



RESOLUTION NO. 198-2015

OF THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO
ADOPTION OF LANDSCAPING AND IRRIGATION STANDARDS

WHEREAS, the County of El Dorado is mandated by the State of California to maintain an adequate and proper General Plan; and

WHEREAS, the County of El Dorado adopted a General Plan in 2004; and

WHEREAS, many General Plan policies, programs, and implementation measures are implemented through the Zoning Ordinance; and

WHEREAS, the El Dorado County Board of Supervisors adopted Resolutions of Intention No. 183-2011 and No. 184-2011 authorizing a comprehensive update of the Zoning Ordinance as part of the Targeted General Plan Amendment – Zoning Ordinance Update Project; and

WHEREAS, as part of the comprehensive Zoning Ordinance Update, the County has developed new and/or updated community design standards to augment those standards found in the Zoning Ordinance Update; and

WHEREAS, to enhance the appearance of development, increase property values, protect the public health, safety and welfare, reduce impervious surfaces and site runoff and to promote water conservation consistent with state law, the County has created new landscaping and irrigation standards for all development requiring either new and/or rehabilitated landscapes; and

WHEREAS, landscaping and irrigation standards can provide clear and graphic direction for new and rehabilitated landscapes and can serve as a tool for an applicant when designing a project; and

WHEREAS, design standards can assist staff and applicants with project processing; and

WHEREAS, design standards serve as a basis for quality design resulting in a higher quality of life for residents, businesses and visitors to the County, and

WHEREAS, Section 65597 of California Government Code requires local agencies to notify the California Department of Water Resources (“DWR”) as to whether the local agency will be subject to the DWR’s updated model water efficient landscape ordinance, or if not, to submit to the DWR a copy of the water efficient landscape ordinance adopted by the local agency, and a copy of the local agency’s findings and evidence in the record that its water efficient landscape ordinance is at least as effective in conserving water as the DWR’s updated model ordinance; and

WHEREAS, the County’s landscaping and irrigation standards have been found to be at least as effective in conserving water as the DWR’s updated model water efficient landscape ordinance and appropriate findings and evidence in the record demonstrate the same,

NOW, THEREFORE, BE IT HEREBY RESOLVED that the County of El Dorado Board of Supervisors hereby adopts design standards, identified as the Landscaping and Irrigation Standards, to apply to all residential and non-residential development requiring new and/or rehabilitated landscapes within the unincorporated areas of El Dorado County, attached hereto as Exhibit A.

NOW, THEREFORE, BE IT FURTHER RESOLVED that as the County has recently completed a comprehensive recodification of its entire code of ordinances, code references within the above standards may require minor reformatting, as needed, for consistency with the County's code of ordinances, and to maintain internal consistency within applicable section(s) of the Zoning Ordinance.

PASSED AND ADOPTED by the Board of Supervisors of the County of El Dorado at a regular meeting of said Board, held the 15th day of December 2015, by the following vote of said Board:

Ayes: Novasel, Ranalli, Mikulaco, Frentzen, Veerkamp

Noes: None

Absent: None

Attest:

James S. Mitrison

Clerk of the Board of Supervisors

By:


Deputy Clerk



Chair, Board of Supervisors
Brian K. Veerkamp

Exhibit A



Community Design Standards

In accordance with the Zoning Ordinance Update

Landscaping and Irrigation Standards

Adopted December 15, 2015

Community Design Standards

Landscaping and Irrigation Standards

LANDSCAPING AND IRRIGATION STANDARDS

Sections:

- 1.1 Purpose
- 1.2 Applicability
- 1.3 Exemption
- 1.4 Definitions
- 1.5 Landscape Plan
- 1.6 Landscape Standards
- 1.7 Irrigation Standards
- 1.8 Maintenance and Protection
- 1.9 Non-conforming Landscaping
- 1.10 Water Efficient Landscape Plan
- 1.11 Water Efficient Landscape Plan Requirements

1.1 Purpose

The purpose of this Chapter landscaping standards that enhance the appearance of development, increase property values, and protect the public health, safety, and welfare by providing buffers; parking lot shading; incentives for outdoor art and water features; a means to reduce impervious surfaces and site runoff by incorporating stormwater best management practices into landscape areas; and requirements for water conservation methods that encourage the use of native, drought tolerant species, reclaimed water and graywater systems. It is further the intent of this Chapter to comply with the Water Conservation in Landscaping Act: Model Water Efficient Landscape Ordinance (Gov. Code 65591 – 65599).

1.2 Applicability

All ministerial and discretionary development for industrial, research and development, commercial, multi-unit residential, civic or utility uses shall provide landscaping for all areas of a lot that do not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or impervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

1.3 Exemptions

- A. Commercial uses on agricultural and resource zoned land shall be exempt from the requirements of this Chapter; except for the following:
 - 1. A permanent parking lot located adjacent to a public road shall be subject to landscape buffer requirements in compliance with Paragraph 17.33.060.A.1.

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2. A permanent paved parking lot shall be subject to the shade requirements under Subsection 17.33.060.C.

B. For purposes of public health and safety, proposed landscaping areas located within a public utilities easement may be subject to alternate planting requirements, as determined by the applicable public utility(ies).

1.4 Definitions

As used in this Chapter, the following terms shall have the meanings set forth below:

Backflow Prevention Device. A safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

Certified Landscape Irrigation Auditor. A person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

Check Valve or Anti-drain Valve. A valve located under a sprinkler head, or other location in the irrigation system, to hold water

in the system to prevent drainage from sprinkler heads when the sprinkler is off.

Drip Irrigation or Emitter. Any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour.

Established Landscape. The point at which plants have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

ET Adjustment Factor (ETAF). A factor of 0.7 that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

Evapotranspiration Rate. The quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

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Infiltration Rate. The rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

Irrigation Efficiency (IE). The measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this Chapter is 0.71. Greater irrigation efficiency can be expected from well designed and maintained systems.

Landscape Architect. A person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

Landscape Area. All the planting areas, turf areas, and water features in a landscape plan.

Local Water District. Any entity, including a public agency, city, county, or private water company that provides retail water service.

Low Volume Irrigation. The application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

Maximum Applied Water Allowance (MAWA). The maximum allowed limit of annual applied water for the established landscape area based upon its size, reference evapotranspiration, and the ET Adjustment Factor.

Mulch. Any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

New Construction. A new building requiring landscaping or other new landscaping without an associated building, such as a park, playground, or greenbelt.

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Overhead Sprinkler Irrigation Systems. Systems that deliver water through the air, such as spray heads and rotors.

Plant Factor or Plant Water Use Factor. A factor established in the Department of Water Resources: Water Use Classification of Landscape Species (2000) that, when multiplied by the reference evapotranspiration value (ET_o) for the County, estimates the amount of water needed by plants.

Precipitation Rate. The rate of application of water measured in inches per hour.

Reference Evapotranspiration (ET_o). A standard measurement of environmental parameters which affect the water use of plants, so that regional differences in climate can be accommodated. It is based on an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. The ET_o for the County is 47.3 inches per year.

Special Landscape Area (SLA). An area of the landscape dedicated solely to edible plants such as orchards and vegetable gardens, areas irrigated with recycled water, water features, and areas dedicated to active play where turf provides a playing surface, such as parks, sports fields, and golf courses.

Static Water Pressure. The pipeline or municipal water supply pressure when water is not flowing.

Station. An area served by one valve or by a set of valves that operate simultaneously.

WUCOLS. The Water Use Classification of Landscape Species published by the Department of Water Resources, the University of California Cooperative Extension, and the Bureau of Reclamation (2000).

1.5 Landscape Plan

- A. A landscape plan shall be required prior to the issuance of any building permit subject to the requirements of this Chapter. Plans shall include a site plan, grading plan, planting plan, irrigation design plan, and all other details and specifications necessary for a complete landscape plan review, on an application form provided by the Department.
- B. Where the required landscape area exceeds 1,000 square feet in the whole, said plan shall be prepared by a California licensed landscape architect, civil engineer, architect, or landscaping contractor to the extent that his or her license allows.
- C. If a Water Efficient Landscape Plan is required in compliance with Section 17.33.090, further requirements under 17.33.100 will apply.

