



P.O. BOX 496071
REDDING, CA 96049-6071
*Conserving resources today...
for Redding's tomorrow*

January 11, 2010
W-030-075

Mr. Simon Eching
California Department of Water Resources
Water Use and Efficiency Branch
PO Box 942836
Sacramento, California 94236-0001

RE: Notification of Adoption of Water Efficient Landscape Ordinance

Dear Mr. Eching:

As required by Assembly Bill 1881, this letter shall serve as notice that the City of Redding has adopted the updated State Model Water Efficient Landscape Ordinance. The City has modified the Model Ordinance with both appropriate language and formatting for local adoption.

Enclosed for your records is a copy of the City's Water Efficient Landscape Ordinance. If you have any questions, please contact me in the Water Utility at (530) 224-6032 or via e-mail at pclackler@ci.redding.ca.us. You may also contact Lily Toy, Associate Planner, at (530) 245-7231 or via e-mail at ltoy@ci.redding.ca.us.

Sincerely,


Pamela Clackler
Water Conservation Specialist

pc/ro
Enclosure: Ordinance
Landscape Documentation Package
Certificate of Completion

c: Doug DeMallie, Planning Manager
Ray Duryee, Interim Water Utility Manager
Lily Toy, Associate Planner

ORDINANCE NO. _____

**AN ORDINANCE OF THE CITY OF REDDING AMENDING
TITLE 16 (BUILDINGS AND CONSTRUCTION) BY ADDING
CHAPTER 16.70 (WATER EFFICIENT LANDSCAPE) RELATING
TO IMPLEMENTING STATE REQUIREMENTS MANDATED BY
THE CALIFORNIA WATER CONSERVATION IN LANDSCAPING
ACT OF 2006**

WHEREAS, the California Water Conservation in Landscaping Act of 2006 (AB 1881) mandates that after January 1, 2010, the City of Redding is required to implement and apply certain new regulations to specified landscape projects; and,

WHEREAS, as a means to implement the regulatory mandates of AB 1881, it is necessary for the City to either adopt a model ordinance crafted by state regulators or adopt a local ordinance containing the mandatory provisions of AB 1881 in a format consistent with how the City processes development applications; and

WHEREAS, the City Council finds it is in the best interest of the local development community to adopt a City of Redding ordinance containing the basic requirements of AB 1881;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF REDDING AS FOLLOWS:

Section 1. Title 16 of the Redding Municipal Code is amended to add Chapter 16.70 with a title to read as follows:

WATER EFFICIENT LANDSCAPE

Sections:

- 16.70.010 Purpose**
- 16.70.020 Applicability**
- 16.70.030 Definitions**
- 16.70.040 Landscape Plan Review and Approval Required**
- 16.70.050 Elements of Landscape Documentation Package**
- 16.70.060 Certificate of Completion**
- 16.70.070 Irrigation Scheduling**
- 16.70.080 Irrigation Maintenance Schedule**
- 16.70.090 Irrigation Audit, Survey, and Water Use Analysis**
- 16.70.100 Irrigation Efficiency**
- 16.70.110 Recycled Water**
- 16.70.120 Stormwater Management**
- 16.70.130 Model Homes**

- 16.70.140 Environmental Review**
- 16.70.150 Provisions for Existing Landscapes**
- 16.70.160 Water-Waste Prevention**
- 16.70.170 Reserved**
- 16.70.180 Enforcement**

Section 2. Title 16 of the Redding Municipal Code is amended to add Sections 16.70.010 through 16.70.180 to Chapter 16.70 to read as follows:

16.70.010 PURPOSE

This chapter is intended to comply with the provisions of the California Water Conservation in Landscaping Act of 2006 (AB 1881), Chapter 3, Article 10.8, Government Code. The specific purposes of these regulations are to:

- A. Promote the values and benefits of landscapes, while recognizing the need to invest water and other resources as efficiently as possible.
- B. Retain flexibility and encourage creativity through appropriate design.
- C. Ensure the attainment of water efficient landscape goals by requiring that landscapes not exceed a maximum water demand.
- D. Establish a structure for designing, installing, and maintaining water efficient landscapes in new projects.
- E. Establish provisions for water-management practices and water-waste prevention for established landscapes.
- F. Establish the City's responsibilities for administrating programs to ensure compliance with the provisions for this chapter and of the California Water Conservation in Landscaping Act of 2006.
- G. Establish provisions for water-management programs that may include, but are not limited to: irrigation water use analyses, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.
- H. Achieve water conservation by raising public awareness of the need for an effective management program through education and incentives.

16.70.020 APPLICABILITY

This section shall apply to all the following landscape projects:

- A. New construction and rehabilitated landscapes for public-agency projects and private commercial or industrial development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review.

- B. New construction and rehabilitated landscapes which are developer-installed in single-family and multiple-family projects with a common landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review.
- C. New construction landscapes which are homeowner-provided and/or homeowner-hired in single-family and multiple-family residential projects with a total project landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check, or design review.
- D. All subdivision model homes with front-yard landscape installed by the developer.
- E. Landscapes over one acre in size installed before January 1, 2010, are subject to the limited provisions in Section 16.70.150.
- F. Cemeteries. Recognizing the special landscape management needs of cemeteries, the following shall apply:
 - 1. New and rehabilitated cemeteries are subject to the limited provisions of Sections 16.70.050.B, 16.70.080, and 16.70.090.
 - 2. Existing cemeteries are subject to the limited provisions in Section 16.70.150.
- G. This chapter does not apply to:
 - 1. Registered local, state, or federal historical sites.
 - 2. Ecological restoration projects that do not require a permanent irrigation system.
 - 3. Mined land reclamation projects that do not require a permanent irrigation system.
 - 4. Plant collections, as part of botanical gardens and arboretums, open to the public.

