sp.	2	4.23	62.50
Populus alba	2	0.14	37.75
Populus deltoides	3	9.61	36.17
Populus tremuloides	12	0.90	58.38
Prunus sp.	31	12.49	47.26
Prunus cerasifera	18	2.36	62.50
Pseudotsuga menziesii	2	0.08	78.50
Pyrus sp.	5	2.30	66.50
Pyrus calleryana	2	0.04	72.50
Quercus gambelii	1	0.08	62.50
Robinia neomexicana	1	0.09	62.50
Robinia pseudoacacia	7	37.18	48.36
Robinia sp.	4	7.21	50.13
Salix sp.	2	1.14	62.50
Salix matsudana	1	1.55	62.50
Sorbus aucuparia	1	0.00	62.50
Syringa vulgaris	1	0.22	13.00
Thuja sp.	3	1.11	75.83
Tilia sp.	1	0.01	82.50
Tilia cordata	2	5.92	62.50
Ulmus americana	147	407.80	46.34
Ulmus parvifolia	1	0.16	62.50
Ulmus pumila	446	1580.39	58.84

Tree Condition by Park

West Side Streets	Total	986	2235.95	58.09
	Ailanthus altissima	1	1.56	62.50
	Chilopsis linearis	1	0.46	62.50
	Gleditsia triacanthos	2	1.22	72.50
	Malus domestica	1	0.02	82.50
	Morus sp.	1	0.10	82.50
	Pinus edulis	1	0.05	62.50
	Pinus ponderosa	12	2.64	54.25
	Picea pungens	1	0.44	82.50
	Pyrus sp.	1	0.01	62.50
	Ulmus americana	11	20.02	59.82
	Ulmus pumila	54	128.50	61.95
	Total	86	155.02	61.59
NM Highlands University Campus	Acer sp.	1	0.01	62.50
	Acer negundo	13	24.33	66.50
	Acer saccharinum	22	4.76	64.00
	Aesculus glabra	1	0.02	82.50
	Catalpa speciosa	3	2.84	52.67
	Cercis canadensis	1	0.00	82.50
	Celtis occidentalis	2	0.07	62.50
	Cornus sp.	1	0.00	62.50
	Crataegus sp.	13	0.03	73.77
	Cupressus arizonica	1	1.52	82.50
	Fraxinus sp.	42	21.97	65.99
	Fraxinus pennsylvanica	30	2.26	70.05
	Gleditsia triacanthos	4	0.38	72.50
	Juniperus sp.	11	0.08	85.77
	Juniperus deppeana	5	1.38	80.90
	Juniperus scopulorum	11	4.18	77.77
	Koelreuteria paniculata	2	0.42	62.50
	Malus sp.	11	1.37	78.50
	Malus domestica	1	0.33	62.50
	Pinus sp.	14	0.74	70.79
	Pinus aristata	1	0.10	94.50
	Pinus edulis	24	2.20	55.08
	Pinus ponderosa	4	0.74	67.50
	Picea pungens	38	27.26	68.39
	Pinus sylvestris	3	0.22	90.50
	Platanus wrightii	3	0.10	69.17
	Populus angustifolia	1	2.14	62.50
	Populus fremontii	3	14.76	69.17

Municipal Building	Populus tremuloides	24	0.08	60.44
	Prunus sp.	24	0.76	67.67
	Prunus armeniaca	1	0.00	82.50
	Prunus cerasifera	6	0.13	62.50
	Pseudotsuga menziesii	7	1.67	62.50
	Pyrus calleryana	6	0.67	71.17
	Quercus sp.	6	0.80	54.25
	Rhus glabra	1	0.04	62.50
	Robinia neomexicana	5	1.25	62.50
	Robinia sp.	4	1.52	62.50
	Salix sp.	3	16.69	62.50
	Sorbus sp.	3	0.07	63.33
	Sorbus americana	2	0.02	88.50
	Tilia americana	1	2.36	62.50
	Ulmus americana	12	53.92	62.50
	Ulmus pumila	45	269.17	45.22
	Total	416	463.35	65.09
	Acer tataricum ssp. ginnala	7	1.00	55.43
	Acer negundo	2	2.80	72.50
Lion Park	Fraxinus sp.	3	2.34	29.50
	Juniperus sp.	1	1.38	82.50
	Picea sp.	1	0.14	62.50
	Pinus edulis	4	1.26	67.50
	Pinus flexilis	2	0.20	62.50
	Pinus ponderosa	1	0.91	62.50
	Populus deltoides	1	9.27	82.50
	Populus tremuloides	5	4.29	52.60
	Ulmus davidiana	13	2.46	64.04
	Ulmus pumila	1	1.20	62.50
	Total	41	27.25	60.11
James Marrujo Park	Ulmus pumila	10	50.67	62.50
	Total	10	50.67	62.50
	Juniperus scopulorum	1	0.02	82.50
	Juniperus virginiana	22	0.43	80.68
	Pinus nigra	1	0.02	82.50
	Picea pungens	1	0.00	62.50
Veterans Park	Populus deltoides	40	1.70	73.53
	Ulmus pumila	3	0.02	62.50
	Total	68	2.20	75.46
	Acer saccharum	1	0.04	82.50
	Juniperus scopulorum	1	3.71	82.50

