THE GUIDELINES

INTRODUCTION TO THE GUIDELINES

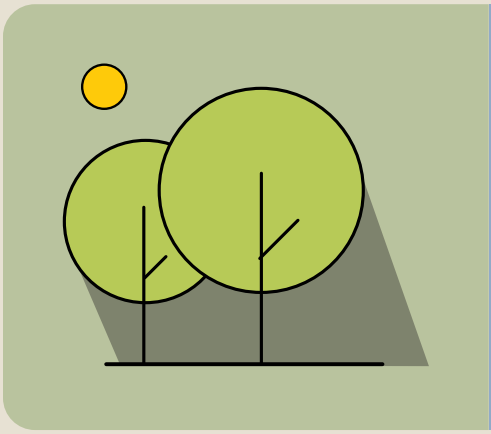
Effective shade infrastructure requires a multi-faceted approach that integrates trees, water harvesting, and structures to maximize cooling, comfort, and long-term livability. Each component contributes uniquely to reducing heat exposure and supporting a resilient community.

The Guidelines offer a highly visual, easy-to-use resource for residents, developers, planners, and policymakers. Their purpose is to provide clear, practical direction on maintaining and expanding the city's shade infrastructure.

To achieve these goals, the Guidelines refine complex strategies into applicable solutions tailored to Scottsdale's desert context, while the Design Scenarios illustrate how those strategies can be combined on typical sites. The Old Town section further illustrates shade solutions for Scottsdale's most walkable, urban setting, aligning shade infrastructure with the existing character plan and downtown urban design expectations.

Developed collaboratively with multiple city departments and industry experts, the Guidelines reflect Scottsdale's commitment to community-focused solutions that enhance livability and the environment.

TREES



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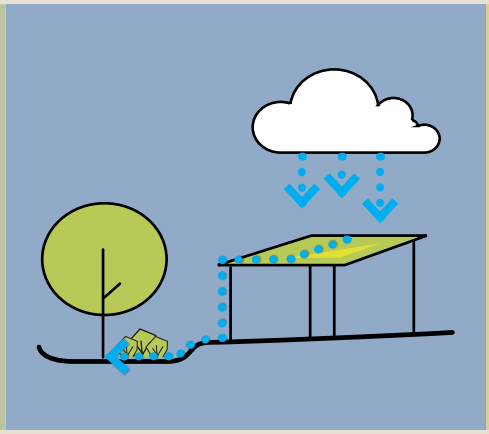
WATER HARVESTING



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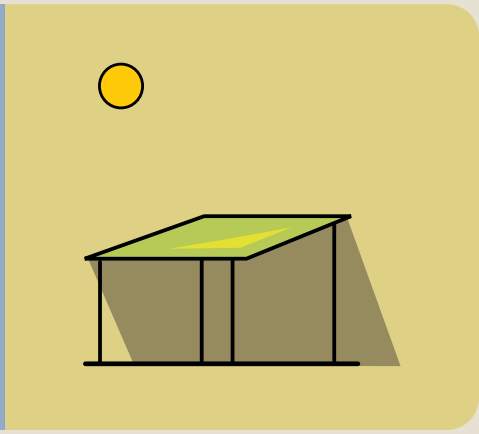
SHADE STRUCTURES



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DESIGN SCENARIOS

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OLD TOWN SCOTTSDALE

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TREES

Trees are the cornerstone of Scottsdale's shade infrastructure, providing natural cooling along with other environmental, economic and aesthetic benefits. They create habitat for wildlife, enhance neighborhood character, and improve comfort in outdoor spaces. In combination with shade structures and water-harvesting practices, trees contribute to a cooler, healthier, and more resilient community.

The Tree Guidelines provide direction for every stage in the life cycle of a tree to promote healthy growth, structural stability, and effective canopy coverage. The guidelines are intended for use by city departments, developers, and design teams to inform project planning and review, ensuring that landscaping contributes to Scottsdale's broader shade goals.

Design and Implementation Framework

The Tree Guidelines outline expectations for selecting, placing, establishing, and maintaining trees that are suited to Scottsdale's desert conditions. Rather than prescribing a single species or approach, they establish consistent, citywide expectations for a healthy, durable canopy.

Working in tandem with the Shade Structure and Water Harvesting Guidelines, the Tree Guidelines form one of the three technical foundations of the Shade & Tree Plan.

The Guidelines provide detailed direction organized under the following seven topics:

Tree Placement outlines how to approach spatial constraints and surrounding context so trees can reach their full canopy without conflicts.

Soil Volume defines the preparation and minimum soil requirements needed to support root growth and canopy health.

Tree Diversity sets the stage for tree selection by prioritizing the use of multiple species for ecological and aesthetic benefits.

Tree Selection offers details for choosing species appropriate to site conditions, spatial constraints, water requirements and maintenance needs.

Tree Staking describes methods to support young trees while allowing natural structural development.

Efficient Watering Strategies identify practices that maximize water efficiency and tree performance.

Tree Pruning & Maintenance establishes standards for canopy maintenance to promote safety, longevity, and aesthetic quality.

Protect Mature Trees

Mature trees are a large part of Scottsdale's existing shade infrastructure. While these guidelines support adding new shade trees to **Increase Our Shade**, it is just as important to protect the trees we already have and **Maintain Our Shade**. The Tree Guidelines are not intended to replace existing mature trees. Whenever feasible, plan and design around mature trees and focus on keeping them healthy and safe.

TREE PLACEMENT

Place trees to maximize shade benefits, ensure long-term tree health, and avoid conflicts with surrounding infrastructure.

TR 1 For pedestrian areas and street frontages, ensure proper mature canopy overlap while allowing sufficient room for growth.

TR 1.1 A maximum of 25’ measured from trunk to trunk is recommended (25’ O.C. - on center). Refer to the Tree Lists and Tree Guides beginning on page 38 for recommended placement on individual species.

TR 1.2 Closer spacing may be evaluated for smaller tree species.

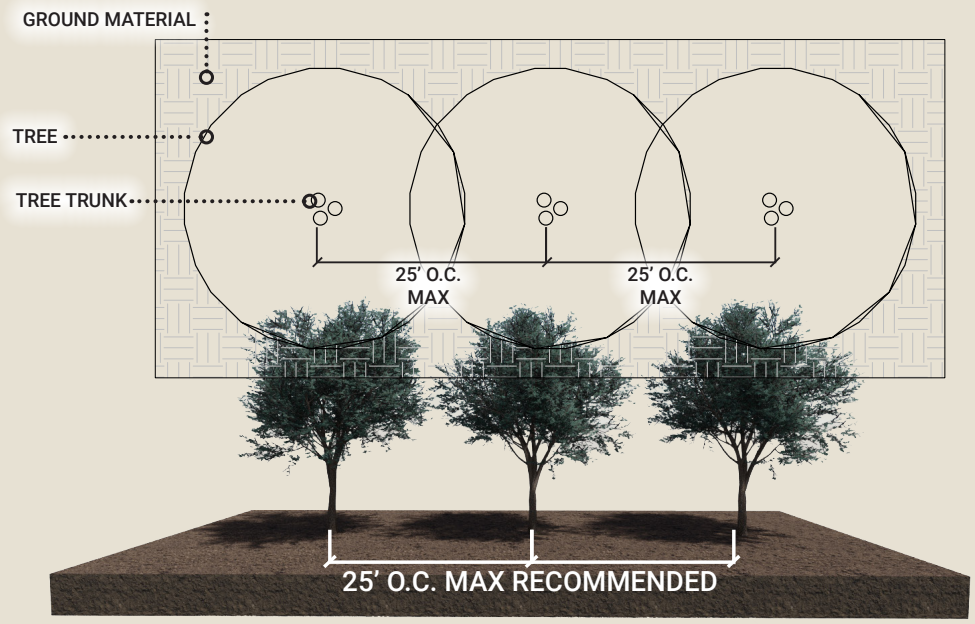


Figure 1-1. Guideline TR1.1.

TR 2 Prevent damage to structures and allow for healthy root and canopy development.

TR 2.1 10’ minimum measured from building/structure to a tree trunk is recommended.

TR 2.2 5’ minimum may be appropriate for smaller trees with non-invasive root systems. Refer to the Tree Lists and Tree Guides beginning on page 38.