16.70.030 DEFINITIONS

For the purpose of this chapter, the following words shall have the meanings set forth below:

Applied Water The portion of water supplied by the irrigation system to the landscape.

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.

Certificate of Completion The document required under Section 16.70.060, *Certificate of Completion*.

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

Certified Irrigation Designer A person certified to design irrigation systems by an accredited academic institution; a professional trade organization; or other programs, such as the U.S. Environmental Protection Agency's WaterSense irrigation designer certification program and the Irrigation Association's Certified Irrigation Designer 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.

Common Interest Developments Community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.

Controller An automatic timing device used to remotely control valves to operate an irrigation system. A weather-based controller is a controller that uses evapotranspiration or weather data to determine when to irrigate. A self-adjusting irrigation controller is a controller that uses sensor data (i.e., soil-moisture sensor).

Conversion Factor (0.62) The number that converts acre-inches per acre per year to gallons-per-square-foot per year.

Drip Irrigation Any nonspray low-volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low-volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

Ecological Restoration Project A project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

Effective Precipitation or Usable Rainfall (Eppt) The portion of total precipitation which becomes available for plant growth.

Emitter A drip-irrigation emission device that delivers water slowly from the system to the soil.

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

Establishment Period of the Plants The first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth.

Estimated Total Waster Use (ETWU) The total water used for the landscape as described in Section 16.70.050.B.

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.

A combined plant mix with a site-wide average of 0.5 is the basis of the plant-factor portion of this calculation. For purposes of the ETAF, the average irrigation efficiency is 0.71. Therefore, the ET Adjustment Factor is $(0.7) = (0.5/0.71)$. ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing, nonrehabilitated landscapes is 0.8.

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

Flow Rate The rate at which water flows through pipes, valves, and emission devices measured in gallons per minute, gallons per hour, or cubic feet per second.

Hardscapes Any durable material (pervious and nonpervious).

Homeowner-Provided Landscape Any landscape either installed by a private individual for a single-family residence or installed by a licensed contractor hired by a homeowner. A homeowner, for purposes of this chapter, is a person who occupies the dwelling he or she owns. This excludes speculative homes, which are not owner-occupied dwellings.

Hydrozone A portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or nonirrigated.

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

Invasive Plant Species Species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. "Noxious weeds" refers to any weed that is designated by the Weed Control Regulations in the Weed Control Act and identified on a regional district noxious weed control list. Lists of invasive plants are maintained in the California Invasive Plant Inventory and U.S. Department of Agriculture's invasive and noxious weeds database.

Irrigation Audit An in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

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.

Irrigation Survey An evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

Irrigation Water Use Analysis An analysis of water use data based on meter readings and billing data.

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 design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or nonpervious hardscapes, and other nonirrigated areas designated for nondevelopment (e.g., open spaces and existing native vegetation).

Landscape Contractor A person licensed (with a valid C-27 license) by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

Landscape Documentation Package The documents required under Section 16.70.050.

Landscape Project Total area of landscape in a project as defined in "landscape area" for the purposes of the Water Efficient Landscape chapter, meeting requirements under Section 16.70.020.

Lateral Line The water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

Local Water Purveyor 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.

Main Line The pressurized pipeline that delivers water from the water source to the valve or outlet.

Maximum Applied Water Allowance (MAWA) The upper limit of annual applied water for the established landscaped area as specified in Section 16.70.050B.3. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas—including recreation areas; area permanently and solely dedicated to edible plants, such as orchards and vegetable gardens; and areas irrigated with recycled water—are subject to the MAWA, with an ETAF not to exceed 1.0.

Microclimate The climate of a small specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

Mine Land Reclamation Projects Any surface mining operation with a reclamation plan approval in accordance with the Surface Mining and Reclamation Act of 1975.

Mulch Any organic material (such as leaves, bark, or straw) 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 For the purposes of the Water Efficient Landscape chapter, a new building with a landscape or other new landscape.

Operating Pressure The pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

Overhead Sprinkler Irrigation Systems Systems that deliver water through the air (e.g., spray heads and rotors).

Overspray The irrigation water which is delivered beyond the target area.

Permit An authorized document issued by the City of Redding for new construction or rehabilitated landscape.

Pervious Any surface or material that allows the passage of water through the material and into the underlying soil.

Plant Factor or Plant Water Use Factor A factor, when multiplied by ETo, that estimates the amount of water needed by plants. For purposes of the Water Efficient Landscape chapter, the plant factor range for low-water-use plants is 0 to 0.3, the plant factor range for moderate-water-use plants is 0.4 to 0.6, and the plant factor range for high-water-use plants is 0.7 to 1.0. Plant factors cited in the Water Efficient Landscape chapter are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species."

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

Project Applicant The individual or entity submitting a Landscape Documentation Package required under Section 16.70.050 to request a permit, plan check, or use permit from the City of Redding. A project applicant may be the property owner or his or her designee.

