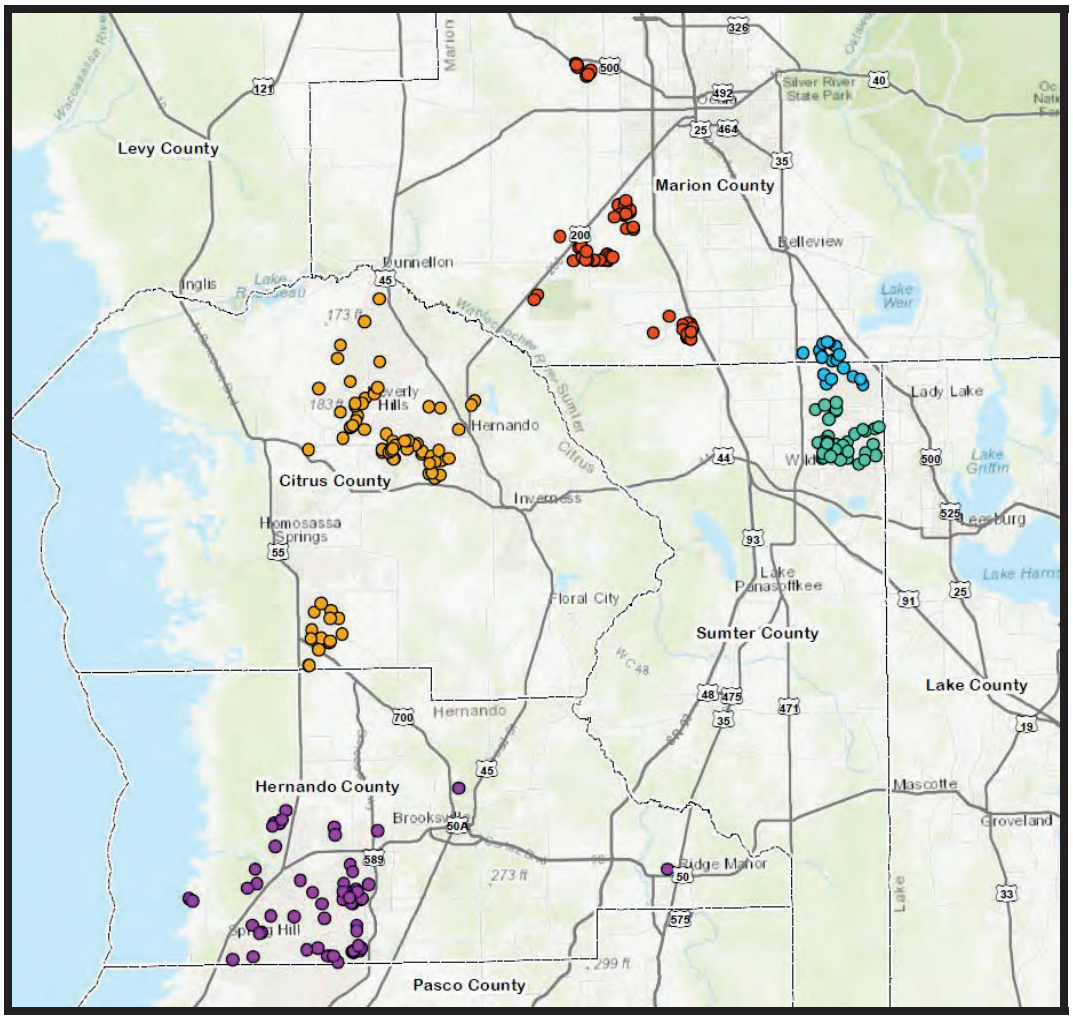
PHASE V
IRRIGATION SYSTEM AUDIT PROGRAM (Q040)



Cooperative Funding Initiative Q040

between the

Southwest Florida Water Management District

and the

Withlacoochee Regional Water Supply Authority

Acknowledgements Page

Cooperative Funding Initiative Q040
between the

Southwest Florida Water Management District
and the

Withlacoochee Regional Water Supply Authority

With funding by:

Southwest Florida Water Management District

WITHLACOOCHEE REGIONAL WATER SUPPLY AUTHORITY

and

Citrus County Water Resources

Hernando County Utilities

Marion County Board of County Commissioners

North Sumter County Utility Dependent District

Villages Community Center Development District

Withlacoochee Regional Water Supply Authority

Irrigation System Audit and Education Phase V Project (Q-040)

Table of Contents

Withlacoochee Regional Water Supply Authority

Irrigation System Evaluation and Education Program Phase V (Q040)

A Cooperative Funding Initiative

1. Introduction

The Withlacoochee Regional Water Supply Authority (Authority) and several local water utilities partnered with the Southwest Florida Water Management District (District or SWFWMD) to provide a water conservation program for single-family residential customers of the water utilities. Under the District's Cooperative Funding Initiative (Initiative), the Authority applied for matching funds to conduct the water conservation program. Single-family residential customers of the water utilities were eligible to apply for and receive a free irrigation system evaluation. Citrus, Hernando, and Marion County utilities, as well as the North Sumter County Utility Dependent District (NSCUDD) and the Villages Community Center Development District (VCCDD) participated in the program. The utilities identified those single-family residential customers with the highest water use for potential participation. The evaluations were designed to assess residential irrigation systems and to provide recommendations for conserving water. Recommendations included the use of Florida-friendly™ landscaping techniques, appropriate rainy season or dry season scheduling, efficient irrigation application systems, and improvements to the irrigation system. A professionally certified irrigation contractor developed these recommendations. In numerous cases the Authority's contractor, at the direction of the participating local utility, completed "Enhanced" evaluations.

2. Program Description

This project targeted existing high usage, fully operational single-family residential irrigation systems to increase water savings and water quality protection.

Participating utilities had the option of having "Core" or "Enhanced" evaluations performed. Core evaluations included an in-depth inspection of each participant's irrigation system, by zone, followed by a written report to the resident that included efficiency measures per zone, recommendations for optimizing the use of water outdoors through Florida-Friendly Landscaping™ practices, and other efficient irrigation best management practices. The timing and run cycles for each zone were analyzed and changes either recommended or made with the homeowners permission. A new rain sensor was installed or the existing one repaired if the existing sensor was non-functional. Each participant also received information and brochures on measures to conserve outdoor water use as part of the educational component designed to maintain the water savings over time (see Appendix C).

Enhanced evaluations involved not only the core services described above, but also in some cases installation of an advanced Water Sense labeled evapotranspiration (ET) controller. In Citrus County the enhanced improvements were limited to just additional ET controllers, per Citrus County staff reference; however in Hernando and Marion County enhanced evaluations also included performing additional irrigation system modifications such as installing an ET sensor device (instead of a standard rain sensor), replacing broken or mixed sprinkler heads, capping unnecessary heads, raising low irrigation heads, and straightening crooked irrigation.

Approximately one year after the initial evaluation, a sample of 25% of the Core evaluation participants were offered a follow-up inspection. For core evaluations, the reinspection determined how many changes were made by the homeowner. The contractor provided an estimate of changes made based on the original recommendations. For enhanced evaluations, the reinspection evaluated subsequent changes by the homeowner and recommendations not implemented by the contractor during the original evaluation. Each residential account was tracked by the utility to show the actual amount of water used one year prior to the evaluation and for one year following the evaluation. The utility water use data is the primary method used to measure the water savings. While the program was designed to measure water use for one year before and after the evaluation, the utilities have the ability to further track the water use over time. The Authority administered the program and prepared this report.

2.1 Objectives

The District's *Regional Water Supply Plan* states that lawn and landscape irrigation can comprise 35 to 60 percent of the residential water used in the Public Supply sector in some of the larger utility services areas in the WRWSA area. This component of the public supply demand represents a significant opportunity for water savings. The water conservation specialists at each of the participating utilities also identify residential outdoor water use as an area with the greatest opportunity for water savings. The regional irrigation evaluation program was initiated to assist participating utilities to reach, maintain and surpass the

District's maximum compliance water use rate of 150 gallons of water per capita per day (gpcd), to allow existing sources of water to meet the needs of a growing customer base, and to reduce current and future water demands.

The Phase V Project Plan called for 170 core and 90 enhanced evaluations to be conducted, for a total of 260, with approximately 25% or 43 receiving a follow-up inspection. The actual results were 151 core evaluations, 132 enhanced evaluations, for a total of 283, with 43 follow-ups. These results are further explained below.