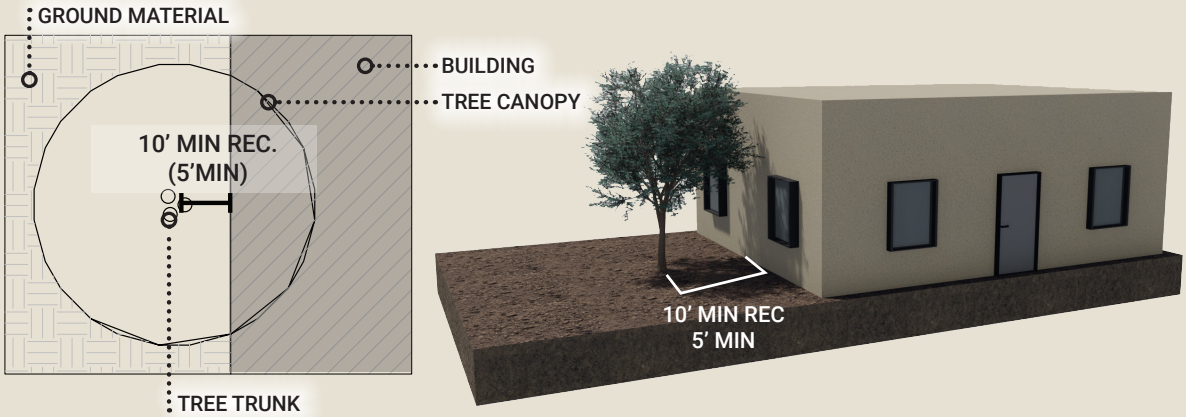


Figure 1-2. Guidelines TR 2.1 and TR 2.2.

TR 3 Minimize heat retention and reduce the risk of root conflicts with nearby hardscape.

TR 3.1 5’ minimum measured from hardscape to trunk is recommended.

TR 3.2 3.5’ minimum may be acceptable for smaller trees with non-invasive root systems.

TR 3.3 Provide a minimum of 50% shade coverage over hardscape surfaces through a combination of trees at maturity and shade structures.

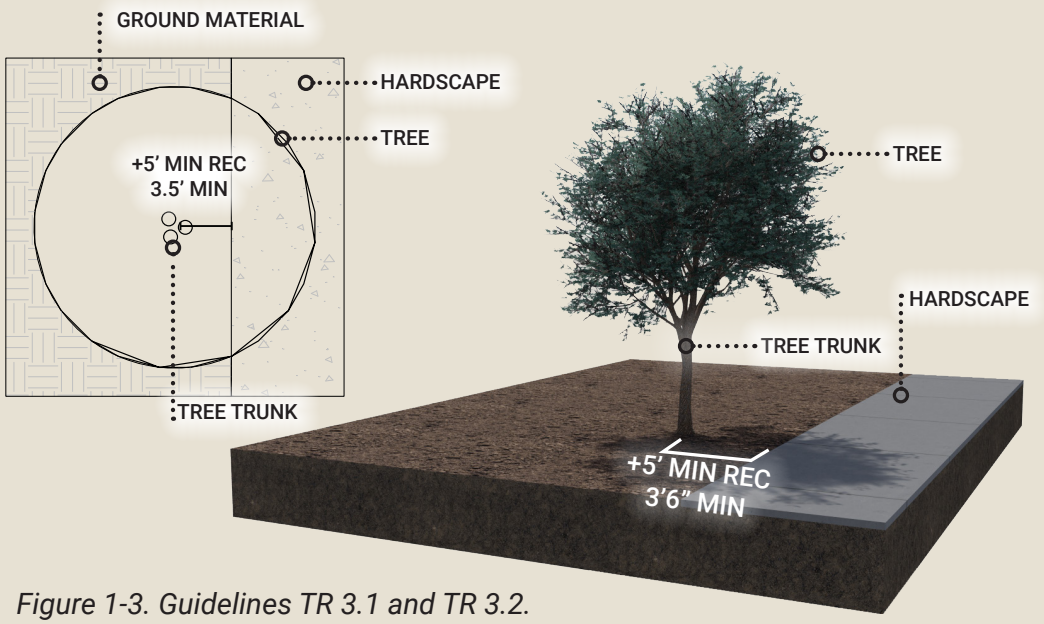


Figure 1-3. Guidelines TR 3.1 and TR 3.2.

TR 4 Maintain safe sightlines and unobstructed movement.

TR 4.1 8’ minimum vertical clearance from a pedestrian facility (sidewalks, paths, etc.) is recommended at maturity.

TR 4.2 13.5’ minimum vertical clearance from drivelanes is recommended.

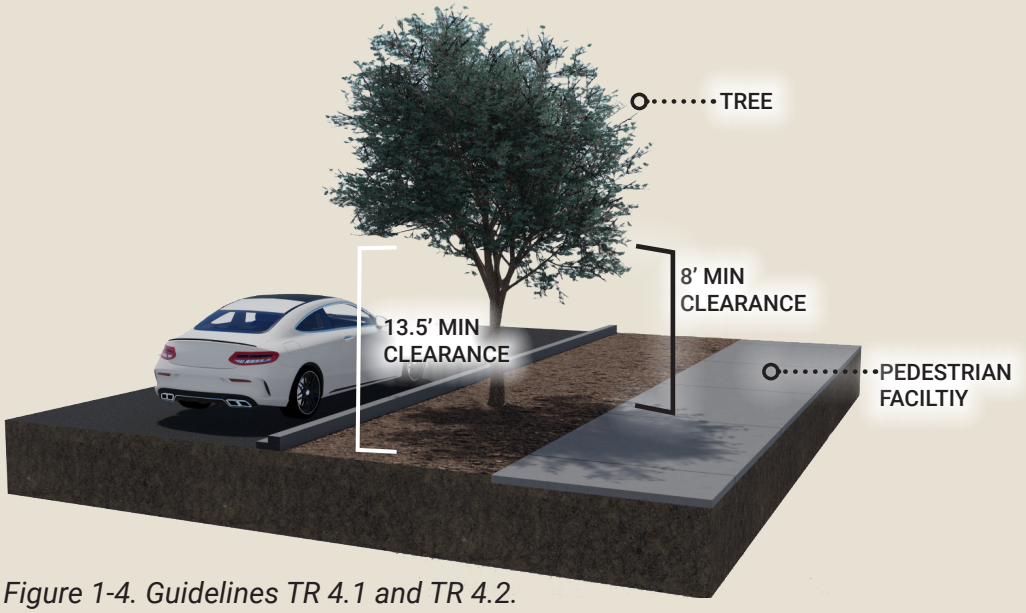


Figure 1-4. Guidelines TR 4.1 and TR 4.2.

TR 5 Avoid conflicts with buildings, power lines, underground utilities, drainage systems, and other infrastructure.

TR 5.1 Consult utility providers to avoid conflicts. Call 811 prior to digging.

TR 5.2 Use trees with limited invasive roots (Refer to the Tree Lists and Tree Guides beginning on page 38).

TR 5.3 Root barriers may be utilized for added underground protection.

TR 5.4 The trunk of a tree should be a minimum of 7' from underground utilities.

TR 5.5 In areas where trees may not be feasible, evaluate the practical use of shade structures.

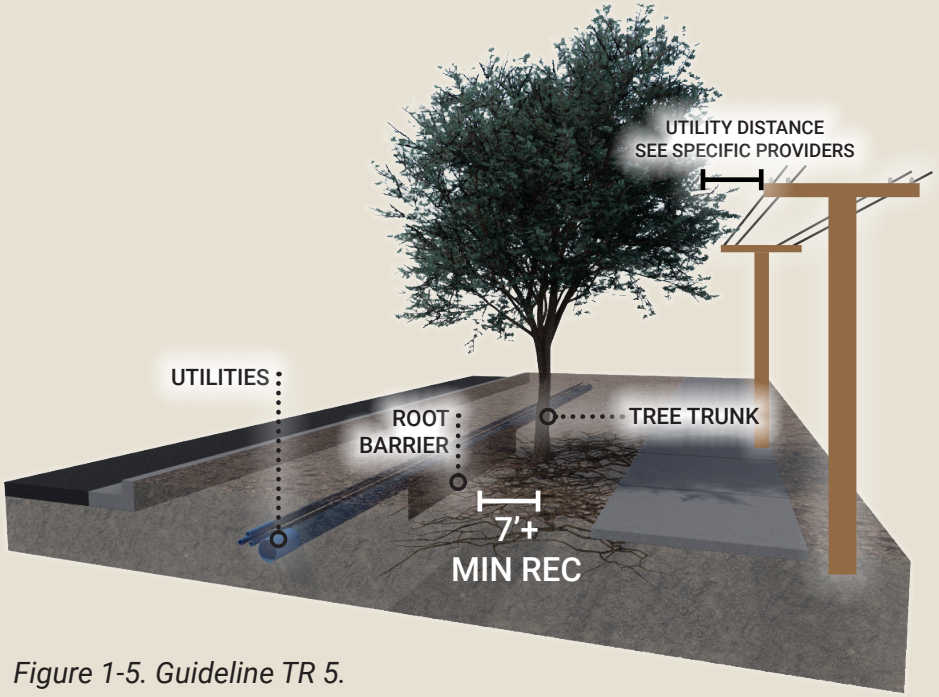


Figure 1-5. Guideline TR 5.