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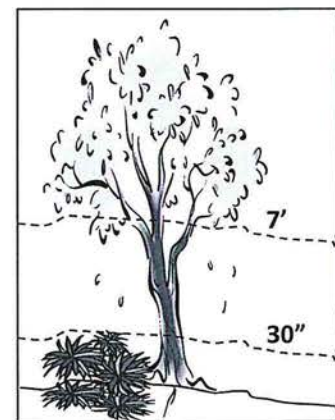
- D. The Director or applicable review authority may approve an alternative landscape plan when unique circumstances apply to the site that makes compliance with the standards of this Chapter infeasible. Consideration shall be given to adjacent land uses, the nature of the change, existing site conditions, and the suitability of the proposed alternative. The review authority must find that the alternative provides comparable buffering and shading, and otherwise meets the intent of this Chapter.
- E. Prior to issuance of a certificate of occupancy, the applicant shall provide a Certificate of Completion by the preparer of the approved landscape plan that verifies the landscape improvements have been installed in compliance with the approved landscape plan, on a form provided by the Department.

1.6 Landscape Standards

Landscaping shall conform to the standards set forth below:

- A. Landscape Buffers. Landscaped buffers shall be required along a road frontage, or property under a different ownership or zone, as follows:
1. Road Frontage.
 - a. The required buffers along road frontage shall be a minimum of 10 feet in width outside of the right-of-way and exclusive of any curbs or sidewalks, unless otherwise set forth in the development standards for the zone.
 - b. Where industrial, research and development, commercial, civic, or utility uses are located across a county-maintained road from residentially zoned lots and parking is provided facing said lots, either of the following shall be required:
 - (1) An ornamental masonry wall not less than three feet in height from grade shall be installed between the parking spaces and the landscape buffer; or
 - (2) A minimum three foot high landscaped berm may be provided within the buffer area.
 - c. Landscape buffers adjacent to public rights of way or road easements shall maintain line-of-sight visibility subject to the review and approval of the Department of Transportation. No foliage or structural feature between the height of 30 inches and seven feet above grade (Figure 1.6.A) shall extend into the cross-visibility area (CVA) defined in Section 17.30.050.B.5 (Fences, Walls, and Retaining Walls):

Figure 1.6.A



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2. Property Lines.
 - a. The required buffer along property lines shall be a minimum of five feet in width.
 - b. Where multiple lots are developed as a single project under common ownership, the landscape buffers shall only be required along the perimeter of the project.
 - c. Should two or more adjoining lots under separate ownership be designed as a single project with shared uses of access and parking, the required five foot landscape buffer adjacent to the common property line shall not be required when a shared parking covenant and reciprocal easement is recorded between all concerned parties in a form approved by the County.
 - d. Where industrial, research and development, commercial, civic, or utility uses adjoin residentially zoned lots, either of the following shall be required:
 - (1) A 30 foot-wide landscape buffer with a minimum of eighteen trees and 72 shrubs per 100 feet of length; or
 - (2) A ten foot landscape buffer with an ornamental masonry wall not less than six feet in height installed at the property line and extending to within 15 feet of any road right-of-way or easement. Within the buffer, a row of evergreen conifer trees shall be planted to provide continuous screening.

B. General Landscape Requirements.

1. On-site landscaped areas designed for compliance with either the Western El Dorado County or Lake Tahoe Basin Storm Water Management Plan requirements for storm water retention and bio-filtration purposes can be used to satisfy landscaping requirements under this Chapter providing the minimum buffer, shade, and oak tree replacement requirements are met.
1. A minimum of six trees and 24 shrubs shall be provided per each 100 linear feet of required landscape buffer along the property boundaries and public roads, with the exceptions under Paragraph A.2.d, above.
2. All shrubbery and at least 50 percent of required trees shall be evergreen.
3. Where street lights exist or are proposed to be installed, the size, location, and variety of trees shall be reviewed by the Department of Transportation and designed to minimize conflict between the lighting needs and landscaping requirements.
4. No landscaping or tree planting shall be installed or maintained in such a manner that the expected growth of the plant or tree material at 15 years will cast a shadow between the peak solar collection hours of 10 a.m. to 2 p.m. on more than ten percent

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of the solar absorption panels of an existing solar energy device located on site or on adjoining lots. Trees planted before the installation of affected solar panels or their replacement plantings shall be exempt from this requirement.

5. A minimum of 50 percent drought-tolerant plant species shall be used in all landscape plans required by this Section. Shade trees and drought-tolerant plant species shall be selected from the Director-approved lists in Appendices B and C. Plant species similar to those on the lists may be considered providing they conform to the intent of this Subsection for drought tolerance and adaptability to the area. Species selection shall be based on site elevation in accordance with the lists.
6. To ensure plant diversity, the following standards shall apply to any plant material required to meet the regulations of this Chapter:
 - a. Between eight and 23 trees, a minimum of three different species must be used. For 24 trees or more, a minimum of four different species must be used. Existing trees may be included in the calculations.
 - b. For 25 shrubs or more, a minimum of three different species must be used.
7. Lawn or turf grasses shall constitute no greater than 10 percent of the required landscaping and shall not be planted on slopes greater than 25 percent where the toe of the slope is adjacent to an impermeable hardscape.
8. Bark, decorative rock, and similar organic materials, when used to enhance the required plant material, shall be replenished on a routine basis in order to maintain a neat and consistent appearance.
9. Any outdoor form of sculpture or other artwork, as well as any water feature such as a fountain, cascade, stream, or reflection pond can be substituted in place of living plant material, with the exception of the buffer and shade requirements, providing:
 - a. Artwork or water feature(s) are publicly visible and accessible at the main pedestrian entrance to the building(s) or along a perimeter sidewalk or pedestrian connection;
 - b. Artwork or water feature does not contain a corporate name, logo, or slogan in its form or appearance, or it will be counted as a sign;
 - c. Substitution will be at a 1:1 ratio based on the square footage of the footprint of the artwork or water feature. When a water efficient landscape plan is required, the square footage of the surface area of a water feature will be included in estimated water use calculations, in compliance with Section 17.33.100 below;

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- d. Water features use a recirculating water system and, when available, reclaimed water;
 - e. Water features are maintained in a clean and non-contaminated condition;
 - f. Water remains in motion and/or is aerated during hours of operation; and
 - g. The manner and extent to which artwork or water features replace landscaping shall be reviewed and approved by the Director or appropriate review authority.
11. The size of plant material shall be the following pot size or equivalent container, such as tree pot, slip, or bare root packaging, as certified by the preparer of the landscape plan:
- Trees.....5 gallon minimum
 - Shrubs.....1 gallon minimum
12. The use of landscape fabric shall be prohibited to allow the rejuvenation and self-sufficiency of the underlying soil.
13. A minimum two inch layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement. Stabilizing mulching products shall be used on slopes.
14. Landscaping within the 100-year flood plain of the South Fork of the American River shall be consistent with Element 6.5.2.1 of the El Dorado County River Management Plan.
15. For phased projects, or projects for which only a portion of a lot is proposed to be developed, landscaping may be deferred for areas surrounding the undeveloped phases or portions, providing temporary erosion and dust control measures are implemented as required by the County.

C. Parking Lot Landscaping.

- 1. Landscaping shall be provided in paved parking lots of five spaces or more and shall provide shade over 50 percent of all paved parking areas, as set forth below:
 - a. Shade calculations shall assume the sun is directly overhead;
 - b. Shade shall be calculated by using the expected diameter of the tree crown at 15 years.

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- c. The percentage of area required to be shaded shall be based on the total square footage of all aboveground and uncovered pavement.
 - d. Solar panel grids, canopies, and other structures that can be utilized as shade structures and meet the 50 percent shade requirements for the paved parking areas can be substituted for living tree material, providing they are architecturally compatible with the structure(s) on site and the minimum buffer requirements of Paragraph B.1 are met.
 2. In addition to the required landscape buffers, landscaping areas within a parking facility shall have a minimum width of five feet and a minimum area of 25 square feet, exclusive of any curbs.
 3. Wheel stops or similar devices shall be installed three feet from landscape areas, as measured from the far side of the wheel stop to the edge of curb, to prevent vehicle damage or encroachment onto landscape materials. In lieu of wheel stops, concrete curbing used to separate the landscape area from the parking lot may serve as the wheel stop provided that the planting area width, exclusive of curbing, is increased by a minimum of 2.5 feet for each side adjoining the vehicular encroachment. Plant material designed to grow no higher than six inches shall be planted within the increased planting area.
 4. Walkways and/or sidewalks shall be required to provide pedestrian circulation across landscaped areas where necessary to prevent pedestrian traffic from destroying plant material.

1.7 Irrigation Standards

Landscape areas shall be provided with a permanent automatic irrigation system(s) coordinated to meet the needs of various planting areas/hydrozones and water efficiency in compliance with the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance subject to the following:

- A. An irrigation plan shall be submitted with the Landscape Plan application. The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, nonirrigated areas, hardscape, roadways, or structures.
- B. When reclaimed water is available within the region containing the project lot(s), or when a reclamation master plan indicating the availability of reclaimed water in the future has been adopted by either the local water district or the County, the applicant shall incorporate the use of reclaimed water into the project design subject to public health and safety regulations.