2.2 Methodology

The Phase V program consisted of four major components:

a. Onsite investigations: 152 core irrigation evaluations and 131 enhanced evaluations.
b. Follow-up evaluations for up to 25 percent of the core evaluation participants: 37 core follow-ups were completed for core evaluation sites, and 5 follow-ups at enhanced sites were also completed.
c. Recommendations and educational materials provided to each participant to achieve more efficient irrigation; and
d. Analysis of water use from the utilities' data for each participant for one year prior to the on-site evaluation and one year after the evaluation.

The program Agreement was signed on April 26, 2019. The following paragraphs describe the implementation of the Phase V Program.

Initiation. The Authority's Board selected Eco Land Design, Jack Overdorff, as the irrigation system contractor and entered into a contract with Eco Land Design on September 19, 2018 in anticipation of entering into the Cooperative Funding Agreement with the District. The contractor was responsible for conducting the onsite evaluations, preparing a written report for each homeowner that contained a summary of the evaluation, recommendations for improving irrigation efficiency and providing follow-up inspections to approximately 25 percent of the core evaluation participants. Phase V evaluations began in December 2018.

Process. Each participating utility, including Citrus, Hernando and Marion county utilities, the VCCDD and NSCUDD assigned a staff person to manage their participation in the project and coordinate with the Authority's staff. The local utility personal directed their efforts to target the highest water users in each utility. In Marion County, only single-family residential customers located in the SWFWMD, or west of Interstate 75, were eligible to participate since the District was co-funding the program and required participants to be located within the District's boundaries. Directing the program toward the highest users was determined to be the most effective way to reduce overall water use and to achieve the highest return for the money spent. The local utility staff provided the Authority with a list of names and addresses for direct contact, as well as their average monthly water use and the water rates for that utility. The Authority created mail merge files specific to each utility, including potential savings in dollars per month for each customer by participation in the program. Invitation letters, associated

application forms, a program description and a postage paid return envelope were mailed by the Authority with assistance from SWFWMD (see Appendix A for sample materials). Table 2.1 summarizes the response rate for each utility:

Table 2.1 Response Rates by Utility

Utility	Response Rate
Citrus	12%
Hernando	10%
Marion	16%
VCCDD (LSSA)	26%
NSCUDD (VWCA)	25%

Response rates to these mailings ranged from a low of 10% in Hernando County to a high of 26% in the VCCDD.

As the program progressed, some account holders requested evaluations based on word of mouth from neighbors who had participated in the program and were satisfied with the results and from the signs used by the contractor. The District provided the Authority with signs to be used by the irrigation contractor. These signs were placed in the yard for the duration of the on-site evaluation and were useful in generating additional visibility and interest in the program.

Because of the decision to focus on the highest water users, the Phase V project was not generally advertised, and no press releases were issued.

3. Program Summary

3.1 Overall Summary of Irrigation System Evaluations

The first on-site evaluation was conducted on December 4, 2018. The on-site portion of the program extended through July 29, 2020 lasting a total of 20 months. A total of 283 irrigation system evaluations were completed within the five utilities out of a program goal of 260, or 109 percent. Table 3.1 summarizes the irrigation system evaluations completed by participating utility. Citrus, Hernando and Marion county utilities elected to have both core and enhanced audits conducted. As the project progressed, significantly more audits were performed as enhanced audits and fewer as core audits within these counties than was originally planned. In the VCCDD and NSCUDD only core audits were budgeted and performed.

Table 3.1 Irrigation System Evaluation Summary

Participating Utility	Core Audits		Enhanced Audits		Total Audits	
	Target Number of Evaluations	Completed Evaluations	Target Number of Evaluations	Completed Evaluations	Target Number of Evaluations	Completed Evaluations
Citrus	65	63	10	14	75	77
Hernando	20	11	30	46	50	57
Marion	25	12	50	71	75	83
VCCDD (LSSA)	20	19	0	0	20	19
NSCUDD (VWCA)	40	47	0	0	40	47
Total	**170**	**152**	**90**	**131**	**260**	**283**

3.2 Rain Sensors Installed

A total of 253 rain sensors were installed, repaired, or replaced. Eighty-nine percent of all on-site evaluations needed to have the rain sensor installed, repaired, or replaced. Table 3.2 shows the breakout of rain sensor installation by utility. Only 10.6 % of the irrigation evaluation locations had existing functional rain sensors. Installation of a new rain sensor was counted if the sensor had to be replaced entirely or in part. If the sensor was re-set or moved to a new location, it was counted as an operational sensor.

Table 3.2 Rain Sensor Installation per Utility

Utility	Total Evaluations	Sensors Installed or Repaired/Replaced		Functional Sensors	
		Number	Percent	Number	Percent
Citrus	77	68	88.3%	9	11.7%
Hernando	57	56	98.2%	1	1.7%
Marion	83	72	86.7%	11	13.3%
VCCDD (LSSA)	19	15	78.9%	4	21.1%
NSCUDD (VWCA)	47	42	89.4%	5	10.6%
Totals	**283**	**253**	**89.4%**	**30**	**10.6%**

3.3 Follow-up Evaluations

The Agreement between the Authority and the District, as amended, stated that follow-up evaluations be conducted on approximately 25 percent of the core irrigation evaluation sites. This 25% target was applied at the utility level, resulting in a total of 37 follow-up evaluations at core evaluation sites. An additional five follow-ups were completed at enhanced evaluation sites. The follow-up inspections were designed to occur approximately 12 months following the initial evaluation. Over the course of a year, customers had the opportunity to implement some or all of the recommendations and to establish more efficient irrigation practices. During the follow-up inspection, the contractor reviewed each of the sites based on the initial evaluation. He determined how many changes were made and provided a percentage of recommendations followed. These items were noted on the original inspection form and provided to the homeowner, to the Authority, and to each utility. The follow-up evaluations ended in October 2020.

Table 3.3 summarizes the total number of completed follow-up evaluations by utility.

Table 3.3 Follow-up Evaluations by Utility

Utility	Number of Core Evaluations Completed	Target Number of Follow-Ups Based on Core Evaluations Completed	Actual Follow-Ups
Citrus	63	15	13 core, 2 enhanced
Hernando	11	2	4 core, 2 enhanced
Marion	12	3	2 core, 1 enhanced
VCCDD	19	4	6 core
NSCUDD	47	11	12 core
Totals	**152**	**35**	**37 core, 5 enhanced**

3.4. Total Water Savings

For this Phase V program, 283 single-family residential irrigation systems were evaluated. For each of these participants, monthly water use data was collected by the utility for one year prior to the month in which the evaluation was performed and one year after the evaluation. This data is shown in Appendix E. These data show a number of participants had zero or near zero values for one or more months. These zero or near zero values were sometimes associated with a customer moving or having their water turned off while away.

Since the purpose of the pre- and post-audit water use analysis is to evaluate the impact the audit and associated educational program have had on the customer's water use, the monthly water use of some customers was adjusted to reflect these other factors that would otherwise distort the analysis. Accounts with 6 months or more of zero or near zero monthly water use values in either the pre- or post-evaluation period were excluded from the analysis. For those accounts with five months or less of missing, zero or near zero monthly values in either the pre-

or post-evaluation period, the missing or low monthly values were adjusted. These data were adjusted by calculating the average of the remaining monthly values within the pre- or post-evaluation period and applying that average to the missing, zero or near zero monthly values. In addition, one customer had one month of abnormally high water use, which was adjusted in a similar manner whereby the average monthly value of the remaining months in that period was applied to that month(s) of abnormal high use. Four customers were removed from the analysis due to 6 or more months of zero or missing water usage data. The adjusted data is shown in Appendix E.

Table 3.4 shows total amount of water used in the pre-evaluation and post-evaluation periods by these accounts and the water saved. The data is shown first for core audits and then enhanced audits, and finally for the total program.

The types of evaluations completed varied throughout the WRWSA service area based on the preferences of the participating utilities. Enhanced evaluations in Hernando County and Marion County included replacing broken or mixed sprinkler heads, capping unnecessary heads, raising low irrigation heads, and straightening crooked irrigation heads where appropriate. In Citrus County the Enhanced evaluation only included the core audit components plus a Water Sense Controller and did not include additional repairs and adjustments to the irrigation system. In the VCCDD LSSA and NSCUDD VWCA only core evaluations were performed.

Water savings for the 150 core evaluations was approximately 9.3 million gallons for the year, or 20%. This represents 25,505 gallons per day and 170 gallons per account per day. Water savings for the 14 enhanced evaluations in Citrus County was approximately 1.8 million gallons for the year, or 33%. This represents 4,969 gallons per day and 355 gallons per account per day. Water savings for the 115 enhanced evaluations in Marion and Hernando Counties was approximately 8.3 million gallons for the year, or 22%. This represents 22,692 gallons per day and 197 gallons per account per day. Total annual water savings for all 279 accounts was approximately 19.4 million gallons, or 53,167 gallons of water per day and 191 gallons per account per day, representing a 22% reduction in water use.