TR 6 Prioritize tree placement to provide shade in pedestrian areas.

TR 6.1 Locate trees so mature canopy provides shade along pedestrian routes and connections, including sidewalks, paths, crossings, and primary and secondary building entries.

TR 6.2 Locate trees so mature canopy provides shade where people gather or wait, including seating areas, plazas, playground edges, transit stops, and community facilities.

TR 6.3 Locate trees, or groupings of trees, to minimize large unshaded gaps along pedestrian routes and gathering areas.

TR 6.4 Avoid placing higher-allergen tree species adjacent to seating areas, entries, and other gathering or waiting areas with sustained pedestrian activity.

SOIL VOLUME & QUALITY

Ensure adequate soil volume and quality to support tree growth, health and longevity.

Limited soil volume restricts root expansion, resulting in stunted growth and diminished vitality—a condition often described as "bonsai-ing." Trees under chronic stress are more susceptible to pests and diseases, increasing the need for maintenance and replacement. In urban environments, where soil is frequently compacted or constrained by pavement and structures, providing adequate soil volume is essential to support healthy, mature tree development.

Figure 1-6. illustrates how soil volume directly influences tree size and canopy potential. Trees planted in approximately 120 cubic feet of soil remain substantially smaller than those provided with 500 or 1,000 cubic feet, where they can achieve their full growth potential and contribute meaningful shade.

Additional soil-related considerations, including soil quality, compaction and planting practices, are addressed in the following guidelines.

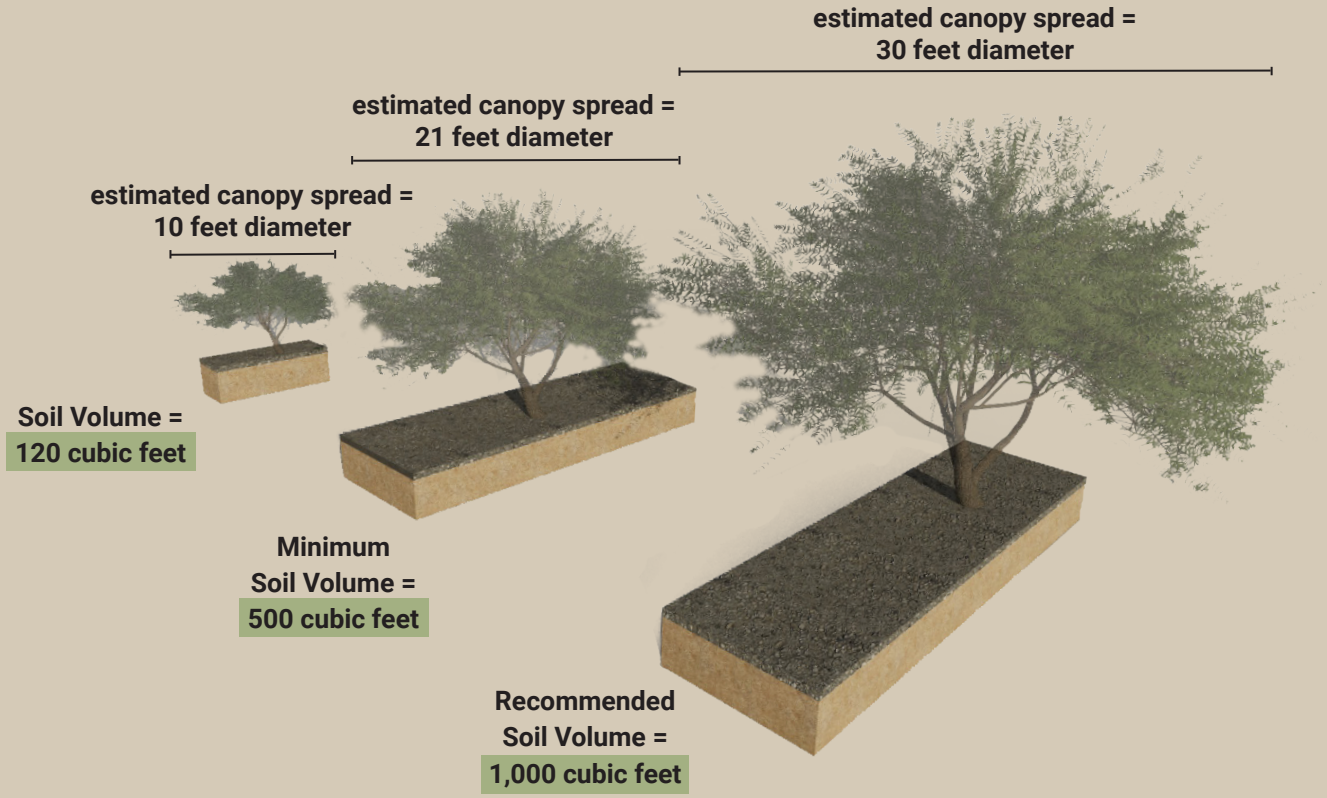


Figure 1-6. Diagram illustrating the relationship between soil volume and canopy potential.

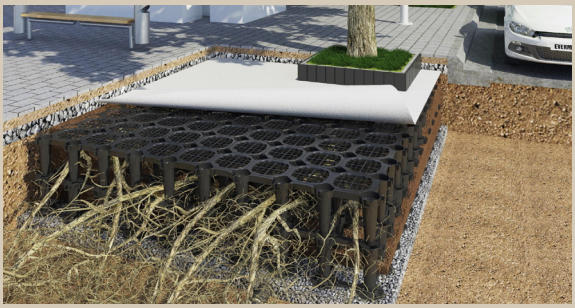
TR 7 Provide adequate soil volume in paved or compacted areas to support tree canopy and root growth.

TR 7.1 Provide a minimum of 500 cubic feet (CF) with a recommended 1,000 CF of soil volume. Soil volume calculations should generally assume 3 feet of rootable soil depth unless otherwise justified by the planting system. See Figures 1-6 and 1-7.

TR 7.2 Suspended pavement may be utilized in hardscaped areas or areas where 1,000 CF of soil volume cannot be achieved.

TR 7.3 When planting trees near hardscapes, use structural soil or suspended pavement to allow roots to grow beneath pavements while preventing soil compaction.

TR 7.4 Incorporate permeable paving or larger planting pits to increase available soil volume.



SUSPENDED PAVEMENT: SOIL CELLS

In hardscaped areas, soil cells provide uncompacted, nutrient-rich soil to support healthy tree root growth. These modular systems stabilize pavement while allowing roots to expand. Studies show trees in soil cells grow larger and healthier than those in compacted soils (EPA).

Figure 1-7. Description of soil cells.

TR 8 Prepare compacted soils when necessary to ensure healthy tree establishment.

TR 8.1 Amend compacted soils with organic matter or mulch to improve water retention and nutrient availability (around rootball only and not below to avoid sinking as the organics break down). Utilize suitable native soil where feasible.

TR 8.2 Use techniques like deep tilling, air spade, or soil fracturing to break up compacted layers and increase infiltration.

TR 8.3 Design passive water harvesting systems (e.g., bioswales, rain gardens) to integrate water flow into planting areas, reducing water stress and enhancing soil health (see Water Harvesting Guidelines, pages 59 - 75).

TREE DIVERSITY

Promote biodiversity to support healthier ecosystems and enhance visual variety.

TR 9 Prevent monocultures (plantings dominated by a single species or family) by providing a balanced mix of tree varieties.

TR 9.1 For roadway, civic, and large-scale private developments that may affect or alter the context area through landscape design, consider applying the 30/20/10 Rule, where no more than 30% of plants in a landscape plan belong to the same family, no more than 20% belong to the same genus, and no more than 10% belong to the same species.

Tree Diversity Benefits include:

- **Pest and Disease Resilience:** Diverse plantings reduce the risk of a single pest or disease wiping out large portions of the landscape.
- **Adaptability to Environmental Changes:** Mixed plantings are more likely to thrive under changing environmental conditions.
- **Ecosystem Support:** Biodiversity supports a wider range of pollinators, birds, and other wildlife, enhancing ecological health.
- **Aesthetic Appeal:** Varied plantings create more visually dynamic landscapes with seasonal interest, textures, and colors.

WHAT ARE FAMILY, GENUS & SPECIES?

Plants are classified by their family, genus and species, which group them based on shared characteristics.

