6 ATTACHMENT 3 – PROJECT JUSTIFICATION

This attachment includes a summary of the proposed project(s), including the purpose and how the Proposal meets the need(s) created by the drought. Attachment 3 also contains the estimated physical benefits of the project(s); justifies how the project is technically feasible; describes how the project can achieve the claimed level of benefits; and explain whether the benefits will be attained through the least cost alternative. The information contained in this attachment will be used by DWR reviewers to score questions #3 and #8-15.

6.1 Projects Summary Table

Table 4 is provided to summarize the Drought and IRWM project elements addressed by this Proposal. Each project meets at least one element in both sections.

Table 4 – 2014 IRWM Drought Solicitation Project Summary Table			
Drought Project Element		**Visalia Water Conservation Program Project**	**Well 15 Water Quality Protection Project**
D.1	Provide immediate regional drought preparedness	X	X
D.2	Increase local water supply reliability and the delivery of safe drinking water	X	X
D.3	Assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective	X	
D.4	Reduce water quality conflicts or ecosystem conflicts created by the drought		
IRWM Project Element			
IR.1	Water supply reliability, water conservation, and water use efficiency	X	X
IR.2	Stormwater capture, storage, clean-up, treatment, and management		
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands		
IR.4	Non-point source pollution reduction, management, and monitoring		
IR.5	Groundwater recharge and management projects		
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users		
IR.7	Water banking, exchange, reclamation, and improvement of water quality		
IR.8	Planning and implementation of multipurpose flood management programs		
IR.9	Watershed protection and management		
IR.10	Drinking water treatment and distribution		X
IR.11	Ecosystem and fisheries restoration and protection		

6.2 Project Descriptions

Two projects are included in this Proposal. One project is the Visalia Water Conservation Program Project implemented by Cal Water (sponsored by the City of Visalia). The Visalia Water Conservation Program provides drought relief by implementing carefully-chosen water conservation programs that are not locally cost-effective. The other project is the City of Lindsay Well 15 Water Quality Protection Project implemented by the City of Lindsay. The Well 15 Water Quality Protection Project addresses water quality and water supply issues for the City of Lindsay, a disadvantaged community.

6.2.1 Visalia Water Conservation Program Project

Funding is being requested to augment the conservation program portfolio for Cal Water's Visalia district authorized by the California Public Utilities Commission (CPUC) for the 2014-2016 period. Augmentation is designed to help alleviate impacts of the current drought by promoting water conservation programs meant to increase long-term reduction of water use. The CPUC decision allowed Cal Water flexibility in re-allocating the conservation funding for each district among programs to help expedite implementation. In order to ramp up these programs as quickly as possible to provide maximum benefit in the current extreme drought conditions and to be in place if conditions continue into 2015, it is imperative funding be expedited. Program elements and activity levels to address drought impacts are listed below.

Table 6-1: Visalia Water Conservation Program Project Elements

Program Name	Class	Indoor/ Outdoor	2014-2016 Activity
High-Efficiency Toilets (HET) and Ultra-High Efficiency Toilets (UHET): Customer Rebates or Vouchers	Single Family	Indoor	500
Smart Controllers: Customer Rebates or Vouchers	Single Family	Outdoor	50
Turf Replacement Rebates	Single Family	Outdoor	50,000 sq ft
HET and UHET: Customer Rebates or Vouchers	Multi Family	Indoor	500
Rotating Sprinkler Nozzle Rebate	Multi Family	Outdoor	5,000
Spray Body Integrated Pressure Regulation & Check Valve Rebate	Multi Family	Outdoor	10,000
Turf Replacement Rebates	Multi Family	Outdoor	25,000 sq ft
HET Rebate	Commercial	Indoor	100
Rotating Nozzle Rebate	Commercial	Outdoor	5,000
Spray Body Integrated Pressure Regulation and Check Valve Rebates	Commercial	Outdoor	10,000
Turf Replacement Rebates	Commercial	Outdoor	25,000 sq ft
Large Landscape Water Use Reports	Irrigation	Outdoor	324
Large Landscape Surveys	Irrigation	Outdoor	18

This project will help improve on several impacts caused by the current drought. The mix of conservation program elements was selected to reduce the demand on an already over-drafted groundwater basin. Reducing the demand in an area will help reduce groundwater overdraft which can then help reduce the risk of not meeting existing drinking water and agricultural demands of the Region. Approximately 84% of the proposed program will be for reductions in outdoor water use through improved irrigation efficiency

and replacement of turf grass which primarily lead to peak-demand season savings when the water supply under the most stress.

This project is designed to meet three of the four eligible drought project types by providing immediate regional drought preparedness, increasing local water supply reliability, and to assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective. Drought preparedness is accomplished by promoting water conservation programs and improving irrigation efficiencies to achieve long-term reduction of water use. Effects of this conservation can help increase local water supply reliability. The project helps provide immediate drought assistance and helps local water suppliers comply with the State's 2009 conservation law (20x2020).

6.2.2 Well 15 Water Quality Protection Project

The principal goal of the Well 15 Water Quality Protection Project is to give to the City of Lindsay (Lindsay) a dependable and compliant source of groundwater to tie into their delivery system. Lindsay has chosen treated surface water as its principal source of supply to meet demands. It has done so with the recognition that the source of surface supply is subject to reductions in available quantity due to several factors including drought. The availability of fully compliant groundwater sources with respect to all quality parameters is difficult to achieve in the groundwater basin which is available to Lindsay to tap for a source of supply. Being able to deliver groundwater compliant with drinking water standards becomes even more critical in drought year conditions when Lindsay cannot rely on its surface water supply through their Friant CVP contract supply. In cases such as this year with no Friant CVP allocation, Lindsay is hard pressed to meet drinking water demands with clean drinking water.

In addition to drought conditions, further demonstration of the need in this area and the overall importance of having available compliant groundwater supplies at hand, the recent (2013) 120-day shutdown of the Friant-Kern Canal (FKC) necessitated coordination between several domestic water purveyors to survive the prolonged outage of this main conveyance facility. The prolonged shutdown was necessary due to chemical treatment of the invasive species identified as Acquired Western Water Milfoil where, following dewatering, chemical application occurred with an application period of a minimum of 45 days being required prior to re-introducing water into the FKC. Post application, diversions of water from the canal could still not occur until testing validated that remainder concentrations of the applied chemicals were below thresholds established by the toxicologist from the State Department of Health Services which extended the lack of diversion capability well beyond the 120 day original forecasted period. During this time, coordination occurred between Lindsay and other agencies in the area who shuffled supplies attempting to deliver compliant drinking water to their customers for as long a period of time as possible. Availability of fully compliant water from Well 15 would have enhanced the coordination efforts between these agencies and further eased the problems associated with the prolonged time frame associated with diversion capability.

Water produced by Well 15 is compliant with all applicable Federal and State drinking water standards, with the exception of the bacteriological parameter, implementation of a method to incorporate 4-log virus inactivation (required by CDPH) with the Project would make available the supply on a continuous, year-round basis. As fully compliant wells are rare in the area and as the principal source of supply for Lindsay is to treat raw surface water from the FKC, the Well 15 supply would be available when the surface supply is insufficient to meet demands due to constraints in available supply, constraints related to treatment facilities, and when the FKC is unavailable due to periods of outage for operation and/or

maintenance purposes. In the satisfaction of this goal, the Project also achieves the object of providing a source of supply from a facility in which Lindsay has invested a significant amount of public funds and eliminates the need to construct and equip another groundwater extraction facility with its additive capital investment requirement.

Completion of the Project will, therefore, add significant value and enhanced capability to the coordination efforts between domestic, commercial and industrial water purveyors in the area, as well as introducing another tool into the operational matrix of the coordinating agencies. These abilities will aid in meeting several State priorities such as increasing the local water supply reliability and the delivery of safe drinking water, and also increase reliability of established system interties in the area. With expedited funding, these benefits would be available to a disadvantaged community by July 2015. If drought conditions continue into 2015, funding and project implementation would be vital.

6.3 Regional Maps and Project Maps

A series of maps are provided for this section. The Kaweah River IRWM region, its signatories, boundaries, DAC communities, and project locations are shown in the first series of maps. Maps for each project follow the regional maps.

