City of Villa Park

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December 8, 2009

Mr. Simon Eching
California Department of Water Resource
Water Use and Efficiency Branch
Post Office Box 942836
Sacramento, California 94236-0001

Re: Submittal of adopted water efficient landscape ordinance

Dear Mr. Eching:

At its meeting on November 17, 2009, the City Council of the City of Villa Park approved the second reading and adopted Ordinance No. 2009-547, adding Chapter 24 to the Villa Park Municipal Code regarding the adoption of a water efficient landscape ordinance. Enclosed is copy of this Ordinance for your review.

As you are aware, in 2006, Governor Schwarzenegger signed Assembly Bill 1881 (Laird, Water Conservation) amending the Water Conservation in the Landscape Act (Act). The bill required two new things: 1) DWR is to update the original Model Water Efficient Landscape Ordinance; and 2) cities and counties are to update local Landscape Ordinances by January 1, 2010 so that they are "at least as effective as" DWR's updated Model Ordinance.

In response to the new landscape water efficiency requirements, a stakeholder group was formed under the leadership of the Municipal Water District of Orange County and the Orange County Division of the League of California Cities. The stakeholder group included representatives from the county, cities, local water agencies, Building Industries Association, Orange County Fire Authority, irrigation consultants, landscape architects, and other green industry professionals. The stakeholder group developed a locally-crafted Orange County Model Water Efficient Landscape Ordinance (OC Model Ordinance) that will meet the "at least as effective as" requirement of state law. City of Villa Park Ordinance No. 2009-547 is consistent with the OC Model Ordinance.

Additionally attached, you will find a document identifying the significant differences between the OC Model Ordinance and the State Model Ordinance, and providing justification for how the OC Model Ordinance is "at least as effective" as the State's Model Ordinance.

Please feel free to contact me at (714) 998- 1500 should you have any questions.

Sincerely,
THE CITY OF VILLA PARK

Jarad Hildenbrand
Assistant City Manager / City Clerk

Enclosures

W. BILL MAC ALONEY, Mayor • W. RICHARD ULMER, Mayor Pro Tem
DEBORAH PAULY, Councilmember • BRAD REESE, Councilmember • JIM RHEINS, Councilmember

ORDINANCE NO. 2009-547

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF VILLA PARK ADDING CHAPTER 24 TO THE VILLA PARK MUNICIPAL CODE REGARDING THE ADOPTION OF A WATER EFFICIENT LANDSCAPE ORDINANCE

BE IT ORDAINED, by the City Council of the City of Villa Park, as follows:

Section 1. That Chapter 24, of the Villa Park Municipal Code is hereby added, to read as follows:

1. Purpose

(a) The State Legislature has found that:

(1) the waters of the State are of limited supply and are subject to ever increasing demands;

(2) the continuation of California's economic prosperity is dependent on the availability of adequate supplies of water for future uses;

(3) it is the policy of the State to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;

(4) landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development;

(5) landscape design, installation, maintenance, and management can and should be water efficient; and

(6) Article X, Section 2 of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served, and the right does not and shall not extend to waste or unreasonable method of use of water.

(b) The City hereby finds that:

(1) Orange County has an established, large *reclaimed water* infrastructure system;

(2) Allocation-based and tiered water rate structures allow public agencies to document water use in landscapes;

(3) Incentive-based water use efficiency programs have been actively implemented within Orange County since before 1991;

(4) current local design practices in new landscapes typically achieve the State Model Water Efficient Landscape Ordinance water use goals;

(5) all water services within the City are metered;

(6) Orange County is a leader in researching and promoting the use of *smart automatic irrigation controllers* with more than 4,500 installations as of June 2009;

(7) all new *irrigation controllers* sold after 2012 within Orange County will be *smart controllers*;

(8) landscape plan submittal and review has been a long standing practice for new development in the City of Villa Park;

(9) the average rainfall in Orange County is approximately 12 inches per year; and

(10) Serrano Water District, as the *local water purveyor*, is implementing enforcement of water waste prohibitions for all existing metered *landscaped areas* within its jurisdiction.

(c) Consistent with these findings, the purpose of the City's Water Efficient Landscape Ordinance is to establish an alternative model acceptable under AB 1881 as being at least as effective as the State Model Water Efficient Landscape Ordinance in the context of conditions in the City in order to:

(1) promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;

(2) promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;

(3) establish a structure for planning, designing, installing, and maintaining and managing water efficient landscapes in *new construction* and rehabilitated projects;

(4) establish provisions for water management practices and water waste prevention for existing landscapes;

(5) use water efficiently without waste by setting a *Maximum Applied Water Allowance* as an upper limit for water use and reduce water use to the lowest practical amount; and

(6) encourage the use of economic incentives that promote the efficient use of water, such as implementing a *budget-based tiered-rate structure*.

1.1 Applicability

(a) Beginning January 1, 2010, all planting, irrigation, and landscape-related improvements required by this Water Efficient Landscape Ordinance shall apply to the following *landscape projects*:

(1) New landscape installations or landscape rehabilitation projects by public agencies or private non-residential developers with a *landscaped area*, including pools or other *water features* but excluding hardscape, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial *permit* for a landscape or *water feature*;

(2) New landscape installations or landscape rehabilitation projects by developers of single-family residential projects with a landscaped area, including pools or other *water features* but excluding *hardscape*, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial *permit* for a landscape or *water feature*;

(3) New landscape installation projects by individual homeowners on residential lots with a total project landscaped area, including pools or other *water features* but excluding *hardscape*, equal to or greater than 5,000 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial *permit* for a landscape or *water feature*;

(b) Section 3(b) of the *Landscape Water Use Standards* of this Water Efficient Landscape Ordinance shall apply to:

(1) all *landscaped areas*, whether installed prior to or after January 1, 2010; and

(2) all *landscaped areas* installed after January 1, 2010 to which Section 1.1(a) is applicable.

(c) This Water Efficient Landscape Ordinance does not apply to:

(1) registered local, state, or federal historical sites;

(2) *ecological restoration projects* that do not require a permanent irrigation system; or

(3) *mined-land reclamation projects* that do not require a permanent irrigation system.

2. Implementation Procedures

(a) Prior to installation, a *Landscape Documentation Package* shall be submitted to the City for review and approval of all *landscape projects* subject to the provisions of this Water Efficient Landscape Ordinance. Any *Landscape Documentation Package* submitted to the City shall comply with the provisions of the *Guidelines*.

(b) The *Landscape Documentation Package* shall include a certification by a professional appropriately licensed in the State of California stating that the landscape design and water use calculations have been prepared by or under the supervision of the licensed professional and are certified to be in compliance with the provisions of this Water Efficient Landscape Ordinance and the *Guidelines*.

(1) Landscape and irrigation plans shall be submitted to the City for review and approval with appropriate water use calculations. Water use calculations shall be consistent with calculations contained in the *Guidelines* and shall be provided to the *local water purveyor,* as appropriate, under procedures determined by the City.

(2) Verification of compliance of the landscape installation with the approved plans shall be obtained through a *Certification of Completion* in conjunction with a Certificate of Use and Occupancy or Permit Final process, as provided in the *Guidelines*.

3. Landscape Water Use Standards

(a) For applicable landscape installation or rehabilitation projects subject to Section 1.1(a) of this Water Efficient Landscape Ordinance, the *Estimated Applied Water Use* allowed for the *landscaped area* shall not exceed the *MAWA* calculated using an *ET adjustment factor* of 0.7, except for *special landscaped areas* where the *MAWA* is calculated using an *ET adjustment factor* of 1.0; or the design of the *landscaped area* shall otherwise be shown to be equivalently water-efficient in a manner acceptable to the City; as provided in the *Guidelines*.