Family

A group of plants that share broad characteristics about leaf shape, flower type, etc.
(All Mesquite are in the Fabaceae family)

Genus

Closely related trees within a family that share specific similarities, like growth habit or bark type
(Mesquite trees fall under the Genus 'Prosopis')

Species

The most specific level, referring to one exact type of tree
(Honey Mesquite species is '*glandulosa*')

Fabaceae Prosopis glandulosa **Example - Honey Mesquite**

Figure 1-8. Explanation of family, genus, and species classifications.

TREE SELECTION

Choose site-appropriate, desert-adaptive trees that support both project objectives and shade and water conservation goals.

TR 10 Tree selection should support shade and water conservation goals.

TR 10.1 Projects should utilize tree species included in the Tree Guides (pages 38 - 47); when alternatives are proposed, use ADWR's Low Water Use and Drought Tolerant Plant List to support water-efficient selection and confirm equivalent canopy potential.

TR 10.2 Trees should be selected based on site-specific conditions and species attributes.

TR 10.3 In areas with special operational constraints (for example, the Scottsdale Airpark), select tree species compatible with the setting and coordinate with the appropriate stakeholders or City departments.

TR 10.4 In areas with sustained pedestrian activity (for example, schools, playgrounds, and community facilities), tree selection should consider pollen and allergen potential.

Choose site-appropriate, desert-adaptive trees.

SITE-SPECIFIC TREE LISTS

These lists recommend tree species based on location; however, final tree selection should account for site-specific environmental conditions and constraints. The lists are intended as guidance, and no guarantees are implied regarding performance at any individual site.

Near Building

- Anacacho Orchid
- Texas Mountain Laurel
- Palo Blanco
- Mulga
- **Desert Willow** ☀
- Mexican Bird of Paradise
- Fruitless Olive
- **Palo Verde** ☀
- **Ironwood** ☀
- Texas Ebony
- Sweet Acacia
- Chinese Elm
- Ghost Gum

Parking lots

- **Mesquite** ☀
- Mulga
- Mexican Bird of Paradise
- Texas Ebony
- Chinese Pistache
- Fruitless Olive
- **Desert Willow** ☀
- Live Oak
- **Palo Verde** (Edge) ☀
- Palo Blanco

☀ **Appropriate for Environmentally Sensitive Lands (ESL)**

Street - Back of Curb

- Mulga
- Chinese Pistache
- **Desert Willow** ☀
- Palo Blanco
- Ghost Gum

Street - Back of Sidewalk

- **Desert Willow** ☀
- **Palo Verde** ☀
- **Mesquite** ☀
- Mexican Bird of Paradise

Street - Median (6'-12' Wide)

- Mulga
- **Desert Willow** ☀
- Cascalote
- Date Palm

Street - Median (12'-20' Wide)

- Date Palm
- Fruitless Olive
- Willow Acacia
- Cascalote
- Mulga
- Mexican Bird of Paradise
- **Desert Willow** ☀
- Chaste Tree
- Featherbush
- Texas Mountain Laurel
- Mastic Tree
- Anacacho Orchid

Path/Sidewalks

- Chinese Pistache
- Mulga
- **Desert Willow** ☀
- Ghost Gum
- Shoestring Acacia
- Willow Acacia
- Chinese Elm
- **Mesquite** ☀
- Sweet Acacia

TREE GUIDES

Tree Guides feature recommended species and are intended to be used in conjunction with the subsequent design scenarios to assist in selecting the right tree species for a project.

- **Tree Name (Botanical and Common):** Identifies the species by both common and scientific names for accurate selection.
- **Size & Growth:** Indicates the mature height and width (h x w) and growth rate (Slow, Moderate, Fast).
- **Shade Type:** Defines the kind of shade the tree provides (High, Medium, or Dappled).
- **Water Needs:** Helps in selecting trees based on irrigation requirements (Low, Lower, Lowest).
- **Litter:** Assesses the level of maintenance required for fallen debris (Low, Medium, High).
- **Pool-friendly (Root Damage Potential):** Highlights the likelihood of roots causing issues with pools, sidewalks, utilities, or nearby structures.

Photo of tree

Appropriate for Environmentally Sensitive Lands (ESL)

Scientific name

MEXICAN BIRD OF PARADISE

Caesalpinia mexicana

Ⓑ	Size(h x w)	10’ x 10’
	Growth Rate	fast
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	yes, summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	8’ O.C.
Ⓐ	Min Sidewalk Dist.	4’
Ⓐ	Min Street Dist.	8’
Ⓓ	Min Building Dist.	4’
	Parking Lot	no
	Allergenic	non-allergenic

Common name

Water usage

Low

Lower

Lowest

Letters correspond to callouts in Design Scenarios (pages 89 - 98)

Color corresponds to tree size

Small trees

Medium trees

Large trees

Figure 1-9. Explanation of Tree Guide elements.

Small Trees

- Small trees grow up to 25’ tall, ideal for areas with size limits or close to buildings and infrastructure.
- Well suited to residential yards, patios, courtyards, driveways, walkways, neighborhood streets, and areas near utility lines.
- Provide filtered shade, color, and habitat without overpowering smaller spaces or creating excessive debris.

MULGA

Acacia aneura

Ⓑ	Size(h x w)	20’ x 15’
	Growth Rate	moderate
	Shade Type	dappled
	Deciduous	no, evergreen
	Flower	subtle
	Fruit	no
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	12’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	5’
	Parking Lot	yes
	Allergen	non-allergenic

ANACACHO ORCHID

Bauhinia lunarioides

Ⓑ	Size(h x w)	10’ x 10’
	Growth Rate	moderate
	Shade Type	dappled
	Deciduous	yes, semi-evergreen
	Flower	yes, spring/summer
	Fruit	no
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	6’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	5’
	Parking Lot	no
	Allergen	non-allergenic

TEXAS MOUNTAIN LAUREL

Dermatophyllum secundiflorum

Ⓑ	Size(h x w)	15’ x 15’
	Growth Rate	slow
	Shade Type	dappled
	Deciduous	no, evergreen
	Flower	yes, spring
	Fruit	yes
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	yes, seedpods
	Pool-friendly	yes
Ⓒ	Distance Apart	8’ O.C.
Ⓐ	Min Sidewalk Dist.	4’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	6’
	Parking Lot	no
	Allergen	non-allergenic

MEXICAN BIRD OF PARADISE

Caesalpinia mexicana

Ⓑ	Size(h x w)	10’ x 10’
	Growth Rate	fast
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	yes, summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	8’ O.C.
Ⓐ	Min Sidewalk Dist.	4’
Ⓐ	Min Street Dist.	8’
Ⓓ	Min Building Dist.	4’
	Parking Lot	no
	Allergen	non-allergenic

DESERT WILLOW*

*Seedless Varieties

Chilopsis linearis

Ⓑ	Size(h x w)	25’ x 20’
	Growth Rate	fast
	Shade Type	dappled
	Deciduous	yes
	Flower	yes, spring/fall
	Fruit	no
	Water	lowest
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	15’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

CASCALOTE

Caesalpinia cacalaco

Ⓑ	Size(h x w)	15’x15’
	Growth Rate	slow
	Shade Type	moderate
	Deciduous	yes, semi-evergreen
	Flower	yes, winter/spring
	Fruit	no
	Water	lower
	Litter	low
	Thorns	yes
	Poisonous	yes
	Pool-friendly	no
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	7’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

FEATHER BUSH

Lysiloma watsonii

Ⓑ	Size(h x w)	15’ x 15’
	Growth Rate	moderate
	Shade Type	moderate
	Deciduous	no, evergreen
	Flower	yes, spring/summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	15’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

MASTIC

Pistacia lentiscus

Ⓑ	Size(h x w)	15’ x 20’
	Growth Rate	slow
	Shade Type	high
	Deciduous	no, evergreen
	Flower	yes, spring
	Fruit	no
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	10’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	8’
	Parking Lot	yes
	Allergen	non-allergenic

CHASTE TREE

Vitex agnus-castus

Ⓑ	Size(h x w)	15’ x 15’
	Growth Rate	slow
	Shade Type	high
	Deciduous	yes
	Flower	yes, spring/summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	yes
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	10 O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	5’
	Parking Lot	yes
	Allergen	non-allergenic

PALO BLANCO

Mariosousa willardiana

Ⓑ	Size(h x w)	20’ x 10’
	Growth Rate	slow
	Shade Type	dappled
	Deciduous	yes, semi-evergreen
	Flower	yes, spring
	Fruit	no
	Water	lowest
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	10’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	5’
	Parking Lot	yes
	Allergen	non-allergenic

Medium Trees

- Medium trees grow 25’ – 40’ tall and are highly versatile in streetscapes and neighborhoods.
- Ideal for sidewalks, medians, parking areas, and residential yards, offering shade for pedestrians, vehicles, and outdoor spaces.
- Can be planted near streets or buildings with careful attention to root space, canopy spread, and maintenance needs.