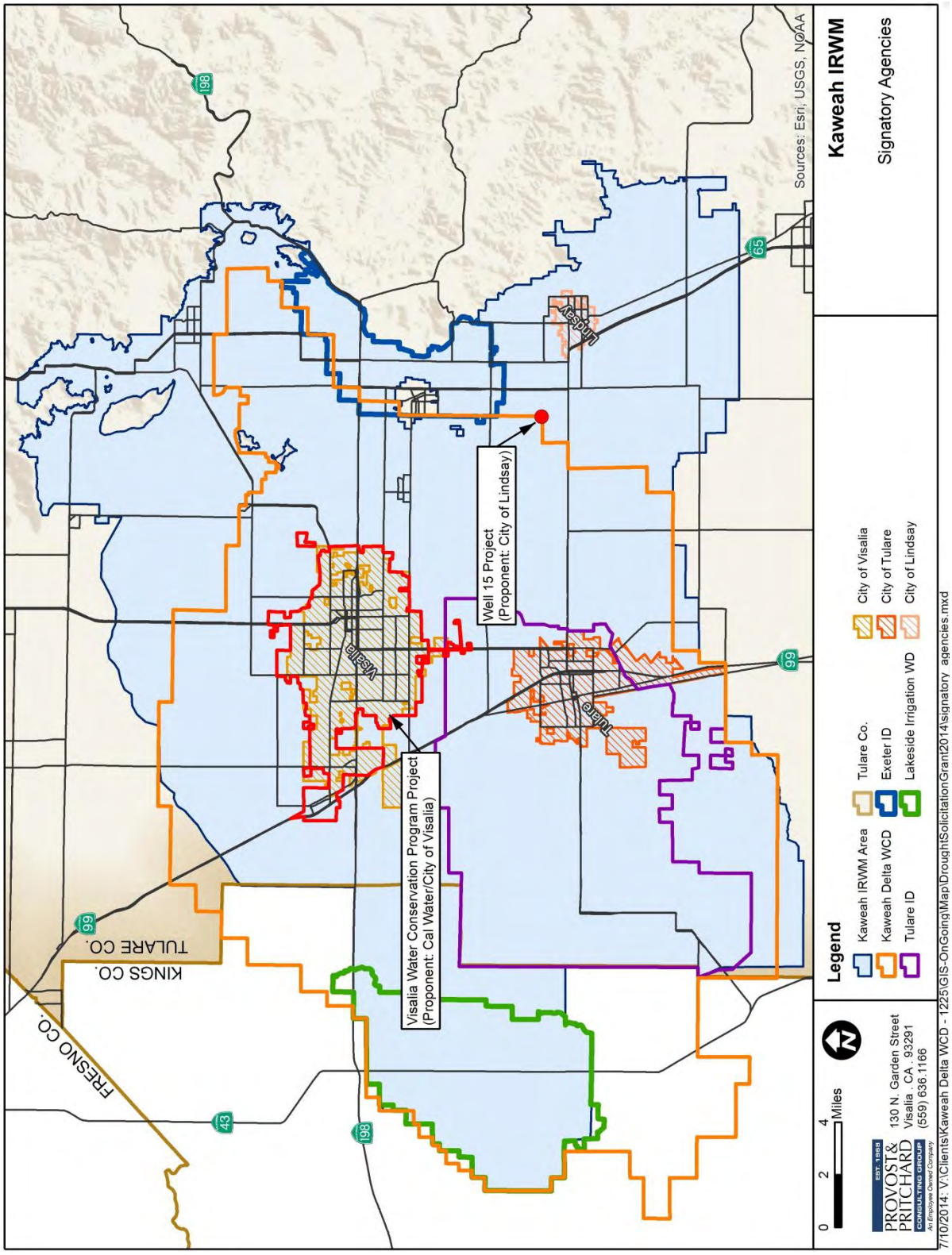

Figure 6-1: Kaweah River Basin IRWMG Signatory Agencies

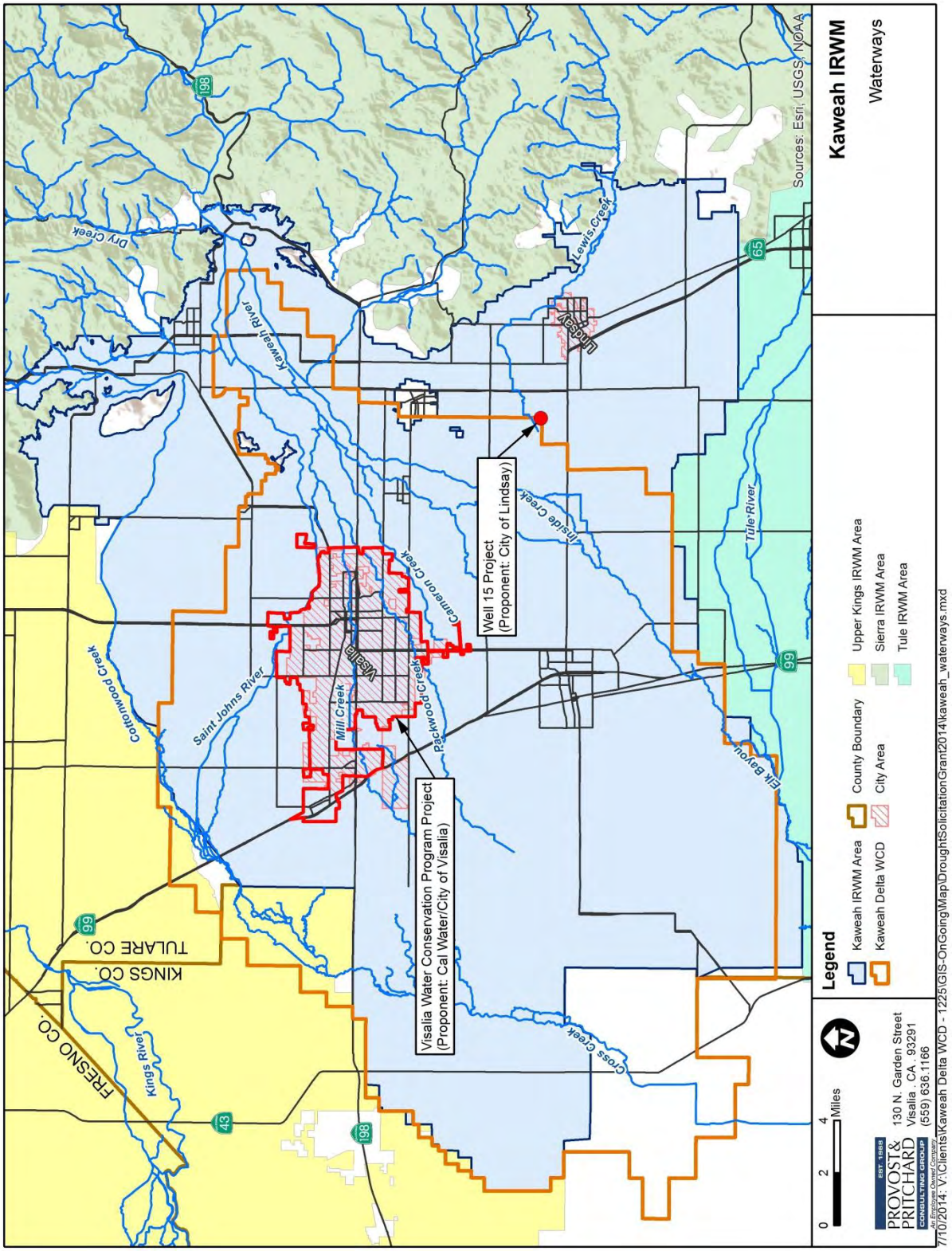

Figure 6-2: Kaweah River Basin IRWMG Waterways

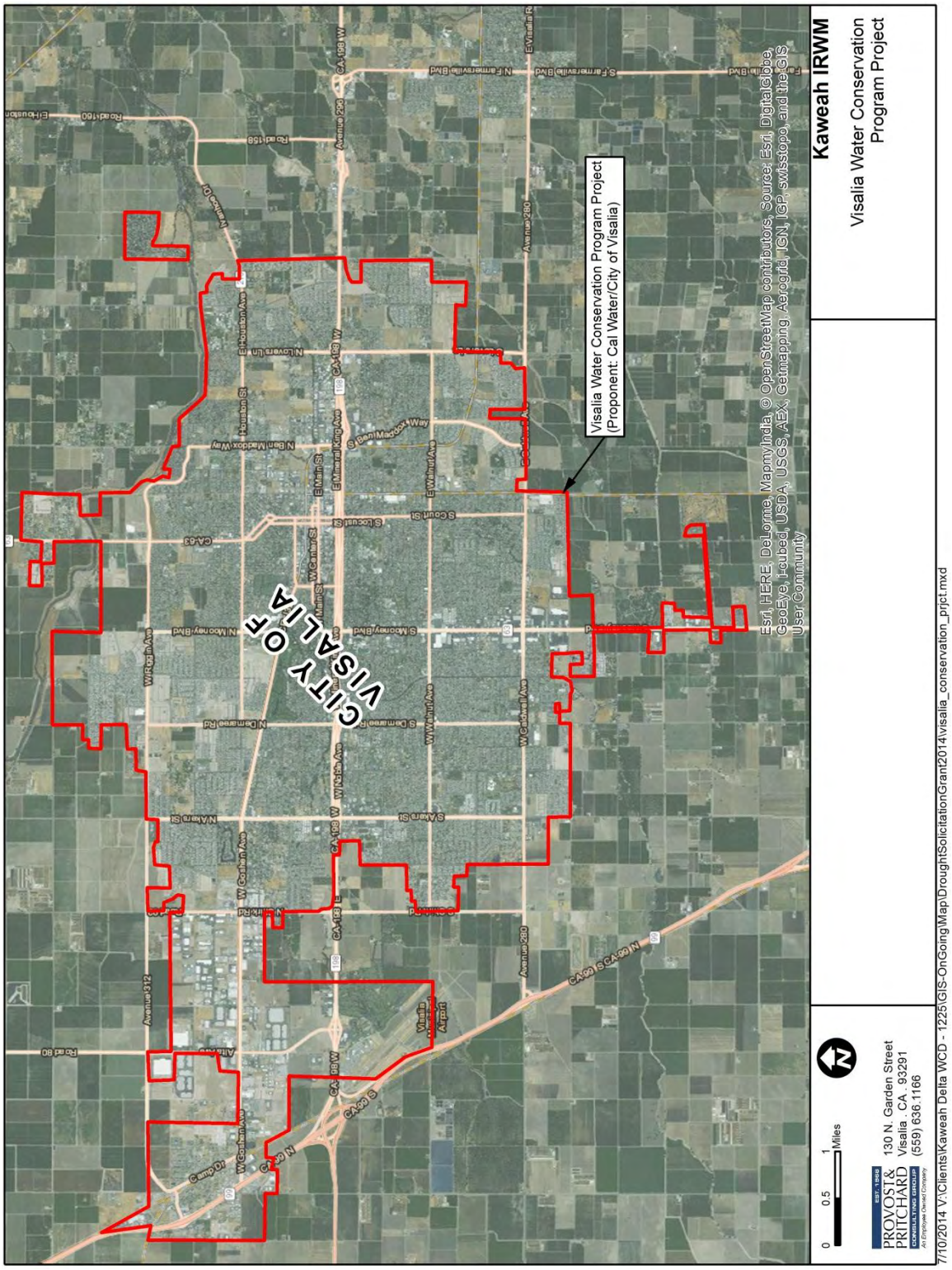

Figure 6-3: Visalia Water Conservation Program Project Map

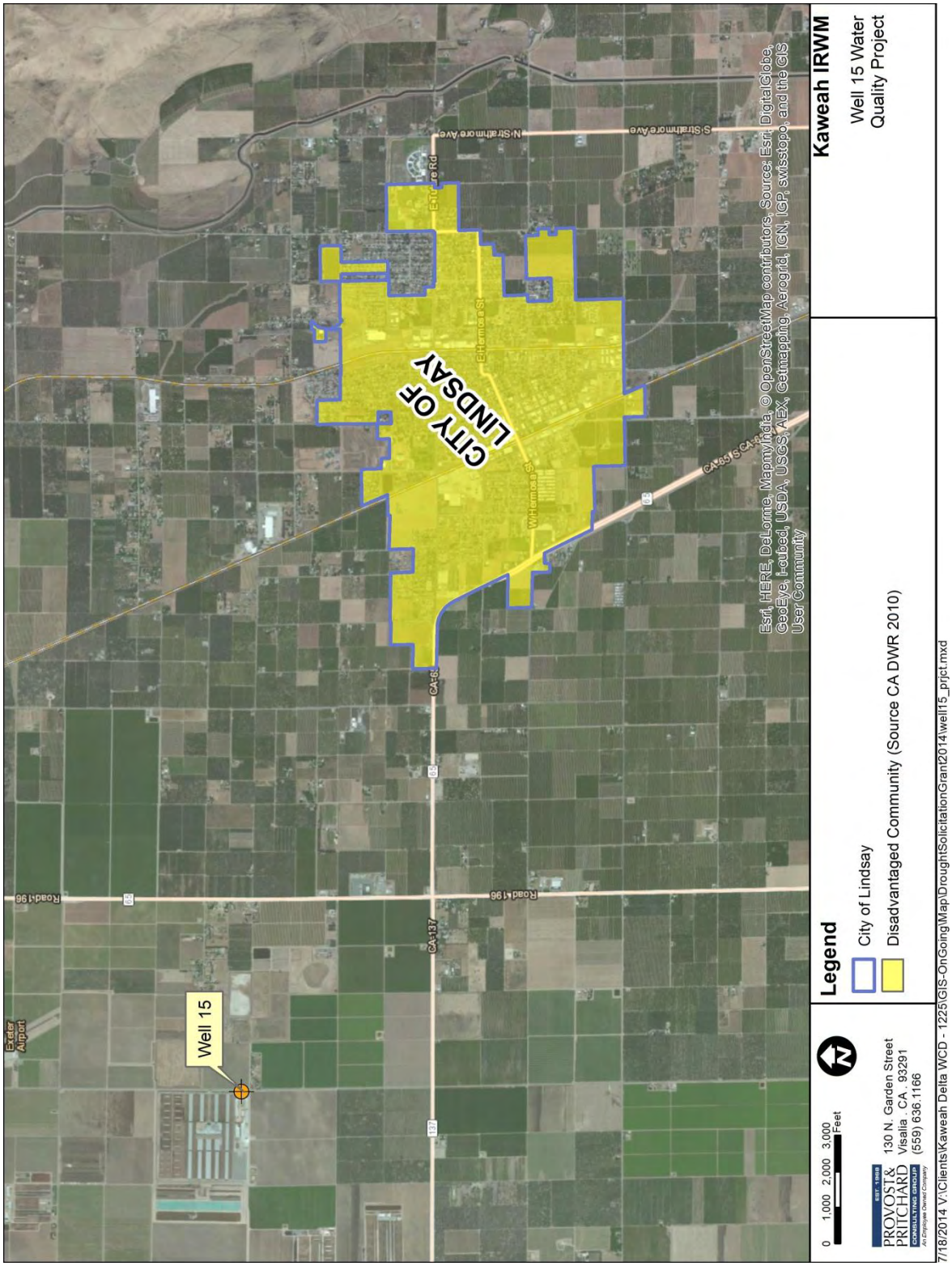

Figure 6-4: Well 15 Water Quality Protection Project Map

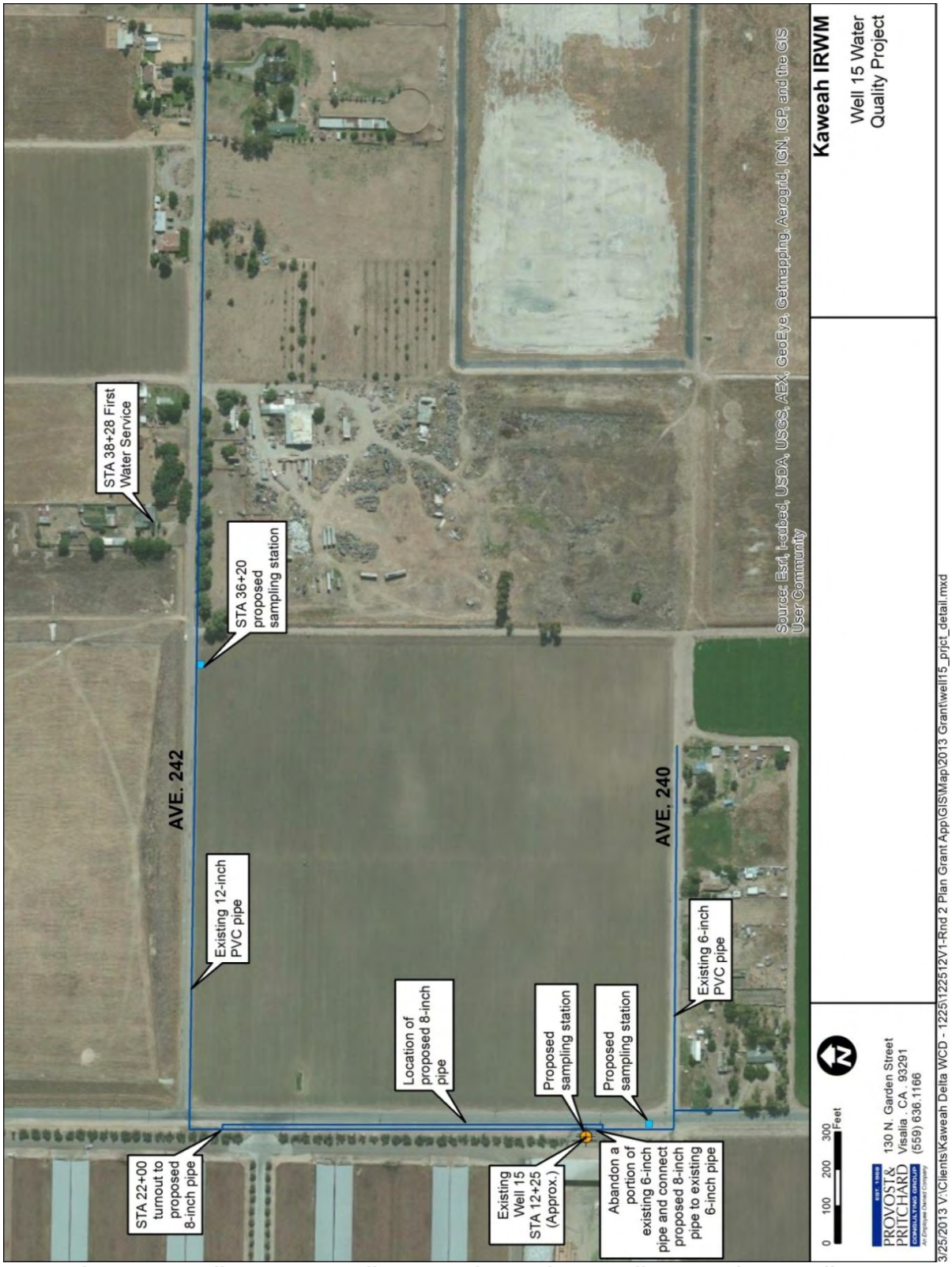

Figure 6-5: Well 15 Water Quality Protection Project Detail Map Project Detail Map

6.4 Project Physical Benefits

6.4.1 Visalia Water Conservation Program Project

Table 5a summarizes the primary physical benefits of the Visalia Water Conservation Program Project, which are annual water savings. Description of how quantities derivation is provided in the Technical Analysis section.

Table 6-2: Visalia Water Conservation Program Project Physical Benefits

Table 5a – Annual Project Primary Physical Benefits			
Project Name: Visalia Water Conservation Program Project			
Type of Benefit Claimed: Potable Water Savings (Net of Natural Replacement)			
Units of the Benefit Claimed : Acre-Feet per year			
Additional Information About this Benefit: N/A			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2014	0	50	50
2015	0	95	95
2016	0	144	144
2017	0	131	131
2018	0	130	130
2019	0	128	128
2020	0	126	126
2021	0	123	123
2022	0	122	122
2023	0	122	122
2024	0	88	88
2025	0	54	54
2026	0	17	17
2027	0	17	17
2028	0	16	16
2029	0	16	16
2030	0	15	15
2031	0	15	15
2032	0	14	14
2033	0	14	14
2034	0	13	13
2035	0	13	13
2036	0	13	13
2037	0	12	12
2038	0	12	12
2039	0	10	10
2040	0	5	5
Comment: Total cumulative savings through 2040 exceed 1500 AF.			

Table 5b summarizes the secondary physical benefits of the Visalia Water Conservation Program Project, which are annual energy savings. Description of how quantities derivation is provided in the Technical Analysis section.