(b) Irrigation of all *landscaped areas* shall be conducted in a manner conforming to the rules and requirements, and shall be subject to penalties and incentives for water conservation and water waste prevention as determined and implemented by the *local water purveyor* or as mutually agreed by *local water purveyor* and the local agency.

4. Delegation.

The City may delegate to, or into a contract with, a *local agency* to implement, administer, and/or enforce any of the provisions of the Water Efficient Landscape Ordinance on behalf of the City.

5. Definitions.

The following definitions are applicable to this chapter:

"*Applied water*" means the portion of water supplied by the irrigation system to the landscape.

"*Budget-based tiered-rate structure*" means tiered or block rates for irrigation accounts charged by the retail water agency in which the block definition for each customer is derived from lot size or irrigated area and the evapotranspiration requirements of landscaping.

"*Ecological restoration project*" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

"*Estimated Applied Water Use*" means the average annual total amount of water estimated to be necessary to keep plants in a healthy state, calculated as provided in the *Guidelines*. It is based on the *reference evapotranspiration* rate, the size of the landscape area, *plant water use factors*, and the relative *irrigation efficiency* of the irrigation system.

"*ET adjustment factor*" or "*ETAF*" is equal to the *plant factor* divided by the *irrigation efficiency factor* for a *landscape project*, as described in the *Guidelines*. The *ETAF* is calculated in the context of local *reference evapotranspiration*, using site-specific *plant factors* and *irrigation efficiency factors* that influence the amount of water that needs to be applied to the specific *landscaped area*.

A combined plant mix with a site-wide average *plant factor* of 0.5 (indicating a moderate water need) and average *irrigation efficiency* of 0.71 produces an *ET adjustment factor* of (0.7) = (0.5/0.71), which is the standard of water use efficiency generally required by this Water Efficient Landscape Ordinance and the *Guidelines,* except that the *ETAF* for a *special landscape area* shall not exceed 1.0.

"*Guidelines*" refers to the Guidelines for Implementation of the Water Efficient Landscape Ordinance, as adopted by the City, which describes procedures, calculations, and requirements for *landscape projects* subject to this Water Efficient Landscape Ordinance.

"*Hardscapes*" means any durable material or feature (*pervious* and *non-pervious*) installed in or around a *landscaped area*, such as pavements or walls. Pools and other *water features* are considered part of the *landscaped area* and not considered *hardscapes* for purposes of this Water Efficient Landscape Ordinance.

"*Homeowner installed landscape*" means any landscaping 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 ordinance, is a person who occupies the dwelling he or she owns. This definition excludes speculative homes, which are not owner-occupied dwellings and which are subject under this ordinance to the requirements applicable to developer-installed residential landscape projects.

"*Irrigation efficiency*" means 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 Water Efficient Landscape Ordinance is 0.71. Greater *irrigation efficiency* can be expected from well designed and maintained systems.

"*Landscaped area*" means all the planting areas, *turf* areas, and *water features* in a landscape design plan subject to the *Maximum Applied Water Allowance* and *Estimated Applied Water Use* calculations. The *landscaped area* does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other *pervious* or *non-pervious hardscapes*, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

"L*andscape contractor*" means a person licensed by the State of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

"*Landscape Documentation Package*" means the documents required to be provided to the City for review and approval of landscape design projects, as described in the *Guidelines*.

"*Landscape project*" means total area of landscape in a project, as provided in the definition of "*landscaped area,*" meeting the requirements under Section 1.1 of this Water Efficient Landscape Ordinance.

"*Local agency*" means a city or county, including a charter city or charter county, that is authorized by the City to implement, administer, and/or enforce any of the provisions of the Water Efficient Landscape Ordinance on behalf of the City. The *local agency* may be responsible for the enforcement or delegation of enforcement of this Water Efficient Landscape Ordinance including, but not limited to, design review, plan check, issuance of *permits,* and inspection of a *landscape project*.

"*Local water purveyor*" means any entity, including a public agency, city, county, or private water company that provides retail water service.

"*Maximum Applied Water Allowance*" or "*MAWA*" means the upper limit of annual *applied water* for the *established landscaped area* as specified in Section 2.2 of the *Guidelines*. It is based upon the area's *reference evapotranspiration*, the *ET Adjustment Factor*, and the size of the *landscaped area*. The *Estimated Applied Water Use* shall not exceed the *Maximum Applied Water Allowance*.

"*Mined-land reclamation projects*" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

"*New construction*" means, for the purposes of this Water Efficient Landscape Ordinance, a new building with a landscape or other new landscape such as a park, playground, or greenbelt without an associated building.

"*Non-pervious*" means any surface or natural material that does not allow for the passage of water through the material and into the underlying soil.

"*Pervious*" means any surface or material that allows the passage of water through the material and into the underlying soil.

"*Permit*" means an authorizing document issued by local agencies for *new construction* or *rehabilitated landscape*.

"*Plant factor*" or "*plant water use factor*" is a factor, when multiplied by *ETo*, that estimates the amount of water needed by plants. For purposes of this Water Efficient Landscape Ordinance, 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 this Water Efficient Landscape Ordinance are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species."

"*Recycled water*" or "*reclaimed water*" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and *water features*. This water is not intended for human consumption.

"*Reference evapotranspiration*" or "*ETo*" means a standard measurement of environmental parameters which affect the water use of plants. *ETo* is given expressed in inches per day, month, or year as represented in Appendix A of the *Guidelines*, and is an estimate of the evapotranspiration of a large field of four-to seven-inch tall, cool-season grass that is well watered. *Reference evapotranspiration* is used as the basis of determining the *Maximum Applied Water Allowance*s.

"*Rehabilitated landscape*" means any re-landscaping project that meets the applicability criteria of Section 1.1(a), where the modified landscape area is greater than 2,500 square feet, is 50% of the total landscape area, and the modifications are planned to occur within one year.

"*Smart automatic irrigation controller*" means an automatic timing device used to remotely control *valves* that operate an irrigation system and which schedules irrigation events using either evapotranspiration (weather-based) or soil moisture data.

"*Special landscape area*" means an area of the landscape dedicated solely to edible plants such as orchards and vegetable gardens, 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.

"*Turf*" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

"*Valve*" means a device used to control the flow of water in an irrigation system.

"*Water feature*" means 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 *landscaped area*. Constructed wetlands used for on-site wastewater treatment, habitat protection or

storm water best management practices that are not irrigated and used solely for water treatment or storm water retention are not *water features* and, therefore, are not subject to the water budget calculation.

6. Exemption from California Environmental Quality Act.

The City Council hereby determines that this Ordinance is exempt from review under the California Environmental Quality Act ("CEQA") (California Public Resources Code Section 21000 et seq.), because pursuant to State CEQA Regulation 15307 (14 Cal. Code Regs., § 15307), this Ordinance is covered by the CEQA Categorical Exemption for actions taken to assure the maintenance, restoration, enhancement, or protection of a natural resource where the regulatory process involves procedures for protection of the environment. The adoption of this Ordinance will result in the enhancement and protection of water resources in the City, and will not result in cumulative adverse environment impacts. It is therefore exempt from the provisions of CEQA. The City Council hereby directs the City Manager or designee to prepare and file a Notice of Exemption as soon as possible following adoption of this Ordinance.

7. Severability.

The provisions of this Ordinance are severable, and the invalidity of any section, paragraph, phrase, clause, or part of this Ordinance shall not affect the validity or effectiveness of the remainder of this Ordinance.

8. Effective Date

This Ordinance shall become effective thirty (30) days after its adoption in accordance with the provisions of California law.

9. City Clerk Certification

The City Clerk shall certify to the passage of this Ordinance and cause the same or a summary thereof to be published within fifteen (15) days after adoption in a newspaper of general circulation, printed and published in Villa Park, California.