Rain Sensor or Rain-Sensing Shutoff Device A component which automatically suspends an irrigation event when it rains.

Record Drawing or As-Builts A set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

Recreational Area Areas dedicated to active play, such as parks, sports fields, and golf courses, where turf provides a playing surface.

Recycled Water, Reclaimed Water, or Treated Sewage Effluent Water Treated or recycled wastewater of a quality suitable for nonpotable uses, such as landscape irrigation and water features. This water is not intended for human consumption.

Reference Evapotranspiration, or ETo A standard measurement of environmental parameters which affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Section 16.70.050.B.2.a, Water Efficient Landscape Worksheet, and is an estimate of the evapotranspiration of a large field of 4- to 7-inch-tall cool-season grass that is well-watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances, so that regional differences in climate can be accommodated.

Rehabilitated Landscape Any re-landscaping project that requires a permit, plan check, or use permit; meets the requirements of Section 16.07.020, Applicability; where the modified landscape area is greater than 2,500 square feet; and 50 percent of the total landscape area and the modifications occur within one year.

Runoff Water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or where there is a slope.

Soil Moisture Sensing Device or Soil Moisture Sensor A device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

Soil Texture The classification of soil based on its percentage of sand, silt, and clay.

Special District Bella Vista, Centerville, Clear Creek.

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

Sprinkler Head A device which delivers water through a nozzle.

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.

Swing Joint An irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

Turf A groundcover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermuda grass, Kikuyu grass, Seashore Paspalum grass, St. Augustine grass, Zoysia grass, and Buffalo grass are warm-season grasses.

Valve A device used to control the flow of water in the irrigation system.

Water-Conserving Plant Species A plant species identified as having a low plant factor.

Water Feature A design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high-water-use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.

Watering Window The time of day irrigation is allowed.

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

16.70.040 LANDSCAPE DOCUMENTATION PACKAGE REVIEW AND APPROVAL REQUIRED

A complete landscape documentation package must be submitted and found to satisfy the requirements of this chapter prior to authorization for water service and the installation of a new water meter or a change in water service.

- A. City Water Applications. Landscape plans submitted as part of a building plan application through the Building Division shall be routed for review in accordance with procedures established by the Building Official for review.
- B. Water District Applications. Water-conservation measures adopted by any special water district with jurisdiction within the city limits that are more restrictive than these standards shall supercede City standards.
- C. Plan Check Approval Process. The project applicant shall be notified in writing if plans are found to be incomplete or inconsistent with the standards and indicate where such additions or revisions are necessary.
- D. Application Fee. A filing fee set by resolution of the City Council shall accompany each application.
- E. Upon approval of the Landscape Documentation Package, the project applicant shall:
 - 1. Receive a building permit and record the date of the permit on the Certificate of Completion.
 - 2. Provide a copy of the approved Landscape Documentation Package to the property owner or site manager.

3. Submit a copy of the Water Efficient Landscape Worksheet to the Municipal Utility Department or to the appropriate water district, whichever is applicable to the project site.
- F. In the event that a water-supply emergency is declared by a water purveyor, these landscape requirements shall be deferred for those projects served within the impacted area until such time as the water-supply emergency has been lifted.

16.70.050 ELEMENTS OF LANDSCAPE DOCUMENTATION PACKAGE

The Landscape Documentation Package shall contain the following:

- A. Water Efficiency Application Form.
- B. Water Efficient Landscape Worksheet consisting of:
 1. A hydrozone information table and a hydrozone map for the landscape project.
 2. A water budget calculation for the landscape project, adhering to the following:
 - a. For the calculation of the Maximum Applied Water Allowance and Estimated Total Water Use, the following ETo values shall apply:

REFERENCE EVAPOTRANSPIRATION (ETo) TABLE												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
1.2	1.4	2.6	4.1	5.6	7.1	8.5	7.3	5.3	3.2	1.4	0.9	48.8

- b. The plant factors used shall be from WUCOLS, which are as follows:
 - i. Low-water-use plants = 0 to 0.3
 - ii. Moderate-water-use plants = 0.4 to 0.6
 - iii. High-water-use plants= 0.7 to 1.0
 - c. All water features shall be included in the high-water-use hydrozone, and temporarily irrigated areas shall be included in the low-water-use hydrozone.
 - d. All Special Landscape Areas shall be identified and their water use calculated; the ETAF for all Special Landscape Areas shall not exceed 1.0.
3. Maximum Applied Water Allowance (MAWA)
 - a. A project's Maximum Applied Water Allowance shall be calculated using the following formula:

$$MAWA = (ETo) (0.62) [(0.7 \times LA) + (0.3 \times SLA)]$$

Where:

MAWA	=	Maximum Applied Water Allowance (gallons per year)
0.62	=	Conversion Factor
0.7	=	ET Adjustment Factor
LA	=	Landscape Area (square feet)
0.3	=	Additional Water Allowance for SLA
SLA	=	Special Landscape Area (square feet)
ETo	=	Reference Evapotranspiration (inches per year)

4. Estimated Total Water Use (ETWU)

- a. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance.
- b. The sum of the Estimated Total Water Use calculations for all hydrozones shall not exceed the Maximum Applied Water Allowance.
- c. A project's Estimated Total Water Use shall be calculated using the following formula:

$$ETWU = (ETo) (0.62) [(PF \times HA) \div IE + SLA]$$

Where:

ETWU	=	Estimated Total Water Use (gallons per year)
ETo	=	Reference Evapotranspiration (inches per year)
PF	=	Plant Factor from WUCOLS
HA	=	Hydrozone Area (square feet)
0.62	=	Conversion Factor
IE	=	Irrigation Efficiency (minimum 0.71)
SLA	=	Special Landscape Area (square feet)

C. Soil Management Report

In order to reduce runoff and encourage healthy plant growth, a soil management report satisfying the following criteria shall be submitted as a part of the Landscape Documentation Package:

Results of a soils analysis prepared by a qualified professional or laboratory; soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

1. The soil analysis shall include the following:
 - a. Determination of soil texture, indicating the percentage of organic matter.
 - b. An appropriate soil infiltration rate determined by laboratory test or soil texture/infiltration rate tables.
 - c. Measure of pH.

- d. Total soluble salts and sodium.
 - e. Recommendations
2. The project applicant shall submit documentation verifying implementation of soil analysis report recommendations in the Landscape Plan.

D. Landscape Design Plan.

A landscape design plan meeting the following requirements shall be submitted as part of the Landscape Documentation Package.

1. Plant Material

- a. Any plant may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance. To encourage the efficient use of water, the following practices are highly recommended:
 - i. Protection and preservation of native species and natural vegetation.
 - ii. Selection of water-conserving plant and turf species.
 - iii. Selection of plants from local and regional landscape program plant lists.
- b. Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use as specified in Section 16.70.050.E.1.d, *Elements of Landscape Documentation Package - Irrigation Design Plan - Irrigation System*.
- c. Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. To encourage the efficient use of water, the following is highly recommended:
 - i. Use the Sunset Western Climate Zone System, which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate.
 - ii. Recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure (e.g., buildings, sidewalks, power lines).
 - iii. Consider the solar orientation for plant placement to maximize summer shade and winter solar gain.
- d. Turf is not allowed on slopes greater than 25 percent where the toe of the slope is adjacent to an impermeable hardscape and where 25 percent means 1 foot of

vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).

- e. A landscape design plan for projects in fire-prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required in accordance with Public Resources Code Section 4291(a) and (b) and Chapter 9.20 of the Redding Municipal Code. Avoid fire-prone plant materials and highly flammable mulches.
- f. The use of invasive and/or noxious plant species is discouraged.
- g. The architectural guidelines of a common-interest development, which includes community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water-use plants as a group.

2. Water Features

- a. Recirculating water systems shall be used for water features.
- b. Where available, recycled water shall be used as a source for decorative water features.
- c. Surface area of a water feature shall be included in the high-water-use hydrozone area of the water budget calculation.
- d. Pool and spa covers are highly recommended.

3. Mulch and Amendments

- a. A minimum 2-inch layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting ground covers, or direct seeding applications.
- b. Stabilizing mulching products shall be used on slopes.
- c. The mulching portion of the seed/mulch slurry in hydroseeded applications shall meet the mulching requirement.
- d. Soil amendments shall be incorporated according to recommendations of the Soil Management Report and what is appropriate for the plants selected.

4. Landscape Plan

The project Landscape Plan shall, at a minimum, provide the following information, in addition to meeting the form and content of the City of Redding Landscape Plan Standards adopted by the Planning Commission:

- a. Delineation and labeling of each hydrozone by number, letter, or other method.
- b. Identification of each hydrozone as low, moderate, high, or mixed water use.
- c. Identification of recreational areas.
- d. Identification of areas permanently and solely dedicated to edible plants.
- e. Identification of areas irrigated with recycled water
- f. Identification of type of mulch and application depth.
- g. Identification of soil amendments, type, and quantity.
- h. Identification of type and surface area of water features.
- i. Identification of hardscapes (pervious and nonpervious).
- j. Location and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Stormwater best management practices are encouraged in the Landscape Design Plan and examples include, but are not limited to:
 - i. Infiltration beds, swales, and basins that allow water to collect and soak into the ground.
 - ii. Constructed wetlands and retention ponds that retain water, handle excess flow, and filter pollutants.
 - iii. Pervious or porous surfaces (e.g., permeable pavers or blocks, pervious or porous concrete) that minimize runoff.
- k. Identification of any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.).
- l. Contain the following statement: "I have complied with the criteria of the Water-Efficient Landscape chapter and applied it for the efficient use of water in the Landscape Design Plan."
- m. The signature of a licensed landscape architect; licensed landscape contractor, who is a designer/builder; or as stipulated under the State Business and Professions Code.

E. Irrigation Design Plan.

For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturer's recommendations. The irrigation system and its related

components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

1. Irrigation System

- a. Dedicated landscape water meters are required for landscape projects greater than 5,000 square feet to facilitate water management and are highly recommended for projects less than 5,000 square feet.
- b. Weather-based irrigation controllers or soil moisture-based controllers or other self-adjusting irrigation controllers shall be required for irrigation scheduling in all irrigation systems.
- c. The irrigation system shall be designed to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.
 - i. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices, such as in-line pressure regulators, booster pumps, or other devices, shall be installed to meet the required dynamic pressure of the irrigation system.
 - ii. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow 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.
- d. Sensors (rain, freezing weather, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.
- e. Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required as close as possible to the point of connection to the water supply to minimize water loss in case of an emergency (such as a mainline break) or routine repair.
- f. Backflow-prevention devices shall be required to protect the water supply from contamination by the irrigation system. Backflow-prevention devices shall be installed in accordance with the City of Redding Public Works Construction Standards and State Building, Plumbing, and Health and Safety Codes.
- g. High-flow sensors that detect and report high-flow conditions created by system damage or malfunction are recommended.
- h. The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto

nontargeted areas, such as adjacent property, nonirrigated areas, hardscapes, roadways, or structures.