Table 6-3: Visalia Water Conservation Program Project Secondary Benefits

Table 5b – Annual Project Secondary Physical Benefits Project Name: Visalia Water Conservation Program Project Type of Benefit Claimed: Annual Energy Savings Units of the Benefit Claimed : Kilowatt-Hours Additional Information About this Benefit: N/A			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2014	0	27,558	27,558
2015	0	59,927	59,927
2016	0	94,012	94,012
2017	0	87,170	87,170
2018	0	85,969	85,969
2019	0	84,016	84,016
2020	0	82,109	82,109
2021	0	80,246	80,246
2022	0	79,226	79,226
2023	0	78,247	78,247
2024	0	61,107	61,107
2025	0	44,156	44,156
2026	0	25,717	25,717
2027	0	24,885	24,885
2028	0	24,087	24,087
2029	0	23,321	23,321
2030	0	22,585	22,585
2031	0	21,879	21,879
2032	0	21,201	21,201
2033	0	20,550	20,550
2034	0	19,925	19,925
2035	0	19,325	19,325
2036	0	18,749	18,749
2037	0	18,197	18,197
2038	0	17,666	17,666
2039	0	14,943	14,943
2040	0	7,599	7,599
Comment: Total cumulative energy usage reductions through 2040 are approximately 1.2 MWh.			

6.4.2 Well 15 Water Quality Protection Project

Table 5 has been completed to present the physically quantifiable benefits of the Project, which are acre-feet of reliable water supply. The table also indicates that, absent the Project, Lindsay remains short of compliant supply by the amount of the Project benefit. The Project is estimated to produce 24,189 acre-feet of quantifiable physical benefit over the remaining life-span of the well, which is estimated to be a full 35 years. Another benefit of the Project cannot be quantified, but also important, is the discontinuance of the public's perception and lack of confidence in the water supply created from the Boil Water Advisory.