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- C. Domestic graywater systems for subsurface landscape irrigation can be utilized subject to the provisions of the Department of Water Resources California Graywater Standards, the Uniform Plumbing Code (UPC), and the building code.
- D. Temporary irrigation systems that will be utilized to establish native, drought tolerant landscaping or xeriscaping, or other alternative irrigation methods, shall be subject to the review and approval of the Director.

1.8 Maintenance and Protection

All landscaping shall be maintained in accordance with the approved landscape plan, as set forth below:

- A. All plant materials shall be maintained in a healthy and attractive manner and kept free from weeds, debris, and undesirable materials for fire safety as well as aesthetic purposes. Plant materials showing damage from insects, disease, or lack of maintenance shall be replaced in accordance with the approved landscape plan.
- B. Plant materials shall not be allowed to become overgrown, so as to compromise the CVA (cross-visibility area), pedestrian or vehicular circulation, or public safety.
- C. All existing plant material to be retained on site shall be subject to the protection measures set forth in the Design and Improvement Standards Manual during grading and construction activities.
- D. The Director may cause an inspection of landscaping at any time following the installation of said landscaping to determine compliance with this Section. Any costs associated with said inspection or to insure compliance shall be paid by the property owner.
- E. If loss of landscaping occurs due to lack of water during a declared water shortage, or due to other mandatory water conservation measures, all plants shall be replaced within a reasonable time after the water shortage has ended.
- F. Any Low Impact Development (LID) measures installed to satisfy Western El Dorado County or Lake Tahoe Basin Storm Water Management Plan shall be maintained in order to remain effective under the Municipal Phase II Permit's Operations and Maintenance Verification Program.

1.9 Non-conforming Landscaping

When a change in use occurs on a site that contains landscaping that is non-conforming to the standards of this Chapter, the following shall apply:

- A. When a proposed new use requires no expansion of the parking area, the Department shall verify that the existing landscaping is maintained consistent with the requirements of the site when the previous use was established. Replacement landscaping consistent with minimum

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plant material, plant diversity, and shade requirements in compliance with Section 17.33.050 may be required if the landscaping has not been properly maintained.

- B. Whenever additional parking is required due to an intensification of use or expansion of a structure that does not exceed the thresholds under Section 17.33.090, the landscaping for the entire site shall be consistent with minimum plant material, plant diversity, and shade requirements in compliance with Paragraphs 17.33.050.B.1, B.4, B.6, and C.1-3.
- C. Whenever the structure(s) on a site are enlarged, modified, or redeveloped to the level of thresholds under Subsection 17.33.090.A below, the provisions of this Chapter shall apply to the entire site.

1.10 Water Efficient Landscape Plan

- A. A Water Efficient Landscape Plan is required for the following:
 - 1. New construction and rehabilitated landscapes requiring a permit with a landscape area equal to or greater than 2,500 square feet for industrial, research and development, commercial, civic, or utility uses, and developer-installed landscaping in single- and multi-unit residential development.
 - 2. New construction landscapes that are homeowner-provided and/or homeowner-hired in single- and multi-unit residential projects, with a total landscape area equal to or greater than 5,000 square feet and only when a building or grading permit is required for said landscaping installation.
 - 3. New and rehabilitated cemeteries limited to a Water Efficient Landscape Worksheet (Appendix A), landscape and irrigation maintenance schedule, irrigation audits or surveys, and irrigation water use analysis by the local water district.
 - 4. Existing cemeteries and landscapes limited to irrigation audits or surveys and irrigation water use analysis by the local water district addressing water waste prevention.
- B. The following shall be exempt from this Section:
 - 1. Registered local, state, or federal historical sites.
 - 2. Ecological restoration projects where the site is intentionally altered to establish a defined, indigenous, historic ecosystem and that do not require a permanent irrigation system.
 - 3. Mining reclamation projects that do not require a permanent irrigation system.
 - 4. Plant collections, as part of public arboretums and botanical gardens.
 - 5. Commercial agricultural operations.

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1.11 Water Efficient Landscape Plan Requirements

In addition to the submittal requirements set forth in Section 17.33.040, additional information related to water use and efficient application shall be submitted as follows:

- A. Landscape Documentation Package. A Landscape Documentation Package, as provided in Subsection B, shall be submitted to the Department for review and approval prior to permit issuance. A copy of the approved Landscape Documentation Package shall be provided to the property owner or site manager along with any other information normally forwarded to the property owner or site manager as part of the permit process.
- B. Elements of the Landscape Documentation Package.
 1. Project Information:
 - a. Applicant/owner names and contact information;
 - b. Site address and Assessor's Parcel Number (APN);
 - c. Total landscape area (in sq ft);
 - d. Project type, such as new, rehabilitated, public, private, cemetery, homeowner-installed;
 - e. Water type, such as potable, reclaimed, well; and
 - f. Applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance."
 2. Water Efficient Landscape Worksheet. A project applicant shall complete the Water Efficient Landscape Worksheet for the project, as follows:
 - a. A hydrozone information table (Appendix A, Section A); and
 - b. A water budget calculation (Appendix A, Section B). Water budget calculations shall adhere to the following requirements:
 - (1) For the calculation of the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU), a project applicant shall use the Reference Evapotranspiration (ET_o) value of 47.3 inches per year for El Dorado County (CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999).
 - (2) The plant factor used (Appendix A, Section B.2) shall be from the Water Use Classification of Landscape Species (WUCOLS). For purposes of this Ordinance, the plant factor shall range from 0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

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- (3) All surface area of water features, as defined in Article 8, shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.
 - (4) All Special Landscape Areas (SLA), as defined in Section 17.33.030, shall be identified and included in calculating the MAWA. A statement shall be included with the landscape design plan designating recreational areas to be used for such purposes.
3. Landscape Design Plan. For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following requirements shall be submitted as part of the landscape documentation package:
- a. Plant Selection and Grouping. Plant selection shall be in compliance with Section 17.33.040 (Landscape Standards) providing the recommended ETWU does not exceed the Maximum Applied Water Allowance and the plants meet the following specifications:
 - (1) Plants having similar water use shall be grouped together in distinct hydrozones with the exception of hydrozones with plants of mixed water use, in compliance with Subparagraph 4.d.(1) below.
 - (2) Plants shall be selected appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the site, as well as their horticultural attributes, such as size and invasiveness, in order to minimize damage to property or infrastructure.
 - (3) Fire-prone plant materials and highly flammable mulches shall be avoided.
 - (4) Soil amendments shall be incorporated according to recommendations of the soil management report and what is appropriate for the plants selected.
 - b. Landscape Design Plan Requirements. The landscape design plan shall be drawn on a base project or permit site plan sheet at a scale that accurately and clearly delineates, labels, and identifies, at a minimum:
 - (1) Square footage of the total landscaped area.
 - (2) Existing and proposed trees, shrubs, ground cover, turf, and other vegetation. Existing vegetation shall be clearly distinguished between what is to be retained and what is to be removed. Planting symbols shall be clearly drawn and vegetation shall be labeled by botanical name, common name, container size, spacing, and quantities of each group of plant material indicated;
 - (3) Each hydrozone by number, letter, or other method;
 - (4) Each hydrozone as low, moderate, high, or mixed water use for calculating the water budget;
 - (5) Where reclaimed water is used for plant irrigation or water features;
 - (6) Special landscape areas and their type;
 - (7) Type and surface area of water features;

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- (8) Location and installation details of any applicable stormwater best management practices (BMPs) used for on-site retention and infiltration of stormwater. Stormwater BMPs are not subject to water budget calculations.
 - (9) Hardscape areas and type (pervious and impervious);
 - (10) Tree staking, plant installation, soil preparation details to include amendment types and quantity, mulch types and application depth, and any other applicable planting and installation details.
 - (11) The following statement bearing the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape: "I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan".
4. Irrigation Plan. For the efficient use of water, an irrigation system shall meet all the requirements listed in this Section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance.
- a. Irrigation Plan Requirements. An irrigation plan shall be drawn on project or permit site plan base sheets. It shall be separate from, but shall use the same format as the landscape design plan. The scale shall be the same as that used for the landscape design plan described in Subparagraph 3.b above, and shall contain:
- (1) Location and size of separate water meter(s) for landscaping.
 - (2) Separate hydrozone areas designated by number, letter, or other designation.
 - (3) Location, type, and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices. Designation of the areas irrigated by each valve, and a number assigned to each valve. This valve number shall be used in the Hydrozone Information Table as part of the water efficient landscape worksheet. The table can also assist with the irrigation audit and programming the controller.
 - (4) Static water pressure at the point of connection to the public water supply.
 - (5) Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station.
 - (6) Reclaimed water or domestic graywater irrigation systems, if applicable.
 - (7) Date and signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system after the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan".
- b. Design Requirements. The following design requirements shall be included in the irrigation system, as appropriate:

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- (1) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data for scheduling in all irrigation systems.
 - (2) If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices installed to meet the required dynamic pressure of the irrigation system within the manufacturer's recommended pressure range for optimal performance.
 - (3) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions customary for the climate area.
 - (4) Manual shut-off valves, such as a gate valve, ball valve, or butterfly valve, as close as possible to the point of connection of the water supply to minimize water loss in case of an emergency, such as a main line break, or for routine repair.
 - (5) Backflow prevention devices to protect the water supply from contamination by the irrigation system.
 - (6) Sprinkler heads and other emission devices having matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.
 - (7) Sprinkler spacing designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.
 - (8) Swing joints or other protection components on all risers adjacent to high traffic areas that are subject to damage.
 - (9) Check valves or anti-drain valves.
- c. Design Standards. The irrigation system must be designed and installed to meet or exceed the irrigation efficiency criteria used in calculating the MAWA. The following design standards shall be included in the irrigation system, as appropriate:
- (1) Narrow or irregularly shaped areas less than eight feet in width in any direction, including turf, shall be irrigated with subsurface irrigation or a low volume irrigation system.
 - (2) Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:
 - (a) The landscape area is adjacent to permeable surfacing and no runoff of water beyond the landscape area occurs;
 - (b) The adjacent non-permeable surfaces are designed and constructed to drain entirely to landscape areas; or
 - (c) The irrigation designer specifies an alternative design or technology, as part of the Water Efficient Landscape Plan, and clearly demonstrates strict adherence to irrigation system design criteria in Subsection 17.33.060.A. Prevention of overspray delivered beyond the target area and runoff must be confirmed during the irrigation audit.

Community Design Standards

Landscaping and Irrigation Standards

- (3) Slopes greater than 25% shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Water Efficient Landscape Plan, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.
 - (4) Incorporation of relevant information from the soil management plan, such as soil type and infiltration rate.
 - (5) Static water pressure, dynamic or operating pressure, and flow reading of the water supply measured at the point of connection. Pressure and flow reading measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.
 - (6) Conformance to the hydrozones of the landscape design plan.
 - (7) The use of low volume irrigation in mulched planting areas to maximize water infiltration into the root zone.
- d. Hydrozones.
- (1) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use subject to the following exceptions:
 - (a) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:
 - i. Plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
 - ii. The plant factor of the higher water using plant is used for calculations.
 - (b) Individual hydrozones that mix high and low water use plants shall not be permitted.
 - (2) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.
 - (3) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.
- e. Irrigation Scheduling. For implementation of the irrigation schedule, total annual applied water shall be less than or equal to MAWA. Irrigation schedules shall meet the following criteria:
- (1) Irrigation scheduling shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.
 - (2) Overhead irrigation shall be scheduled between 8 p.m. and 10 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the requirements of the local water district, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

Community Design Standards

Landscaping and Irrigation Standards

- (3) Parameters used to set the automatic controller shall be developed and submitted for the plant establishment period, the established landscape, and any temporarily irrigated areas.
- (4) Each irrigation schedule shall consider for each station all of the following that apply:
 - (a) Irrigation interval (days between irrigation);
 - (b) Irrigation run times (hours or minutes per irrigation event to avoid runoff);
 - (c) Number of cycle starts required for each irrigation event to avoid runoff;
 - (d) Amount of applied water scheduled to be applied on a monthly basis;
 - (e) Application rate setting;
 - (f) Root depth setting;
 - (g) Plant type setting;
 - (h) Soil type;
 - (i) Slope factor setting;
 - (j) Shade factor setting; and
 - (k) Irrigation uniformity or efficiency setting.

- f. Landscape and Irrigation Maintenance Schedule. Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion to include, but not be limited to:
 - (1) Routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing, pruning, and weeding in all landscape areas; and removing obstruction to emission devices.
 - (2) Repair of all irrigation equipment with the originally installed components or their equivalents.

- g. Irrigation Audit Report or Survey. For new construction and rehabilitated landscape projects under Section 17.33.090.A, the applicant shall submit the following:
 - (1) An irrigation audit report, conducted by a certified landscape irrigation auditor, to the local water district for their review and approval. The irrigation audit report may include, but not be limited to irrigation schedule, inspection report, system tune-up schedule, system test with distribution or emission uniformity, and method of reporting overspray or runoff that causes overland flow.
 - (2) Where an irrigation survey is allowed in lieu of an audit report in compliance with this Section, or as determined by the local water district, it shall include, but not be limited to inspection, system test, and written recommendations to improve performance of the irrigation system.
 - (3) A filed copy of the approved irrigation audit report or survey, or other form of documentation indicating approval by the local water district, to the Department with the Certificate of Completion.

Community Design Standards

Landscaping and Irrigation Standards

5. Grading Plan. For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. As part of a grading permit, the grading plan shall be separate from, but at the same scale as the landscape design plan and shall indicate finished configurations and elevations of the landscape area and stormwater retention improvements, if applicable.

The grading plan shall contain the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan" and shall bear the signature of a licensed professional as authorized by law.

6. Soil Management Report. In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant prior to grading, as follows:
 - a. Soil samples shall be submitted to a laboratory for analysis and recommendations in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
 - b. The project applicant shall submit the soil management report to the Department as part of the Landscape Documentation Package.
 - c. The project applicant shall make the soil management report available to the professionals preparing the landscape design plans and irrigation plans to allow them to make any necessary adjustments to the design plans in a timely manner.
 - d. The project applicant shall submit documentation verifying implementation of the soil management report recommendations to the Department with the Certificate of Completion.
7. Certificate of Completion. The signer of the landscape design plan, the signer of the irrigation plan, or the licensed landscape contractor shall conduct a final field observation and provide a Certificate of Completion to the Department (see Appendix A, Section C), as follows:
 - a. The Certificate shall specifically indicate that the landscape project has been installed in compliance with the approved Landscape Documentation Package. Where there have been significant changes made in the field during construction, these "as-built" drawings shall be included with the certification.
 - b. The project applicant shall submit the signed Certificate to the Department for review.
 - c. The Department shall approve or deny the Certificate. If the Certificate is denied, the Department shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

Community Design Standards

Landscaping and Irrigation Standards

d. The project applicant shall ensure that copies of the approved Certificate are submitted to the local water district and property owner or his or her designee.

C. Provisions for Existing Landscapes.

1. All existing landscaped areas, one acre or more in size, to which a local water district provides water, including golf courses, green belts, common areas, multi-unit residential development, schools, businesses, parks, cemeteries, and publicly owned landscapes, shall have a landscape irrigation audit at least once every five years. An audit shall not be required if the local water district determines, based on an irrigation water use analysis of meter readings and billing data, that the existing landscape area does not exceed the MAWA for the project site.
2. The audit shall be in accordance with the California Landscape Water Management Program, as described in the Landscape Irrigation Auditor Handbook version 5.5 (Dept. of Water Resources: Water Conservation Office), or with criteria established through a local water district program, whichever is stricter.

APPENDIX A

SECTION B: WATER BUDGET CALCULATIONS

Section B.1 Maximum Applied Water Allowance (MAWA)

The project's Maximum Applied Water Allowance shall be calculated using this equation:

$$\text{MAWA} = (\text{ET}_o) (0.62) [(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

where:

- MAWA = Maximum Applied Water Allowance (gallons per year)
- ET_o = Reference Evapotranspiration (47.3 inches per year)
- 0.7 = ET Adjustment Factor (ETAF)
- LA = Landscaped Area, including Special Landscape Area (SLA) (in square feet)
- 0.62 = Conversion factor (to gallons per square foot)
- SLA = Portion of the landscape area identified as SLA (in square feet)
- 0.3 = Additional ETAF for SLA (1.0 – 0.7 = 0.3)

Maximum Applied Water Allowance = _____ gallons per year

Show calculations.

APPENDIX A

Section B.2 Estimated Total Water Use (ETWU)

The project's ETWU is calculated using the following formula:

$$ETWU = (ETo)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

where:

- ETWU = Estimated total water use per year (gallons per year)
- ETo = Reference Evapotranspiration (inches per year)
- PF = Plant Factor from WUCOLS (defined in 17.33.030)
- HA = Hydrozone Area (high, medium, and low water use areas) (in square feet)
- SLA = Special Landscape Area (in square feet)
- 0.62 = Conversion Factor (to gallons per square foot)
- IE = Irrigation Efficiency (minimum 0.71)

Hydrozone Table for Calculating ETWU:

Please complete the hydrozone table(s). Use as many tables as necessary.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Area (HA) (square feet)	PF x HA (square feet)
			Total	
		SLA		+
			Grand Total	

Estimate Total Water Use = _____ gallons

Show calculations.