- i. Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.
- j. The design of the irrigation system shall conform to the hydrozones of the Landscape Design Plan.
- k. The irrigation system must be designed and installed to meet irrigation efficiency criteria as described in Section 16.70.050.B, *Elements of Landscape Documentation Package - Water Efficient Landscape Worksheet*, regarding the Maximum Applied Water Allowance.
- l. If water is being provided by a local water district (i.e., Bella Vista, Centerville, or Clear Creek Water District), the project applicant shall consult with the appropriate district about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.
- m. In mulched planting areas, the use of low-volume irrigation is required to maximize water infiltration into the root zone.
- n. Sprinkler heads and other emission devices shall have matched precipitation rates unless otherwise directed by the manufacturer's recommendations.
- o. Head-to-head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.
- p. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to high-traffic areas.
- q. Check valves or anti-drain valves are required for all irrigation systems.
- r. Narrow or irregularly shaped areas, including turf less than 8 feet in width in any direction, shall be irrigated with subsurface irrigation or low-volume irrigation technology.
- s. Overhead irrigation shall not be permitted within 24 inches of any nonpermeable surface. Allowable irrigation within the setback from nonpermeable surfaces may include drip, drip line, or other low-flow nonspray 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 any of the following occur:
 - i. The landscape area is adjacent to permeable surfacing and there is no overspray or runoff.

- ii. The adjacent nonpermeable surfaces are designed and constructed to drain entirely to landscape.
- iii. The irrigation designer specifies an alternative design or technology as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria in Section 16.70.050.E.1.h, *Elements of Landscape Documentation Package - Irrigation Design Plan - Irrigation System*. Prevention of overspray and runoff must be confirmed during an irrigation audit.
- t. Slopes greater than 25 percent shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inch per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology as part of the Landscape Documentation Package and clearly demonstrates that no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during irrigation audit.
- u. Hydrozone.
 - i. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.
 - ii. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.
 - iii. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.
 - iv. Individual hydrozones that mix plants of moderate- and low-water use or moderate- and high-water use may be allowed if either of the following occurs:
 - (a) Plant factor calculation is based on the proportions of the respective plant water uses and their plant factor.
 - (b) The plant factor of the higher-water-using plant is used for calculations.
 - v. Individual hydrozones that mix high- and low-water-use plants shall not be permitted.
 - vi. On the Landscape Design Plan and Irrigation Design Plan, hydrozone areas shall be designated by number, letter, or other designation. On the Irrigation Design Plan, the areas irrigated by each valve shall be designated and assigned a number to each valve. This valve number shall be provided in the Hydrozone Information Table and used to assist with preinspection and final inspection of the irrigation system and programming the controller.

2. Irrigation Design Plan Specifications.

The Irrigation Design Plan shall, at a minimum, contain the following:

- a. Location and size of separate water meters for landscape.
- b. 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.
- c. Static water pressure at the point of connection to the public water supply.
- d. Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station.
- e. Recycled water-irrigation systems as specified in Section 16.70.110, *Recycled Water*.
- f. The following statement: "I have complied with the criteria of the water efficient landscape chapter and applied it accordingly for the efficient use of water in the Irrigation Design Plan."
- g. The signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor who is a designer/builder, or any other person authorized to design an irrigation system. (See Sections 5500.1, 5615, 5641 through 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.

F. Grading Design Plan.

For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for a grading permit satisfies this requirement.

1. The project applicant shall submit a Landscape Grading Plan that indicates finished configurations and elevations of the landscape area, including the height of graded slopes, drainage patterns, pad elevations, finish grade percent or ratios of slope, and stormwater-retention improvements, if applicable.
2. To prevent excessive erosion and runoff, the grading plan shall be designed to the extent practical to:
 - a. Grade so that all irrigation and normal rainfall remains within property lines and does not drain onto nonpermeable hardscapes.

- b. Avoid disruption of natural drainage patterns and undisturbed soil.
 - c. Avoid soil compaction in landscape areas.
3. The Grading Design Plan shall bear the signature of a licensed professional as authorized by law and contain the following statement: "I have complied with the criteria of the Water Efficient Landscape Chapter and applied it accordingly for the efficient use of water in the Grading Design Plan."