SWEET ACACIA

Acacia farnesiana

Ⓑ	Size(h x w)	30’ x 30’
	Growth Rate	moderate
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	yes
	Fruit	no
	Water	lower
	Litter	high
	Thorns	yes
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	7’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	8’
	Parking Lot	yes
	Allergen	allergenic, seasonal

CHINESE PISTACHE

Pistacia chinensis

Ⓑ	Size(h x w)	30’ x 25’
	Growth Rate	moderate
	Shade Type	medium
	Deciduous	yes, semi-evergreen
	Flower	yes, fall color change
	Fruit	yes, female species
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

FRUITLESS OLIVE

Olea europea ‘Wilsonii’

Ⓑ	Size(h x w)	25’ x 25’
	Growth Rate	slow
	Shade Type	medium
	Deciduous	no,evergreen
	Flower	yes, spring
	Fruit	no
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	8’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	allergenic, low pollen

IRONWOOD

Olneya tesota

Ⓑ	Size(h x w)	25’ x 25’
	Growth Rate	slow
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	yes, spring
	Fruit	no
	Water	lowest
	Litter	low
	Thorns	yes
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	7’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

TEXAS EBONY

Ebenopsis ebano

Ⓑ	Size(h x w)	20’ x 15’
	Growth Rate	slow
	Shade Type	high
	Deciduous	no, evergreen
	Flower	yes, spring/summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	yes
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	10 O.C.
Ⓐ	Min Sidewalk Dist.	6’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	8’
	Parking Lot	yes
	Allergen	non-allergenic

COOLIBAH

Eucalyptus microtheca

Ⓑ	Size(h x w)	35’ x 25’
	Growth Rate	fast
	Shade Type	high
	Deciduous	no, evergreen
	Flower	yes, spring/summer
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

DATE PALM

Phoenix dactylifera

Ⓑ	Size(h x w)	80’ x 20’
	Growth Rate	slow
	Shade Type	dappled
	Deciduous	no, evergreen
	Flower	no
	Fruit	yes
	Water	low
	Litter	medium
	Thorns	yes, base of frond
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	16’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	8’
Ⓓ	Min Building Dist.	5’
	Parking Lot	no
	Allergen	non-allergenic

PALO VERDE

Parkinsonia spp.

Ⓑ	Size(h x w)	25’ x 25’
	Growth Rate	moderate
	Shade Type	dappled
	Deciduous	yes
	Flower	yes, spring
	Fruit	no
	Water	lowest
	Litter	high
	Thorns	yes
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	8’
	Parking Lot	yes
	Allergen	non-allergenic

MESQUITE

Neltuma Spp. [formerly Prosospis spp.]

Ⓑ	Size(h x w)	30’ x 30’
	Growth Rate	moderate
	Shade Type	medium
	Deciduous	yes, semi-evergreen
	Flower	subtle
	Fruit	no
	Water	lowest
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	allergenic, seasonal

MESQUITE (SEEDLESS)

Neltuma seedless hybrid [formerly Prosopis spp.]

Ⓑ	Size(h x w)	30’ x 30’
	Growth Rate	moderate
	Shade Type	medium
	Deciduous	yes, semi-evergreen
	Flower	subtle
	Fruit	no
	Water	lowest
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	6’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	allergenic, seasonal

Large Trees

- Large trees grow over 40’ tall and play a key role in expanding citywide canopy and cooling.
- Best for large residential lots, parks, open spaces, and wide rights-of-way, where they can provide deep shade, reduce heat, and support biodiversity.
- Must be carefully sited to avoid conflicts with buildings, sidewalks, and overhead or underground utilities.

LIVE OAK

Quercus virginiana

Ⓑ	Size(h x w)	40’ x 50’
	Growth Rate	slow
	Shade Type	high
	Deciduous	yes, semi-evergreen
	Flower	no
	Fruit	yes, nut
	Water	lower
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	yes
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	allergenic, seasonal

CHINESE ELM

Ulmus parvifolia

Ⓑ	Size(h x w)	45’ x 45’
	Growth Rate	fast
	Shade Type	medium
	Deciduous	yes, semi-evergreen
	Flower	no
	Fruit	yes, poison
	Water	low
	Litter	medium
	Thorns	no
	Poisonous	yes, berries
	Pool-friendly	no
Ⓒ	Distance Apart	24’ O.C.
Ⓐ	Min Sidewalk Dist.	5’
Ⓐ	Min Street Dist.	5’
Ⓓ	Min Building Dist.	10’
	Parking Lot	yes
	Allergen	non-allergenic

GHOST GUM

Corymbia aparrerinja [formerly Eucalyptus papuana]

Ⓑ	Size(hxw	40’ x 25’
	Growth Rate	fast
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	no
	Fruit	no
	Water	lower
	Litter	medium
	Thorns	no
	Poisonous	semi
	Pool-friendly	no
Ⓒ	Distance Apart	20’ O.C.
Ⓐ	Min Sidewalk Dist.	4’
Ⓐ	Min Street Dist.	4’
Ⓓ	Min Building Dist.	4’
	Parking Lot	yes
	Allergen	non-allergenic

SHOE STRING ACACIA

Acacia stenophylla

Ⓑ	Size(h x w)	40′ x 30′
	Growth Rate	fast
	Shade Type	high
	Deciduous	no, evergreen
	Flower	yes, fall/
	Fruit	winter
	Water	no
	Litter	low
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24′ O.C.
Ⓐ	Min Sidewalk Dist.	5′
Ⓐ	Min Street Dist.	5′
Ⓓ	Min Building Dist.	8′
	Parking Lot	yes
	Allergen	non-allergenic

WILLOW ACACIA

Acacia salicina

Ⓑ	Size(h x w)	40′ x 30′
	Growth Rate	fast
	Shade Type	medium
	Deciduous	no, evergreen
	Flower	yes
	Fruit	no
	Water	lower
	Litter	high
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	24′ O.C.
Ⓐ	Min Sidewalk Dist.	5′
Ⓐ	Min Street Dist.	5′
Ⓓ	Min Building Dist.	10′
	Parking Lot	yes
	Allergen	non-allergenic

TIPU

Tipuana tipu

Ⓑ	Size(h x w)	35′ x 50′
	Growth Rate	fast
	Shade Type	high
	Deciduous	yes, semi-evergreen
	Flower	yes, summer
	Fruit	yes
	Water	low
	Litter	medium
	Thorns	no
	Poisonous	no
	Pool-friendly	no
Ⓒ	Distance Apart	30′ O.C.
Ⓐ	Min Sidewalk Dist.	6′
Ⓐ	Min Street Dist.	6′
Ⓓ	Min Building Dist.	15′
	Parking Lot	no
	Allergen	allergenic, seasonal

TREE STAKING

Stake trees properly to provide stability during early growth while the root system establishes.

TR 11 Implement proper staking techniques at planting to support tree growth and health according to Maricopa Association of Governments (MAG) Uniform Standard Details for Public Works Construction.

TR 11.1 When planting, maintain the root flare above finished grade (soil level) to ensure the tree gets enough oxygen and has proper drainage (Figure 1-10).

TR 11.2 Remove nursery stakes promptly, unless otherwise specified, to prevent restriction of trunk growth and encourage natural movement.

TR 11.3 For small to medium-sized trees in moderate wind conditions, use two stakes placed on opposite sides of the tree (Figure 1-11. MAG Detail 601-1).

TR 11.4 For tall, heavy, or wind-sensitive trees, use three stakes evenly spaced around the tree (Figure 1-12. MAG Detail 601-3).

TR 11.5 Position stakes outside the root ball to avoid root damage.

TR 11.6 Use soft, flexible tree ties to prevent girdling (when the tie cuts into the tree).

TR 11.7 Use stakes and guy lines (typically cable, cord, or rope) to provide stability and support while allowing the tree to sway naturally in the wind.

TR 11.8 Remove stakes as soon as the tree can stand upright and withstand normal wind conditions.