Table 3.4 Water Savings by Utility

Utility	Evaluations with Pre/Post Use	One Year Pre-Evaluation Water Use (in millions of gallons)	One Year Post-Evaluation Water Use (in millions of gallons)	One Year Water Saved (in millions of gallons)	Percent Water Saved	Gallons Per Day Saved	Gallons Per Account Per Day Saved
Core Evaluations:							
Citrus	62	20.037	16.063	3.974	20%	10,888	176
Hernando	11	3.435	2.798	0.637	19%	1,745	159
Marion	12	3.310	2.700	0.610	18%	1,672	139
VCCDD	19	6.334	4.510	1.824	29%	4,998	263
NSCUDD	46	12.366	10.102	2.264	18%	6,202	135
Subtotal	**150**	**45.482**	**36.172**	**9.309**	**20%**	**25,505**	**170**
Enhanced Evaluations with Water Sense Controller only (Citrus County) Subtotal:							
Citrus	14	5.549	3.735	1.814	33%	4,969	355
Subtotal	**14**	**5.549**	**3.735**	**1.814**	**33%**	**4,969**	**355**
Enhanced Evaluations with additional enhancements (Marion and Hernando County) Subtotal:							
Hernando	44	14.312	11.725	2.587	18%	7,088	161
Marion	71	23.586	17.890	5.696	24%	15,604	220
Subtotal	**115**	**37.898**	**29.615**	**8.283**	**22%**	**22,692**	**197**
Core and Enhanced Evaluations Total:							
Citrus	76	25.586	19.799	5.787	23%	15,857	209
Hernando	55	17.747	14.522	3.225	18%	8,834	161
Marion	83	26.896	20.590	6.306	23%	17,276	208
VCCDD	19	6.334	4.510	1.824	29%	4,998	263
NSCUDD	46	12.366	10.102	2.264	18%	6,202	135
Total	**279**	**88.929**	**69.523**	**19.406**	**22%**	**53,167**	**191**

The Enhanced Evaluations that included just the Water Sense Controller (in Citrus County) saved 185 gallons per day more water than the average Core Evaluation. This represents more than twice the water savings for the Enhanced Evaluations that included just the Water Sense Controller (in Citrus County) over the core evaluations.

The Enhanced Evaluations that included the additional irrigation system improvements (in Hernando and Marion County) saved 27 gallons per day more water than the average Core Evaluation. This represents an approximate 16% greater water savings for the Enhanced Evaluations that included the additional irrigation system improvements (in Hernando and Marion County) over the core evaluations.

The increased water savings of the enhanced evaluations over the core evaluations is likely attributable to the contractor implementing additional modifications as a part of the evaluation. In the case of Citrus County, the additional savings from enhanced evaluations are only attributable to the installation of a Water Sense labeled irrigation controller, and in Hernando and Marion Counties the additional savings are due to additional repairs and adjustments to the irrigation system by the evaluation contractor.

Water Use Variables. The total amount of water used for irrigation will vary over time for a variety of reasons. While this program did not attempt to control for changes in pre- and post-water use caused by factors other than implementation of the audit recommendations, it is important to recognize some of the other possible causal factors. Other factors include when homeowners make seasonal time adjustments or periodically turn the irrigation system off. Actual rainfall amounts varying over time and place is also a significant factor influencing water use. Rainfall amounts were examined for the pre and post periods for the four-county region (Marion County only within the SWFWMD) and are summarized in Table 3.5.

As can be seen, there is less rainfall in the post-audit period when compared to the pre-audit period. This would tend to cause outdoor water use to increase slightly for the post evaluation period. In addition, changes in watering restrictions within the local government may affect the amount and frequency of lawn irrigation, for example Citrus County implemented an ordinance for once a week watering in June 2020.

Table 3.5 Pre and Post Period Rainfall

Time Periods	Cumulative Rainfall
Pre: December 2017 – June 2020	142.45
Post: January 2019 – July 2019	138.28
Difference	4.17

Data obtained from the SWFWMD

3.5 Per Capita Water Savings

This water conservation program was initiated between the District and the Authority to assist utilities to meet, maintain, or surpass the SWFWMD's maximum compliance per capita rate of 150 gpcd required by the District. As shown in Table 3.6, the program resulted in a savings range of 62 to 161 gallons per capita per day, and a range of 18% to 33% reduction in per capita water use.

Table 3.6 Water Saved Per Capita

Utilities	Number of Accounts	Persons Per Household [1]	Pre-Evaluation Per Capita Use	Post-Evaluation Per Capita Use	Water Saved Per Capita Per Day	Per Capita % Reduction
Core Evaluations						
Citrus County	62	2.2	402	323	80	20%
Hernando County	11	2.38	359	292	67	19%
Marion County	12	2.35	322	262	59	18%
VCCDD	19	1.9	481	342	138	29%
NSCUDD	46	1.9	388	317	71	18%
Total	150	**2.10**	**396**	**315**	**81**	**20%**
Enhanced Evaluations – Citrus County						
Citrus County	14	2.2	493	332	161	33%
Total	14	**2.2**	**493**	**332**	**161**	**21%**
Enhanced Evaluations – Marion and Hernando Counties						
Hernando County	44	2.38	374	307	62	18%
Marion County	71	2.35	387	294	93	24%
Total	**115**	**2.36**	**382**	**299**	**83**	**22%**

[1] For Citrus, Hernando and Marion counties, 2010 Census. American Fact Finder, "Community Facts." *Table DP-1. Profile of General Population and Housing Characteristics: 2010: Average household size*. Retrieved from www.factfinder2.census/gov on 1/22/2014. The average household size for Hernando and Marion counties is calculated for the entire county. The average household size for Citrus County is for the zip code area, retrieved from the zip code tabulation provided by the US Census Bureau. For VCCDD and NSCUDD provided by Arnett Environmental, 2019.

3.6 Program Costs

The total program costs were budgeted for $145,000 pursuant to the Agreement. Total program expenditures were $131,939 or 91 percent of the original budget. The on-site evaluation expenses averaged $320 per core evaluation with a total cost of $60,934, a cost per enhanced evaluation in Citrus County of $723 with a total cost of $10,125, and an average cost per enhanced evaluations in Marion and Hernando Counties of $520 with a total cost of $60,880 for a combined cost of $131,939. The project included an administrative fee at $50 per evaluation, for a total cost of $14,150. Marketing and outreach costs were $0 because SWFWMD performed the mailings. The cost for the follow-up inspections was $5,250.

Pursuant to the Agreement, the District provided 50 percent of the total funding, not to exceed $72,500. The Authority and the participating utilities shared the other half. The Authority was responsible for 25 percent with each utility contributing 25 percent of the total cost for their respective portion of the program. In addition, the participating utilities provided critical support by identifying high water users as potential participants, contacting customers, and assisting with analyzing the data.

Table 3.7 shows the cost of the program among the various funding entities for each major component of the program. Costs are shown for the District, the total amount for each utility (Authority and utility combined), and the total cost per component. The actual direct cost to each utility is shown on the last row of the table. This is the program cost to each utility after subtracting the funds provided by the Authority. The Authority's total final cost is $32,985.

Table 3.7 Expenditures Per Utility

Irrigation Evaluation Program Costs								
		WRWSA						
Item	SWFWMD	Citrus	Hernando	Marion	VCCDD	NSCUDD	Subtotal	Total
Irrigation Evaluations	$56,270	$15,033	$12,421	$18,647	$2,810	$7,360	$56,270	$112,540
Administration	$7,075	$1,925	$1,425	$2,075	$475	$1,175	$7,075	$14,150
Marketing	$0*	$0	$0	$0	$0	$0	$0	$0
Follow-up Inspections	$2,625	$938	$375	$188	$375	$750	$2,625	$5,250
Total	$65,670	$17,895	$14,221	$20,909	$3,660	$9,285	$65,670	$131,940
Final Utility Cost (50% WRWSA Cost)		**$8,948**	**$7,110**	**$10,455**	**$1,830**	**$4,642**	**$32,985**	

*Mailings completed by SWFWMD

Table 3.8 shows the total cost by utility summarized for enhanced and core audits. The average cost for a core audit was $401, while the average cost for an enhanced audit (Citrus County) was $723, and the average cost of an enhanced audit (Hernando and Marion County) was $520. The average cost for all evaluations in the Phase V program was $466.