16.70.060 CERTIFICATE OF COMPLETION

Upon completion of the installation of landscape and irrigation systems in compliance with the approved Landscape Design Plan, a Certificate of Completion shall be submitted to the City or appropriate water district for review and to the owner of record. The City or appropriate water district shall review the Certificate of Completion and shall approve or deny the certificate. If the Certificate of Completion is denied, the City or appropriate water district shall provide information to the project applicant regarding reapplication, appeal, or other assistance. The Certificate of Completion shall include the following elements:

- A. Project information. This shall include, but is not limited to the date; project name; project address and location; project applicant's name, telephone number, and mailing address; and property owner's name, telephone number, and mailing address.
- B. Certification by either the signer of the Landscape Design Plan, the signer of the Irrigation Design Plan, or the licensed landscape contractor that the landscape project has been installed in accordance with the approved Landscape Documentation Package. Where there have been significant approved changes made in the field during construction, "as-built" or record drawings shall be included with the certification.
- C. Irrigation scheduling parameters used to set the controller (see Section 16.70.070, *Irrigation Scheduling*).
- D. Landscape and irrigation maintenance schedule (see Section 16.70.080, *Irrigation Maintenance Schedule*).
- E. Irrigation audit report (see Section 16.70.090, *Irrigation Audit, Survey, and Water Analysis*).
- F. Soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 16.70.050.C, *Elements of Landscape Documentation Package - Soil Management Report*).

16.70.070 IRRIGATION SCHEDULING

For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

- A. Irrigation scheduling shall be regulated by automatic irrigation controllers.
- B. 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 City or 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.
- C. For implementation of the irrigation schedule, irrigation run times, emission device, flow rate, and current reference evapotranspiration shall be considered, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data or soil moisture sensor data.
- D. Parameters used to set the automatic controller shall be developed and submitted for each of the following:
 - 1. The plant establishment period.
 - 2. The established landscape.
 - 3. Temporarily irrigated areas.
- E. Each irrigation schedule shall consider for each station all the following that apply:
 - 1. Irrigation interval (days between irrigation).
 - 2. Irrigation run times (hours or minutes per irrigation event to avoid runoff).
 - 3. Number of cycle starts required for each irrigation event to avoid runoff.
 - 4. Amount of applied water scheduled to be applied on a monthly basis.
 - 5. Application-rate setting.
 - 6. Root-depth setting.
 - 7. Plant-type setting.
 - 8. Soil-type setting.
 - 9. Slope-factor setting.
 - 10. Shade-factor setting.
 - 11. Irrigation-uniformity or efficiency setting.

16.70.080 LANDSCAPE AND IRRIGATION MAINTENANCE SCHEDULE

Landscapes shall be maintained to ensure water use efficiency.

- A. A regular maintenance schedule shall be submitted with the Certificate of Completion. A regular maintenance schedule shall include, but is not limited to: routine inspection, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas; and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
- B. Repair of all irrigation equipment shall be done with the originally installed components or their equivalents.

- C. A project applicant is encouraged to implement sustainable or environmentally friendly practices for overall landscape maintenance.

16.70.090 IRRIGATION AUDIT, IRRIGATION SURVEY, AND IRRIGATION WATER USE ANALYSIS

An irrigation audit is required for new construction and rehabilitated landscape projects installed after January 1, 2010. All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor. The project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

16.70.100 IRRIGATION EFFICIENCY

For the purpose of determining Maximum Applied Water Allowance, average irrigation efficiency is assumed to be 0.71. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average landscape irrigation efficiency of 0.71.

16.70.110 RECYCLED WATER

The installation of recycled water irrigation systems shall allow for the current and future use of recycled water unless a written exemption has been granted as described in Section 16.70.110(A).

- A. Decorative water features shall use recycled water unless a written exemption has been granted by the City or water district, whichever is applicable, stating that recycled water meeting all public health codes and standards is not available and will not be available for the foreseeable future. An exemption shall be presumed to exist for the connection of recycled water irrigation systems unless the utility with jurisdiction requires such connection.
- B. All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and state laws.
- C. Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for Special Landscape Areas shall not exceed 1.0.

16.70.120 STORMWATER MANAGEMENT

Stormwater-management practices minimize runoff and increase infiltration, which recharges groundwater and improves water quality. Implementing stormwater best management practices into the Landscape and Grading Design Plans to minimize runoff and to increase on-site retention and infiltration are encouraged.

- A. Project applicants shall refer to the City or Regional Water Quality Control Board for information on any applicable stormwater ordinances and stormwater-management plans.
- B. Rain gardens, cisterns, and other landscapes features and practices that increase rainwater capture and create opportunities for infiltration and/or on-site storage are recommended.

16.70.130 MODEL HOMES

All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described this chapter.

- A. Signs shall be used to identify the model as an example of a water efficient landscape featuring elements, such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme.
- B. Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

16.70.140 ENVIRONMENTAL REVIEW

Projects subject to the Water Efficient Landscape chapter shall comply with the California Environmental Quality Act (CEQA), as appropriate.

16.70.150 PROVISIONS FOR EXISTING LANDSCAPES

This section shall apply to all existing landscapes that were installed before January 1, 2010, and are over one acre in size.

- A. Landscapes that have a water meter are subject to a City irrigation or appropriate water district audit of irrigation water use to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: $MAWA = (0.8)(ET_o)(LA)(0.62)$. Landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.
- B. Landscapes that do not have a water meter are subject to a City audit of irrigation water use to evaluate water use and provide recommendations, as necessary, in order to prevent water waste.

16.70.160 WATER-WASTE PREVENTION

- A. It shall be unlawful for any Responsible Party (as defined in Section 1.14.020 of the Redding Municipal Code) to willfully permit runoff to leave the target landscape area due to low-head drainage, overspray, or other similar conditions where water flows onto adjacent property, nonirrigated areas, walks, roadways, parking lots, or structures.
- B. Restrictions regarding overspray and runoff may be modified if either of the following occurs:
 - 1. The landscape area is adjacent to permeable surfacing and no runoff occurs.
 - 2. The adjacent nonpermeable surfaces are designed and constructed to drain entirely to landscape.