Tree Condition by Park

Keyes Park	Pinus edulis	1	0.13	82.50
	Pinus ponderosa	1	0.47	13.00
	Picea pungens	7	4.88	75.64
	Pseudotsuga menziesii	2	0.39	37.75
	Ulmus pumila	2	8.14	72.50
	Total	15	17.78	67.37
	Elaeagnus angustifolia	3	0.70	69.17
	Juniperus monosperma	5	1.28	62.50
	Juniperus scopulorum	35	11.46	75.64
	Juniperus virginiana	5	1.45	74.50
City Hall Dog Park	Pinus edulis	4	0.41	62.50
	Salix gooddingii	1	5.10	82.50
	Ulmus pumila	23	47.91	63.83
	Total	76	68.31	70.27
	Juniperus scopulorum	3	3.43	75.83
	Pinus edulis	1	0.26	62.50
	Ulmus pumila	4	10.06	77.50
	Total	8	13.75	75.00
	Fraxinus pennsylvanica	3	0.18	75.83
	Gleditsia triacanthos	1	0.08	62.50
Hanna Park	Malus sp.	3	0.85	82.50
	Pinus nigra	3	0.70	82.50
	Total	10	1.81	78.50
Harris Pond Park	Pinus edulis	2	0.74	62.50
	Ulmus americana	1	4.33	62.50
	Ulmus pumila	47	120.09	61.45
	Total	50	125.16	61.51
	All Parks Total	2308	4034.89	63.37



Hydrology Effects by Species

Hydrology Effects of Trees by Species

Location: Las Vegas, San Miguel, New Mexico, United States of America
Project: Las Vegas, NM, Series: Parks & Streets, Year: 2025
Generated: 2/26/25



Species Name	Number of Trees	Leaf Area (ac)	Potential Evapotranspiration (gal/yr)	Evaporation (gal/yr)	Transpiration (gal/yr)	Water Intercepted (gal/yr)	Avoided Runoff (gal/yr)	Avoided Runoff Value (\$/yr)
Ulmus pumila	741	56.72	5,465,499.97	513,598.15	3,290,862.51	511,068.16	91,218.01	815.12
Ulmus americana	239	16.49	1,588,642.96	149,286.27	637,697.75	148,550.88	26,514.11	236.93
Pinus ponderosa	126	4.36	2,260,539.11	111,076.39	304,359.57	112,885.21	20,893.49	186.70
Picea pungens	61	2.87	1,489,133.45	73,171.74	501,243.29	74,363.30	13,763.62	122.99
Populus deltoides	78	5.68	547,170.69	51,418.14	219,639.99	51,164.86	9,132.16	81.60
Fraxinus pennsylvanica	101	3.49	336,374.83	31,609.46	135,024.34	31,453.75	5,614.02	50.17
Juniperus scopulorum	56	1.08	560,213.42	27,527.28	339,422.77	27,975.54	5,177.89	46.27
Fraxinus	65	2.54	245,060.96	23,028.61	87,713.26	22,915.17	4,090.01	36.55
Acer negundo	31	2.48	239,462.13	22,502.48	96,122.58	22,391.63	3,996.57	35.71
Pinus edulis	86	0.72	373,075.95	18,331.88	55,254.15	18,630.40	3,448.23	30.81
Juniperus virginiana	100	0.47	243,613.00	11,970.44	82,000.30	12,165.37	2,251.64	20.12
Pseudotsuga menziesii	11	0.32	168,535.75	8,281.36	42,546.93	8,416.22	1,557.73	13.92
Acer saccharinum	29	0.77	74,455.66	6,996.67	37,359.09	6,962.20	1,242.65	11.10
Malus	84	0.74	71,310.01	6,701.07	28,624.58	6,668.06	1,190.15	10.64
Celtis laevigata v. reticulata	15	0.68	65,071.99	6,114.88	11,754.26	6,084.75	1,086.04	9.70
Salix	7	0.61	58,574.28	5,504.28	42,322.18	5,477.17	977.59	8.74
Salix matsudana	2	0.19	97,280.30	4,780.07	32,744.61	4,857.91	899.13	8.03
Platanus x hybrida	5	0.56	53,710.65	5,047.24	21,560.01	5,022.38	896.42	8.01
Pinus	15	0.16	83,936.05	4,124.38	26,018.26	4,191.54	775.80	6.93
Gleditsia triacanthos	30	0.46	44,790.68	4,209.02	10,488.01	4,188.29	747.55	6.68
Robinia pseudoacacia	14	0.45	43,396.05	4,077.97	8,709.81	4,057.88	724.27	6.47
Platycladus orientalis	6	0.13	69,258.13	3,403.15	23,312.33	3,458.56	640.13	5.72
Pinus nigra	7	0.13	66,390.56	3,262.24	22,347.11	3,315.36	613.63	5.48
Ilex opaca	1	0.12	63,828.72	3,136.36	32,227.18	3,187.43	589.95	5.27
Juniperus monosperma	12	0.12	62,170.16	3,054.86	20,926.52	3,104.61	574.62	5.13
Populus fremontii	6	0.36	34,302.52	3,223.44	16,064.28	3,207.56	572.50	5.12
Ulmus davidiana	16	0.33	31,554.70	2,965.22	18,999.57	2,950.62	526.64	4.71
Prunus	57	0.29	28,402.82	2,669.04	13,681.42	2,655.89	474.04	4.24
Pinus sylvestris	4	0.09	48,251.04	2,370.92	29,234.40	2,409.53	445.97	3.99
Catalpa speciosa	12	0.25	23,906.84	2,246.55	1,919.29	2,235.48	399.00	3.57
Juniperus deppeana	5	0.08	42,722.83	2,099.28	14,380.53	2,133.46	394.87	3.53