APPENDIX A

SECTION C: CERTIFICATE OF COMPLETION

This certificate is filled out by the project applicant upon completion of the landscape project.

Section C.1 Project Information Sheet

Project Name and Applicant

Date	
Project Name	
Name of Project Applicant	Telephone No.
	Fax No.
Title	E-mail Address
Company	Street Address
City	State and Zip Code

Property Owner or Designee

Name	Telephone No.
	Fax No.
Title	E-mail Address
Company	Street Address
City	State and Zip Code

Site Identification

Street Address	APN
City	Latitude/Longitude (optional)
State and Zip Code	

Property Owner Certification:

“I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule.”

Signature(s)

Date

Please answer the questions below:

1. Date the Landscape Documentation Package was submitted to the Department. _____
2. Date the Landscape Documentation Package was approved by the Department. _____
3. Date that a copy of the Water Efficient Landscape Worksheet (including Water Budget Calculation) was submitted to the local water district, if applicable. _____

APPENDIX A

Section C.2 Certification of Installation According to the Landscape Documentation Package

“I/we certify that based upon periodic site observations, the work has been completed in accordance with Chapter 17.33 (Landscape Standards) and that the landscape planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package.”

Signature*	Date
Name (Print)	Telephone No.
	Fax No.
Title	E-mail Address
License or Certification No.	
Company	Street Address
City	State and Zip Code
* Signer of the landscape design plan, irrigation plan, or a licensed landscape contractor.	

Section C.3 Irrigation Scheduling

Attach parameters for setting the irrigation schedule on controller in compliance with Subparagraph 17.33.100.B.4.e (Landscaping Standards: Irrigation Scheduling).

Section C.4 Schedule of Landscape and Irrigation Maintenance

Attach schedule of Landscape and Irrigation Maintenance in compliance with Subparagraph 17.33.100.B.4.f (Landscaping Standards: Landscape and Irrigation Maintenance Schedule).

Section C.5 Landscape Irrigation Audit Report or Survey

Attach Landscape Irrigation Audit Report or Survey in compliance with Subparagraph 17.33.100.B.4.g (Landscaping Standards: Irrigation Audit Report or Survey).

Section C.6 Soil Management Report

Attach documentation verifying implementation of recommendations from the soil analysis report in compliance with Paragraph 17.33.100.B.6 (Landscaping Standards: Soil Management Report).

Appendix B

PARKING LOT SHADE TREE AND CALCULATION LISTS

A. Introduction

The attached lists are recommended for use in designing shade tree coverage for parking lots in compliance with Chapter 17.33 of the Zoning Ordinance (Landscaping Standards). You may also refer to the *El Dorado County Drought Resistant Plant List* which is customized for planting success in the foothills of El Dorado County where there are particular microclimates and soil conditions.

General Plan Policy 7.3.5.1 requires commercial development to utilize drought tolerant plant species in landscaping, where feasible. Exotic or introduced plant species not indigenous to or consistent with the plant community in which proposed development is located is discouraged.

B. Exceptions to the lists.

The following shade tree lists may be expanded by a horticulturalist, landscape architect, or arborist certified by the International Society of Arboriculture (ISA) upon submittal of documentation on the appropriateness of the tree based on its adaptability to the El Dorado County climate, its drought tolerance, normal growth characteristics, and the estimated crown size after 15 years of maturity. The Director will consider this information and may add the tree(s) to the list if it satisfies local criteria.

C. Using the lists.

As used in the following lists, "Upper Elevations" means the elevation above 1,800 feet, which generally encompasses the areas east of Greenwood, Garden Valley, Kelsey, and Placerville. In most situations trees and shrubs so denoted will become stressed as they mature at lower elevations and their water needs will increase significantly. Should they be used at lower elevations, they do best when planted in fill-dirt areas and protected from hot wind and radiant heat. Their sensitivity to radiant heat should strongly discourage anyone from planting them in paved parking lots at the lower elevations.

The following shade tree lists are grouped according to their growth potential at 15 years maturity. Their shade estimates at maturity are shown in square feet based on their percent of tree canopy that will cover the parking lot. To figure the total shade area proposed in a landscape plan, see Section E, (Using Figure 1).

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D. TREE LISTS. Based on shade potential at tree maturity:

1. 30 to 35 Foot Diameter-Growth Trees:

- 100 percent (interior placement) = 962 square feet
- 50 percent (south, east, and west elevations) = 481 square feet
- 25 percent (north elevation and corner placement) = 240 square feet

BOTANICAL NAME	COMMON NAME
<i>Acer platanoides</i> ²	Norway maple
<i>Acer platanoides</i> ² 'Crimson King'	purple-leafed Norway maple
<i>Acer macropyllum</i> ^{1,2} (upper elevations)	bigleaf maple
<i>Calocedrus decurrens</i> ¹ (upper elevations)	incense cedar
<i>Cedrus atlantica</i>	Atlas cedar
<i>Cedrus deodara</i> (top choice for non-native conifer)	deodar cedar
<i>Cupressus arizonica</i>	Arizona cypress
<i>Fraxinus latifolia</i> ¹	Oregon ash
<i>Melia azedarach</i>	chinaberry
<i>Pistacia chinensis</i> (top choice for non-native deciduous tree)	Chinese pistache
<i>Platanus acerifolia</i> ³	European sycamore/London plane tree
<i>Pseudotsuga menziesii</i> ¹ (upper elevations)	Douglas fir
<i>Quercus chrysolepis</i> ¹ (upper elevations)	canyon live oak
<i>Quercus douglasii</i> ¹	blue oak
<i>Quercus ilex</i>	holly oak
<i>Quercus kelloggii</i> ¹	California black oak
<i>Quercus lobata</i> ¹ (top choice for native deciduous tree)	California valley oak
<i>Quercus suber</i>	cork oak
<i>Quercus wislizenii</i> ¹	interior live oak
<i>Sequoiadendron giganteum</i> (upper elevations)	giant sequoia
<i>Umbellularia californica</i> ¹	California laurel

NOTES:

¹ Indigenous to and grows naturally in El Dorado County.

² Impacts to infrastructure and hardscape from this tree species should be considered when siting due to invasive root systems that may cause upheaval and cracking.

³ This species is not drought resistant in the El Dorado County environment and will require supplemental water throughout its lifespan

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2. 25 to 30 Foot Diameter-Growth Trees:

100 percent (interior placement)	= 707 square feet
50 percent (south, east, and west elevations)	= 354 square feet
25 percent (north elevation and corner placement)	= 240 square feet

<i>Acer macrophyllum</i> ^{1,2}	bigleaf maple
<i>Aesculus californica</i> ¹	California buckeye
<i>Fraxinus oxycarpa</i> "Raywood"	Raywood ash
<i>Liquidambar styraciflua</i> ²	American sweet gum (liquid amber)
<i>Olea euroapea</i>	olive (fruitless varieties available)

3. 20-25 Foot Diameter-Growth Trees:

100 percent (interior placement)	= 491 square feet
50 percent (south, east, and west elevations)	= 246 square feet
25 percent (north elevation and corner placement)	= 123 square feet

<i>Aesculus californica</i> ¹	California buckeye
<i>Koelreuteria paniculata</i>	goldenrain tree

4. 15-20 Foot Diameter-Growth Trees:

100 percent (interior placement)	= 314 square feet
50 percent (south, east, and west elevations)	= 157 square feet
25 percent (north elevation and corner placement)	= 79 square feet

<i>Arbutus unedo</i>	strawberry tree
<i>Cercis occidentalis</i> ¹	western redbud
<i>Cornus nuttalli</i> ¹	western flowering dogwood
<i>Ficus carica</i>	edible fig
<i>Laburnum anagyroides</i>	goldenchain tree
<i>Lagerstroemia indica</i>	crepe myrtle
<i>Prunus cerasifera</i> 'Krauter Vesuvius'	purple-leaf flowering plum
<i>Pyrus communis</i>	European pear

NOTES: ¹ Indigenous to and grows naturally in El Dorado County.
² Impacts to infrastructure and hardscape from this tree species should be considered when siting due to invasive root systems that may cause upheaval and cracking .
³ This species is not drought resistant in the El Dorado County environment and will require supplemental water throughout its lifespan