16.70.170 RESERVED

16.70.180 ENFORCEMENT

A violation of any portion of this chapter and of guidelines adopted pursuant to this chapter is subject to the provisions in Redding Municipal Code Chapter 1.13, *Administrative Citations*, in addition to other civil or administrative remedies.

Section 3. The passage of this ordinance is not a "project" according to the definition in the California Environmental Quality Act and, therefore, is not subject to the provisions requiring environmental review.

Section 4. This ordinance shall take effect 30 days after the date of its adoption, and the City Clerk shall certify to the adoption thereof and cause its publication according to law.

I HEREBY CERTIFY that the foregoing ordinance was introduced and read by the City Council at a regular meeting on the 5th day of January 2010 and was duly read and adopted at a regular meeting on the ___ day of _____ 2009 by the following vote:

AYES: COUNCIL MEMBERS:
NOES: COUNCIL MEMBERS:
ABSENT: COUNCIL MEMBERS:
ABSTAIN: COUNCIL MEMBERS:

PATRICK JONES, Mayor

ATTEST:

FORM APPROVED:

PAMELA MIZE, Deputy City Clerk

RICHARD A. DUVERNAY, City Attorney



LANDSCAPE DOCUMENTATION PACKAGE


REDDING
 CALIFORNIA
 City of Redding
 777 Cypress Avenue
 Redding CA 96001
 Telephone:
 (530) 225-4013
 FAX: (530) 225-4360

WATER EFFICIENCY APPLICATION FORM

Project Name			
Project Location			
Building Permit Number		Planning File Number	
Landscape Contractor			
Contractor's City License Number		Contractor's State License Number	
Landscape Architect			
Landscape Architect's City License Number		Landscape Architect's State License Number	
Irrigation Designer			
Irrigation Designer's City License Number		Irrigation Designer's Certification/State License Number	

**Included in this project submittal package are:
(Check to indicate completion)**

<input type="checkbox"/> Hydrozone Information Table (Section B1)	
<input type="checkbox"/> Hydrozone Map (Section B1)	
<input type="checkbox"/> Maximum Applied Water Allowance (Section B3)	gallons/year
<input type="checkbox"/> Maximum Applied Water Allowance (Section B3.b.) (If considering Effective Precipitation)	gallons/year
<input type="checkbox"/> Estimated Total Water Use (Section B4)	gallons/year
<input type="checkbox"/> Soil Management Report (from accredited soils lab)	
<input type="checkbox"/> Landscape Design Plan: (signature of authorized person required)	
<input type="checkbox"/> Plant Material	
<input type="checkbox"/> Water Features	
<input type="checkbox"/> Mulch and Amendments	
<input type="checkbox"/> Landscape Plan (signature of authorized person required)	
<input type="checkbox"/> Irrigation Design Plan (signature of authorized person required)	
<input type="checkbox"/> Irrigation System	
<input type="checkbox"/> Irrigation Design Plan Specifications	
<input type="checkbox"/> Grading Design Plan (signature of authorized person required)	

WATER EFFICIENCY APPLICATION - CERTIFICATIONS AND SIGNATURES

APPLICANT / REPRESENTATIVE - CERTIFICATION AND SIGNATURE

I have reviewed this application and the attached material. I agree to comply with the requirements of the Water Efficient Landscape Ordinance and submit a complete Landscape Documentation Package.

Signed _____

Date _____

PROPERTY OWNER / AUTHORIZED AGENT - CERTIFICATION AND SIGNATURE

I have read this application and consent to its filing. I agree to comply with the requirements of the Water Efficient Landscape Ordinance and submit a complete Landscape Documentation Package.

Signed _____

Date _____

LANDSCAPE PLAN - CERTIFICATION AND SIGNATURE

LICENSED LANDSCAPE ARCHITECT, LICENSED LANDSCAPE CONTRACTOR WHO IS A DESIGNER/BUILDER, OR ANY OTHER PERSON AUTHORIZED TO DESIGN A LANDSCAPE: *I complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the landscape design plan.*

Signed _____

Date _____

IRRIGATION PLAN - CERTIFICATION AND SIGNATURE

LICENSED LANDSCAPE ARCHITECT, CERTIFIED IRRIGATION DESIGNER, LICENSED LANDSCAPE CONTRACTOR WHO IS A DESIGNER/BUILDER, OR ANY OTHER PERSON AUTHORIZED TO DESIGN A LANDSCAPE: *I complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the irrigation design plan.*

Signed _____

Date _____

GRADING PLAN - CERTIFICATION AND SIGNATURE

Licensed Professional as authorized by law: *I complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the grading design plan.*

Signed _____

Date _____

SECTION B2. WATER BUDGET CALCULATION. A water budget calculation for the landscape project shall be provided adhering to the following:

- a. For the Calculation of the Maximum Applied Water Allowance and Estimated Total Water Use, the following ETo values shall apply:

Reference Evapotranspiration (ETo) Table												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
1.2	1.4	2.6	4.1	5.6	7.1	8.5	7.3	5.3	3.2	1.4	0.9	48.8

- b. The plant factor used shall be from the Water Use Classification of Landscape Species (WUCOLS) published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000, which are as follows:

- i. Low water use plants = 0 to 0.3
- ii. Moderate water use plants = 0.4 to 0.6
- iii. High water use plants= 0.7 to 1.0

- c. All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.
- d. All Special Landscape Areas, which include edible plants, areas irrigated with recycled water, water features using recycled water, and areas dedicated to active play, such as parks, sports fields, golf courses, and where turf provides a playing surface, shall be identified and their water use calculated; the ET Adjustment Factor (ETAF) for all Special Landscape Areas shall not exceed 1.0.