Planting Depth to Maintain Root Flare

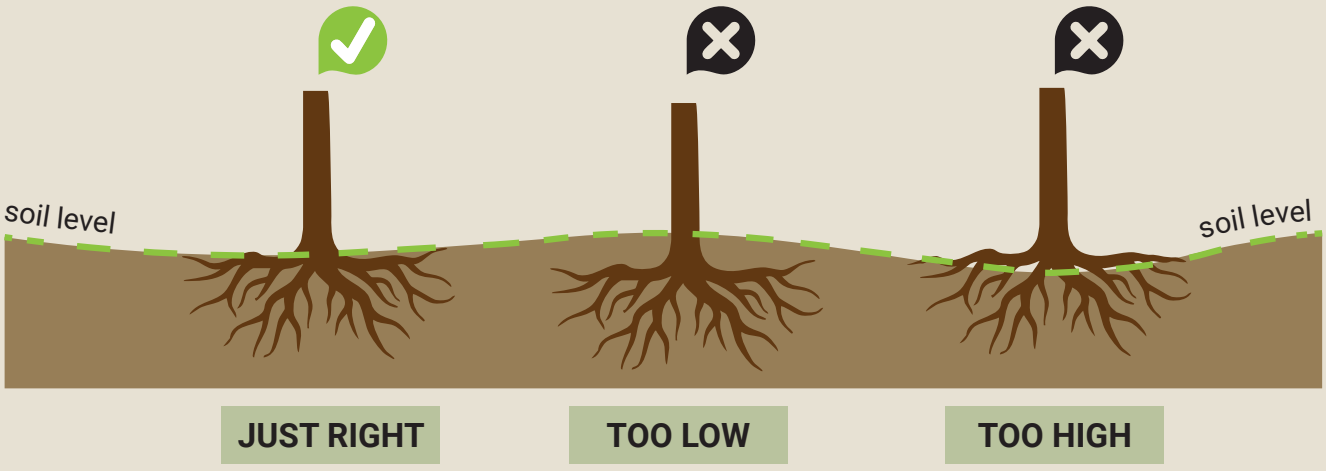


Figure 1-10. Depictions of possible root flare scenarios.

Figure 1-11. Double Stake Tree (MAG Detail 601-1)

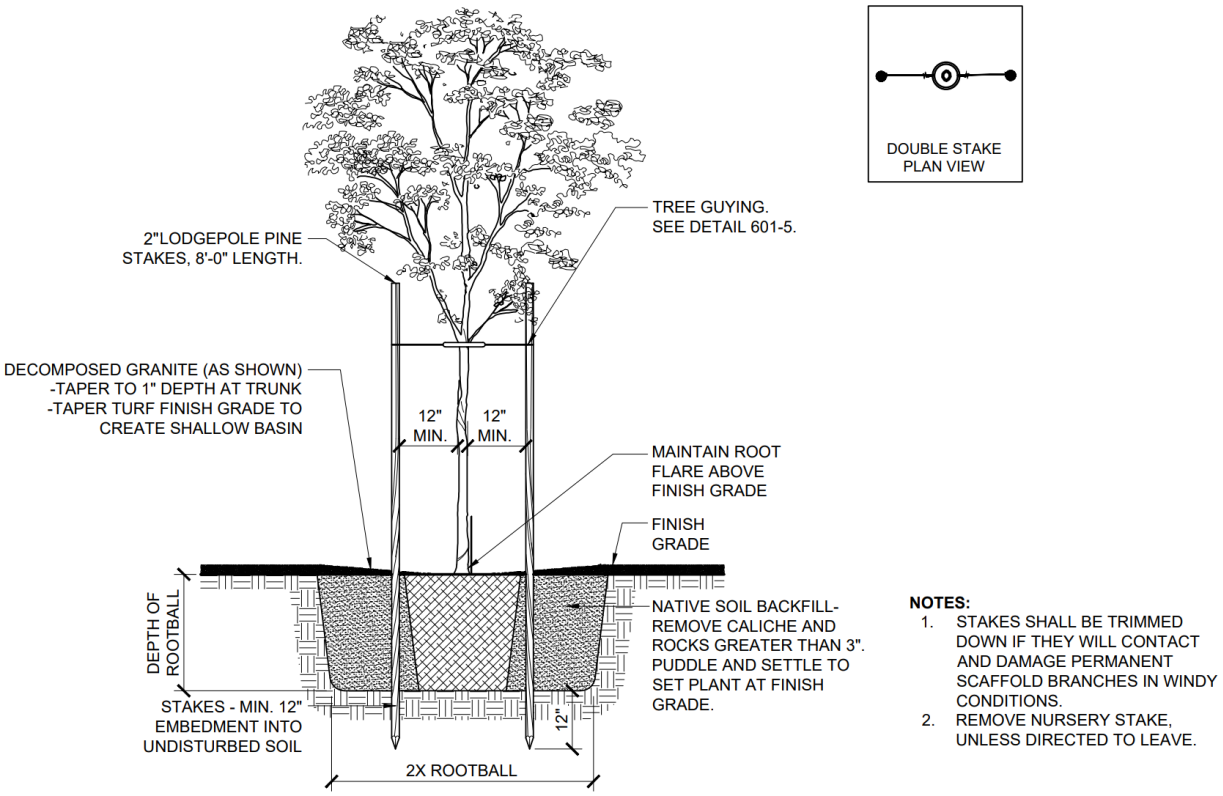


Figure 1-12. Triple Stake Tree (MAG Detail 601-3)

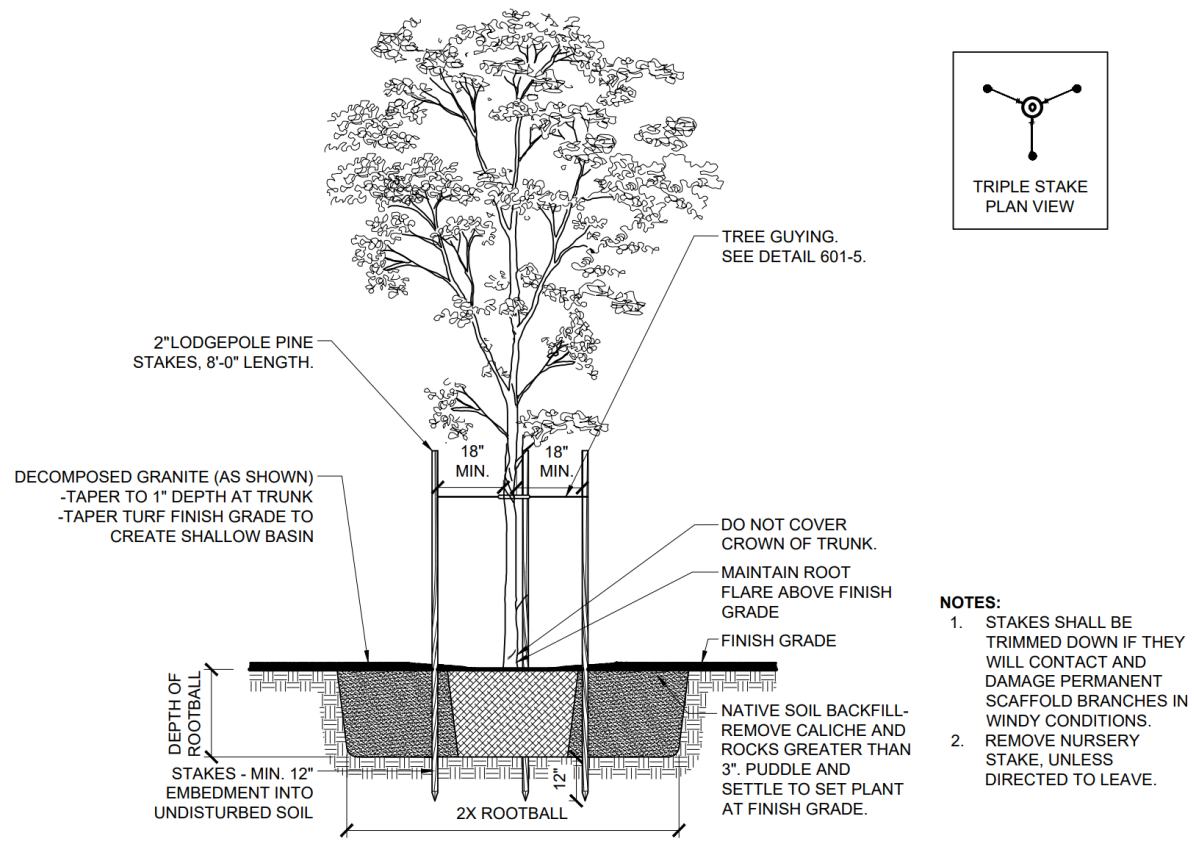
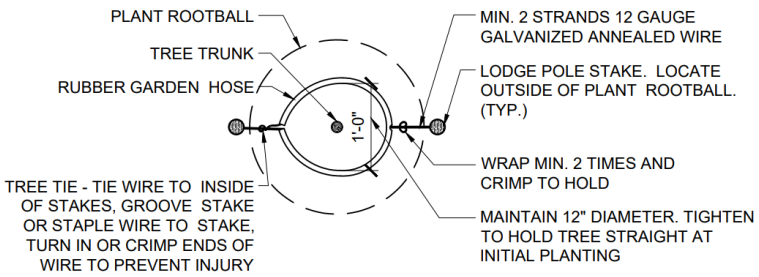
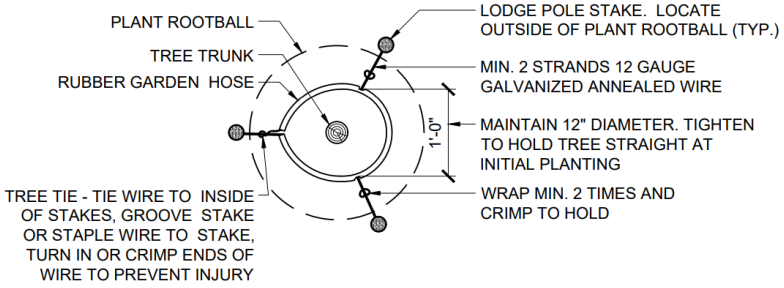


Figure 1-13. Tree Staking and Guying for Single Trunks (MAG Detail 601-5)



TREE STAKING PLAN - DOUBLE



TREE STAKING PLAN - TRIPLE

Proper Staking Timeline

First 6-12 Months - Initial Stabilization:

- Use stakes to stabilize the tree until the root system is established.
- For most trees, 6-12 months is sufficient to provide the necessary support.