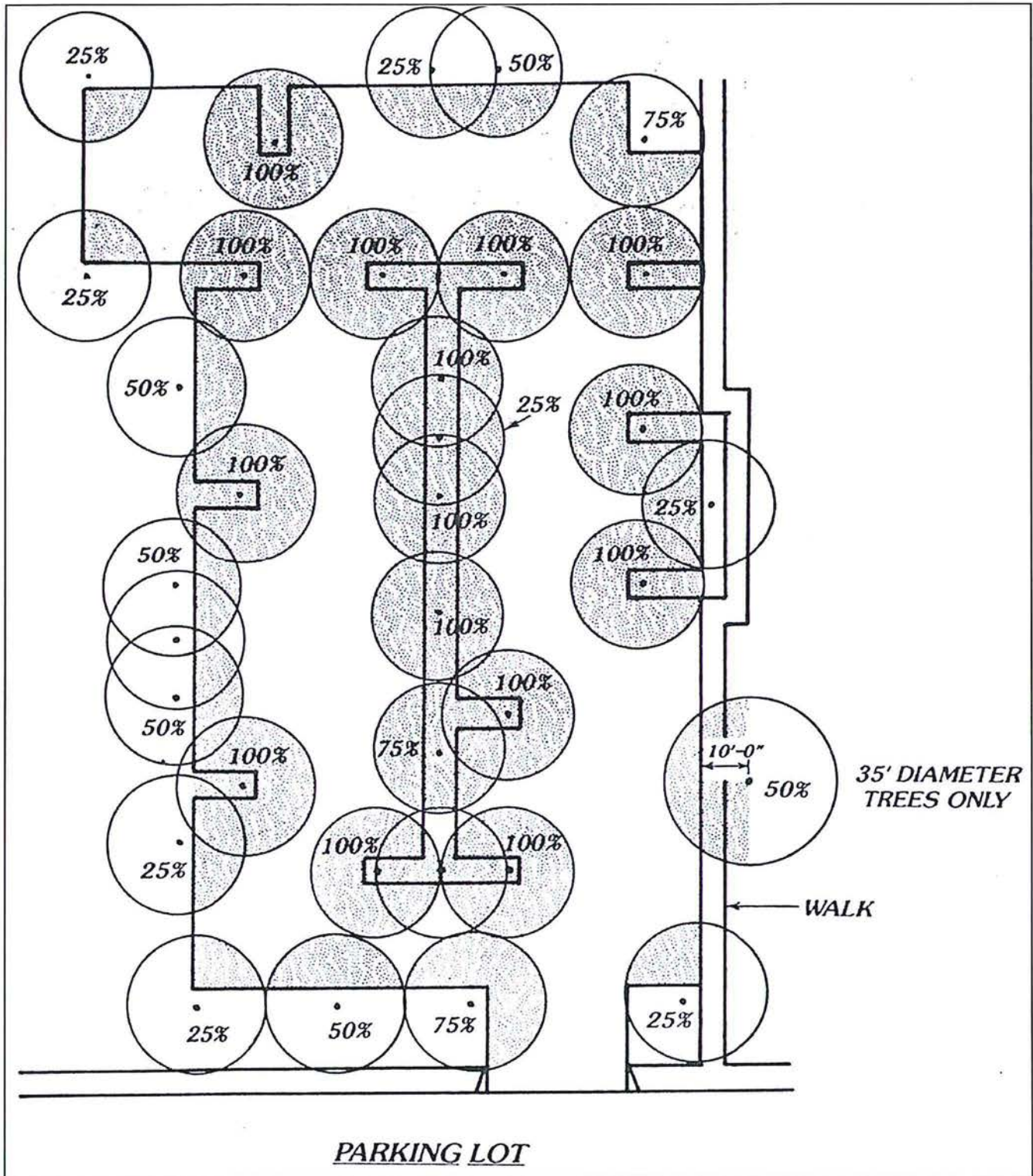
Appendix B

E. Using Figure 1. Figure 1, to follow, is intended to reflect the manner in which shade is credited under various conditions and is not an illustration of 50 percent shade coverage. In addition, it only reflects the shade potential produced by trees listed under the 30-35 foot diameter-growth potential. Better placement and/or more trees will be necessary to conform to shade requirements when trees with smaller diameter-growth potential are utilized in a parking lot landscape design.

1. If the site has two or more unconnected parking lots, shade shall be calculated separately for each lot. If multiple parking lots are connected by an adjoining drive, they shall be calculated as one lot.
2. Shade is determined by using the appropriate percentage of the tree's crown based on its planting location within the lot, as demonstrated in Figure 1. The percentage can then be translated into square feet according to the criteria under the applicable tree diameter-growth list. A determination of compliance with Section 17.33.050.C (Parking Lot Landscaping) can be made by the following process:
 - a. Calculate the total shade area required (in sq ft) by multiplying the square footage of the paved parking lot area(s) by 0.5;
 - b. Select trees from the approved Tree Lists for placement in the landscaping plan.
 - c. Mark each tree in the landscaping plan with the following ratings based on the percent of coverage that will be provided due to its planting location (shade overlap is not counted twice):
 - (1) F for 100 percent
 - (2) TQ for 75 percent
 - (3) H for 50 percent
 - (4) Q for 25 percent
3. Calculate the shade provided from each tree by translating the percentage rating into square feet using the appropriate diameter-growth tree list square footage criteria in Section D (Tree Lists).
4. Total the amount of square footage provided and compare it to the total square footage required under Paragraph 2.a above. The amount should be equal to or greater than the required amount of parking lot shade coverage.

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FIGURE 1



Appendix C

DROUGHT RESISTANT PLANT LIST

For Planting Up To The 3,400-foot elevation

Indigenous means the naturally growing plants of El Dorado County.

Adaptive means plants that are not indigenous, but that possess genetic traits that enable them to survive in El Dorado County with minimal or no water supplement. These plants have been proven to grow here.

Upper Elevations: “Upper Elevations” as used in this list means the areas between 1,800 and 3,400 feet, which generally encompass the areas east of Garden Valley, Kelsey, Greenwood and Placerville up to Quintette, and Pollock Pines. Trees and shrubs marked (**Upper Elevations**) will get stressed in most situations when you plant them in the lower elevations. Should you want to try them anyway, plant them in fill dirt areas, on the north side of buildings or north facing slopes, or in areas partially protected by the shade of mature trees. When you find such trees and shrubs growing in the lower elevations, look closely at their orientation and microclimate as far as slope, soil, and water conditions, and surrounding plant canopy and then compare it to your conditions before you decide to take the risk.

“See species list”: As there are too many species to include on our list, “See species list” refers to our recommended resource books, such as *Sunset Western Garden Book*, *Hortus*, *Jepson Manual of Flowering Plants*, or similar sources that can be used to research specific genus, species, and varieties for drought and high elevation sun tolerance.

Sunset Western Garden Book ‘Zone 7’ should only be used as a reference for cold tolerance. Many experienced gardeners in El Dorado County have lost their landscape investment by mistakenly planting only to *Sunset’s Zone 7* guidelines. In El Dorado County, two neighbors side by side can have different soil types and depths, levels of soil compaction, areas of fill dirt, and orientation to the sun. A day of full sun here at our elevations can be destructive to a non-indigenous plant. The following list comes from firsthand experience and observations of successful plant growth. Your results may vary because of poor plant quality due to either genetic inferiority or because you bought a plant with compacted and/or circling, girdling roots that had outgrown its pot. When a plant with root problems matures, it will choke to death or fall over if you plant it without spreading out the roots in a fan shape. Other times the failure could be from variations in soil depth on your property, lack of mulch, the wrong north/south orientation, excessive radiant heat from bare dirt, black top, or concrete, or your planting technique.

Why Are Some Plants Not Listed? The intent of this list is to prepare for an inevitable drought. The genetically embedded characteristics of plants that have evolved in other dissimilar environments will not change or re-adapt when planted here. Most trees native to other latitudes suffer as they mature and show signs of stress and failure when planted elsewhere. You will only see a very few exceptions on the list below. Eastern and northern American oaks and maples, birches, ornamental pears, and most fruit trees get sunscald on their trunks from “our” sun here. Maples and mulberries are notorious for failures of root and branch structures as they mature. Locusts send up “volunteer” shoots from their roots. All sycamores are natives of riparian areas and suffer from lack of water and radiant heat from adjacent pavement. They are also susceptible

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to infestations of a fungus disease called anthracnose and their huge leaves can clog drains. Eucalyptus and Chinese tallow trees suffer dieback from frost. Tupelos cannot take our sun. Aleppo pines suffer from the heat stress and get branch tip dieback and turpentine beetles as they mature. Coast Redwoods are indigenous to an ocean environment and have adapted to existing entirely on moisture from fog in the summer. They will require large amounts of water and protection from radiant heat and hot wind when they mature.