Table 3.8 Costs for Enhanced and Core Audits

	Number of Audits	Total Cost	Audit Cost Only / Audit	Total Cost / Audit
Costs for Core Evaluations				
Citrus	63	$25,665	$332	$407
Hernando	11	$4,874	$348	$443
Marion	12	$4,507	$305	$376
VCCDD (LSSA)	19	$7,319	$296	$385
NSCUDD (VWCA)	47	$18,570	$313	$395
Total	**152**	**$60,934**	**$320**	**$401**
Costs for Enhanced Evaluations with Water Sense Controllers Only (Citrus County)				
Citrus	14	$10,125	$655	$723
Total	**14**	**$10,125**	**$655**	**$723**
Costs for Enhanced Evaluations with Additional improvements (Hernando and Marion County)				
Hernando	46	$23,568	$457	$512
Marion	71	$37,312	$474	$526
Total	**117**	**$60,880**	**$467**	**$520**
Combined Evaluation Costs				
Citrus	77	$35,790	$390	$465
Hernando	57	$28,442	$436	$499
Marion	83	$41,818	$449	$504
VCCDD (LSSA)	19	$7,319	$296	$385
NSCUDD (VWCA)	47	$18,570	$313	$395
Total	**283**	**$131,939**	**$398**	**$466**

3.7 Cost Effectiveness

The cost effectiveness can be calculated using the SWFWMD method of benefit/cost analysis. The benefit/cost calculations are summarized below, with additional calculation detail in Appendix G.

Table 3.9: Cost Effectiveness Calculation Summary

Evaluation Type	Cost/Benefit Calculation ($/Kgal)
Core Evaluations	$1.64
Enhanced Evaluation (Citrus County)	$1.40
Enhanced Evaluation (Hernando and Marion Counties)	$1.84
All Evaluations	**$1.70**

The enhanced audits with the additional Water Sense Irrigation Controllers appear to be more cost effective than the core audits, while the enhanced audits with the additional irrigation system adjustments and improvements included appear to provide a lesser impact than core audits for each dollar spent.

4. Customer Implementation

The program included the Authority's contractor revisiting approximately 25 percent of each utility's participating customers to inspect how recommendations have been implemented and other changes the homeowners may have made to their irrigation systems since the evaluation was performed. Each follow-up evaluation included an estimate of the changes made by the customer based on the original evaluation and recommendations provided. A sample of a complete evaluation is contained in Appendix B. The evaluation form was used to provide a written set of recommendations to each customer. On the follow-up inspection, the contractor used the last column of the form to note whether changes were implemented. The results of the follow-up inspections are included in this section.

4.1 Implementation Rates for Efficiency Recommendations

About a year after the first on-site evaluation, the irrigation contractor began scheduling follow-up appointments with customers. He reviewed the irrigation system on each site using the original written evaluation. Based on the changes made to the system relative to the written evaluation and its recommendations, an implementation rate was determined for completion of water conservation measures (Section 3.3 covers the number of follow-up evaluations). The implementation rate is not necessarily indicative of the potential or actual water savings. Some changes to system components may have a greater impact on one system than another depending on the severity of the particular issue and the corresponding changes to the systems. Table 4.1 summarizes the follow-up evaluations conducted for participants within each utility as well as the average for enhanced, core and all follow-ups. Appendix F summarizes the follow-up inspections.

Table 4.1 Summary of Follow-up Findings

	Number of Follow-Up Inspections			Percent of Changes Implemented		
Utility	Core	Enhanced	Total	Core	Enhanced	Total
Citrus	13	2	15	58%	63%	59%
Hernando	4	2	6	72%	75%	72%
Marion	2	1	3	65%	30%	55%
VCCDD (LSSA)	6	0	6	60%	-	60%
NSCUDD (VWCA)	12	0	12	46%	-	46%
Total	37	5	42	58%	61%	60%

Potential changes included relocation of heads, changes in types of heads, eliminating or removing items that block the spray pattern or coverage, repairing or replacing leaking or broken heads, reducing turf areas, reducing areas of overspray, and capping heads in areas where irrigation is not needed. All customers who participated in the follow-up evaluations made some changes to their irrigation systems, ranging from 17 to 86 percent. The overall program implementation rate was 60%.

The installation or repair of the rain sensor by the irrigation contractor and alterations to system run times were not included in the percent of changes implemented.

4.2 Customer Satisfaction Surveys

A customer satisfaction survey was prepared using Momentive (previously Survey Monkey). The complete survey and results are included in Appendix D. A total of 51 responses were received. Respondents to the survey included customers who received either a core or enhanced irrigation system evaluation.

Eighty percent of respondents reported making at least some changes to their irrigation systems. Forty-nine percent reported adjusting, repairing or replacing irrigation heads, followed by adjustments to irrigation system run times (28%). Sixty-seven percent reported using less water after implementing the recommendations. Respondents were asked to rate the overall evaluation process by selecting “Pleased,” “Very Pleased,” “Dissatisfied,” or no response. Of the respondents, 98 percent selected “Pleased” or “Very Pleased” with the irrigation system evaluation.

5. Recommendations

It is recommended that this Irrigation System Audit program be continued for additional phases. The Phase V results show a positive outcome for both core and enhanced audits. This was the second time enhanced audits have been offered in the program and the results were positive both times. Core audits saved on average 81 gallons per person per day, a 20% reduction. Enhanced audits with the water sense irrigation controller improvements saved on average 161 gallons per person per day, a 33% reduction, and the enhanced evaluations with other repairs/adjustments to the irrigation systems saved on average 84 gallons per capita per day, a 22% reduction.

The calculated cost effectiveness of the core audits is $1.64 $/Kgal, while enhanced audit calculations come in at $1.40 and $1.84 $/Kgal for evaluations with irrigation controller upgrades in Citrus County, and with other irrigation system improvements in Hernando and Marion Counties, respectively. Therefore, for Phase V, the enhanced audits with the irrigation controller upgrades were more cost effective while the enhanced evaluations with the other repairs and adjustment in the irrigation system appear to provide a lesser impact than core audits for each dollar spent.

It appears for the 14 enhanced evaluations in Citrus County that included only the additional water sense irrigation controller improvements that this modification can be very cost effective. These customers were selected to receive the enhanced evaluation because they had very high water use. While the cost per evaluation is higher, the water saved was also greater.

It also appears that having the irrigation contractor complete additional repairs in the irrigation system does save more water than leaving the repairs up to the customer but it is less cost effective within this program; however, the cost effectiveness calculation does not include the component of the cost that is then shifted to the customer.

It is recommended for future phases to maintain the variety of core and enhanced evaluations and to incorporate the water sense controllers where appropriate based on very high water users. This would allow for continued attractiveness of the program to residents and utilities based on their comfort level of commitment.

Appendices

A. Marketing Materials

B. Sample Evaluation Report

C. List of Educational Material

D. Customer Satisfaction Survey

E. Water Use Data by Utility

F. Summary of Follow-ups

G. SWFWMD Cost Effectiveness Calculation

Appendix A

Marketing Materials

(Municipality Logo)

(Date)

(Name)
(Address)
(City/State/Zip)

Subject: Potential Water Bill Savings

Dear (Name),

We noticed your water usage has averaged about __,000 **gallons per month** at your home located at (Address) in (Municipality), Florida. This usage is higher than the average user. The average residential customer of the _____ Utilities Department is between 8,000-10,000 gallons per month, which includes both indoor and outdoor water consumption. So, we are trying to find ways to help you reduce your water use.

Based on past performance, I believe our Irrigation Evaluation program could reduce your water use by 20% or more. Using Hernando County Utilities 2018 water rates that went into effect this October, I estimate participation in this program could save you an average of **$__** a month! There are other things Hernando County does to help customers save water, but I think the Irrigation Evaluation program will offer the greatest savings – and, it's **FREE** to you. See the enclosed brochure which further describes our program.

If you choose to participate, our contractor will run each of your irrigation system zones to identify ways to improve water efficiency, create a map of the irrigation system for you to keep, and provide written recommendations of improvements. With your permission, he can even do some minor fixes and adjustments at no cost to you. All you must do is complete the enclosed application and return it to:

LuAnne Stout, Administrative Assistant
Withlacoochee Regional Water Supply Authority
3600 W Sovereign Path, Suite 228
Lecanto, FL 34461

The contractor will contact you to schedule a convenient time to visit your home. This is a by 'invitation only' offer available on a first-come, first-served basis. Space is limited. I hope you will consider participating. If you have any questions, please give me a call. I look forward to working with you.