Table 6-4: Well 15 Water Quality Protection Project Primary Benefits

Table 5 – Annual Project Physical Benefits Project Name: City of Lindsay Well 15 Water Quality Protection Project Type of Benefit Claimed: Increase local water supply reliability and the delivery of safe drinking water Units of the Benefit Claimed : Acre-Feet Additional Information About this Benefit N/A			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2015	0	564	564
2016	0	375	375
2017	0	375	375
2018	0	1125	1125
2019	0	1125	1125
2020	0	375	375
2021	0	375	375
2022	0	375	375
2023	0	1125	1125
2024	0	1125	1125
2025	0	375	375
2026	0	375	375
2027	0	375	375
2028	0	1125	1125
2029	0	1125	1125
2030	0	375	375
2031	0	375	375
2032	0	375	375
2033	0	1125	1125
2034	0	1125	1125
2035	0	375	375
2036	0	375	375
2037	0	375	375
2038	0	1125	1125
2039	0	1125	1125

2040	0	375	375
2041	0	375	375
2042	0	375	375
2043	0	1125	1125
2044	0	1125	1125
2045	0	375	375
2046	0	375	375
2047	0	375	375
2048	0	1125	1125
2049	0	1125	1125
2050	0	375	375
Comments: The City of Lindsay delivers annually (March to February) 2,500 acre-feet on average. The City holds a CVP - Friant Division Class 1 contract for 2,500 acre-feet. The Bureau of Reclamation concluded that on average during a normal year, only 85% of all Class 1 allocations will be met in the foreseeable future. In a typical 10 year period, the City will experience 6 years of normal contract deliveries from the Friant-Kern Canal and 4 years of below normal (55% used for this table) contract deliveries due to below normal contract supply and/or canal outage. Year 1 is estimated at 564 AF as the Project would be completed in time to deliver the remaining 6 months of the 2015 Water Year. If allocation is 55%, Well 15 would provide the 564 AF in the remaining 6 months (half of 1125 AF).			