Indigenous Propagation Techniques. Ideally, planting trees and shrubs indigenous to your area will ensure their drought tolerance and viability. Planting seeds or native trees grown from seeds that have been collected within a 500 foot change in elevation from where your property is located will ensure the best chance of survival. When outside of the 500 foot elevation change, even trees of the same species may have different characteristics as the same species within this parameter. This is the same principal the Forest Service uses when distributing their trees for reforestation.

Some Things You Can Do To Improve Your Chances of Success:

1. Stockpile topsoil. Whenever you grade, stockpile your topsoil. Our topsoil is, on average, around 18 inches deep and contains beneficial fungi essential in helping our plants take in water and minerals. Taproots in the foothills are a fallacy. Most roots that pick up all the nutrients are in the top 12 inches of the soil and grow out horizontally past the edge of the dripline or outer most branch tips. Look at road cutbanks, irrigation or foundation trenches, or the percolation test or soil mantle holes for your septic system to see what lies beneath.

2. Use the stockpiled soil to make raised beds. Raised beds conserve water. Make islands of raised beds to concentrate your water in clustered locations and in doing so you will have created fire breaks in between. Use the native rocks you uncovered while grading to hold the soil in.

3. Be careful choosing your plants. Do not be shy about pulling a plant out of its container and looking for circular/girdling roots. Shorter, stouter trees and shrubs with many lower branches will thrive better than tall ones that are lashed to a packing stick. **Five gallon trees will pass up fifteen gallon trees in the long run, both in size and viability.** Planting a fifteen gallon tree that has spent its life rootbound in a container has the same chance for success as getting a person to walk with one foot.

4. Remember that a container grown tree is not a natural condition. A tree needs to blow in the wind in order for it to get the signal to grow stronger. What would happen to your muscles in your arms if they were kept in a cast? They would weaken and atrophy. It is the same principal for a tree that has been taped tightly to a packing stick for purposes of transporting it to its final location. After planting, remove the tape and stick and replace them with two stakes positioned on opposite sides of the trunk outside the branch tips. Use something flexible like plastic tape or old nylons and wrap one piece each in opposite directions around the tree trunk and tie the loose ends to the stake. Tie them tight for about three weeks after planting. After that stretch them so their only purpose is to catch the tree in a storm. Remove them after one year. If the tree falls over it either has a girdling root wrapped around its crown, has been destroyed by a mole or gopher, or you bought a container grown specimen whose structure was so artificially enhanced with fertilizer it could no longer take the environmental pressure. If you were pumped full of

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steroids when you were developing you would look great for a while, too. Unfortunately, both scenarios go against how plants and people are genetically programmed to develop and cause results that would not normally happen under natural conditions.

5. Digging the planting hole. Using metal tools like shovels, backhoes, and mechanical augers will glaze the sides of planting holes and water will not percolate beyond the sides of the hole. You must correct this before you plant or the formerly happy plant or tree will get stuck spinning around in the bowl you've created and topple over or will rot at the root crown. Always use a pick or the point of the shovel to break up and roughen the sides of the hole before planting.

6. Mulching. Mulching adds organic matter and nutrients to the soil. Landscape cloth of any kind is not recommended because it prevents this from happening and makes for an artificial, chemical fertilizer-dependant situation. Try to imitate the forest. Any plant you choose that is not a manmade cultivar is indigenous somewhere and in their natural environment they do not live in a hole surrounded by bare dirt. Tree service chipper mulch used as top dressing gives the best and longest lasting protection from radiant heat, keeps the soil at even temperatures, and brings in the earwigs, fungi, and worms that regenerate and aerate the soil for you. Remember that in our county the roots of plants in most situations live in the top 12-18" of soil. The roots at the dripline (tips of the outermost branches) are the ones picking up the water and nutrients. This means as the plant matures you will have to increase the mulched area outward to keep up with that growth.

7. Watering. Watering at the trunk will cause the base of the tree to rot. Roots at the dripline are the ones picking up water, so you will need to keep moving the watering points of your drip irrigation outward as the tree matures. In most cases dripline watering becomes impossible because of site constraints and therein lies the reason to choose drought resistant plants at the start.

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(If you would like to see photos of any of these trees or plants just use a search engine such as Google.com or similar and select the "Images" section. Enter either the common or botanical name to bring up photos.)

TREES

Adaptive Conifers (needle-leafed evergreens)

<i>Cedrus atlantica glauca</i>	blue Atlas cedar
<i>Cedrus atlantica</i>	green Atlas cedar
<i>Cedrus deodora</i>	deodar cedar (top choice of non-indigenous conifers)
<i>Cedrus libani</i>	cedar of Lebanon
<i>Cupressus arizonica</i>	Arizona cypress
<i>Pinus mugo mugo</i>	Mugo pine
<i>Juniperus deppeana</i>	alligator juniper
<i>Juniperus monosperma</i>	cherrystone juniper
<i>Juniperus osteosperma</i>	Utah Juniper
<i>Juniperus scopulorum</i>	Rocky Mountain juniper
<i>Juniperus virginiana</i>	eastern red cedar
<i>Sequoiadendron giganteum</i>	giant Sequoia
<i>Torreya californica</i>	California nutmeg

Indigenous Conifers (needle-leafed evergreens)

<i>Calocedrus (Libocedrus) decurrens</i>	incense cedar (upper elevations)
<i>Pseudotsuga menziesii</i>	Douglas fir (upper elevations)
<i>Pinus ponderosa</i>	ponderosa pine
<i>Pinus sabiniana gray</i>	foothill pine
<i>Juniperus occidentalis</i>	western juniper
<i>Taxus brevifolia</i>	Pacific yew (upper elevations)
<i>Tsuga mertensiana</i>	mountain hemlock (upper elevations)

Adaptive Broadleafed Evergreens

(Trees that hold their leaves but are not needle bearing trees like pines, firs etc.)

<i>Arbutus unedo</i>	strawberry tree
<i>Quercus ilex</i>	holly oak
<i>Quercus suber</i>	cork oak

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Indigenous Broadleafed Evergreen Trees

(Trees that hold their leaves but are not needle-bearing trees like pines, firs etc.)

<i>Arbutus menziesii</i>	Pacific madrone (upper elevations)
<i>Lithocarpus densiflorus</i>	tanbark oak (upper elevations)
<i>Quercus chrysolepis</i>	canyon live oak (upper elevations)
<i>Quercus durata</i>	leather oak
<i>Quercus wislizenii</i>	interior live oak
<i>Umbellularia californica</i>	California bay laurel

Adaptive Broadleafed Deciduous Trees

(Trees that shed their leaves in winter)

<i>Acer platanoides</i>	Norway maple, 'Crimson King'
<i>Ficus carica</i>	fig
<i>Koelreuteria paniculata</i>	goldenrain tree
<i>Laburnum anagyroides</i>	goldenchain tree
<i>Lagerstroemia indica</i>	crape myrtle
<i>Melia azedarach</i>	chinaberry
<i>Olea euroapea</i>	olive
<i>Pistachia chinensis</i>	Chinese pistache (top choice of non-indigenous shade trees)
<i>Prunus cerasifera</i>	purple-leaf plum
<i>Pyrus communis</i>	pear

Indigenous Broadleafed Deciduous Trees

(Trees that shed their leaves in winter)

<i>Acer macrophyllum</i>	bigleaf maple (upper elevations)
<i>Acer negundo 'californicum'</i>	box elder
<i>Aesculus californica</i> (California buckeye
<i>Cornus nuttallii</i>	flowering dogwood
<i>Fraxinus latifolia</i>	Oregon ash
<i>Juglans hindsii</i>	California black walnut
<i>Quercus Douglasii</i>	blue oak
<i>Quercus kelloggii</i>	California black oak
<i>Quercus lobata</i>	valley oak/California white

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SHRUBS

Adaptive Low (0'-3') Shrubs

<i>Arctostaphylos</i>	manzanita (See species list)
<i>Baccharis pillularis</i>	dwarf coyote bush
<i>Ceanothus</i>	(See species list)
<i>Correa</i>	Australian fuchsia
<i>Cistus crispus</i>	rockrose
<i>Cotoneaster dammeria</i>	'Coral Beauty', 'Lowfast' bearberry cotoneaster
<i>Cotoneaster horizontalis</i>	rock cotoneaster
<i>Cotoneaster microphyllus</i>	rockspray
<i>Grevillea</i>	(See species list)
<i>Juniperus chinensis</i>	'Armstrong'
<i>Juniperus chinensis</i>	'Mint Julep'
<i>Lavendula</i>	lavender
<i>Rosmarinus officinalis</i>	rosemary (See species list)
<i>Santolina</i>	(See species list)