Hydrology Effects by Species

Hydrology Effects of Trees by Species

Location: Las Vegas, San Miguel, New Mexico, United States of America
Project: Las Vegas, NM, Series: Parks & Streets, Year: 2025
Generated: 2/26/25



Species Name	Number of Trees	Leaf Area (ac)	Potential Evapotranspiration (gal/yr)	Evaporation (gal/yr)	Transpiration (gal/yr)	Water Intercepted (gal/yr)	Avoided Runoff (gal/yr)	Avoided Runoff Value (\$/yr)
Pinus flexilis	3	0.07	38,214.30	1,877.74	12,862.96	1,908.32	353.20	3.16
Thuja	3	0.07	37,875.63	1,861.10	12,748.96	1,891.41	350.07	3.13
Cupressus arizonica	1	0.07	35,565.61	1,747.59	3,112.57	1,776.05	328.72	2.94
Morus	3	0.20	19,663.12	1,847.76	7,329.19	1,838.66	328.17	2.93
Populus angustifolia	6	0.20	19,515.08	1,833.85	7,833.55	1,824.82	325.70	2.91
Abies concolor	5	0.07	34,713.98	1,705.75	11,684.75	1,733.52	320.85	2.87
Tilia cordata	8	0.20	18,888.69	1,774.99	7,582.12	1,766.24	315.25	2.82
Juniperus	12	0.06	33,504.74	1,646.33	8,458.29	1,673.14	309.67	2.77
Robinia	10	0.18	17,540.52	1,648.30	4,400.59	1,640.18	292.75	2.62
Tilia americana	2	0.18	17,178.43	1,614.27	6,895.60	1,606.32	286.70	2.56
Celtis occidentalis	5	0.18	17,120.57	1,608.84	5,497.90	1,600.91	285.74	2.55
Populus	2	0.17	16,791.08	1,577.87	10,110.17	1,570.10	280.24	2.50
Tilia	5	0.17	16,699.51	1,569.27	12,066.04	1,561.54	278.71	2.49
Prunus cerasifera	25	0.16	15,161.09	1,424.70	10,954.48	1,417.68	253.04	2.26
Malus domestica	6	0.16	15,145.50	1,423.24	9,119.34	1,416.23	252.78	2.26
Fraxinus americana	7	0.12	11,792.91	1,108.19	4,733.80	1,102.73	196.82	1.76
Salix gooddingii	1	0.12	11,339.16	1,065.55	6,827.48	1,060.30	189.25	1.69
Ailanthus altissima	5	0.11	10,418.77	979.06	836.44	974.24	173.89	1.55
Populus tremuloides	41	0.10	9,739.13	915.20	3,909.39	910.69	162.54	1.45
Koelreuteria paniculata	6	0.10	9,181.77	862.82	3,071.38	858.57	153.24	1.37
Gymnocladus dioica	6	0.09	8,226.91	773.09	3,302.37	769.28	137.31	1.23
Acer	8	0.08	7,892.43	741.66	3,168.10	738.01	131.72	1.18
Pinus aristata	2	0.03	12,979.88	637.79	4,369.04	648.18	119.97	1.07
Pyrus	7	0.07	6,520.20	612.71	4,403.18	609.69	108.82	0.97
Pyrus calleryana	8	0.06	5,663.85	532.24	4,092.35	529.62	94.53	0.84
Acer tataricum ssp. ginnala	7	0.05	5,272.11	495.42	3,174.42	492.98	87.99	0.79
Chilopsis linearis	1	0.02	8,085.51	397.30	2,721.59	403.77	74.73	0.67
Malus pumila	1	0.04	4,290.79	403.21	3,100.26	401.22	71.61	0.64
Quercus	6	0.04	3,920.99	368.46	2,833.06	366.64	65.44	0.58
Juglans major	2	0.04	3,466.27	325.73	1,391.40	324.12	57.85	0.52
Picea	3	0.01	6,251.46	307.18	2,525.09	312.18	57.78	0.52

Hydrology Effects by Species

Hydrology Effects of Trees by Species

Location: Las Vegas, San Miguel, New Mexico, United States of America
Project: Las Vegas, NM, Series: Parks & Streets, Year: 2025
Generated: 2/26/25