6.5 Technical Analysis of Physical Benefits Claimed

6.5.1 Visalia Water Conservation Program Projects

The water savings in Table 5a are calculated as the sum of savings from each of the program elements. Following are brief descriptions of the manner in which these savings are calculated and the sources of the underlying assumptions. An additional table is provided showing the annual benefit from each conservation component for each year. Annual breakdowns for each component are provided in **Attachment 3 Appendix A**. None of the benefits would be realized without implementation of the program. The program is a rebate program, thus no new facilities are required.

High Efficiency (HET) and Ultra High Efficiency (UHET) Toilet Rebates:

Single-Family Household Rebate Water Savings: First year annual savings for HET and UHET rebates are 6,772 and 8,023 gallons per rebate, respectively. In terms of average daily savings, the estimates are approximately 18.5 and 22.0 gallons per day per rebate, respectively. The estimates are derived from toilet rebate program evaluation studies conducted for the California Urban Water Conservation Council (CUWCC, 2004), and account for average number of toilets per household, average number of persons per household, and average efficiency of toilets being replaced. Because state law prohibits the sale or installation of non-HET toilets starting January 2014, it is assumed that up to 50% of program participants receiving HET rebates could be free-riders (i.e. would have replaced the toilet even without the rebate). No freeridership is assumed for UHET rebates, since state law does not cover UHET toilets and they are not currently prevalent in the market place. First year annual water savings for both HET and UHET toilets are decayed at a rate of 4% per year to account for expected natural replacement of inefficient toilets due to plumbing code requirements. This adjustment ensures that the savings estimates for toilet rebates are not overstated by double counting water savings that would otherwise have occurred due to plumbing codes. The rate of adjustment is recommended by the CUWCC for reliably estimating water

savings from toilet replacement programs. Water savings from toilet rebates are assumed to have a maximum useful life of 25 years.

Multi-Family Household Rebate Water Savings: First year annual savings for HET and UHET rebates are 11,595 and 15,147 gallons per rebate, respectively. In terms of average daily savings, the estimates are approximately 31.8 and 41.5 gallons per day per rebate, respectively. The estimates are derived from toilet rebate program evaluation studies conducted for the California Urban Water Conservation Council (CUWCC, 2004), and account for average number of toilets per household, average number of persons per household, and average efficiency of toilets being replaced. The higher rate of savings for multi-family households compared to single-family households is due to three factors. The first is the higher density of toilets (persons per toilet) in multi-family housing, which increases the likelihood that a rebate will replace the primary toilet used by household residents. The second is the empirically confirmed observation that average efficiency of existing toilets is lower in multi-family housing (i.e. there is a greater proportion of higher water using toilets in multi-family housing). The third is the empirically confirmed observation that rebated toilets in multi-family housing have a higher frequency of undetected or unrepaired leaks that are resolved when the toilet is replaced. Because state law prohibits the sale or installation of non-HET toilets starting January 2014, it is assumed that up to 50% of program participants receiving HET rebates could be free-riders (i.e. would have replaced the toilet even without the rebate). No freeridership is assumed for UHET rebates, since state law does not cover UHET toilets and they are not currently prevalent in the market place. As with single-family rebates, first year annual water savings are decayed at a rate of 4% per year to account for expected natural replacement of inefficient toilets due to plumbing code requirements. This adjustment ensures that the savings estimates for toilet rebates are not overstated by double counting water savings that would otherwise have occurred due to plumbing codes. The rate of adjustment is the rate recommended by the CUWCC for reliably estimating water savings from toilet replacement programs. Water savings from toilet rebates are assumed to have a maximum useful life of 25 years.

Commercial Toilet Rebate Water Savings: First year annual savings for HET toilet rebates are 6,302 gallons per rebate. In terms of average daily savings, the estimate is 17.3 gallons per day. The estimate is derived from the CUWCC's commercial toilet water savings evaluation study (CUWCC, 1997) and zip-code level counts of pre-1992 toilets by commercial sector for the Visalia region, also published by CUWCC (CUWCC, 1998). The estimate reflects a weighted-average for 10 commercial sectors most likely to participate in the rebate program. Weights are calculated using zip-code level counts of pre-1992 toilets in each of the 10 commercial sectors. Because state law prohibits the sale or installation of non-HET toilets starting January 2014, it is assumed that up to 50% of program participants receiving HET rebates could be free-riders (i.e. would have replaced the toilet even without the rebate). As with single- and multi-family rebates, first year annual water savings are decayed at a rate of 4% per year to account for expected natural replacement of inefficient toilets due to plumbing code requirements.

Irrigation Equipment Rebates:

Single Family Smart Irrigation Controller Rebates: Smart Controller water savings are estimated to average 16,771 gallons per year. The estimate is based on empirical studies that show that Smart Controllers can reduce outdoor residential water usage by as much as 20% (Western Policy Research, 1996; Western Policy Research, 1997; CUWCC, 2004). It was assumed up to 75% of this savings potential would be realized by the program. Thus, Smart Controllers were assumed to reduce residential outdoor water use by 15% (75% of 20%). Outdoor water use was set to the five-year average of outdoor

water use for the period 2005-2009, which was 111,806 gallons based Visalia district UWMP data. The water savings are estimated to have a 10-year useful life based on the typical lifecycle of irrigation controllers.

Multi-Family and Commercial Rotating Sprinkler Nozzle Rebates: Estimated water savings for rotating sprinkler nozzle rebates are 1,042 gallons per year per nozzle. The source for the annual savings estimate is Metropolitan Water District of Southern California's Save Water Save A Buck program assumption. The MWD estimate is reduced by 20% to account for nozzles that do not get installed. The water savings are estimated to have a 10-year useful life based on the typical lifecycle of irrigation spray nozzles.

Multi-Family and Commercial Spray Body Integrated Pressure Regulation and Check Valve Rebates: Savings in this program are achieved through proper pressure management and through limiting low-head drainage water loss. Per-nozzle savings of 835 gallons per year for pressure regulation were calculated using the Rain Bird savings calculator.1 Low-head drainage water loss savings of 150 gallons per year are based on 1" PVC pipe and 25% of total irrigated area being flat/marginal. Combined per-nozzle savings from pressure regulation and avoided low-head drainage loss is 985 gallons. The water savings are estimated to have a 10-year useful life based on the typical lifecycle of irrigation spray nozzle bodies.

Turf Replacement Rebates

Turf replacement is estimated to save on average 33 gallons per square foot per year for single-family, multi-family, and commercial properties. The estimate is derived from the EPA Waterwise landscape water requirements model. It is assumed turf replacement improves irrigation application efficiency by 40% and cuts plant water use by 50%. Resulting in a savings of 33 gallons per square foot of turf replaced. 25% of program participants are assumed to be freeriders (customers that would have replaced the turf in the absence of the utility rebate). Water savings are assumed to have a 10-year useful life.

Large Landscape Water Use Reports and Surveys

Water Use Reports: Water use reports are estimated to save 34,750 gallons per acre per year. The estimate is calculated with the EPA Waterwise landscape water requirements model. The water use reports are assumed to increase irrigation efficiency by approximately 3%. Water savings are assumed to have a lifecycle of one year.

Large Landscape Surveys: Large landscape surveys are estimated to reduce site water use by 89,568 gallons per acre per year. The savings estimate is calculated with the EPA Waterwise landscape water requirements model. The surveys are assumed to increase irrigation efficiency by an additional 13%. Water savings are assumed to have a lifecycle of 5 years.

[1] See http://www.rainbird.com/landscape/resources/calculators/1800prs_5-steps.htm.

Table 6-5: Visalia Water Conservation Program Project Physical Benefit by Program Element

Year	HET and UHET Toilet Rebates (AF)	Irrigation Equipment Rebates (AF)	Turf Replacement Rebates (AF)	Large Landscape Water Use Reports and Surveys (AF)	Total Physical Benefits* (AF)
2014	3	33	1	13	50
2015	14	63	4	15	95
2016	24	95	8	16	144
2017	24	95	8	5	131
2018	23	95	8	5	130
2019	22	95	8	3	128
2020	21	95	8	2	126
2021	21	95	8	0	123
2022	20	95	8	0	122
2023	19	95	8	0	122
2024	19	62	7	0	88
2025	18	32	4	0	54
2026	17	0	0	0	17
2027	17	0	0	0	17
2028	16	0	0	0	16
2029	16	0	0	0	16
2030	15	0	0	0	15
2031	15	0	0	0	15
2032	14	0	0	0	14
2033	14	0	0	0	14
2034	13	0	0	0	13
2035	13	0	0	0	13
2036	13	0	0	0	13
2037	12	0	0	0	12
2038	12	0	0	0	12
2039	10	0	0	0	10
2040	5	0	0	0	5
* Column (c) of Table 5a – Annual Project Primary Physical Benefits.					