Indigenous Low (0'-3') Shrubs

<i>Arctostaphylos nevadensis x viscida</i>	pine-mat manzanita
<i>Mahonia repens</i>	creeping mahonia
<i>Rubus parviflorus</i>	thimbleberry
<i>Symphoricarpus rivularis</i>	creeping snowberry

Adaptive Medium (3'-6') Shrubs

<i>Calycanthus occidentalis</i>	spice brush
<i>Carpenteria californica</i>	bush anemone
<i>Ceanothus</i>	(See species list)
<i>Cistus rockrose</i>	(See species list)
<i>Convolvulus cneorum</i>	bush morning glory
<i>Cotoneaster</i>	(See species list)
<i>Fallugia paradoxa</i>	Apache plume
<i>Grevillea</i>	(See species list)
<i>Nandina domestica</i>	heavenly bamboo
<i>Lupinus albifrons</i>	silver lupine
<i>Mahonia aquifolia</i>	Oregon grape
<i>Mahonia eomariifolia</i>	Venetian blind mahonia
<i>Phlomis fruticosa</i>	Jerusalem sage or P. sania
<i>Potentilla fruticosa</i>	potentilla
<i>Rhus ovata</i>	sugar bush
<i>Ribes sanguineum</i>	gooseberry
<i>Rosmarinus officinalis</i>	rosemary (See species list).
<i>Salvia</i>	sage (See species list)
<i>Spiraea prunifolia</i>	shoe button bridal wreath

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<i>Spiraea densiflora</i>	mountain spiraea
<i>Spiraea douglasii</i>	western spiraea
<i>Styrax officinalis</i> 'californicus'	snowdrop bush

Indigenous Medium (3'-6') Shrubs

<i>Ceanothus cordulatus</i>	snow bush
<i>Ceanothus lemmonii</i>	Lemmon's ceanothus
<i>Ceanothus velutinus</i>	snowbrush
<i>Cercocarpus betuloides</i>	birch-leaf mountain mahogany
<i>Cercocarpus ledifolius</i>	curl-leaf mountain mahogany
<i>Chrysolepis sempervirens</i>	chinquapin
<i>Chrysothamnus nauseosus</i>	rabbit brush
<i>Holodiscus discolor</i>	cream bush
<i>Mahonia nervosa</i>	longleaf mahonia
<i>Mahonia pinnata</i>	holly leaf mahonia
<i>Mimulus aurantiacus</i>	orange bush monkey flower
<i>Lonicera hispidula</i>	pink wild honeysuckle
<i>Lupinus albifrons</i>	silver bush lupine
<i>Pickeringia montana</i>	chaparral pea
<i>Purshia tridentate</i>	bitter brush
<i>Rhamnus crocea ilicifolia</i>	holly-leaf redberry
<i>Rhamnus rubra</i>	red coffeeberry
<i>Rhus trilobata</i>	three-leafed sumac
<i>Ribes cereum</i>	wax currant
<i>Ribes malvaceum</i>	chaparral flowering currant
<i>Ribes roezlii</i>	Sierra gooseberry

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Adaptive Tall (over 6ft) Shrubs

<i>Arctostaphylos</i>	(See species list)
<i>Arbutus unundo</i>	strawberry tree
<i>Ceanothus</i>	(See species list)
<i>Chaenomeles</i>	flowering quince
<i>Cotinus coggygria</i>	smoke tree, 'Velvet Cloak', 'Royal Purple' (See species list)
<i>Elaeagnus x ebbingei</i>	silverberry 'Guilt Edge'
<i>Fremontodendron californicum</i>	flannel bush
<i>Garrya fremontii</i>	Fremont's silk-tassel
<i>Photinia serratifolia</i>	Chinese photinia
<i>Rhamnus californica</i>	'Eve Case' coffeeberry
<i>Syringa vulgaris</i>	lilac
<i>Viburnum tinus</i>	robustum

Indigenous Tall (over 6ft) Shrubs

<i>Arctostaphylos patula</i>	green-leaf manzanita
<i>Arctostaphylos viscida</i>	white-leaf manzanita
<i>Baccharis pilularis consanguineum</i>	coyote brush
<i>Ceanothus cuneatus</i>	buckbrush
<i>Cercis occidentalis</i>	western redbud
<i>Eriodictyon californicum</i>	yerba santa
<i>Fremontodendron decumbens</i>	Pine Hill flannel bush
<i>Heteromeles arbutifolia</i>	toyon
<i>Philadelphus lewisii</i>	mock orange
<i>Physocarpus capitatus</i>	western ninebark
<i>Rhamnus californica tomentella</i>	coffeeberry

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Adaptive Perennials

<i>Aethionema x warleyense</i>	stonecress
<i>Achillea</i>	yarrow (See species list)
<i>Alyssum montanum</i>	'Basket of Gold'
<i>Artemisia</i>	(See species list)
<i>Callirhoe involucrate</i>	poppy mallow
<i>Centranthus ruber</i>	Jupiter's beard
<i>Eriogonum</i>	wild buckwheat (See species list)
<i>Euphorbia</i>	spurge (See species list)
<i>Gaura lindheimeri</i>	
<i>Helianthemum nummularium</i>	sunrose
<i>Iris</i>	Pacific coast iris
<i>Lavendula</i>	lavender (See species list)
<i>Marrubium rotundifolium</i>	silver edged horehound
<i>Nepeta</i>	catmint
<i>Origanum</i>	ornamental oregano (See species list)
<i>Perovskia</i>	Russian sage
<i>Phlomis</i>	(See species list)
<i>Potentilla</i>	cinquefoil (See species list)
<i>Salvia</i>	sage (See species list)
<i>Stachys</i>	(See species list)
<i>Tanacetum densum amanii</i>	partridge feather
<i>Thymus</i>	thyme (See species list)
<i>Veronia prostrate</i>	Speedwell

Indigenous Perennials

<i>Achillea millefolium</i>	yarrow
<i>Agastache urticifolia</i>	nettle-leaf
<i>Lupinus albicaulis</i>	lupine
<i>Lupinus caudatus</i>	silvery lupine
<i>Monardella odoratissima</i>	coyote mint
<i>Monardella villosa</i>	coyote mint
<i>Penstemon heterophyllus</i>	foothill penstemon
<i>Potenilla glandulosa</i>	sticky cinquefoil

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Adaptive Vines

<i>Lonicera standishii</i>	winter daphne bush honeysuckle
<i>Rosa banksiae</i>	Lady Banks' rose (aggressive growth)

Indigenous Vines

<i>Aristolochia californica</i>	California pipe vine or Dutchman's pipe vine
<i>Clematis lasiantha</i>	chaparral virgin's bower
<i>Lonicera hispidula</i>	pink wild honeysuckle
<i>Lonicera interrupta</i>	chaparral honeysuckle
<i>Vitis californica</i>	California wild grape

Adaptive Ground Covers

<i>Achillea tomentosa</i>	wooly yarrow
<i>Arctostaphylos uva-ursi</i>	Kinnick Kinnick and bearberry.
<i>Armeria martima</i>	common thrift; 'Sea Pink'
<i>Baccharis pilularis</i>	'Twin Peaks II' dwarf coyote brush
<i>Ceanothus griseus horizontalis</i>	'Yankee Point'
<i>Ceanothus griseus horizontalis</i>	'Carmel Creeper'
<i>Cotoneaster dammeri</i>	bearberry cotoneaster
<i>Cotoneaster horizontalis</i>	rock cotoneaster
<i>Festuca ovina</i>	'Glauca' blue fescue
<i>Juniperus</i>	(See species list).
<i>Mahonia pepens</i>	creeping mahonia
<i>Rosmarinus officinalis 'Prostratus'</i>	dwarf rosemary
<i>Santolina chamaecyparissus</i>	lavender cotton
<i>Sedum</i>	(See species list).
<i>Thymus</i>	thyme (See species list).

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Adaptive Ornamental Grasses

<i>Festuca</i>	fescue (See species list)
<i>Helictotrichon sempervirens</i>	blue oat grass
<i>Miscanthus sinensis</i>	(See species list)
<i>Stipa tenacissima</i>	feather grass

Indigenous Ornamental Grasses

<i>Festuca californica</i>	California fescue
<i>Festuca idahoensis</i>	Idaho fescue
<i>Muhlenbergia rigens</i>	deer grass
<i>Sisyrinchium bellum</i>	blue-eyed grass
<i>Sisyrinchium californicum</i>	yellow-eyed grass
<i>Stipa comata</i>	needle-and-thread
<i>Stipa pulchra</i>	purple needlegrass

Succulants/Cacti

<i>Agave</i>	(See species list)
<i>Crassula</i>	(See species list)
<i>Dasyliirion wheeleri</i>	desert spoon
<i>Sedum</i>	(See species list)
<i>Yucca</i>	(See species list)