Sincerely,

(Municipality Coordinator)

Enclosures

Irrigation Evaluation Program (Q040) Application Form

Residential Water Customer Information:

Complete Name:	Account Number:	Day-Time Telephone Number: Best Time to Call:
Street Address with Zip Code:	Email Address:	
Does your water account serve more than one home? _____No _____Yes If Yes, how many?_____		
Is your irrigation system operational and without any known or major breaks, leaks or other damage? _____Yes _____No **If the system is not functioning, the irrigation system must be repaired before an evaluation can be scheduled.**	Do you have a rain sensor installed on your automatic in-ground sprinkler system? _____Yes _____No _____Don't Know	
Please indicate the number of zones your sprinkler system contains: 1 - 4 zones _____ 5 - 8 zones _____ More than 8 zones _____ Don't know_____		

(Please Turn Page Over for Program Guidelines)

By signing below, I certify that I have read and will abide by the program guidelines as outlined. IN ADDITION, I certify that my entire irrigation system is in good operating condition. In the event my irrigation system or major parts of my irrigation system are inoperable when the System Evaluator arrives to conduct the irrigation system evaluation, I understand that I will be ineligible to receive the requested evaluation.

_____ _____

Signature Name (Please Print)

_____

Date

This program is cooperatively funded by the Withlacoochee Regional Water Supply Authority, participating local governments, and the Southwest Florida Water Management District.

- **This program applies only to single-family residential users using public-supply, metered water for their operable in-ground irrigation or sprinkler system.**

How to Participate:

1. Complete and sign this application form.

2. Return the application in the stamped, self-addressed envelope that is included with this application; OR, if filling out the online form, return to: lstout@wrwsa.org

3. The Program's contractor will contact you to arrange an appointment to perform an evaluation of your irrigation system. You will need to provide access to your property and your sprinkler system's time clock.

What to Expect from the Irrigation Evaluation Program:

1. ***At no cost to you***, an irrigation system evaluation, including suggested changes to improve the operation and efficiency of your irrigation system**.**
2. Installation of a rain sensor where a rain sensor is not present or is inoperable. Acceptance of a functioning rain sensor is a requirement to participate in this program. ***There is no cost to you.***
3. Educational materials on water conservation, ***at no cost to you*.**
4. Reduction in water use and lower water bills.
5. Possible improvement in the health and appearance of your lawn and landscape over time.

Program Terms and Conditions – What is expected of Participants:

1. The irrigation system must be fully functional without any major breaks, leaks or other damage, as far as you know.
2. The application form must be completed and signed.
3. The Irrigation System Evaluator will need access to the property, including the area where the time clock is installed. The participant or an adult representative will need to be available.
4. The Irrigation System Evaluator is on-site to evaluate the system and to recommend modifications. They are **not** authorized to make recommended modifications or repairs.
5. Any licensed irrigation professional can make the recommended modifications, if the participant chooses to hire someone.
6. Any costs incurred in making recommended modifications will be at the participant's expense.
7. The participant or adult representative agrees to participate in a follow-up evaluation regarding the suggested sprinkler system modifications. If the participant is chosen to participate in a Follow-up Evaluation, this visit will be scheduled approximately 10 to 12 months after the initial visit.
8. A customer satisfaction survey will be completed and returned at the end of the program.

If you have further questions related to this program, please call

LuAnne Stout at 352-527-5795 or email lstout@wrwsa.org

Residential Water Customer Information:

Printed Name:	Water Account Number:	Phone Number(s):
Street Address with Zip Code:		Email Address:

If the irrigation system is not functioning, it must be repaired before an evaluation can be scheduled. Is your irrigation system operational and without any major breaks or leaks? _____Yes _____No

The Irrigation System water must be purchased from Citrus County Utilities to participate in this program. Those connected to a private well are NOT eligible.

Do you have a rain sensor installed on your automatic in-ground sprinkler system?
_____Yes _____No _____Don't Know

How many zones does your sprinkler system contain?
___1-4 zones ___5-8 zones ___If more than 8, indicate how many.

How old is your controller?
____1-5 years ____6-10 years ____11-15 years ____16+ years ____Don't Know

Irrigation Controller:
Brand:_____ Model:_____

Does the controller have pins that are pushed or pulled to schedule the system?
_____Yes _____No

On a scale of 1-10, 10 being the most knowledgeable, how would you rate your understanding of your irrigation controller? ____

On a scale of 1-10, 10 being the most capable, how would you rate your ability to modify the irrigation schedule (day of week, time of day) using the controller? ____

Does a hired professional adjust your controller for you? ____Yes ____No

Wireless internet connection (WiFi) is used for some smart controllers. Do you have WiFi at your home? ____Yes ____No

If you could upgrade your existing controller, which feature would you find most desirable?
____ Irrigation schedule able to be modified from anywhere in the world via Smart Phone
____ Irrigation schedule modified on the irrigation control panel
____ Both of the above are desired
____ I'm not interested in an updated controller

On average, how many gallons of water do you think your household uses a day (while bathing/showering, cooking, washing clothes, watering the lawn, etc.)?
___0-50 gallons ___50-100 gallons ___100-150 gallons ___150-200 gallons ___200+ gallons

(Please Turn Page Over for Program Guidelines)

By signing below, I certify that I have read and will abide by the program guidelines as outlined. In addition, I certify that my entire irrigation system is in good operating condition. In the event my irrigation system or major parts of my irrigation system are inoperable when the System Evaluator arrives to conduct the irrigation system evaluation, I understand that I will be ineligible to receive the requested evaluation.

Name (Please Print) _____ Signature _____ Date _____

This program is cooperatively funded by the Withlacoochee Regional Water Supply Authority, Citrus County Utilities, and the Southwest Florida Water Management District.

FREE

IRRIGATION SYSTEM EVALUATION

This program is for Citrus County Utilities single-family residential customers that have an in-ground irrigation / sprinkler system connected to the utility's water supply.

How to Participate:

1. Complete and sign the application on the back of this page.
2. Return the application via mail, email, fax or hand deliver. We have provided a self-addressed, stamped envelope for your convenience. Other delivery options below:
   - Email to: lstout@wrwsa.org
   - Fax: 352-527-5797
   - Deliver to: WRWSA, 3600 W. Sovereign Path, Ste 228, Lecanto FL 34461
3. The Program's contractor, Jack Overdorff, will contact you to arrange an appointment to perform an evaluation of your irrigation system. You must be present at the time of the evaluation and will need to provide access to your property and sprinkler system's time clock.

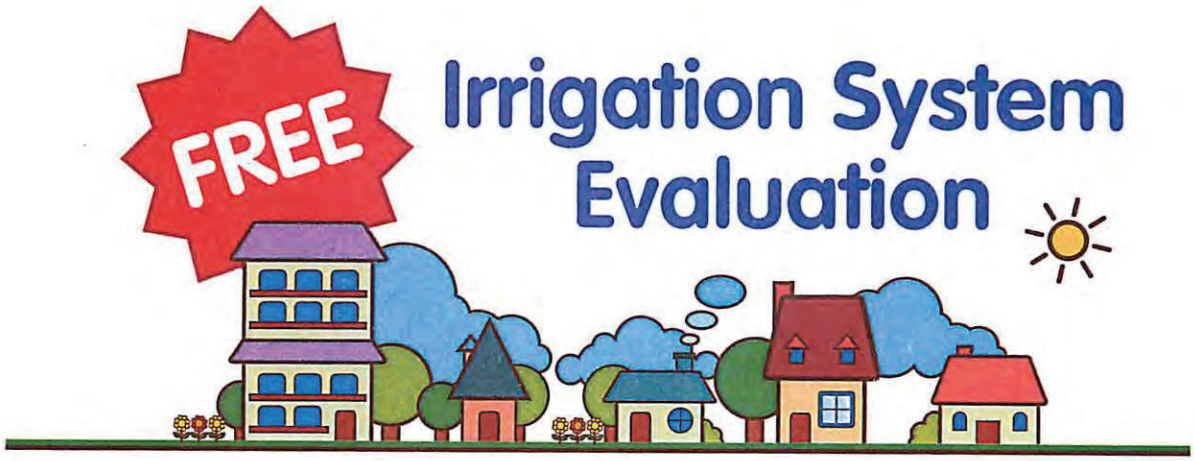
What to Expect from the Irrigation Evaluation Program:

1. ***At no cost to you***, an irrigation system evaluation, including suggested changes to improve the operation and efficiency of your irrigation system**.**
2. Installation of a rain sensor where a rain sensor is not present or is inoperable. Acceptance of a functioning rain sensor is a requirement to participate in this program. ***There is no cost to you.***
3. Educational materials on water conservation, ***at no cost to you*.**
4. Likely, reduction in water use and lower water bills.
5. Possible improvement in the health and appearance of your lawn and landscape over time.