After 6 Months - Tree Health Check:

- Inspect the stakes and ties regularly to ensure they are not causing bark damage or girdling the tree.
- Gently wiggle the tree. If it stands upright without excessive movement, the stakes may no longer be needed.

Up to 2 Years - Extended Staking:

- For trees in windy areas or with weak root systems, stakes may remain necessary for up to 2 years.
- Adjust ties as the tree grows to prevent girdling and ensure proper support.

EFFICIENT WATERING STRATEGIES

Apply watering strategies that match species needs, site conditions, and seasonal variability to optimize resources and support long-term tree health.

TR 12 Implement efficient irrigation practices to ensure trees receive adequate water without unnecessary waste.

TR 12.1 Account for species-specific water needs and soil types when planning irrigation.

TR 12.2 Use drip irrigation and deep root watering methods to deliver water directly to the root zone, minimize evaporation and reduce runoff.

TR 12.3 Position emitters or deep root watering devices at the drip line, the outer edge of the tree canopy where active roots are concentrated.

TR 12.4 Adjust emitter placement outward as trees mature to promote expanding root systems and healthier trees.

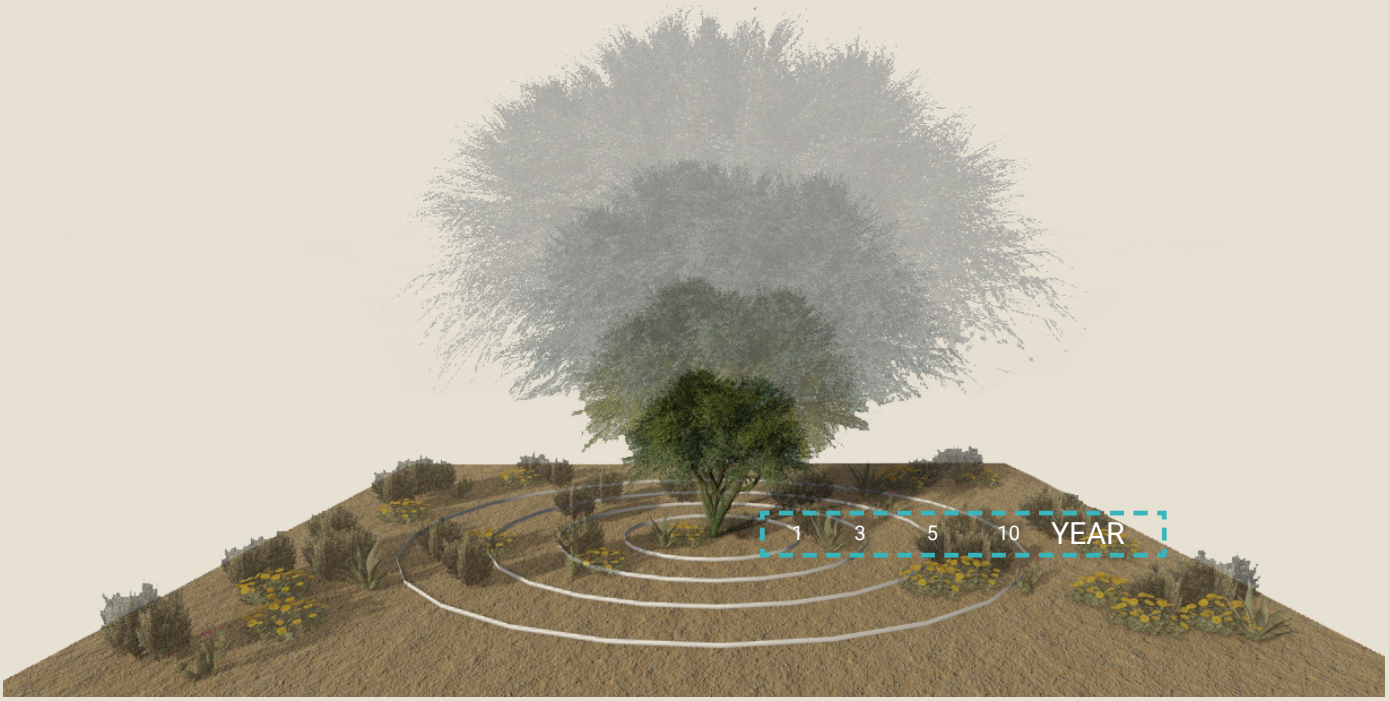


Figure 1-14. Diagram illustrating the placement of emitters over time as a tree matures (Guideline TR 12.4).

TR 13 Utilize smart irrigation controllers to automate watering schedules.

TR 13.1 Adjust watering frequency based on tree age.

TR 13.2 Adjust watering frequency based on weather and seasonal conditions.

Tree Irrigation Basics

YOUNG TREES

Young trees have small, shallow root systems and dry out quickly. They need more frequent, focused watering at the root zone to support establishment. The goal is to keep soil consistently moist—but not waterlogged—to promote strong root growth and canopy expansion.

MATURE TREES

Mature trees have larger, deeper root systems and can access moisture from a wider area. They typically need less frequent, deeper watering and can tolerate short dry periods. However, they may still need supplemental irrigation during extended heat or drought. Watering decisions for older trees should be based on soil moisture, seasonal climate, and species needs. Overwatering can compromise tree limbs.

Table 1-1. Recommended Irrigation Minimums

GROWTH STAGE	TREE AGE (YEARS)	WATERING FREQUENCY (DAYS)
Establishment	1	Every 4-10 Days
Young Tree	2-3	Every 14-21 Days
Maturing Tree	3-5	Every 21-30 Days
Mature Tree	5+	Once Every 30-45 Days (or after significant dry periods)

Spring

- Begin deep watering as trees emerge from dormancy and start active growth.
- Monitor rainfall; supplemental irrigation may still be necessary if the weather is dry.
- Focus on moisture levels for specific species to encourage new root development.

Summer

- Increase watering frequency due to higher temperatures and evapotranspiration.
- Water deeply and early in the morning to reduce evaporation and avoid disease.
- Mulch under the tree canopy can help to retain soil moisture and regulate temperature.

Wet Summer

- Water only if there are prolonged dry periods and high temperatures.
- Focus on maintaining minimal soil moisture to prevent root rot and other issues in many species.
- Avoid fertilizing & watering as it can overly accelerate weak growth; just ensure roots aren't drying out entirely.

Fall

- Fall can be hot here in the desert with continuing high tempatures from summer. Continue your summer watering as needed.
- Gradually reduce watering as temperatures cool, but don't stop too early.
- Deep watering in early fall helps trees store moisture for dormancy.

Winter

- Lessen your watering during wet winters & adjust for dry and warm weeks or extended spells.
- Avoid watering when soil is saturated.
- Protect young or newly planted trees with mulch to insulate roots from potential frosts.

TREE PRUNING & MAINTENANCE

Conduct pruning according to best practices to maintain tree health and reduce hazards.

This section outlines maintenance standards to support the long-term viability of Scottsdale's tree canopy. The pruning guidelines align with the American National Standards Institute (ANSI) A300 Pruning Standards and the International Society of Arboriculture (ISA) Best Management Practices: Tree Pruning. While these serve as a baseline, Scottsdale's guidelines are further optimized for the unique conditions of the Southwest, emphasizing shade optimization, tree longevity and resilience to the region's climate.