SECTION B3. MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

The project's Maximum Applied Water Allowance shall be calculated using the following formula:

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

Where: **MAWA** = Maximum Applied Water Allowance (gallons per year)

0.62 = Conversion Factor

0.7 = ET Adjustment Factor

LA = Landscape Area includes Special Landscape Area (square feet)

0.3 = Additional Water Allowance for SLA

SLA = Special Landscape Area (square feet)

ETo = Reference Evapotranspiration (inches per year). The ETo for Redding is 48.8.

The following example is given to show how the MAWA is calculated using a hypothetical project with 3,450 square feet of landscaped area (**LA**) and 1,325 square feet of special landscaped area (**SLA**).

$$\begin{aligned} \text{MAWA} &= (48.8 \text{ inches})(0.62) [(0.7 \times 3,450) + (0.3 \times 1,325)] = \\ &48.8 \times 0.62 = 30.256 \times [(2,415) + (397.5)] = 30.256 \times 2812.5 = \mathbf{85,095 \text{ gallons/year}} \end{aligned}$$

Project MAWA Calculation A designer **may** choose to include Effective Precipitation to calculate MAWA, however it **is not required**. (fill in only one Section below: If Effective Precipitation is **NOT** being considered fill in Section B3. a. If Effective Precipitation **IS** being considered, fill in Section B3. b.)

Total Landscape Area (including Special Landscape Area) (**LA**) = _____ square feet

Special Landscape Area (**SLA**) = _____ square feet

Section B3. a.

SHOW CALCULATION:

$$(48.8 \text{ inches})(0.62) [(0.7 \times \underline{\hspace{2cm}}) + (0.3 \times \underline{\hspace{2cm}})] = \underline{\hspace{2cm}}$$

(LA) (SLA)

$$30.256 \times [(\underline{\hspace{2cm}}) + (\underline{\hspace{2cm}})] = 30.256 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ gallons/year}$$

Section B3. b. EFFECTIVE PRECIPITATION (EPPT) If considering Effective Precipitation, use 25% of annual precipitation. Use the following equation to calculate Maximum Applied Water Allowance:

$$\text{MAWA} = (\text{ETo} - \text{Eppt})(0.62)[(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

SHOW CALCULATION:

$$(48.8 \text{ inches} - \underline{\hspace{2cm}})(0.62) [(0.7 \times \underline{\hspace{2cm}}) + (0.3 \times \underline{\hspace{2cm}})] = \underline{\hspace{2cm}}$$

(Eppt) (LA) (SLA)

$$(\underline{\hspace{2cm}})(0.62) = \underline{\hspace{2cm}} \times [(\underline{\hspace{2cm}}) + (\underline{\hspace{2cm}})] = \underline{\hspace{2cm}} \text{ gallons/year}$$

SECTION B3. ESTIMATED TOTAL WATER USE (ETWU)

The project's Estimated Total Water Use shall be calculated using the formula below. **The sum of the Estimated Total Water Use calculated for all hydrozones shall not exceed the project's MAWA. (ETWU < MAWA)**

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

- Where:
- ETWU** = Estimated Total Water Use per year (gallons)
 - ETo** = Reference Evapotranspiration (inches per year). The ETo for Redding is 48.8.
 - PF** = Plant Factor from WUCOLS
 - HA** = Hydrozone Area [high, medium, and low water use area] (square feet)
 - SLA** = Special Landscape Area (square feet)
 - 0.62** = Conversion Factor
 - IE** = Irrigation Efficiency (minimum 0.71)

The following example is given to show how the ETWU is calculated using a hypothetical project with 3,450 square feet of landscape area, 1,325 square feet of which is planted with edible plants. The edible plant area is considered a Special Landscape Area (SLA). The plant type, plant factor, and hydrozone area are shown in the table below.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)*	Hydrozone Area (HA) (square feet)	PF x HA (square feet)
1	High	0.8	300	240
2	High	0.7	200	140
3	Medium	0.5	325	162.5
4	Low	0.3	600	180
5	Low	0.2	700	140
			Sum	862.5
6	SLA	1.0	1,325	1,325
		TOTAL	3,450	

$$\begin{aligned}
 ETWU &= (48.8)(0.62) \left(\frac{862.5}{0.71} + 1,325 \right) \\
 &= (30.26) (1,214.79 + 1,325) \\
 &= \mathbf{76,854 \text{ gallons per year}}
 \end{aligned}$$

Compare ETWU with MAWA - (Remember: the project's ETWU shall not exceed the project's MAWA):

For this example: MAWA = (48.8)(0.62)[(0.7 x 3,450) + (0.3 x 1,325)] = 85,095 gallons per year

76,854 gallons per year < 85,095 gallons per year
 (ETWU) (MAWA)

In this example, the water budget complies with the MAWA. **(ETWU < MAWA)**