Species Name	Number of Trees	Leaf Area (ac)	Potential Evapotranspiration (gal/yr)	Evaporation (gal/yr)	Transpiration (gal/yr)	Water Intercepted (gal/yr)	Avoided Runoff (gal/yr)	Avoided Runoff Value (\$/yr)
Elaeagnus angustifolia	3	0.03	3,161.25	297.07	782.52	295.60	52.76	0.47
Robinia neomexicana	6	0.03	2,755.38	258.93	1,106.04	257.65	45.99	0.41
Platanus wrightii	4	0.03	2,419.49	227.36	1,165.45	226.24	40.38	0.36
Pistacia chinensis	5	0.02	2,242.54	210.73	180.04	209.70	37.43	0.33
Fraxinus velutina	4	0.02	1,974.14	185.51	792.44	184.60	32.95	0.29
Syringa vulgaris	2	0.02	1,461.96	137.38	586.85	136.71	24.40	0.22
Forestiera	7	0.01	1,340.77	125.99	269.10	125.37	22.38	0.20
Cercis canadensis	2	0.01	1,282.63	120.53	514.86	119.94	21.41	0.19
Quercus macrocarpa	4	0.01	1,224.44	115.06	491.50	114.50	20.44	0.18
Acer saccharum	3	0.01	1,189.26	111.76	477.38	111.21	19.85	0.18
Ulmus parvifolia	2	0.01	1,121.33	105.37	450.11	104.85	18.71	0.17
Crataegus	13	0.01	1,039.60	97.69	751.15	97.21	17.35	0.16
Tilia tomentosa	1	0.01	939.96	88.33	188.66	87.89	15.69	0.14
Sorbus	3	0.01	804.67	75.62	553.27	75.24	13.43	0.12
Populus alba	2	0.01	616.66	57.95	445.56	57.66	10.29	0.09
Aesculus glabra	1	0.01	542.57	50.99	217.79	50.73	9.06	0.08
Sorbus americana	2	0.00	406.69	38.22	163.25	38.03	6.79	0.06
Cercis canadensis v. texensis	3	0.00	256.49	24.10	58.34	23.98	4.28	0.04
Acer rubrum	4	0.00	254.06	23.87	127.48	23.76	4.24	0.04
Rhus glabra	1	0.00	248.76	23.38	99.86	23.26	4.15	0.04
Quercus gambelii	1	0.00	220.19	20.69	44.19	20.59	3.67	0.03
Acer glabrum	1	0.00	147.56	13.87	59.23	13.80	2.46	0.02
Prunus armeniaca	1	0.00	83.21	7.82	33.40	7.78	1.39	0.01
Pinus cembroides	1	0.00	94.58	4.65	31.84	4.72	0.87	0.01
Sorbus aucuparia	1	0.00	49.69	4.67	35.90	4.65	0.83	0.01
Cornus	1	0.00	45.92	4.32	21.47	4.29	0.77	0.01
Ginkgo biloba	1	0.00	30.67	2.88	12.31	2.87	0.51	0.00
Total	2,308	107.22	15,085,210.69	1,155,910.75	6,399,336.75	1,156,299.35	208,305.98	1,861.42

Avoided runoff value is calculated by the price \$0.009/gal. The user-designated weather station reported 10.0 inches of total annual precipitation. Eco will always use the hourly measurements that have the greatest total rainfall or user-submitted rainfall if provided.

Tree Removal Reports



Las Vegas, New Mexico has proudly held the distinction of Tree City USA for 26 years, 2025.

TREE HEALTH REPORT

Tree #17466
Species: Siberian Elm - *Ulmus pumila*
Address: 613-575 12th Street Las Vegas, NM
DBH:27” **Height (Estimated)** [ft]: 48
Wires: Present and Conflicting
Clearance Conflicts: Building, Pedestrian,Vehicle, Overhead Wires
Overview

Tree has been trimmed for electrical lines. However one trunk is fully over the building, is scratching the roof, and does not have lower branches available for reduction cut. Dominant trunk leaning over road, and is balanced by the trunk scratching the roof. Neighbor has expressed concern for his roof. Location provides good option for 3 smaller trees due to wires. Could also remove and stump grind small Siberian Elm next to it as well (17467)

Observations

Improperly Installed, Improperly Mulched, Improperly Pruned, Mechanical Damage,Pest Problem, Poor Location, Poor Structure, Poor Root System, Remove Hardware, Serious Decline.

Condition: Fair - Minor Problems

STATUS: REMOVAL



Latitude: 35.5925028302225
Longitude: -105.22179038763615

Risk Assessment	
Assessed Tree part:	Trunk
Likelihood of Failure:	Improbable
Likelihood of Impacting Target:	Low
Likelihood:	Unlikely
Consequence of Failure:	Minor
Risk Rating:	Low



Seeds of Wisdom, LLC

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TREE HEALTH REPORT

Tree # 30079
Species: Green ash *Fraxinus pennsylvanica*
Address: 1103 Lincoln Avenue Las Vegas, NM
DBH:38” Height (Estimated) [ft]: 47
Wires: No wires
Clearance Conflicts: No conflicts

Overview

Tree was completely dead with a bee hive in the trunk. This is an indicator that there is internal hollowing, making the tree more at risk of failure during strong wind events. Adjacent homeowner, who has young children, is concerned about dead limbs falling into the yard, as well as the size of the tree. Grapple is recommended to remove entire section of tree with bees for relocation, possibly along the river in an area with low pedestrian traffic, as well as for safety of removal crew. Removal should occur during cold season for less hazard to crew by bees. Safety clothing is recommended. Stump grinding is recommended.

Observations

Condition: Dead / Dying

Tree Comments:

Bee hive in tree. Unclear which type. Take a section of the trunk and use as a bee hotel. Typically green ash is an excellent urban wood resource.