Program Terms and Conditions – What is expected of Participants:

1. The irrigation system must be fully functional without any major breaks, leaks or other damage.
2. The application form must be completed and signed.
3. The Irrigation System Evaluator will need access to the property, including the area where the time clock is installed. The participant or an adult representative will need to be available.
4. The Irrigation System Evaluator is on-site to evaluate the system and to recommend modifications. The evaluator is **only** authorized to make minor modifications or repairs necessary to improve system efficiency. The evaluator may also replace the irrigation controller under special circumstances.
5. Recommended modifications not carried out by the evaluator can be done by any licensed irrigation professional, should the participant choose to hire someone.
6. The irrigation system must be connected to Citrus County Utilities water supply. Systems connected to a private well do not qualify for this program.
7. Any costs incurred by hiring a licensed professional to make modifications are the participant's responsibility.
8. The participant or adult representative agrees to participate in a follow-up evaluation regarding the suggested sprinkler system modifications. If the participant is chosen to participate in a Follow-up Evaluation, this visit will be scheduled approximately 10 to 12 months after the initial visit.
9. Participant agrees to complete and return a customer satisfaction survey at the end of the program.

If you have further questions related to this program, please call LuAnne Stout
352-527-5795 or lstout@wrwsa.org



Irrigation System Evaluation

Would you like a **FREE** irrigation system evaluation? Want to **lower your water bill** by optimizing your outdoor water use? Water-efficient landscaping equipment and practices can reduce water bills and help protect Florida's precious water resources.

Some irrigation systems have damaged sprinkler heads, heads that are incorrectly angled and sized for the area, or heads programmed to overwater zones. You may not even know if a problem exists, but participating in this evaluation is a good way to find out.

Evaluations:
The Withlacoochee Regional Water Supply Authority and the Southwest Florida Water Management District are offering a limited number of free evaluations to qualified residents. Eco-Land Design, a certified irrigation auditor, will visit your home to:

- Perform an irrigation system evaluation
- Install a free rain sensor if you do not have an operable sensor
- Evaluate your time clock and sprinkler zones for water efficiency
- Provide a detailed report with suggestions that could improve the operation and effectiveness of your irrigation system
- Supply information on Florida-Friendly Landscaping™ principles and other landscape-related information

Qualifications:
You must be a single-family residence using 30,000 gallons of water or more per month; have a fully functional irrigation system with no leaks, breaks or repair needs; and you must be a customer of one of the following utilities:

- Citrus County Utilities
- Hernando County Utilities
- Marion County Utilities
- Village Center Community Development District
- North Sumter County Utility Dependent District

To participate, complete and return the attached application by

_____

The number of free evaluations is limited.

For further information, call the program administrator at **(352) 527-5795**.

This irrigation system evaluation pilot program is funded by

Marion County FLORIDA

North Sumter County UTILITY Dependent District

UTILITIES

Withlacoochee Regional Water Supply Authority

Sponsored by a grant from the Coastal Rivers and Withlacoochee River basin boards of the Southwest Florida Water Management District

WATERMATTERS.ORG · 1-800-423-1476

Appendix B

Sample Evaluation Report

Eco Land Design
landscape architecture studio

7615 Terrace River Drive
Tampa, FL 33637
Ph: (813) 466-8705
E-Mail: ecolandfl@gmail.com

Residential Landscape/Irrigation Evaluation Report

Evaluator: Jack Overdorff, RLA

Date:

Resident Name:

Address:

E-mail:

Report Overview:

On Monday, _____ 20__, a site inspection was conducted for the irrigation system at the above referenced residence. The irrigation system is connected to the potable (drinking) water supply.

A visual inspection as well as a more in-depth review of the irrigation system was conducted. The findings are outlined below as well as recommendation for addressing the system issues and setting of watering durations.

Turf Area

Checklist:

Item	Location	Functioning?
Time clock	Garage wall of the residence	Program A, Zones 1-8 Program Running Days:, Tuesday, Thursday & Saturday @ 1am Zones #1 thru #3, #7 & #8 running 40 minutes Zones #2 & #3 running 40 minutes Zone #4 running 30 minutes Zone #5 running 20 minutes Zone #6 running 55 minutes Program B, Zone 2 Program Running Days:, Mon., Wed., Fri. & Sat. @ 5:15am Zone #2 running 35 minutes Low Volume Zone (Hose bib battery valve) Program Running Days: Every 3 days #9 running 45 minutes
Rain sensor	East Side	No, new wired sensor installed and functioning correctly
Backflow Preventer	Side yard	Yes

Evaluation:

Area	Observation	Action	Addressed by Homeowner
General	Spray Heads & Rotor Heads have irregular head spacing	Recommend moving heads and adding heads as noted below to achieve head to head coverage and improve the spray pattern coverage	

	The overall turf maintenance can be reduced as large turf areas are difficult to maintain	Recommend reducing the turf areas by installing Florida Friendly Landscape materials that are suited for the site conditions.	
	Zones are irrigating turf and landscape beds within the same zone	It is not recommended to irrigate turf and landscape beds within the same zone as each have different water requirements. Recommend separating the landscape beds and turf/lawn areas into separate zones	
	Spray Heads in the landscape beds are being blocked by plant material	Recommend making adjustments as noted below to improve the irrigation coverage	
	Several heads are of a different manufacture than other heads on the zones	It is not recommended to use different manufacturer's equipment within a zone as the spray nozzle precipitation rates vary between the different manufactures and can create uneven coverage. Recommend installing all of the same equipment fitted with matched precipitation rate nozzles on each zone.	

Zone #1 **Rotor Zone** **Side Yard Turf Area** **(See attached site plan)**	Water can be conserved as Rotor Head R1 is leaking	Recommend replacing the head with a similar large turf Rotor Head similar to other heads on the zone fitted with a matched precipitation rate spray nozzle	
	Water can be conserved as Rotor Head R4 is overspraying onto the street	Recommend adjusting the spray pattern to reduce overspray and to conserve water	
	Zone is operating at approximately 9 Gallons Per Minute (GPM)	No action	
Zone #2 **Rotor Zone** **Side Yard Turf Area** **(See attached site plan)**	Water can be conserved as Rotor Heads R5 thru R7 are irrigating a narrow turf area and overspraying mature plantings	Recommend replacing the heads with fixed Spray Heads fitted with strip spray nozzles to reduce overspray and to conserve water	
	Spray pattern coverage for the turf areas can be improved as Rotor Head R6 is set too low and blocked by the surrounding turf areas	Recommend raising the head and also recommend trimming the turf around the head to conserve water	

	Zone is operating at 10 Gallons Per Minute (GPM)	No Action	
Zone #3 **Rotor Zone** **Front Yard Turf Area & Landscape Beds** **(See attached site plan)**	Spray pattern coverage can be improved as rotating Spray Head #1 is located in a planting bed	Recommend moving the head to the turf area for better coverage	
	Water can be conserved as Rotor Head R8 is overspraying onto the street	Recommend adjusting the spray pattern to reduce overspray and to conserve water	
	Zone is operating at approximately 11 Gallons Per Minute (GPM)	No action	
Zone #4 **Spray Zone** **Side Yard Turf Area** **(See attached site plan)**	Spray pattern coverage can be improved as Spray Head #2 does not have head to head spray pattern coverage for the turf areas	Recommend adding a similar fixed Spray Head at the street fitted with a matched precipitation rate spray nozzle to improve the spray pattern coverage for the turf areas	
	Water can be conserved as Spray Head #8 is overspraying onto the air conditioning unit	Recommend adjusting the spray pattern to reduce overspray, conserve water and prevent water damage to the air conditioning unit	

	Water can be conserved as Spray Head #9 is overspraying onto the residence	Recommend adjusting the spray pattern to reduce overspray, conserve water and prevent water damage to the residence	
	Spray pattern coverage can be improved as Spray Head #10 is set too low and blocked by the surrounding turf	Recommend raising the head or replacing the 4" tall Spray Head with a 6" tall Spray Head to improve the spray pattern coverage for the turf area	
	Zone is operating at 6 Gallons Per Minute (GPM)	No action	
Zone #5 **Spray Zone** **Front/Side Yard Planting Beds & Turf Areas** **(See attached site plan)**	Spray pattern coverage can be improved for the turf areas as Spray Heads #17, #18 & #19 are blocked by the plantings	Recommend moving the heads to the turf area to improve the spray pattern coverage for the turf	
	Water can be conserved as Spray Heads #11 thru #15 are irrigating mature plantings	Recommend replacing the heads with low volume dripline or micro-irrigation on a separate low volume zone to conserve water	
	Water can be conserved as Spray Head #16 is irrigating an area covered by low volume dripline	Recommend capping the head to conserve water	
	Zone is operating at 12 Gallons Per Minute (GPM)	No action	