PASSED AND ADOPTED by the City Council of the City of Villa Park at an adjourned regular meeting on the 17th day of November, 2009.

W. Bill MacAlonely, Mayor
City of Villa Park

ATTEST:

Jarad L. Hildenbrand, City Clerk
City of Villa Park

STATE OF CALIFORNIA
COUNTY OF ORANGE } SS
CITY OF VILLA PARK

I, JARAD L. HILDENBRAND, City Clerk of the City of Villa Park **DO HEREBY CERTIFY** that the foregoing Resolution was adopted at an adjourned regular meeting of the City Council of the City of Villa Park held on the 17th day of November, 2009, and was carried by the following roll call vote, to wit:

AYES:	COUNCILMEMBERS:	ULMER, REESE, PAULY, RHEINS, MACALONEY
NOES:	COUNCILMEMBERS:	NONE
ABSENT:	COUNCILMEMBERS:	NONE
ABSTAIN:	COUNCILMEMBERS:	NONE

Jarad L. Hildenbrand, City Clerk
City of Villa Park

GUIDELINES

FOR IMPLEMENTATION OF THE CITY OF VILLA PARK WATER EFFICIENT LANDSCAPE ORDINANCE

Adopted at the October 27, 2009 City Council Meeting

TABLE OF CONTENTS

Section **Page No.**

1. Purpose and Applicability 1
1.1 Purpose 1
1.2 Applicability 2
2. Submittal Requirements for New Landscape Installations or Landscape Rehabilitation Projects 3
2.1 Elements of the Landscape Documentation Package 3
2.2 Water Efficient Landscape Calculations and Alternatives 4
2.3 Soil Management Report 6
2.4 Landscape Design Plan 7
2.5 Irrigation Design Plan 10
2.6 Grading Design Plan 14
2.7 Certification of Completion 15
2.8 Post-Installation Irrigation Scheduling 16
2.9 Post-Installation Landscape and Irrigation Maintenance 16
3. Provisions for Existing Landscapes 16

Appendix A – Example Certification of Design A-1
Appendix B – Water Efficient Landscape Worksheet B-1
Appendix C – Reference Evapotranspiration (ETo) Table C-1
Appendix D – Example Installation Certificate of Completion D-1
Appendix E - Definitions E-1

1. Purpose and Applicability

1.1 Purpose

(a) The primary purpose of these Guidelines is to provide procedural and design guidance for *project applicants* proposing landscape installation or rehabilitation projects that are subject to the requirements of the *Water Efficient Landscape Ordinance*. This document is also intended for use and reference by City staff in reviewing and approving designs and verifying compliance with the *Water Efficient Landscape Ordinance*. The general purpose of the *Water Efficient Landscape Ordinance* is to promote the design, installation, and maintenance of landscaping in a manner that conserves regional water resources by ensuring that landscaping projects are not unduly water-needy and that irrigation systems are appropriately implemented to minimize water waste.

(b) Other regulations affecting landscape design and maintenance practices are potentially applicable and should be consulted for additional requirements. These regulations include but may not be limited to:

(1) State of California Assembly Bill 1881;

(2) National Pollutant Discharge Elimination Permit for the Municipal Separate Storm Sewer System;

(3) Orange County Fire Authority Regulations for Fuel Modification in the Landscape;

(4) Water Conservation and Drought Response Regulations of the Local Water Purveyor;

(5) Regulations of the Local Water Purveyor governing use of Recycled Water;

(6) Zoning Code;

(7) Building Code;

(8) Specific Plans, Master Plans, General Plan, or similar land use and planning documents; and

(9) Conditions of approval for a specific project

1.2 Applicability

(a) The Water Efficient Landscape Ordinance and these Guidelines apply to all of the following landscape projects:

(1) New landscape installations or landscape rehabilitation projects by public agencies or private non-residential developers with a landscaped area, including pools or other water features but excluding hardscape, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan or which otherwise require a ministerial permit for a landscape or water feature.

(2) New landscape installations or landscape rehabilitation projects by developers or property managers of single-family and multi-family residential projects or complexes with a landscaped area, including pools or other water features but excluding hardscape, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan or which otherwise require a ministerial permit for a landscape or water feature

(3) New landscape installation projects by individual homeowners on single-family or multi-family residential lots with a project landscaped area, including pools or other water features but excluding hardscape, equal to or greater than 5,000 square feet, and which are otherwise subject to a discretionary approval of a landscape plan or which otherwise require a ministerial permit for a landscape or water feature.

(b) A landscape rehabilitation project is subject to the requirements of the Ordinance and these Guidelines where (i) the modified landscaped area is greater than 2,500 square feet and represents at least 50% of the total landscaped area; and (ii) the modifications are planned to occur within one year. The requirements of the Guidelines may be partially or wholly waived, at the discretion of the city or its designee, for landscape rehabilitation projects that are limited to replacement plantings with equal or lower water needs and where the irrigation system is found to be designed, operable and programmed consistent with minimizing water waste in accordance with local water purveyor regulations.

(c) Unless otherwise determined by the *City*, the Water Efficient Landscape Ordinance and these Guidelines do not apply to:

(1) registered local, state, or federal historical sites;

(2) ecological restoration projects that do not require a permanent irrigation system; or

(3) mined-land reclamation projects that do not require a permanent irrigation system.

2. Submittal Requirements for New Landscape Installations or Landscape Rehabilitation Projects

(a) Discretionary approval is typically required for landscape projects that are subject to site plan reviews, or where a variance from a local building code is requested, or other procedural processes apply such that standard or special conditions of approval may be required by the City. Discretionary projects with conditions of approval may be approved administratively by city staff, or acted on formally by the City Council, or other jurisdictional authority. A typical standard condition of approval reads:

> *"Landscaping for the project shall be designed to comply with the City's Water Efficient Landscape Ordinance and with the Guidelines for Implementation of the Water Efficient Landscape Ordinance."*

Landscape or water features that typically require a ministerial permit (i.e., a building, plumbing, electrical, or other similar permit), thereby triggering compliance with the Water Efficient Landscape Ordinance requirements independently of the need for discretionary approval include, but are not limited to, swimming pools, fountains or ponds, retaining walls, and overhead trellises.

2.1 Elements of the Landscape Documentation Package

(a) A *Landscape Documentation Package* is required to be submitted by the *project applicant* for review and approval prior to the issuance of ministerial permits for landscape or water features by the City, and prior to start of construction. Unless otherwise directed by the City, the *Landscape Documentation Package* shall include the following elements either on plan sheets or supplemental pages as directed by the City:

(1) Project Information, including, but not limited to, the following:

(a) date;

(b) project name;

(c) project address, parcel, and/or lot number(s);

(d) total landscaped area (square feet) and rehabilitated landscaped area (if applicable);

(e) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed);

(f) water supply type (e.g., potable, recycled, or well) and identification of the local retail water purveyor if the *project applicant* is not served by a private well;

(g) checklist or index of all documents in the *Landscape Documentation Package*;

(h) project contacts, including contact information for the *project applicant* and *property owner*;

(i) a *Certification of Design* in accordance with **Exhibit A** of these *Guidelines* that includes a *landscape professional's* professional stamp, as applicable, signature, contact information (including email and telephone number), license number, and date, certifying the statement that "The design of this project complies with the requirements of the City's *Water Efficient Landscape Ordinance*" and shall bear the signature of the *landscape professional* as required by law; and

(j) any other information the City deems relevant for determining whether the landscape project complies with the *Water Efficient Landscape Ordinance* and these *Guidelines*.