STATUS: REMOVAL



Latitude: 35.591829312651
Longitude:-105.22066810358

Risk Assessment	
Assessed Tree part:	Whole Tree
Likelihood of Failure:	Probable
Likelihood of Impacting Target:	High
Likelihood:	Likely
Consequence of Failure:	Severe
Risk Rating:	High



TREE HEALTH REPORT

Tree # #17465
Species: Siberian elm *Ulmus pumila*
Address: 1112 Douglas Avenue
DBH: 30” Height (Estimated) [ft]:
Wires: Present and Conflicting
Clearance Conflicts: Overhead Wires

Overview

Tree has been partially girdled through vandalism. The vandalism of removing bark 3/4 around the tree has caused strain on its growth, and remaining two trunks are over electrical wires and along the parade route. It is in serious decline and has multiple dead branches hanging over the sidewalk. Stump grinding is recommended.

Observations

Cavity Decay, Improperly Pruned, Pest Problem, Poor Structure, Serious Decline, Crown Dieback

Condition: Poor - Major Problems

STATUS: REMOVAL



Latitude: 35.592793253089
Longitude: -105.22189289331

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	Medium
Likelihood:	Unlikely
Consequence of Failure:	Severe
Risk Rating:	Low



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TREE HEALTH REPORT

Tree #17464
Species: American elm *Ulmus americana*
Address: 1112 Douglas Avenue
DBH: 28“ Height (Estimated) [ft]: 67’
Wires: No Lines
Clearance Conflicts: Vehicle
Overview

Tree is in serious decline with several branches likely to fail, including several that are already off and caught in the canopy. Stump grinding is recommended.

Observations

Cavity Decay, Improperly Pruned, Poor Structure, Serious Decline, Crown Dieback

Condition: Poor - Major Problems

STATUS: REMOVAL



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Latitude: 35.592823788519
Longitude: -105.22181108594

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Imminent
Likelihood of Impacting Target:	Medium
Likelihood:	Likely
Consequence of Failure:	Severe
Risk Rating:	High



TREE HEALTH REPORT

Tree #17471
Species: Siberian Elm *Ulmus pumila*
Address: 1109 Douglas Avenue Las Vegas, NM
DBH:32” Height (Estimated) [ft]: 83
Wires:
Clearance Conflicts:
Overview

Siberian Elm. Fourth tree on Southside of Douglas and 12th. Lion-tailed with very few new epicormic shoots along trunks for possibility of reduction. Narrow crotches between several trunks. Stump grinding is recommended.

Observations

Cavity Decay, Improperly Installed, Improperly Mulched, Improperly Pruned, Pest Problem, Poor Structure, Poor Root System, Remove Hardware, Girdling Roots

Condition: Poor

STATUS: REMOVAL



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Latitude: 35.592733272746
Longitude: -105.22147044539

Risk Assessment	
Assessed Tree part:	Trunk
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	High
Likelihood:	Somewhat Likely
Consequence of Failure:	Severe
Risk Rating:	Moderate



TREE HEALTH REPORT

Tree #17461
Species: Siberian elm *Ulmus pumila*
Address: 1108 Douglas Avenue
DBH: 25" Height (Estimated) [ft]: 70
Wires: No Lines
Clearance Conflicts:
Overview:

Fifth tree on northside of Douglas and 12th. Lion-tailed with both branches leaning heavily toward residence. It has grown away from dominating crown class adjacent trees, and as such has poor structure. Stump grinding is recommended.

Observations

Cavity Decay, Improperly Pruned, Poor Structure, Crown Dieback

Condition: Poor - Major Problems

STATUS: REMOVAL



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TREE HEALTH REPORT

Tree #17455
Species: American elm *Ulmus americana*
Address: 1102 11th Street
DBH: 23" Height (Estimated) [ft]: 47
Wires: No Lines
Clearance Conflicts: Building, Vehicle
Overview

Tree has been lion-tailed and one branch has a lean toward and is hanging over adjacent building. Trunk union is very tight, increasing chance of failure during wind event. Additionally, a recreational vehicle is parked under the tree, leading to increase consequence of failure.

Observations

Cavity Decay, Improperly Pruned, Pest Problem, Poor Location, Poor Structure, Poor Root System, Remove Hardware, Serious Decline

Condition: Dead / Dying

STATUS: REMOVAL



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Latitude: 35.59332386843578
Longitude: -105.22110088507951

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	High
Likelihood:	Somewhat Likely
Consequence of Failure:	Severe
Risk Rating:	Moderate



TREE HEALTH REPORT

Tree #22778
Species: American elm *Ulmus americana*
Address: 500 National Avenue
DBH: 18" Height (Estimated) [ft]: 42
Wires:
Clearance Conflicts:
Overview:

Carnegie park. Surface roots appear to have been cut, and trunk is easily moved. Due to high traffic, tree should be removed and stump ground to prevent tripping hazard.