Secondary Physical Benefits

The water savings will help buttress water supply reliability during the current drought and into the future. These savings also result in key secondary benefits for Visalia such as reduced pumping from an over-drafted groundwater basin and reduced energy usage. All of Cal Water's Visalia supply is pumped from the Kaweah Sub-Basin. Average static groundwater elevations in the district have declined up to 50 feet over the past twenty years. If not addressed, the continuation of this decline can result in significant environmental damage as well as a marked reduction in available groundwater supplies. This could result in additional costs in terms of both well construction, and operation and maintenance costs generated by the needed effort to seek groundwater at greater and greater depths. Conservation programs such as

those being proposed in this application, along with other actions being undertaken by Cal Water, help protect the basin. Table 5b estimates the reduced energy consumption as a result of the water savings shown in Table 5a. These estimates are based on power usage as estimated by the U.S. Department of Energy (U.S. Department of Energy, 2006). The figures in Table 5b include, for all water savings, the energy savings associated with groundwater pumping (based on the approximate current static level of the Kaweah Sub-Basin, this is assumed to be 540 kWh per million gallons) and distribution (950 kWh/mg), as well as energy usage reductions associated with wastewater collection and treatment (2,850 kWh/mg) and discharge (200 kWh/mg) for the indoor portion of the water savings. As the groundwater basin level is likely to decrease in the future, the energy usage reductions in the table likely understate actual savings.

6.5.2 Well 15 Water Quality Protection Project

The City of Lindsay has an annual water supply demand near 2,500 acre-feet. The principal source of supply to meet this demand comes from treated raw surface water from the Friant-Kern Canal. The decision to pursue treated surface water in lieu of groundwater was based on the long history of poor quality from groundwater wells drilled and developed in the area, an increase in the number of chemical constituents causing MCL violations and the costs associated with repeated failures to complete a well installation fully compliant with State and Federal drinking water standards. As Lindsay has chosen treated surface water as its principal source of supply to meet the demands of its customers, it has done so with the recognition that the source of surface supply has its own set of shortcomings. The supply is subject to reductions in available quantity due to several factors, including drought conditions.

Due to the inability for Lindsay to offset demand from their Well 15, without issuing a mandated Boil Water Advisory (BWA) as required by the California Department of Public Health (CDPH) in 2009, a review of potential alternative solutions and their estimated costs to allow Lindsay to meet CDPH's requirements under the Groundwater Rule, which occurs by achieving a 4-log inactivation of viruses was completed. This review was completed in an effort to salvage Well 15, which other than cyclic bacteriological contamination is a very dependable, high-volume (1500 AF/year) producing well, versus securing a new well location and constructing a new well in or around the city limits with no guarantees that a comparable or superior well could be constructed. To salvage the well, additional piping to increase contact time of the chlorine is the preferred alternative. Sampling stations are also to be included to have continuous monitoring to verify the 4-log virus inactivation requirement is always being satisfied.

To ensure that the pipeline and sampling station project preferred alternative would work, a Chlorine Contact Time Study (Study) was accomplished for Lindsay in 2010 by Keller/Wegley Consulting Engineers which provided information to Lindsay relative to the utilization of their Well 15 as it pertained to the removal of the bacteriological contamination. The Study indicated the capability of the proposed alternative facilities to accomplish the retention of the produced water supply sufficiently to satisfy the minimum contact time requirement.

Based on the Study, an estimated 24,189 acre-feet of compliant and dependable water supply would be produced, based upon estimated 85% and 55% allocations for Friant Contractors, which would otherwise not be available. Well 15 would offset the Friant CVP contract supply shortages. If allocations do not achieve these levels, like the 0% allocation this year, then benefits of the Project are further increased. A recent condition that provides illustration to this description is the 2012-2013 water year (Mar. 2012 to

Feb. 2013). The 2012-2013 water year was classified as a normal-dry water year and allocation of Lindsay's Class 1 CVP – Friant Division contract amount was 57% of normal, which equated to 1,425 acre-feet of available surface water delivery from the Friant-Kern Canal. In addition, due to a non-native aquatic plant species growing in the Friant-Kern Canal, canal operation was ceased for a 120 day period, during which Lindsay could not receive any deliveries of its 2012-2013 surface water supply. Due to the inability to delivery surface water supplies, Lindsay was forced to put Well 15 into full operation, issue a mandated Boil Water Advisory, and deliver non-compliant groundwater supply.

Another recent, yet on-going problem that Lindsay has had to deal with is the public's perception of the BWA. Prior to the Chlorine Contact Study CDPH required Lindsay to deliver the BWA notice to all customers, city-wide. This amount was reduced to 34 customers through protests filed by Lindsay with CDPH and was further reduced to five (5) customers following the results of the Chlorine Contact Study in 2010. While these reductions were a result of working with CDPH relative to technical compliance matters, the discontinuing of the BWA to certain parties, while remaining issued to other parties has caused considerable confusion and an overall distrust among certain customer elements. The Project's ability to have the BWA removed for all customers will go a long way toward rebuilding the trust that is an important element of operating a public water system.

6.6 Cost Effectiveness Analysis

The cost-effective analysis has been performed used Table 6. Each project has a unique Table 6 answering the three questions provided.

6.6.1 Visalia Water Conservation Program Project

Table 6-6: Visalia Water Conservation Program Project Cost-Effectiveness Table

Table 6 – Cost Effectiveness Analysis **Project name: Visalia Water Conservation Program Project**	
Question 1	Types of benefits provided as shown in Table 5 -The primary benefits of the water savings shown in Table 5a are water supply benefits. The savings enable Cal Water to reduce its water production costs. During periods of drought, the savings increase water supply reliability. -Secondary benefits associated with these water savings include protection of an overdrafted groundwater basin and reductions in the energy used to produce and distribute water and collect, treat, and discharge wastewater.
Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? -In 2010-2011, Cal Water undertook a comprehensive conservation master planning process. As part of that process, an exhaustive search of the literature and experience of other water utilities was conducted to develop a universe of all possible approaches to conserving water. This universe was subjected to several layers of screening to end up with the most appropriate and cost-effective portfolio of programs for each Cal Water district. The conservation program elements that are included in this application are the portion of the Visalia portfolio deemed most applicable for immediate drought relief.

Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods. -With the exception of the turf replacement program, the proposed conservation programs that comprise this project were developed by Cal Water to comply with the state's 20x2020 requirements at least possible cost. As part of the 20x2020 analysis a broader suite of programs was evaluated and programs were selected for implementation on the basis of savings potential, technical and administrative feasibility, and cost effectiveness. (M.Cubed, 2012) The programs for which grant funding is being requested are from the subset of programs included in the least-cost set of conservation measures that are not locally cost-effective to implement, though nonetheless needed to meet the 2020 gpcd reduction target. Thus this grant will assist Cal Water and the region to implement conservation programs and measures that are not locally cost-effective but needed for drought relief and longer term compliance with the state's 2009 conservation law. The turf replacement program was not originally part of the least cost set of conservation measures selected for 20x2020 compliance. It has been added as a drought relief measure because it provides immediate and lasting reductions in water use, has significant public relations value, and in response to increased public demand for this program during the drought.
Comments: N/A	

6.6.2 Well 15 Water Quality Protection Project

Table 6 – Cost Effective Analysis **Project name: Well 15 Water Quality Protection Project**	
Question 1	Types of benefits provided as shown in Table 5 The primary benefit shown in Table 5 is increased water supply reliability for delivery of safe drinking water. With this project, the City of Lindsay will be able to meet drinking water demands with safe drinking water (i.e. no more bacteriological issues requiring a Boil Water Advisory) in any year, especially when its surface water supply is unavailable during drought conditions like the present.

Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? Yes, other alternative methods that have been considered include UV Disinfection (cost $638,935) and inclusion of a Contact Tank (cost $887,700). The Project has a number of significant benefits over all other alternatives which would deliver comparable benefits. First, the fact that it incorporates an existing well facility means that that investment is not lost, nor does it have to have been duplicated in another installation. Duplication may require the drilling and development of a multiple number of wells to secure a compliant facility. If one could be found, an interconnecting pipeline to the existing distribution system would have to be constructed. When compared to the UV Disinfection alternative, multiple Project benefits exist in addition to the initial capital cost differential. UV systems consume considerable amounts of power. As every acre-foot of developed water has to be treated, that cost is extensive, a cost which is avoided completely with the recommended Project, as no additional power consumption is required. The UV Disinfection alternative also requires periodic lamp cleaning, lamp replacement and lamp ballast replacement, all of which add to the annual operating cost and are avoided with the recommended Project. The last avoided cost is the requirement to shade all of the facilities as the impact of the summer sun is to shorten the life of the facilities and to cause intermittent outages due to high electrical power cabinet temperatures. When compared to the Contact Tank alternative, the benefits are also multiple. A site would have to be identified, or created, purchased and developed for the tank, pumping and electrical facilities. The small size in an agricultural area makes direct purchase of an existing parcel a difficult proposition and would take agricultural land out of production. Increased operation and maintenance would also be a permanent expense due to the annual maintenance and periodic replacement of the anode packs necessary to protect the steel tanks. Power use would also increase due to the impressed current requirements and friction loss increases caused by the design of the system. The existing pump and motor serving Well 15 would have to be removed and replaced. Additional unavoidable maintenance costs would also be experienced for painting and periodic replacement of booster pumps, related electrical, and control support equipment.
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods. The proposed alternative is the least cost alternative. See Question 2.
Comments: N/A	

ATTACHMENT 3 – PROJECT JUSTIFICATION

APPENDIX A

Visalia Water Conservation Program
Water Savings by Element

Visalia Water Conservation Program Project - Water Savings by Program Element

	Single Family HET Rebate Savings							Single Family UHET Rebate Savings						
Year	HET Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	UHET Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)
2014	40	20	20	135,440	0	135,440	0.42	60	60	60	481,380	0	481,380	1.48
2015	80	40	60	406,320	-5,418	400,902	1.23	120	120	180	1,444,140	-16,253	1,427,887	4.38
2016	80	40	100	677,200	-21,454	655,746	2.01	120	120	300	2,406,900	-64,361	2,342,539	7.19
2017			100	677,200	-47,684	629,516	1.93			300	2,406,900	-143,051	2,263,849	6.95
2018			100	677,200	-72,864	604,336	1.85			300	2,406,900	-218,593	2,188,307	6.72
2019			100	677,200	-97,038	580,162	1.78			300	2,406,900	-291,113	2,115,787	6.49
2020			100	677,200	-120,244	556,956	1.71			300	2,406,900	-360,732	2,046,168	6.28
2021			100	677,200	-142,522	534,678	1.64			300	2,406,900	-427,567	1,979,333	6.07
2022			100	677,200	-163,909	513,291	1.58			300	2,406,900	-491,728	1,915,172	5.88
2023			100	677,200	-184,441	492,759	1.51			300	2,406,900	-553,323	1,853,577	5.69
2024			100	677,200	-204,151	473,049	1.45			300	2,406,900	-612,454	1,794,446	5.51
2025			100	677,200	-223,073	454,127	1.39			300	2,406,900	-669,220	1,737,680	5.33
2026			100	677,200	-241,238	435,962	1.34			300	2,406,900	-723,715	1,683,185	5.17
2027			100	677,200	-258,677	418,523	1.28			300	2,406,900	-776,031	1,630,869	5
2028			100	677,200	-275,418	401,782	1.23			300	2,406,900	-826,254	1,580,646	4.85
2029			100	677,200	-291,489	385,711	1.18			300	2,406,900	-874,467	1,532,433	4.7
2030			100	677,200	-306,918	370,282	1.14			300	2,406,900	-920,753	1,486,147	4.56
2031			100	677,200	-321,729	355,471	1.09			300	2,406,900	-965,187	1,441,713	4.42
2032			100	677,200	-335,948	341,252	1.05			300	2,406,900	-1,007,843	1,399,057	4.29
2033			100	677,200	-349,598	327,602	1.01			300	2,406,900	-1,048,793	1,358,107	4.17
2034			100	677,200	-362,702	314,498	0.97			300	2,406,900	-1,088,106	1,318,794	4.05
2035			100	677,200	-375,282	301,918	0.93			300	2,406,900	-1,125,845	1,281,055	3.93
2036			100	677,200	-387,359	289,841	0.89			300	2,406,900	-1,162,076	1,244,824	3.82
2037			100	677,200	-398,952	278,248	0.85			300	2,406,900	-1,196,857	1,210,043	3.71
2038			100	677,200	-410,082	267,118	0.82			300	2,406,900	-1,230,246	1,176,654	3.61
2039			80	541,760	-334,139	207,621	0.64			240	1,925,520	-1,002,417	923,103	2.83
2040			40	270,880	-169,188	101,692	0.31			120	962,760	-507,564	455,196	1.4

Multi Family HET Rebate Savings						
HET Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)
30	15	15	173,925	0	173,925	0.53
120	60	75	869,625	-6,957	862,668	2.65
150	75	150	1,739,250	-41,464	1,697,786	5.21
		150	1,739,250	-109,375	1,629,875	5
		150	1,739,250	-174,570	1,564,680	4.8
		150	1,739,250	-237,157	1,502,093	4.61
		150	1,739,250	-297,241	1,442,009	4.43
		150	1,739,250	-354,921	1,384,329	4.25
		150	1,739,250	-410,295	1,328,955	4.08
		150	1,739,250	-463,453	1,275,797	3.92
		150	1,739,250	-514,485	1,224,765	3.76
		150	1,739,250	-563,475	1,175,775	3.61
		150	1,739,250	-610,506	1,128,744	3.46
		150	1,739,250	-655,656	1,083,594	3.33
		150	1,739,250	-699,000	1,040,250	3.19
		150	1,739,250	-740,610	998,640	3.06
		150	1,739,250	-780,555	958,695	2.94
		150	1,739,250	-818,903	920,347	2.82
		150	1,739,250	-855,717	883,533	2.71
		150	1,739,250	-891,058	848,192	2.6
		150	1,739,250	-924,986	814,264	2.5
		150	1,739,250	-957,557	781,693	2.4
		150	1,739,250	-988,824	750,426	2.3
		150	1,739,250	-1,018,841	720,409	2.21
		150	1,739,250	-1,047,658	691,592	2.12
		135	1,565,325	-964,078	601,247	1.85
		75	869,625	-543,156	326,469	1

Multi Family UHET Rebate Savings						
UHET Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)
20	20	20	302,940	0	302,940	0.93
80	80	100	1,514,700	-9,276	1,505,424	4.62
100	100	200	3,029,400	-55,285	2,974,115	9.13
		200	3,029,400	-145,834	2,883,566	8.85
		200	3,029,400	-232,760	2,796,640	8.58
		200	3,029,400	-316,210	2,713,190	8.33
		200	3,029,400	-396,321	2,633,079	8.08
		200	3,029,400	-473,229	2,556,171	7.84
		200	3,029,400	-547,059	2,482,341	7.62
		200	3,029,400	-617,937	2,411,463	7.4
		200	3,029,400	-685,980	2,343,420	7.19
		200	3,029,400	-751,300	2,278,100	6.99
		200	3,029,400	-814,008	2,215,392	6.8
		200	3,029,400	-874,208	2,155,192	6.61
		200	3,029,400	-932,000	2,097,400	6.44
		200	3,029,400	-987,480	2,041,920	6.27
		200	3,029,400	-1,040,741	1,988,659	6.1
		200	3,029,400	-1,091,871	1,937,529	5.95
		200	3,029,400	-1,140,956	1,888,444	5.8
		200	3,029,400	-1,188,078	1,841,322	5.65
		200	3,029,400	-1,233,315	1,796,085	5.51
		200	3,029,400	-1,276,742	1,752,658	5.38
		200	3,029,400	-1,318,432	1,710,968	5.25
		200	3,029,400	-1,358,455	1,670,945	5.13
		200	3,029,400	-1,396,877	1,632,523	5.01
		180	2,726,460	-1,285,438	1,441,022	4.42
		100	1,514,700	-724,208	790,492	2.43