(2) *Maximum Applied Water Allowance* (*MAWA*) and *Estimated Applied Water Use* (*EAWU*) expressed as annual totals including, but not limited to, the following:

(a) a *Water Efficient Landscape Worksheet* (optional at discretion of the City) for the landscape project;

(b) *hydrozone* information table (optional at the discretion of the City) for the landscape project; and

(c) water budget calculations (optional at the discretion of the City) for the landscape project.

(3) A soil management report or specifications, or specification provision requiring soil testing and amendment recommendations and implementation to be accomplished during construction of the landscape project.

(4) A landscape design plan for the landscape project.

(5) An irrigation design plan for the landscape project.

(6) A grading design plan, unless grading information is included in the landscape design plan for the landscape project or unless the landscape project is limited to replacement planting and/or irrigation to rehabilitate an existing landscaped area.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.2 Water Efficient Landscape Calculations and Alternatives

(a) The *project applicant* shall provide the calculated *Maximum Applied Water Allowance (MAWA)* and *Estimated Applied Water Use (EAWU)* for the *landscaped area* as part of the *Landscape Documentation Package* submittal to the City. The *MAWA* and *EAWU* shall be calculated based on completing the *Water Efficient Landscape Worksheets* (in accordance with the sample worksheets in **Appendix B**).

(b) The *EAWU* allowable for the *landscaped area* shall not exceed the *MAWA*. The *MAWA* shall be calculated using an *evapotranspiration adjustment factor* (*ETAF*) of 0.7 except for the portion of the *MAWA* applicable to any *special landscaped areas* within the landscape project, which shall be calculated using an *ETAF* of 1.0. Where the design of the *landscaped area* can otherwise be shown to be equivalently water-efficient, the *project applicant* may submit alternative or abbreviated information supporting the demonstration that the annual *EAWU* is less than the *MAWA*, at the discretion of and for the review and approval of the local agency.

(c) Water budget calculations shall adhere to the following requirements:

(1) The *MAWA* shall be calculated using the *Water Efficient Landscape Worksheets* and equation presented in **Appendix B** on page B-1. The example calculation on page B-1 is a hypothetical example to demonstrate proper use of the equation.

(2) The *EAWU* shall be calculated using the *Water Efficient Landscape Worksheets* and equation presented in Appendix B on page B-2. The example calculation on page B-2 is a hypothetical example.

(3) For the calculation of the *MAWA* and *EAWU*, a *project applicant* shall use the *ETo* values from the closest location listed the Reference Evapotranspiration Table in **Appendix C**. For geographic areas not covered in **Appendix C**, data from other cities located nearby in the same reference evapotranspiration zone may be used, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999.

(4) For calculation of the *EAWU*, the *plant water use factor* shall be determined as appropriate to the project location from the *Water Use Efficiency of Landscape Species* (*WUCOLS*) Species Evaluation List. The *plant factor* is 0.1 for very low water use plants, 0.2 to 0.3 for low water use plants, 0.4 to 0.6 for moderate water use plants, and 0.7 to 1.0 for high water use plants.

(5) For calculating the *EAWU*, the plant water use factor shall be determined for each valve *hydrozone* based on the highest-water-use plant species within the zone. The *plant factor* for each hydrozone may be required to be further refined as a "landscape coefficient," according to protocols defined in detail in the *WUCOLS* document, to reflect planting density and microclimate effects on water need at the option of the *project applicant* or the *City*.

(6) For calculation of the *EAWU*, the area of a water feature shall be defined as a high water use hydrozone with a *plant factor* of 1.0.

(7) For calculation of the *EAWU*, a temporarily irrigated hydrozone area, such as an area of highly drought-tolerant native plants that are not intended to be irrigated after they are fully established, shall be defined as a very low water use hydrozone with a *plant factor* of 0.1.

(8) For calculation of the *MAWA*, the *ETAF* for *special landscaped areas* shall be set at 1.0. For calculation of the *EAWU*, the *ETAF* for *special landscaped areas* shall be calculated as the *special landscaped area* (*SLA*) *plant factor* divided by the *SLA irrigation efficiency factor*.

(9) *Irrigation efficiency* shall be calculated using the worksheet and equation presented in **Appendix B** on page B-2.

(d) The *Maximum Applied Water Allowance* shall adhere to the following requirements:

(1) The *Maximum Applied Water Allowance* shall be calculated using the equation presented in **Appendix B**. The example calculation in **Appendix B** is hypothetical to demonstrate proper use of the equation and does not represent an existing and/or planned landscape project. The *reference evapotranspiration* (*ETo*) values used in this calculation are from the *Reference Evapotranspiration* Table in **Appendix C** and are for planning purposes only. For actual irrigation scheduling, automatic irrigation controllers are required and shall use current *ETo* data, such as from the California Irrigation Management Information System (CIMIS), other equivalent data, or soil moisture sensor data.

2.3 Soil Management Report

(a) In order to reduce *runoff* and encourage healthy plant growth, a soil management report shall be completed by the *project applicant*, or his/her designee, as follows:

(1) Submit soil samples to a certified agronomic soils laboratory for analysis and recommendations.

(a) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

(b) The soil analysis may include, but is not limited to:

1. soil texture;

2. infiltration rate determined by laboratory test or soil texture infiltration rate table;

3. pH;

4. total soluble salts;

5. sodium;

6. percent organic matter; and

7. recommendations.

(2) The *project applicant*, or his/her designee, shall comply with one of the following:

(a) if significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or

(b) If significant mass grading is planned, the soil analysis report shall be submitted to the *City* as part of the *Certification of Completion*.

(c) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans in order to make any necessary adjustments to the design plans.

(d) The *project applicant*, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with the Certification of Completion.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.4 Landscape Design Plan

(a) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. At the landscape design plan meeting, the

following design criteria shall be submitted as part of the *Landscape Documentation Package*.

(1) Plant Material

(a) Any plant may be selected for the *landscaped area* provided the *EAWU* in the *landscaped area* does not exceed the *MAWA*. To encourage the efficient use of water, the following is highly recommended:

1. protection and preservation of non-invasive *water-conserving plant species* and *water-conserving turf*;
2. selection of *water-conserving plant species* and *water-conserving turf*;
3. selection of plants based on disease and pest resistance;
4. selection of trees based on applicable City and local tree ordinances or tree shading guidelines; and
5. 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 2.5(a)(2)(D) of these *Guidelines*.

(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 for inclusion in the landscape design plan:

(1) 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;

(2) 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, and power lines); and

(3) consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(d) *Turf* is discouraged on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% 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 and fuel modification zones shall comply with requirements of the local Fire Authority, where applicable. When conflicts between water conservation and fire safety design elements exist, the fire safety requirements shall have priority.

(f) The use of *invasive plant species* and/or *noxious plant species* is strongly discouraged.

(g) The architectural guidelines of a *common interest development*, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of *water efficient plant species* as a group.

(1) Water Features

(a) Recirculating water systems shall be used for water features.

(b) Where available and consistent with public health guidelines, recycled water shall be used as a source for decorative water features.

(c) The 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.

(2) *Mulch* and Amendments

(a) A minimum two inch (2″) 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.

(b) Stabilizing mulching products shall be used on slopes.

(c) The mulching portion of the seed/*mulch* slurry in hydro-seeded applications shall meet the mulching requirement.

(d) Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 2.3 of these *Guidelines*).

(h) The landscape design plan, at a minimum, shall:

(1) delineate and label each *hydrozone* by number, letter, or other method;

(2) identify each *hydrozone* as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the *landscaped area* shall be included in the low water use *hydrozone* for the water budget calculation;

(3) identify recreational areas;

(4) identify areas permanently and solely dedicated to edible plants;

(5) identify areas irrigated with recycled water;

(6) identify type of *mulch* and application depth;

(7) identify soil amendments, type, and quantity;

(8) identify type and surface area of water features;

(9) identify *hardscapes* (*pervious* and *non-pervious*);

(10) identify location and installation details of any applicable storm water best management practices that encourage on-site retention and infiltration of storm water. Storm water best management practices are encouraged in the landscape design plan and examples include, but are not limited to:

(a) infiltration beds, swales, and basins that allow water to collect and soak into the ground;

(b) constructed wetlands and retention ponds that retain water, handle excess flow, and filter pollutants; and

(c) *pervious* or porous surfaces (e.g., permeable pavers or blocks, *pervious* or porous concrete, etc.) that minimize *runoff*.