Observations:

Improperly Mulched,Improperly Pruned, Mechanical Damage, Pest Problem, Poor Structure, Poor Root System, Serious Decline, Canker, Crown Dieback

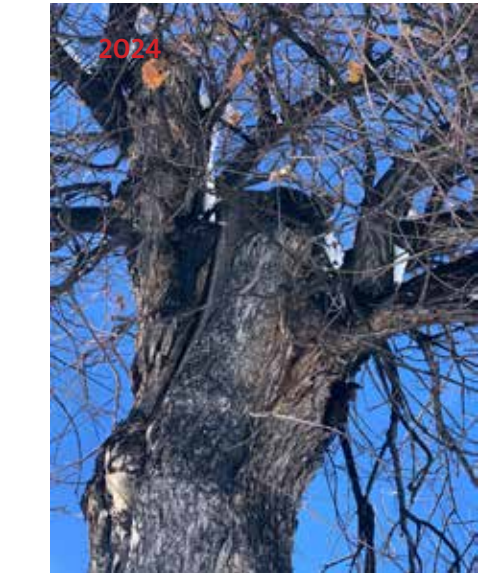
Condition: Dead / Dying
Tree Comments: Previously topped

STATUS: REMOVAL



Latitude: 35.59783799518678
Longitude: -105.21587599755178

Risk Assessment	
Assessed Tree part:	Whole Tree
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	Low
Likelihood:	Unlikely
Consequence of Failure:	Minor
Risk Rating:	Low



TREE HEALTH REPORT

Tree #22749
Species: Honeylocust *Gleditsia triacanthos*
Address: 500 East National Avenue
DBH: 9" Height (Estimated) [ft]: 38
Wires: Present and Conflicting
Clearance Conflicts: Overhead Wires
Overview

Las Vegas Carnegie Park. Tree is next to a service wire, a sidewalk, and adjacent to the library. It has Honey Locust Borer, which has caused severe crown dieback. Stump grinding is recommended to prevent a tripping hazard.

Observations

Improperly Installed,Improperly Pruned,Mechanical Damage,Pest Problem, Poor Location, Serious Decline, Crown Dieback

Condition: Dead / Dying

STATUS: REMOVAL



Latitude: 35.5977203
Longitude: -105.2163625

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	Low
Likelihood:	Unlikely
Consequence of Failure:	Minor
Risk Rating:	Low



TREE HEALTH REPORT

Tree #17054
Species: Siberian Elm *Ulmus pumila*
Address: 700-798 Lincoln Avenue
DBH: 29” Height (Estimated) [ft]: 45
Wires: No Lines
Clearance Conflicts: Vehicle

Overview
(Adjacent to Lincoln Park)

This is a tall tree with severely compromised structure and poor unions due to previous topping. Stump grinding is recommended.

Observations

Cavity Decay, Improperly Mulched, Improperly Pruned, Pest Problem,Poor Location, Poor Structure, Poor Root System, Remove Hardware, Serious Decline

Condition: Dead / Dying

STATUS: REMOVAL



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TREE HEALTH REPORT

Tree #17056
Species: Siberian elm *Ulmus pumila*
Address: 700-798 Lincoln Avenue
DBH: 31” Height (Estimated) [ft]: 68
Wires: Present and Conflicting
Clearance Conflicts: Overhead Wires

Overview
(Adjacent to Lincoln Park)

This tree conflicts with power lines and is a very tall tree, which has been repeatedly lion-tailed as a result of deadwood pruning.

Observations

Improperly Mulched, Improperly Pruned, Poor Location, Poor Structure, Remove Hardware, Serious Decline, Crown Dieback

Condition: Poor - Major Problems

STATUS: REMOVAL



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Latitude: 35.59300067193134
Longitude: -105.21758511352546

Risk Assessment

Assessed Tree part:	Trunk
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	High
Likelihood:	Somewhat Likely
Consequence of Failure:	Significant
Risk Rating:	Moderate

TREE HEALTH REPORT

Tree #17575
Species: American elm *Ulmus americana*
Address: 1099-1001 Lincoln Avenue
DBH: 22” Height (Estimated) [ft]: 40
Wires: No Lines
Clearance Conflicts: Pedestrian, Sign or Signal
Overview

Tree has been vandalized, resulting in a girdling cut half through the trunk. It has been topped, is in serious decline and conflicts with the nearby sidewalk. Growth reserved to epicormic shoots along the trunk, which are not forming strong unions.

Observations

Improperly Pruned, Pest Problem, Poor Structure,Poor Root System,Serious Decline, Crown Dieback

Condition: Dead / Dying

STATUS: REMOVAL



Latitude: 35.59229502908828
Longitude: -105.21920662118109

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	Low
Likelihood:	Unlikely
Consequence of Failure:	Significant
Risk Rating:	Low



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TREE HEALTH REPORT

Tree # 4600
Species: American Elm - *Ulmus americana*
Address: 927-1027 6th Street Las Vegas, NM
DBH:30” Height (Estimated) [ft]: 45
Wires: No wires
Clearance Conflicts: Pedestrian, vehicle, sidewalk
Overview

Tree has many dead branches in its crown. It poses a risk during high wind events considering its location and size.

Observations

Improperly pruned. Pest problem. Poor structure. Serious decline. Crown dieback

Condition: Dead / Dying

Tree Comments:

Severe die back, in decline, most of the life of the tree is reserved to epicormic growth..