Commercial HET Rebate Savings							
HET Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	**Net Savings (AF)**
0	0	0	0	0	0	0	**3**
100	50	50	315,100	0	315,100	0.97	**14**
0	0	50	315,100	-12,604	302,496	0.93	**24**
		50	315,100	-24,704	290,396	0.89	**24**
		50	315,100	-36,320	278,780	0.86	**23**
		50	315,100	-47,471	267,629	0.82	**22**
		50	315,100	-58,176	256,924	0.79	**21**
		50	315,100	-68,453	246,647	0.76	**21**
		50	315,100	-78,319	236,781	0.73	**20**
		50	315,100	-87,790	227,310	0.7	**19**
		50	315,100	-96,883	218,217	0.67	**19**
		50	315,100	-105,611	209,489	0.64	**18**
		50	315,100	-113,991	201,109	0.62	**17**
		50	315,100	-122,035	193,065	0.59	**17**
		50	315,100	-129,758	185,342	0.57	**16**
		50	315,100	-137,171	177,929	0.55	**16**
		50	315,100	-144,289	170,811	0.52	**15**
		50	315,100	-151,121	163,979	0.5	**15**
		50	315,100	-157,680	157,420	0.48	**14**
		50	315,100	-163,977	151,123	0.46	**14**
		50	315,100	-170,022	145,078	0.45	**13**
		50	315,100	-175,825	139,275	0.43	**13**
		50	315,100	-181,396	133,704	0.41	**13**
		50	315,100	-186,744	128,356	0.39	**12**
		50	315,100	-191,878	123,222	0.38	**12**
		50	315,100	-196,807	118,293	0.36	**10**
		0	0	0	0	0	**5**

Visalia Water Conservation Program Project - Water Savings by Program Element

	Single Family Smart Irrigation Controller Rebate Savings							Multi Family and Commercial Rotating Nozzle Rebate Savings						
Year	Control. Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	Nozzle Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)
2014	10	10	10	167,710	0	167,710	0.51	2000	2000	2000	2,084,000	0	2,084,000	6.4
2015	15	15	25	419,275	0	419,275	1.29	3000	3000	5000	5,210,000	0	5,210,000	15.99
2016	25	25	50	838,550	0	838,550	2.57	5000	5000	10000	10,420,000	0	10,420,000	31.98
2017			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2018			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2019			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2020			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2021			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2022			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2023			50	838,550	0	838,550	2.57			10000	10,420,000	0	10,420,000	31.98
2024			40	670,840	0	670,840	2.06			8000	8,336,000	0	8,336,000	25.58
2025			25	419,275	0	419,275	1.29			5000	5,210,000	0	5,210,000	15.99
2026			0	0	0	0	0			0	0	0	0	0
2027			0	0	0	0	0			0	0	0	0	0
2028			0	0	0	0	0			0	0	0	0	0
2029			0	0	0	0	0			0	0	0	0	0
2030			0	0	0	0	0			0	0	0	0	0
2031			0	0	0	0	0			0	0	0	0	0
2032			0	0	0	0	0			0	0	0	0	0
2033			0	0	0	0	0			0	0	0	0	0
2034			0	0	0	0	0			0	0	0	0	0
2035			0	0	0	0	0			0	0	0	0	0
2036			0	0	0	0	0			0	0	0	0	0
2037			0	0	0	0	0			0	0	0	0	0
2038			0	0	0	0	0			0	0	0	0	0
2039			0	0	0	0	0			0	0	0	0	0
2040			0	0	0	0	0			0	0	0	0	0

Multi Fam & Com Spray Body Int. Pressure Reg. & Check Valve Rebate Savings						
Spray Body Rebates	Net of Freeriders	Cumul. Rebates Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)
8500	8500	8500	8,372,500	0	8,372,500	25.69
6500	6500	15000	14,775,000	0	14,775,000	45.34
5000	5000	20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		20000	19,700,000	0	19,700,000	60.46
		11500	11,327,500	0	11,327,500	34.76
		5000	4,925,000	0	4,925,000	15.11
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0

Net Savings (AF)
33
63
95
95
95
95
95
95
95
95
62
32
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0

Visalia Water Conservation Program Project - Water Savings by Program Element

	Turf Replacement Rebate Savings							
Year	SqFt Turf Replaced	Net of Freeriders	Cumul. SqFt Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	**Net Savings (AF)**
2014	10000	7500	7500	247,500	0	247,500	0.76	**1**
2015	40000	30000	37500	1,237,500	0	1,237,500	3.8	**4**
2016	50000	37500	75000	2,475,000	0	2,475,000	7.6	**8**
2017			75000	2,475,000	0	2,475,000	7.6	**8**
2018			75000	2,475,000	0	2,475,000	7.6	**8**
2019			75000	2,475,000	0	2,475,000	7.6	**8**
2020			75000	2,475,000	0	2,475,000	7.6	**8**
2021			75000	2,475,000	0	2,475,000	7.6	**8**
2022			75000	2,475,000	0	2,475,000	7.6	**8**
2023			75000	2,475,000	0	2,475,000	7.6	**8**
2024			67500	2,227,500	0	2,227,500	6.84	**7**
2025			37500	1,237,500	0	1,237,500	3.8	**4**
2026			0	0	0	0	0	**0**
2027			0	0	0	0	0	**0**
2028			0	0	0	0	0	**0**
2029			0	0	0	0	0	**0**
2030			0	0	0	0	0	**0**
2031			0	0	0	0	0	**0**
2032			0	0	0	0	0	**0**
2033			0	0	0	0	0	**0**
2034			0	0	0	0	0	**0**
2035			0	0	0	0	0	**0**
2036			0	0	0	0	0	**0**
2037			0	0	0	0	0	**0**
2038			0	0	0	0	0	**0**
2039			0	0	0	0	0	**0**
2040			0	0	0	0	0	**0**

Visalia Water Conservation Program Project - Water Savings by Program Element

	Water Use Report Savings							Large Landscape Survey Savings							
Year	Acres Covered by Reports	Net of Freeriders	Cumul. Acres Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	Acres Covered by Surveys	Net of Freeriders	Cumul. Acres Net of Freeriders	Ann Savings (Gal)	Plumb. Code Adjustment (Gal)	Net Savings (Gal)	Net Savings (AF)	**Net Savings (AF)**
2014	108	108	108	3,753,000	0	3,753,000	11.52	6	6	6	537,408	0	537,408	1.65	**13**
2015	108	108	108	3,753,000	0	3,753,000	11.52	6	6	12	1,074,816	0	1,074,816	3.3	**15**
2016	108	108	108	3,753,000	0	3,753,000	11.52	6	6	18	1,612,224	0	1,612,224	4.95	**16**
2017			0	0	0	0	0			18	1,612,224	0	1,612,224	4.95	**5**
2018			0	0	0	0	0			18	1,612,224	0	1,612,224	4.95	**5**
2019			0	0	0	0	0			12	1,074,816	0	1,074,816	3.3	**3**
2020			0	0	0	0	0			6	537,408	0	537,408	1.65	**2**
2021			0	0	0	0	0			0	0	0	0	0	**0**
2022			0	0	0	0	0			0	0	0	0	0	**0**
2023			0	0	0	0	0			0	0	0	0	0	**0**
2024			0	0	0	0	0			0	0	0	0	0	**0**
2025			0	0	0	0	0			0	0	0	0	0	**0**
2026			0	0	0	0	0			0	0	0	0	0	**0**
2027			0	0	0	0	0			0	0	0	0	0	**0**
2028			0	0	0	0	0			0	0	0	0	0	**0**
2029			0	0	0	0	0			0	0	0	0	0	**0**
2030			0	0	0	0	0			0	0	0	0	0	**0**
2031			0	0	0	0	0			0	0	0	0	0	**0**
2032			0	0	0	0	0			0	0	0	0	0	**0**
2033			0	0	0	0	0			0	0	0	0	0	**0**
2034			0	0	0	0	0			0	0	0	0	0	**0**
2035			0	0	0	0	0			0	0	0	0	0	**0**
2036			0	0	0	0	0			0	0	0	0	0	**0**
2037			0	0	0	0	0			0	0	0	0	0	**0**
2038			0	0	0	0	0			0	0	0	0	0	**0**
2039			0	0	0	0	0			0	0	0	0	0	**0**
2040			0	0	0	0	0			0	0	0	0	0	**0**