(11) identify any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);

(12) contain the following statement: "I have complied with the criteria of the *Water Efficient Landscape Ordinance* and applied them for the efficient use of water in the landscape design plan;" and

(13) bear the signature of a California-licensed *landscape professional*.

[Note: Authority Cited: Section 65595, Reference: Section 65596, Government Code and Section 1351, Civil Code.]

2.5 Irrigation Design Plan

(a) 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) System

(a) Dedicated landscape water meters are highly recommended on *landscaped areas* smaller than 5,000 square feet to facilitate water management.

(b) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data 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.

1. 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 shall be installed to meet the required dynamic pressure of the irrigation system.

2. *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, freeze, 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 of the water supply to minimize water loss in case of an emergency (such as a *main line* break) or routine repair.

(f) *Backflow prevention devices* shall be required to protect the water supply from contamination by the irrigation system. A *project applicant* shall refer to the applicable City code (i.e., public health) for additional backflow prevention requirements.

(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 non-targeted areas, such as adjacent property, non-irrigated 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) Average irrigation efficiency for the project shall be determined in accordance with the EAWU calculation sheet in **Appendix B**. Unless otherwise indicated by the irrigation equipment manufacturer's specifications or demonstrated by the *project applicant*, the *irrigation efficiency* of the irrigation heads used within each hydrozone shall be assumed to be:

Pop-up stream rotator heads = 75%
Stream rotor heads = 75%
Microspray = 75%
Bubbler = 80%
Drip emitter = 85%
Subsurface irrigation = 90%

(l) It is highly recommended that the *project applicant* or local agency inquire with the local water purveyor 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 eight (8) feet in width in any direction shall be irrigated with subsurface irrigation or a *low volume irrigation* system.

(s) *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:

1. the *landscaped area* is adjacent to permeable surfacing and no *runoff* occurs; or

2. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or

3. the irrigation designer for the landscape project specifies an alternative design or technology, as part of the *Landscape Documentation Package,* and clearly demonstrates strict adherence to the irrigation system design criteria in Section 2.5 (a)(1)(H) hereof. Prevention of overspray and runoff must be confirmed during an irrigation audit.

4. 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 of the landscape project specifies an alternative design or technology, as part of the *Landscape Documentation Package*, and clearly demonstrates no *runoff* or erosion will occur. Prevention of *runoff* and erosion must be confirmed during the *irrigation audit.*

(2) Hydrozone

(a) Each *valve* shall irrigate a *hydrozone* with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(b) *Sprinkler heads* and other emission devices shall be selected based on what is appropriate for the plant type within that *hydrozone.*

(c) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and *turf.*

(d) Individual *hydrozones* that mix plants of moderate and low water use or moderate and high water use may be allowed if:

1. the *plant factor* calculation is based on the proportions of the respective plant water uses and their respective *plant factors*; or

2. the *plant factor* of the higher water using plant is used for the calculations.

(e) Individual *hydrozones* that mix high and low water use plants shall not be permitted.

(f) 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, designate the areas irrigated by each *valve* and assign a number to each *valve*.

(g) The irrigation design plan, at a minimum, shall contain:

1. the location and size of separate water meters for landscape;

2. the 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*;

3. *static water pressure* at the point of connection to the public water supply;

4. *flow rate* (gallons per minute), application rate (inches per hour), and design *operating pressure* (pressure per square inch) for each *station*;

5. irrigation schedule parameters necessary to program smart timers specified in the landscape design;

6. the following statement: "I have complied with the criteria of the *Water Efficient Landscape Ordinance* and applied them accordingly for the efficient use of water in the irrigation design plan;" and

7. the signature of a California-licensed *landscape professional.*

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.6 Grading Design Plan

(a) For the efficient use of water, grading of a landscape project site shall be designed to minimize soil erosion, *runoff,* and water waste. Finished grading configuration of the *landscaped area*, including pads, slopes, drainage, post-construction erosion control, and storm water control Best Management Practices, as applicable, shall be shown on the Landscape Plan unless this information is fully included in separate Grading Plans for the project, or unless the project is limited to replacement planting and/or irrigation to rehabilitate an existing *landscaped area.*

(b) The *project applicant* shall submit a landscape grading plan that indicates finished configurations and elevations of the *landscaped area* including:

(1) height of graded slopes;

(2) drainage patterns;

(3) pad elevations;

(4) finish grade; and

(5) storm water retention improvements, if applicable.

(c) To prevent excessive erosion and *runoff*, it is highly recommended that the *project applicant*:

(1) grade so that all irrigation and normal rainfall remains within property lines and does not drain on to non-permeable *hardscapes*;

(2) avoid disruption of natural drainage patterns and undisturbed soil; and

(3) avoid soil compaction in *landscaped areas.*

(d) The Grading Design 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 the *landscape professional,* as required by law.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.7 Certification of Completion

(a) Landscape project installation shall not proceed until the *Landscape Documentation Package* has been approved by the City and any ministerial permits required are issued.

(b) The *project applicant* shall notify the City at the beginning of the installation work and at intervals, as necessary, for the duration of the landscape project work to schedule all required inspections.

(c) *Certification of Completion* of the landscape project shall be obtained through a Certificate of Use and Occupancy or a *Permit* Final. The requirements for the Final Inspection and *Permit* Closure include submittal of:

(1) *A Landscape Installation Certificate of Completion* in the form included as **Appendix D** of these *Guidelines*, which shall include: (i) certification by a *landscape professional* that the *landscape project* has been installed per the approved *Landscape Documentation Package*; and (ii) the following statement: "The landscaping has been installed in substantial conformance to the design plans, and complies with the provisions of the *Water Efficient Landscape Ordinance* for the efficient use of water in the landscape."

(2) Documentation of the irrigation scheduling parameters used to set the *controller*(s);

(3) An irrigation audit report from a certified irrigation auditor, documentation of enrollment in regional or local water purveyor's water conservation programs, and/or documentation that the MAWA and EAWU information for the *landscape project* has been submitted to the local water purveyor, may be required at the option of the City.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.8 Post-Installation Irrigation Scheduling

(a) 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:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) *Overhead* irrigation shall be scheduled in accordance with the local water purveyor's Water Conservation Ordinance. Operation of the irrigation system outside the normal *watering window* is allowed for auditing and system maintenance.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.9 Post-Installation Landscape and Irrigation Maintenance

(a) Landscapes shall be maintained to ensure water use efficiency in accordance with existing local agency code.

3. Provisions for Existing Landscapes

(a) Irrigation of all *landscaped areas* shall be conducted in a manner conforming to the rules and requirements and shall be subject to penalties and incentives for water conservation and water waste prevention, as determined and implemented by the *local water purveyor* and as may be mutually agreed by the *City*.

(b) The City and/or the regional or *local water purveyor* may administer programs such as irrigation water use analyses, irrigation surveys and/or irrigation audits, tiered water rate structures, water budgeting by parcel, or other approaches to achieve landscape water use efficiency community-wide to a level equivalent to or less than would be achieved by applying a *MAWA* calculated with an ETAF of 0.8 to all *landscaped areas* in the *City* over one acre in size.

(c) The architectural guidelines of a *common interest development*, including apartments, 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.