STATUS: REMOVAL



Latitude: 35.599481047168
Longitude:-105.218096387378

Risk Assessment	
Assessed Tree part:	Branch
Likelihood of Failure:	Possible
Likelihood of Impacting Target:	Medium
Likelihood:	Unlikely
Consequence of Failure:	Minor
Risk Rating:	Low



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Community Survey



Las Vegas Urban Forestry Management Plan



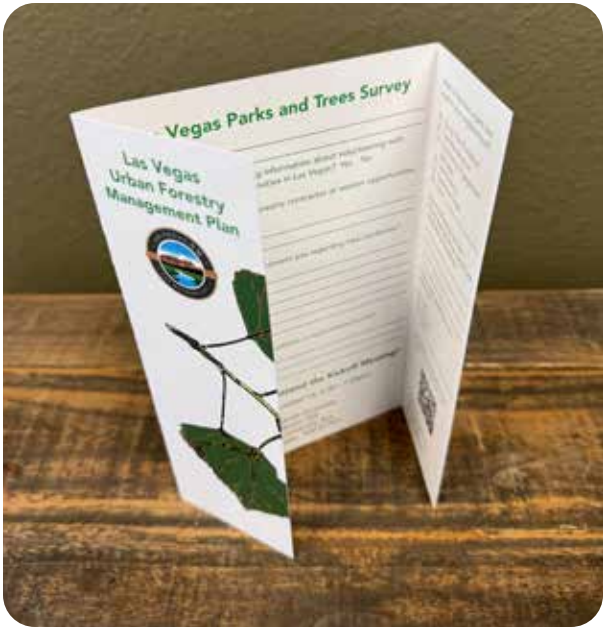
Seeds of Wisdom, LLC

Founded in 2005, Seeds of Wisdom, LLC, specializes in Urban Forestry Design and Stewardship.

From species selection to tree health, from conceptual design to green infrastructure, Seeds of Wisdom cares for trees in urban and semi-arid environments. Our projects aim to address climate change through supporting urban ecosystems, which provide many benefits: protecting habitat for wildlife, making the most of stormwater, and creating spaces for people to enjoy trees.

We value specialized, high-quality work, and are continually adapting management strategies for urban trees, forests, and landscapes.

Seeds of Wisdom, LLC
4001 Office Court Drive
Suite 408
Santa Fe, NM 87507-4906



Part of town where you reside:

- ☐ East
- ☐ West
- ☐ Outside of City

What parks do you use?
(Check all that apply)

- ☐ Carnegie Park
- ☐ Montezuma Pond
- ☐ Rodriguez Park
- ☐ City Hall Dog Park
- ☐ Harris Pond
- ☐ Memorial Park
- ☐ El Creston Circle
- ☐ Hanna Park
- ☐ Veterans Park
- ☐ James Marrujo
- ☐ Gallinas Riverwalk Park
- ☐ Truder Park
- ☐ Keyes Park
- ☐ Bridge St Breezeway
- ☐ South Pacific Park
- ☐ Lincoln Park
- ☐ Train Caboose Park
- ☐ Old Town Plaza
- ☐ Lion Park
- ☐ Pajarito
- ☐ Storrie Lake

What do you enjoy in these parks?

- ☐ Benches and Tables
- ☐ Trees and Shade
- ☐ Play Equipment
- ☐ Shelters
- ☐ Exercise Facilities
- ☐ Open Space
- ☐ Connections
- ☐ Other _____

Las Vegas Parks and Trees Survey

Name _____

E-mail _____

Are you interested in receiving information about volunteering with community urban forestry activities in Las Vegas? Yes No

Are you interested in urban forestry contractor or vendor opportunities in Las Vegas? Yes No

Business Name _____

Phone No. _____

Which areas of the city most concern you regarding tree conditions?

If possible, please provide an address or approximate location.

You are invited to attend the Kickoff Meeting!

Wednesday, October 16, 5:30 - 7:30pm

Highlands University Student Center
Room 322
800 National Ave
Las Vegas, NM 87701

What is the most urgent tree need in your neighborhood?

- ☐ Young Tree Protection
- ☐ Tree Maintenance
- ☐ Community Engagement with trees
- ☐ Tree Planting
- ☐ Hazardous Trees
- ☐ Other _____

Areas of flooding concern
Please describe areas which are vulnerable to flooding.

Public areas needing more plantings.

- ☐ Parks
- ☐ Reservoir
- ☐ Streets
- ☐ Other _____

If you prefer to complete this survey on-line, scan this QR code.



Contact Us;
Seeds of Wisdom, LLC
505.819.3769
plants@sowsfe.com
sowsfe.com

Rain Water Harvesting Cost Share Program



For information about the
Rainwater Harvesting Program
please contact:
Arcenio "AJ" Lujan
505-425-9088
ajlujan@tymswcd.org

Rain water harvesting cost share program guidelines

1. All practices shall be based on the fiscal year from July 1st through June 30th. Applications are considered on a first come, first served basis.
2. A copy of your warranty deed showing ownership of the property where the improvement will take place will be required to be eligible for cost share and must accompany this application.
3. The cost share is paid 25% by the landowner and 75% by Tierra y Montes SWCD. This program is for materials only, no cost share for labor will be paid. New construction is eligible for this program.
4. Approval is subject to project feasibility determination by Tierra y Montes SWCD.
5. Projects must be completed within 60 days of approval and contract signing of June 1st whichever comes first.
6. A full detailed accounting of all expenses with paid receipts (copies are fine) must be submitted with project completion notification. If the landowner submits receipts rather than contractor's invoice, this must include a summary page including all charges and their explanations.
7. No more than \$4,000.00 total per practice per year will be granted per applicant and may not exceed sixteen hundred dollars (\$8,000.00) per applicant for the life of the cost share program. All cost share recipients will receive a 1099 miscellaneous form for tax purposes in January following cost share if their total cost share amount for all practices paid was \$600 or greater.
8. All completed practices must be maintained for a period of 5 years or a full refund of cost share will be required.