Benefits of Pruning

- **Health:** Removing diseased or insect-infested branches, thinning the crown to improve airflow, and eliminating crossing or rubbing branches all promote stronger and healthier trees.
- **Safety:** Pruning prevents potential hazards by removing weak or damaged branches that could fall and by maintaining clearance for streets, sidewalks, and signage.
- **Aesthetics:** Strategic pruning enhances natural form and character, contributing to Scottsdale's distinctive landscape identity.

Appropriate pruning maintains tree health and supports sense of place.

TR 14 Pruning and related maintenance decisions should be conducted in a manner that preserves tree health, protects public safety, and maintains functional clearance and natural form.

Pruning methods should support tree health.

TR 14.1 ISA-Certified Arborist supervision is recommended for pruning on City-owned property.

TR 14.2 Maintain required vertical clearances, including 8' minimum over sidewalks and 13.5' minimum over vehicular areas.

TR 14.3 Remove dead, diseased, broken, crossing, weakly attached, or hazardous branches to maintain safety and tree vitality.

TR 14.4 Avoid excessive summer pruning to prevent sunburn on newly exposed areas.

TR 14.5 Do not apply pruning sealants, which can trap bacteria and compromise health.

TR 14.6 Evaluate volunteer trees early and retain those that are healthy and appropriately located, or remove them when they are incompatible with the setting or likely to create conflicts with sightlines, pedestrian facilities, infrastructure, or drainage.

TR 14.7 Avoid the relocation or removal of mature trees except when the tree is dead, failing, or unsafe and cannot be mitigated, or when improvements cannot reasonably be designed around it.

TR 14.8 In Environmentally Sensitive Lands, maintain and prune trees in a manner that supports fire defensible space.

TR 15 Pruning should align with species characteristics, growth habits, and appropriate seasonal timing to support long-term structural integrity.

TR 15.1 Prune deciduous trees during winter dormancy to support vigorous spring growth.

TR 15.2 Prune desert trees selectively and periodically to maintain a natural form.

TR 15.3 Avoid practices that create unnatural or structurally weak forms.

TR 15.4 Prioritize structural development in young trees during the first 5–10 years after planting:

- TR 15.4.1 Retain lower branches for the first three years to promote trunk strength and caliper growth.
- TR 15.4.2 Encourage strong leader development (one leader for single-trunk trees; three to four leaders for multi-trunk specimens).
- TR 15.4.3 Remove branches with narrow or excessively wide attachment angles.
- TR 15.4.4 Reduce branch length only when necessary for clearance or to limit storm damage.

TR 16 Standardized pruning methods should be applied appropriately to address specific objectives while preserving tree structural stability and natural appearance.

TR 16.1 Crown Cleaning: Remove dead, diseased, broken, weak, or low-vigor branches; remove suckers and water sprouts as appropriate.

TR 16.2 Crown Raising: Remove lower branches to achieve required clearance for pedestrians, vehicles, structures, or signage; evaluate species tolerance and consider tree age.

TR 16.3 Crown Reduction: Reduce height and/or spread where trees conflict with structures or utilities.

TR 16.4 Crown Thinning: Selectively remove live branches to reduce crown density while maintaining a balanced, natural appearance.

TR 16.5 Weight Reduction: Reduce end-weight on long or heavy limbs to minimize the risk of limb or trunk failure.

TR 16.6 Crown Restoration: Restore form and structural integrity in trees damaged by topping, storms, or vandalism; multiple sessions may be required.

TR 16.7 Palm Pruning:

- TR 16.7.1 Trim annually between May 15 and June 15, prior to flowering.
- TR 16.7.2 Do not remove green fronds above the horizontal trunk line
- TR 16.7.3 Remove hazardous fronds, fruit, or loose petioles as needed.
- TR 16.7.4 Avoid cutting all fronds below a 45-degree angle and avoid creating carrot or pencil-pointed forms.

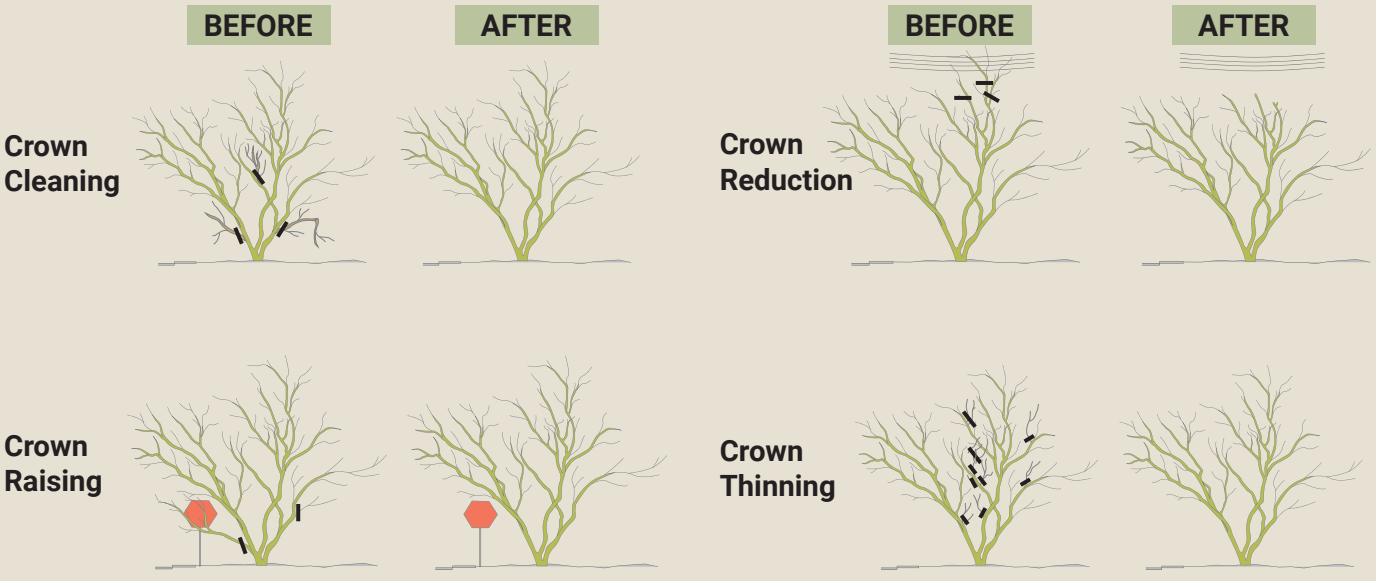


Figure 1-15. Graphic depicting before and after conditions for standardized pruning methods.

PRUNING BEST PRACTICES

Pruning Cuts

Proper pruning starts with using the right tools and making clean cuts that protect the tree.

- Use clean, sharp tools sized appropriately for each cut; disinfect between trees to reduce spread of disease.
- Use bypass hand pruners for cuts up to ¾ inch, loppers for branches up to 2 inches, and hand saws for branches up to 4 inches; use pruning saws for larger branches, cutting on the pull stroke.

Pruning should follow ANSI A300 and ANSI Z133.1 standards and ISA Best Management Practices: Tree Pruning, under the supervision of an ISA Certified Arborist.

THE 3 STEP PRUNING CUT

1. Cut one-third of the way through the branch on the underside.
2. Go 2-4 inches beyond the undercut to remove the branch.
3. Make the final cut just outside the branch bark ridge and trunk collar.

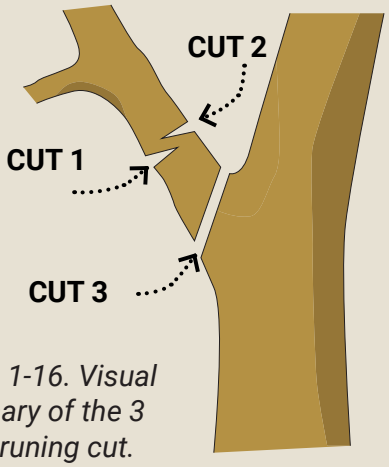


Figure 1-16. Visual summary of the 3 step pruning cut.

Harmful Practices to Avoid

Certain pruning methods cause long-term damage and should not be used on trees in Scottsdale.

- Improper cuts can cause bark ripping, decay, and long-term structural problems.
- Avoid tools or techniques that crush bark or damage the tree.
- Avoid the use of climbing spikes or spurs.
- Avoid flush cuts that remove the branch collar and injure stem tissue.
- Avoid stub cuts that leave long stubs, delay wound closure, and invite pests and disease.
- Avoid anvil-type pruners, which can cause tree damage rather than making clean cuts.
- Do not use topping (removing large upright branches between nodes) or tipping (cutting lateral branches between nodes to reduce length or crown width); these practices create weak sprouts and can kill branches back to the next lateral.
- Avoid poodling, balling, squaring, and lions tailing (removing most interior branches and leaving foliage only at the tips).
- Avoid removing more than about 25% of the live canopy during any single pruning.