Appendix A

CERTIFICATION OF LANDSCAPE DESIGN

I hereby certify that:

(1) I am a professional appropriately licensed in the State of California to provide professional landscape design services.

(2) The landscape design and water use calculations for the property located at _____ _____ (provide street address or parcel number(s)) were prepared by me or under my supervision.

(3) The landscape design and water use calculations for the identified property comply with the requirements of the City of _____ Water Efficient Landscape Ordinance (Municipal Code Sections _____) and the City of _____ _____ Guidelines for Implementation of the City of _____ Water Efficient Landscape Ordinance.

(4) The information I have provided in this Certificate of Landscape Design is true and correct and is hereby submitted in compliance with the City of _____ Guidelines for Implementation of the City of _____ Water Efficient Landscape Ordinance.

_____ Print Name

_____ Date

_____ Signature

_____ License Number

_____ Address

_____ Telephone

_____ E-mail Address

Landscape Design Professional's Stamp
(If applicable)

EXAMPLE WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the *project applicant* for each Point of Connection. Please complete all sections of the worksheet.

Point of Connection # 1

Maximum Applied Water Allowance (MAWA)

Total *MAWA* = (ETo x 0.7 x LA in Sq. Ft. x *0.62*) + (ETo x 1.0 x *SLA* in Sq. Ft. x *0.62*) = Gallons per year for LA+*SLA*

where:
MAWA = *Maximum Applied Water Allowance* (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
0.7 = *Evapotranspiration Adjustment Factor (ETAF)*
1.0 = ETAF for *Special Landscaped Area*
LA = *Landscaped Area* (square feet)
0.62 = *Conversion factor* (to gallons per square foot)
SLA = *Special Landscaped Area* (square feet)

Example Calculation: a hypothetical landscape project in Santa Ana, CA with an irrigated landscaped area of 40,000 square feet with 10,000 square feet of *Special Landscaped Area*. To calculate *MAWA*, the annual *reference evapotranspiration* value for Santa Ana is 48.2 inches as listed in the Reference Evapotranspiration Table in **Appendix C**.

	ETo		ETAF		LA or *SLA* (ft^2)		Conversion		*MAWA* (Gallons Per Year)
MAWA for LA =	48.2	x	0.7	x	40,000	x	*0.62*	=	836,752
MAWA for *SLA* =	48.2	x	1.0	x	10,000	x	*0.62*	=	298,840
Total *MAWA* =					50,000				1,135,592 Gallons per year for LA+*SLA*

Estimated Applied Water Use

EAWU = ETo x K_L x LA x *0.62* ÷ *IE* = Gallons per year

where:

EAWU = Estimated Applied Water Use (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
K_L = *Landscape Coefficient*
LA = *Landscaped Area* (square feet)
0.62 = Conversion factor (to gallons per square foot)
IE = Irrigation Efficiency = IME x DU (See definition in Appendix E for example IE percentages)
IME = Irrigation Management Efficiency (90%)
DU = Distribution Uniformity of irrigation head

$K_L = K_s \times K_d \times K_{mc}$

K_s = species factor (range = 0.1-0.9) (see *WUCOLS* list for values)
K_d = density factor (range = 0.5-1.3) (see *WUCOLS* for density value ranges)
K_{mc} = *microclimate* factor (range = 0.5-1.4) (see *WUCOLS*)

WUCOLS – ***www.owue.water.ca.gov/docs/wucols00.pdf***

Example Calculation:

	ETo		KL		LA		Conversion		*IE*		*EAWU (Gallons per year)*
Special Landscaped Area	48.2	x	1.00	x	10,000	x	*0.62*	÷	0.75	=	398,453
Cool Season Turf	48.2	x	1.00	x	0	x	*0.62*	÷	0.71	=	0
Warm Season Turf	48.2	x	0.65	x	0	x	*0.62*	÷	0.71	=	0
High Water Using Shrub	48.2	x	0.70	x	0	x	*0.62*	÷	0.71	=	0
Medium Water Using Shrub	48.2	x	0.50	x	15,000	x	*0.62*	÷	0.65	=	344,815
Low Water Using Shrub	48.2	x	0.30	x	25,000	x	*0.62*	÷	0.75	=	298,840
Very Low Water Using Shrub	48.2	x	0.20	x	0	x	*0.62*	÷	0.71	=	0
Other	48.2	x	0.50	x	0	x	*0.62*	÷	0.71	=	0
Other	48.2	x	0.50	x	0	x	*0.62*	÷	0.71	=	0
Total *EAWU* =					50,000						1,042,109 Gallons per year

Compare *EAWU* with *MAWA*.
The *EAWU* (1,042,109 gallons per year) is less than *MAWA* (1,135,592 gallons per year). For this example, the water budget complies with the *MAWA*.

List *sprinkler heads*, microspray, and drip *emitters* here along with average *precipitation rate* and *Distribution Uniformity of Irrigation Head.*

***Sprinkler Head* Types**	**Average *Precipitation Rate***	***Distribution Uniformity of Irrigation Head***
Drip		
Microspray		
Bubbler		
Low precipitation rotating nozzles		
Stream rotors		

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the *project applicant* for each Point of Connection. Please complete all sections of the worksheet.

Point of Connection #__

Maximum Applied Water Allowance (MAWA)

Total *MAWA* = (ETo x 0.7 x LA in Sq. Ft. x *0.62*) + (ETo x 1.0 x *SLA* in Sq. Ft. x *0.62*) = Gallons per year for LA+*SLA*

where:

MAWA = *Maximum Applied Water Allowance* (gallons per year)
ETo = *Reference Evapotranspiration* **Appendix C** (inches per year)
0.7 = *Evapotranspiration Adjustment Factor* (ETAF)
1.0 = ETAF for *Special Landscaped Area*
LA = *Landscaped Area* (square feet)
0.62 = *Conversion factor* (to gallons per square foot)
SLA = *Special Landscaped Area* (square feet)

MAWA Calculation:

	ETo		ETAF		LA or *SLA* (ft^2)		Conversion		*MAWA* (Gallons Per Year)
MAWA for LA =		x	0.7	x		x	*0.62*	=	
MAWA for *SLA* =		x	1.0	x		x	*0.62*	=	
Total *MAWA* =									

Estimated Applied Water Use

EAWU = ETo x K_L x LA x *0.62* ÷ *IE* = Gallons per year

where:

EAWU = *Estimated Applied Water Use* (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
K_L = *Landscape Coefficient*
LA = *Landscaped Area* (square feet)
0.62 = *Conversion factor* (to gallons per square foot)
IE = *Irrigation Efficiency* = *IME x DU*
IME = *Irrigation Management Efficiency (90%)*
DU = *Distribution Uniformity of irrigation head*

$K_L = K_s \times K_d \times K_{mc}$

K_s = species factor (range = 0.1-0.9) (see *WUCOLS* list for values)
K_d = density factor (range = 0.5-1.3) (see *WUCOLS* for density value ranges)
K_{mc} = *microclimate* factor (range = 0.5-1.4) (see *WUCOLS*)

WUCOLS – ***www.owue.water.ca.gov/docs/wucols00.pdf***

EAWU Calculation:

	ETo		KL		LA		Conversion		*IE*		*EAWU* (Gallons Per Year)
Special Landscaped Area		x		x		x	*0.62*	÷		=	
Cool Season Turf		x		x		x	*0.62*	÷		=	
Warm Season Turf		x		x		x	*0.62*	÷		=	
High Water Using Shrub		x		x		x	*0.62*	÷		=	
Medium Water Using Shrub		x		x		x	*0.62*	÷		=	
Low Water Using Shrub		x		x		x	*0.62*	÷		=	
Very Low Water Using Shrubs		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
Other		x		x		x	*0.62*	÷		=	
Total *EAWU* =											

List *sprinkler heads*, microspray, and drip *emitters* here along with average *precipitation rate* and *Distribution Uniformity of Irrigation Head.*

***Sprinkler Head* Types**	**Average *Precipitation Rate***	***Distribution Uniformity of Irrigation Head***
Drip		
Microspray		
Bubbler		
Low precipitation rotating nozzles		
Stream rotors		

Appendix C

Reference Evapotranspiration (ETo) Table

Appendix C - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
Orange													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
* The values in this table were derived from:1) California Irrigation Management Information System (CIMIS) 2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999, 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426													

Appendix D

LANDSCAPE INSTALLATION CERTIFICATE OF COMPLETION

I hereby certify that:

(1) I am a professional appropriately licensed in the State of California to provide professional landscape design services.