Specific Requirements

The system must contain an entry screen and roof wash system to reduce litter and dirt from entering a **covered** storage tank. Above ground tanks must be color pigmented to reduce UV rays. The system for collecting rainwater (gutters, roofing, etc.) is not eligible for cost share. Construction of a stable pad for the barrel to rest on can be included in the cost share. The maximum cost share is \$4,000.00.



Tierra y Montes Soil & Water Conservation District
1926 7th St.
Las Vegas, New Mexico 87701
505/425-9088

Rain Water Harvesting Cost Share Program

Date of Request _____
Name of Community _____
Applicant Information:
Name _____
Address _____
Phone No. _____
E-mail _____

Signature: _____

General Description of building or facility to harvest rain from. (May attach additional sheets if needed)

Describe intended use for harvested water (Gardening, Agriculture, Lawn, Other)
The District will only fund projects associated with non-potable use. (No drinking or domestic use).

**Warranty deed of property is required and must be attached to complete application process.
Gutters must have been previously installed on building or facility to qualify for program.**

This section will be completed by Tierra y Montes SWCD

Received date of request: _____

Signature of Tierra y Montes Staff: _____

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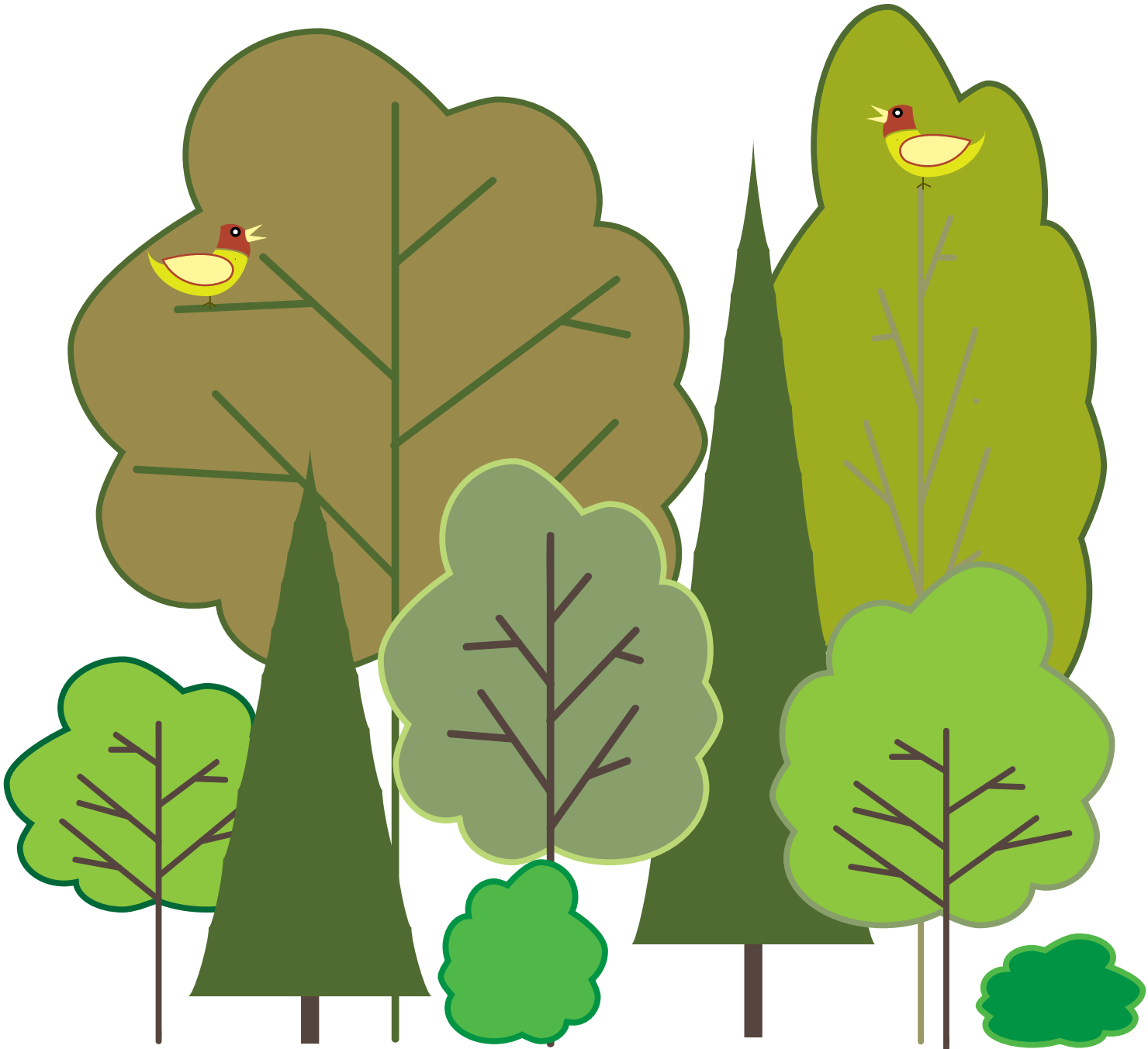
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“The creation of a thousand forests is in one acorn”
- Ralph Waldo Emerson