Zone #6 **Spray Zone** **Side/Rear Yard Turf Area & Landscape Beds** **(See attached site plan)**	The zone efficiency can be improved as Spray Heads #21 thru #25 are irrigating mature plantings on a turf zone	Recommend replacing the heads with low volume dripline or micro-irrigation on a separate zone to improve the zone efficiency and to conserve water	
	Water can be conserved as Spray Head #28 is overspraying onto the residence	Recommend adjusting the spray pattern to reduce overspray, conserve water and prevent water damage to the residence	
	Spray pattern coverage can be improved as Spray Heads #30 thru #32 have low pressure	Recommend capping heads irrigating mature plantings and/or moving heads to zone 2. Also, recommend further investigating the issue to determine the appropriate solution	
	Spray pattern coverage can be improved as Spray Head #32 is set too low and blocked by the surrounding turf	Recommend raising the head or replacing the 4" tall Spray Head with a 6" tall Spray Head to improve the spray pattern coverage for the turf area	
	Zone is operating at 13 Gallons Per Minute (GPM)	No action	

Zone #7 **Rotor Zone** **Side Yard Turf Area** **(See attached site plan)**	Water can be conserved and the spray pattern coverage improved as Rotor Head R13 is leaking and blocked by plantings	Recommend replacing the head with a similar large turf Rotor Head similar to other heads on the zone fitted with a matched precipitation rate spray nozzle. Also, recommend trimming plantings to improve the spray pattern coverage	
	Spray pattern coverage can be improved as Rotor Head R14 is leaning	Recommend straightening the head to improve the spray pattern coverage for the turf areas	
	Zone is operating at 8 Gallons Per Minute (GPM)	No action	
Zone #8 **Rotor Zone** **Side Yard Turf Area** **(See attached site plan)**	Water can be conserved as Rotor Head R15 is overspraying onto the street	Recommend adjusting the spray pattern to reduce overspray and to conserve water	
	Water can be conserved as Rotor Head R17 is located in a planting bed	Recommend capping the head and irrigating plantings with only dripline or micro-irrigation	
	Zone is operating at 10 Gallons Per Minute (GPM)	No action	
Zone #9 **Low Volume Zone** **(See attached site plan)**	Zone is operating at 4 Gallons Per Minute (GPM)	No action	

A catch can test was performed on Zones #4 & #7 to determine the system spray uniformity and also determine appropriate run times for the scheduled waterings in order to achieve a 1/2" to 3/4" application rate. .

Zone #4 is running at 6 gallons per minute and according to the catch can test, is operating at 45% spray uniformity for the Zone (above 70% is considered to be good). This zone is applying 1.38" of water per hour. The lawn has areas of distress. If the recommendations above are made to the system with the application rate increased to 1.40" per hour and the spray uniformity improved to 70%, it is recommended that the zone runtime be set at 30 minutes once per week to achieve a 1/2" application rate. Also, based on the existing soil profile (sandy clay) and root depth it is recommended that the runtime be completed in one application.

Zone #7 is running at 8 gallons per minute and according to the catch can test, is operating at 52% spray uniformity for the Zone (above 70% is considered to be good). This zone is applying .68" of water per hour. The lawn has areas of distress. If the recommendations above are made to the system with the application rate increased to .70" per hour and the spray uniformity improved to 70%, it is recommended that the zone runtime be set at 60 minutes once per week to achieve a 1/2" application rate. Also, based on the existing soil profile (sandy clay) and root depth it is recommended that the runtime be completed in one application.

Irrigation Schedules:

The Watering schedule below (Left Side) reflects the information recorded from the irrigation controller at the time of the inspection by the irrigation evaluator called (Pre-inspection zone runtimes and water usage). The water schedule below (Right Side) reflects recommended changes to the watering times and frequency based on the evaluation inspection called (Post-inspection zone runtimes and water usage). These modifications can create significant water savings in many cases.

The suggested runtimes reflect the fact that Spray Heads deliver more water than rotor sprinklers during a given time period and that turf grasses typically require more frequent irrigation than most plants and shrubs. Following the Post Inspection suggested runtimes will allow for deeper development of turf grass roots, greater soil moisture retention and help promote a more drought resistant turf. Over-watering allows water to travel beyond the root zone, while under-watering may cause shallow roots that will dry out quickly

Plant type	Pre-inspection zone runtimes And water usage	Plant type	Post-inspection suggested runtimes And water usage
	Program A (3 application times per week)		Program A (1 application time per week)
Turf	Zone 1 (Rotor) - 40 mins = 360 Gal	Turf	Zone 1 (Rotor) - 60 mins = 540 Gal
Turf	Zone 2 (Rotor) - 40 mins =400 Gal	Turf	Zone 2 (Rotor) - 60 mins =600 Gal
Mixed	Zone 3 (Rotor) - 40 mins = 440 Gal	Turf	Zone 3 (Rotor) - 60 mins = 660 Gal
Turf	Zone 4 (Spray) - 30 mins = 180 Gal	Turf	Zone 4 (Spray) - 30 mins = 180 Gal
Mixed	Zone 5 (Spray) -20 mins = 240 Gal	Turf	Zone 5 (Spray) -30 mins = 360 Gal
Mixed	Zone 6 (Spray) - 55 mins = 715 Gal	Turf	Zone 6 (Spray) - 30 mins = 390 Gal
Turf	Zone 7 (Rotor) - 40 mins = 320 Gal	Turf	Zone 7 (Rotor) - 60 mins = 480 Gal
Turf	Zone 8 (Rotor) - 40 mins = 400 Gal	Turf	Zone 8 (Rotor) – 60 mins = 600 Gal
	Program A - Current Total Water Usage (per application) = 3,055 Gallons per application x 3 applications per week =9,165 Gallons per week		Program A - Total Water Usage (per application) after run time modifications = 3,810 Gallons per week
	Program C (4 application times per week)		Program C (0 application time per week)
Turf	Zone 2 (Rotor) - 35 mins =350 Gal	Turf	Zone 2 (Rotor) - 0 mins =0 Gal
	Program C - Current Total Water Usage (per application) = 350 Gallons per application x 4 applications per week = 1,400 Gallons per week		Program C- Total Water Usage (per application) after run time modifications = 0 Gallons per week

	Hose Bib Battery Valve (2.5 application times per week)		Hose Bib Battery Valve (2.5 application times per week)
Plants	Zone 9 (Low Vol.) - 45 mins = 180 Gal	Plants	Zone 9 (Low Vol.) - 45 mins = 180 Gal
	Hose Bib Valve -Current Total Water Usage (per application) = 180 Gallons per application x 2.5 applications per week = 450 Gallons per week		Hose Bib Valve -Current Total Water Usage (per application) = 180 Gallons per application x 2.5 applications per week = 450 Gallons per week
	Current Total Water Usage (per application) = 11,015 Gallons per week		Total Water Usage (per application) after run time modifications = 4,260 Gallons per week

*Plant type has three terms: Turf Only, Plants/Shrubs only and Mixed (combination of Both)

a. Consider placing these charts next to your controller.
b. Consider skipping your watering day when there is significant rainfall 1/2 half inch or more).

When watering your lawn and landscape **please observe the local water use restrictions**.

Please check for any changes to the current watering restrictions at: http://swfwmd.state.fl.us/conservation/restrictions/swfwmd.php

Additionally, seasonal adjustments may also be used to further reduce water use during the winter months (December, January and February) when root growth is minimal thus requiring much less water. By watering every other week during the winter months an additional 25,560 gallons could be saved. The controller also has a seasonal adjustment capability that can also be used to adjust runtimes of all zones by increasing or reducing the percentage of application time; during the rainy season or in winter months when plant materials are not in a growth cycle, the controller's seasonal adjustment can be set at 60% to 80% of the current application rate to conserve water.

Also note: additional water savings can occur by repairing leaks, removing heads, capping heads and changing nozzles on heads as noted above.

The chart below reflects how much water is currently used compared to the Post-evaluation water use with adhering to the recommendations noted above.