(2) The landscape project for the property located at _____ _____ (provide street address or parcel number(s)) was installed by me or under my supervision.

(3) The landscaping for the identified property has been installed in substantial conformance with the approved Landscape Documentation Package and complies with the requirements of the City of _____ Water Efficient Landscape Ordinance (Municipal Code Sections _____) and the City of _____ Guidelines for Implementation of the City of _____ Water Efficient Landscape Ordinance for the efficient use of water in the landscape.

(4) The information I have provided in this Landscape Installation Certificate of Completion is true and correct and is hereby submitted in compliance with the City of _____ Guidelines for Implementation of the City of _____ Water Efficient Landscape Ordinance.

_____ _____
Print Name Date

_____ _____
Signature License Number

_____
Address

_____ _____
Telephone E-mail Address

Landscape Design Professional's Stamp
(If Appropriate)

Appendix E

Definitions

The terms used in these *Guidelines* have the meaning set forth below:

"*Backflow prevention device*" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

"*Conversion factor*" means the number that converts acre-inches per acre per year to gallons per square foot per year.

"*Check valve*" or "*anti-drain valve*" means 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.

"*Certified Landscape Irrigation Auditor*" observes system operations, locate irrigation zones, prepare site audit maps, visually identify broken or misaligned equipment, summarize data from field tests and may use this information to generate monthly irrigation base schedules, may provide this information to Certified Landscape Irrigation Managers or Certified Irrigation Designers to make recommendations for changes.

"*Certification of Design*" means the certification included as Exhibit E of these Guidelines that must be included in the *Landscape Documentation Package* pursuant to Section 2.1 of these Guidelines.

"*City*" means the City of Villa Park or its authorized designee.

"*Common interest developments*" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351

"*Distribution Uniformity*" or "*DU*" is a measure of how uniformly an irrigation head applies water to a specific target area and theoretically ranges form zero to 100 percent.

"*Drip irrigation*" means any non-spray *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.

"*Emitter*" means a *drip irrigation* emission device that delivers water slowly from the system to the soil.

"*Estimated Applied Water Use*" or "*EAWU*" means the annual total amount of water estimated to keep plants in a healthy state. It is based on factors such as reference *evapotranspiration rate*, the size of the *landscaped area*, *plant water use factors*, and the *irrigation efficiency* within each hydrozone.

"*Evapotranspiration adjustment factor*" or "*ETAF*" is equal to the *plant factor* divided by the *irrigation efficiency factor* for a *landscape project*, as described in the *Guidelines*. The *ETAF* is calculated in the context of local *reference evapotranspiration*, using site-specific *plant factors* and

irrigation efficiency factors that influence the amount of water that needs to be applied to the specific *landscaped area*. "*Evapotranspiration rate*" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

"*Flow rate*" means 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*" means any durable material or feature (*pervious* and *non-pervious*) installed in or around a *landscaped area*, such as pavements or walls. Pools and other water features are considered part of the *landscaped area* and not considered *hardscapes* for purposes of these Guidelines.

"*Hydrozone*" means a portion of the *landscaped area* having plants with similar water needs and typically irrigated by one *valve*/controller station. A *hydrozone* may be irrigated or non-irrigated.

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

"*Invasive plants species*" or "*noxious*" means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. *Invasive plant species* may be regulated by county agricultural agencies as *noxious species*.

"*Irrigation audit*" means 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 Management Efficiency*" or "*IME*" means the measurement used to calculate the *irrigation efficiency* of the irrigation system for a landscaped project. A 90% IME can be achieved by using evaportranspiration controllers, soil moisture sensors, and other methods that will adjust irrigation run times to meet plant water needs.

"*Irrigation efficiency*" or "*IE*" means the measurement of the amount of water beneficially used divided by the amount of water applied to a *landscaped area*. *Irrigation efficiency* is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average *irrigation efficiency* for purposes of these *Guidelines* is 0.71. Greater *irrigation efficiency* can be expected from well designed and maintained systems. The following irrigation efficiency may be obtained for the listed irrigation heads with an IME of 90%:

a. Pop-up stream rotator heads = 75%

b. Stream rotor heads = 75%

c. Microspray = 75%

d. Bubbler = 80%

e. Drip emitter = 85%

f. Subsurface irrigation = 90%

"*Landscape coefficient*" (K_L) is the product of a *plant factor* multiplied by a density factor and a *microclimate* factor. The *landscape coefficient* is derived to estimate water loss from irrigated *landscaped areas* and *special landscaped areas*.

"*Landscape Documentation Package*" means the package of documents that a *project applicant* is required to submit to the *City* pursuant to Section 2.1 of these Guidelines.

"Landscape Installation Certificate of Completion" means the certificate included as Exhibit F of these *Guidelines* that must be submitted to the *City* pursuant to Section 2.7(a)(1) of hereof.

"*Landscape professional*" means a licensed *landscape architect*, licensed landscape contractor, or any other *person* authorized to design a landscape pursuant to Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the California Business and Professions Code, Section 832.27 of Title16 of the California Code of Regulations, and Section 6721 of the California Food and Agriculture Code.

"*Landscaped area*" means all the planting areas, *turf* areas, and *water features* in a landscape design plan subject to the *Maximum Applied Water Allowance* and *Estimated Applied Water Use* calculations. The *landscaped area* does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other *pervious* or *non-pervious hardscapes*, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

"*Lateral line*" means the water delivery pipeline that supplies water to the *emitters* or sprinklers from the *valve*.

"*Low volume irrigation*" means 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*" means the pressurized pipeline that delivers water from the water source to the *valve* or outlet.

"*Maximum Applied Water Allowance*" or "*MAWA*" means the upper limit of annual applied water for the established *landscaped area,* as specified in Section 2.2 of these *Guidelines*. It is based upon the area's *reference evapotranspiration*, the *ETAF*, and the size of the *landscaped area*. The *Estimated Applied Water Use* shall not exceed the *Maximum Applied Water Allowance*.

"M*icroclimate*" means the climate of a small, specific area that may contrast with the climate of the overall landscaped area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

"*Mulch*" means any organic material such as leaves, bark, straw or compost, or inorganic mineral materials such as rocks, gravel, or 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.

"*Non-pervious*" means any surface or natural material that does not allow for the passage of water through the material and into the underlying soil.

"*Operating pressure*" means the pressure at which the parts of an irrigation system of sprinklers are designed to operate at by the manufacturer

"*Overspray*" means the irrigation water which is delivered beyond the target area.

"*Person*" means any natural person, firm, joint venture, joint stock company, partnership, public or private association, club, company, corporation, business trust, organization, public or private agency, government agency or institution, school district, college, university, any other user of water provided by the *City* or the *local water purveyor*, or the manager, lessee, agent, servant, officer, or employee of any of them or any other entity which is recognized by law as the subject of rights or duties.

"*Pervious*" means 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*" is a factor, when multiplied by *ETo*, that estimates the amount of water needed by plants. For purposes of this *Water Efficient Landscape Ordinance*, 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 these *Guidelines* are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species."

"*Precipitation rate*" means the rate of application of water measured in inches per hour.

"*Project applicant*" means the person submitting a *Landscape Documentation Package* required under Section 2.1 to request a permit, plan check, or design review from the local agency. A *project applicant* may be the property owner or his or her designee.

"*Property owner*" or "*owner*" means the record owner of real property as shown on the most recently issued equalized assessment roll.

"*Reference evapotranspiration*" or "*ETo*" means a standard measurement of environmental parameters which affect the water use of plants. *ETo* is given expressed in inches per day, month, or year as represented in Appendix C of these Guidelines, and is an estimate of the evapotranspiration of a large field of four to seven-inch tall, cool-season grass that is well

watered. *Reference evapotranspiration* is used as the basis of determining the *Maximum Applied Water Allowance*s.

"*Recycled water*" or "*reclaimed water*" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and *water features*. This water is not intended for human consumption.

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

"*Special Landscaped Areas*" or "*SLA*" means an area of the landscape dedicated solely to edible plants such as orchards and vegetable gardens, 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*" means a device which delivers water through a nozzle.

"*Static water pressure*" means the pipeline or municipal water supply pressure when water is not flowing.

"*Station*" means an area served by one *valve* or by a set of *valves* that operate simultaneously.

"*Swing joint*" means 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*" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

"*Valve*" means a device used to control the flow of water in an irrigation system

"*Water Efficient Landscape Ordinance*" means Ordinance No. 2009-547, adopted by the City Council on November 17, 2009, and codified in the Municipal Code in Chapter 25.

"*Water Efficient Landscape Worksheets*" means the worksheets required to be completed pursuant to Section 2.2 of these *Guidelines* and which are included in Appendix B hereof.

"*Water feature*" means 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 *landscaped area*. Constructed wetlands used for on-site wastewater treatment, habitat protection, or storm water best management practices that are not irrigated and used solely for water treatment or storm water retention are not *water features* and, therefore, are not subject to the water budget calculation.

"*Watering window*" means the time of day irrigation is allowed.

"*WUCOLS*" means the Water Use Classification of Landscape published by the University of California Cooperative Extension, the Department of Water Resources, and the Bureau of Reclamation, 2000. *www.owue.water.ca.gov/docs/wucols00*

Issues and Justifications for the differences between the OC Model and the State Model

In the process of drafting the OC Model Ordinance, the drafting committee sought ways of simplifying and streamlining the State Model while maintaining the requirement of being "at least as effective as" the State Model.

AB 1881 also required local agencies to include information in the record for any approval that designates the locally-approved alternative to the States Model as "equally effective" in conserving landscaping irrigation water. The appropriate action is suggested to utilize findings to establish the county's position in the record. With one exception, no essential element of the States Model has been dropped, only re-organized to function more efficiently. The one exception is the States Model requests a Grading Design Plan for every application. The Orange County Grading Code and Grading Manual already provide appropriate and more stringent regulation for managing projects with significant grading elements.

This document identifies the significant differences between the OC Model and the State Model and provides justification for how the OC Model is "at least as effective" as the States Model.

Issue 1: Maximum Applied Water Allowance Calculation

Justification:

Calculation is simplified while still achieving "at least as effective" criteria. The State Model requires MAWA and Estimated Applied Water Use (EAWU) calculations for each valve installed in a landscape area. This requirement causes a significant amount of paperwork and labor and does not increase water efficiency in the landscape. By requiring MAWA and EAWU calculations for each meter rather than each valve, the calculations process is simplified while maintaining the "at least as effective" criteria of AB-1881.

Issue 2: Self Certification

2.4 Landscape Design Plan Section 13; 2.5 Irrigation Design Plan Section 7; 2.6 Grading Design Plan Section 3

Justification:

Self certification is performed by a licensed professional that is authorized to perform the tasks required in the Landscape Documentation Package. The licensed professionals certifying the

project have professional expertise necessary to ensure the project is "at least as effective" as the State Model. Self certification provides a cost effective method for cities to review plans without increasing the need for in-house technical expertise.

Issue 3: Option Boxes

Justification:

There are several billing structures currently implemented throughout the county, and it is necessary to accommodate the diverse rate structures. The OC Model includes option boxes allowing cities to choose the most applicable scenario.

Issue 4: Separation of Ordinance and Guidelines

Justification:

Implementing a new ordinance or updating an old one is a long and cumbersome process. Throughout the OC Model drafting process, city officials have stressed the importance of a streamlined and succinct ordinance that is "at least as effective" as the State Model. In response to these requests, the drafting committee has condensed the OC Model into a document that describes the essential components of AB 1881. All process-oriented elements, equations, and technology-related components have been removed from the ordinance and placed in a guidelines section. Updating guidelines is a less complicated process, which will better accommodate the rapidly evolving field of irrigation technology.

Issue 5: Section 1, C Option Box 1

"The local water purveyor is implementing budget-based tiered-rate billing, water budgeting, and enforcement of water waste prohibitions for all existing metered landscape areas throughout its service area."

Explanation:

Budget-based tiered-rate billing structures are "at least as effective" at achieving outdoor water use efficiency as AB-1881.

Justification:

"The Irvine Ranch Water District (IRWD) has used pricing strategies successfully to discourage excessive outdoor water use. By implementing an increasing block rate structure, the IRWD has reduced outdoor water among customers by nearly 50%" (Amy Vickers, Water Use and Conservation 2001). "In 1990 water usage was 4.4 af/acre/year (ET demand averages about 4.0 af/acre/year). After implementing a budget-based tiered rate billing structure, water use has averaged approximately 2.2 af/acre/year" (Nick Mrvos, Senior Conservation Specialist, Irvine Ranch Water District).

Issue 6: Section 1, C Option Box 2

"The City, as the local water purveyor, is implementing enforcement of water waste prohibitions for all existing metered landscape areas within its jurisdiction."

Explanation:

In recent years, regulatory approaches to conservation and water waste management have become powerful tools at the local, state, and national levels in establishing water conservation requirements for virtually every customer sector (Vickers, Water Use and Conservation 2001).

Justification:

Many cities have multiple codes regulating water waste. These regulations range from local codes that govern irrigation overspray to federal codes such as the Environmental Protection Agency's National Pollution Discharge Elimination System. Existing regulatory water conservation requirements enforce efficient water use through monetary fines and have helped "to limit excessive lawn water and street runoff" (Vickers, Water Use and Conservation 2001).

Issue 7: 492.10 Irrigation Scheduling

Justification:

Prescriptive elements for parameters used to set the automatic controller are removed in order to defer to irrigation controller manufacturer specifications.

Issue 8: 492.11 Landscape and Irrigation Maintenance Schedule

Justification:

Prescriptive elements incorporated by reference to existing code in order to defer to local agency code.

Issue 9: Removal of 492.14 Recycled Water

Justification:

Section incorporated by reference to defer to existing recycled water and health code.

Issue 10: Removal of 492.15 Stormwater Management

Justification:

Section incorporated by reference to defer to existing National Pollutant Discharge Elimination System (NPDES) permits and local stormwater management code.

Issue 11: Removal of 493.2 Water Waste Prevention

Justification:

Section incorporated by reference to defer to existing agency code on water waste prevention.

Issue 12: Removal of 494 Effective Precipitation

Justification:

This section was considered optional in the State Model and was removed because annual effective precipitation of 12" in Orange County is not considered adequate for MAWA adjustment.

Issue 13: 2.1 Section 5 Certification of Completion (Now in Guidelines)

Justification:

Enrollment in one of the local or regional water budgeting programs fulfills the irrigation system audit report criteria. The water budgeting programs are an in-depth and ongoing irrigation monitoring process that is "at least as effective" as a one time irrigation system audit report.