Estimate of existing water usage[1]	Post-evaluation water use [2]	Projected annual gallons saved[2]	Projected Annual Gallons Saved w/ Skip a Week[2]
11,015 GAL/CYCLE/WEEK	4,260 GAL/CYCLE	6,755 GAL/CYCLE	**4,260 GAL/CYCLE**
572,780 GAL/YEAR	*221,520 GAL/YEAR*	*351,260 GAL/YEAR*	**376,820 GAL/YEAR (66% Annual Savings)**

[1] Based on watering days and applications as noted above
[2] Based on 1 day a week watering with 1 application per day

Not only is it important to follow these recommendations because it will help conserve the water supply in the Coastal Rivers and Withlacoochee river Basins, it may also help to lower your current utility bill.

For system repairs: Contact a licensed irrigation contractor for a professional installation, particularly if the system involved additional equipment or major modifications. For a listing of qualified contractors in your area, call the Florida Irrigation Society at 1-800-441-5341 or visit their website: http://www.fisstate.org/. or refer to the yellow pages of the phone directory. For do-it-yourselfers, irrigation supplies can be obtained from home improvement centers or irrigation supply facilities.

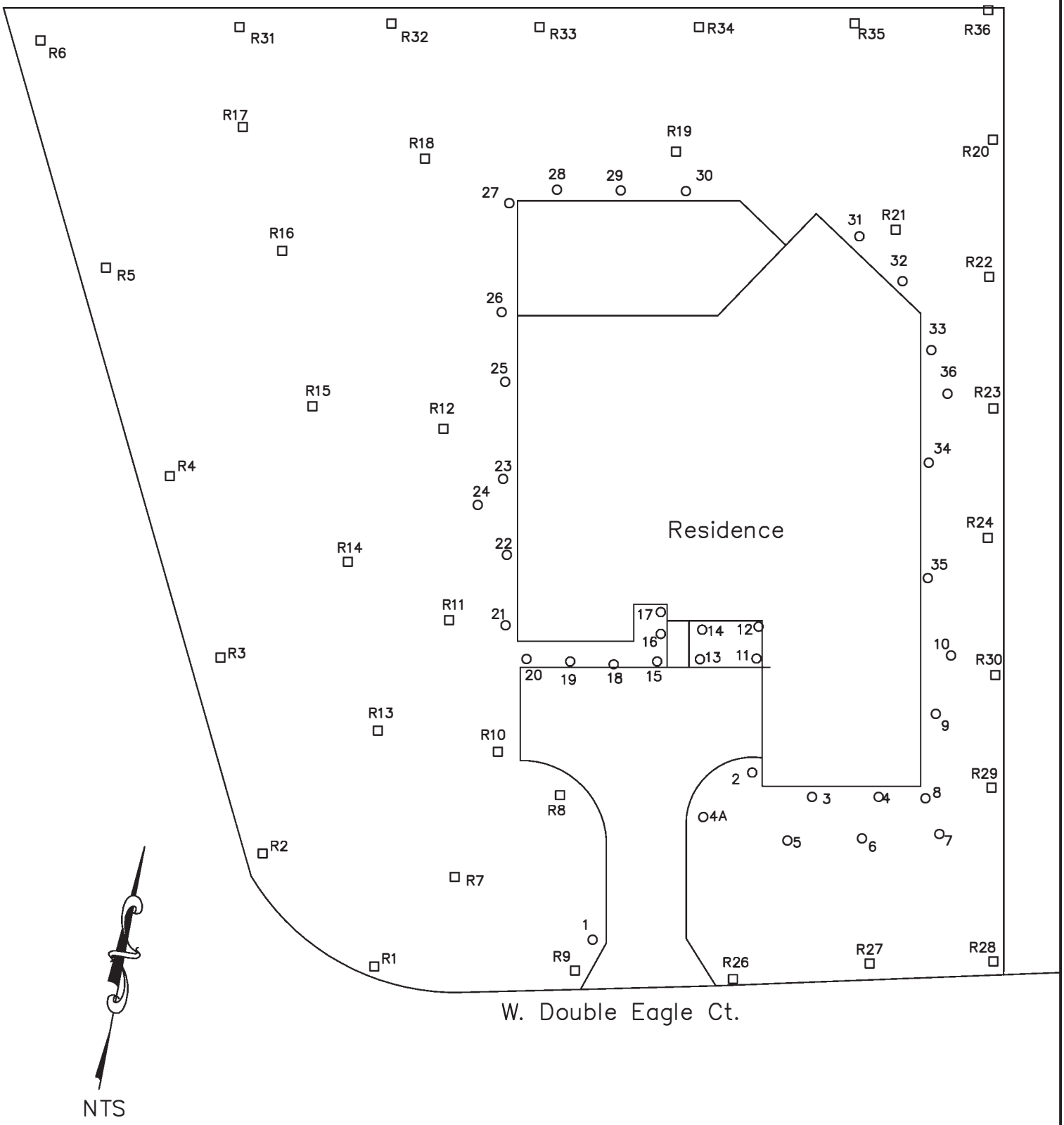
Approximately once per month inspect the irrigation system. Turn on each irrigation zone and visually examine all sprinkler heads. (Are they broken, spraying in the wrong direction or not rotating?) Take notes for later reference. Ten minutes of operation time is allowed for this inspection.

Thanks again for participating in the Withlacoochee Regional Water Supply Authority's Irrigation Evaluation program. We hope this information will benefit you. There are various recommendations and suggested changes made in this report.

Please contact WRWSA Contracted Administrator at 352-527-5795 if you have any questions or comments.

Urban runoff has been identified as the primary source of pollutant loading to surface waters in Florida and is regulated by local, state and federal regulations. Runoff in residential areas is contaminated with fertilizers, bacteria from pet waste, sediment, as well as oil and other automotive fluids from vehicles in driveways and streets. Your efforts in eliminating runoff from excessive irrigation helps reduce the amount of these pollutants which will be transported to local waters. By following the recommendations in this audit report not only will you be conserving water by irrigating more efficiently you will also be reducing your impact on the environment!

See attached Irrigation Layout Plan for irrigation equipment locations on the property.



Plan provided courtesy of the SWFWMD, Withlacoochee Regional Water Supply Authority & Citrus County

LEGEND

- ○ Location of Spray Heads
- □ Location of Rotor Head

ECO-Land Design
7615 Terrace River Drive
Tampa, FL 33637
Ph: (813) 466-8705
eco-landdesign.com

IRRIGATION LAYOUT PLAN

DATE: January 2019

APPLICANT:

Appendix C

List of Educational Material

List of Educational Materials

(1) A Guide to the Basics of Micro-Irrigation

(2) Rain Barrels: A Homeowner's Guide

(3) Watch the Weather, Wait to Water!

(4) A Do-It-Yourself Guide to Florida Friendly Fertilizing

(5) Saving Water Outdoors

(6) Saving Water Indoors

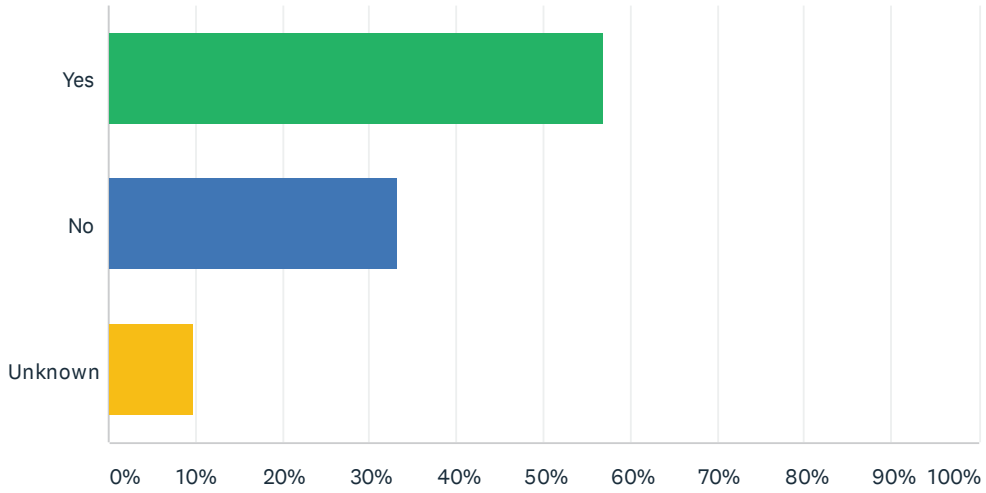
The educational materials were ordered by Jack Overdorff, the irrigation evaluation contractor, and distributed during the onsite irrigation system evaluation.

Appendix D

Customer Satisfaction Survey

Q1 Did the irrigation evaluation contractor make any changes to your system?

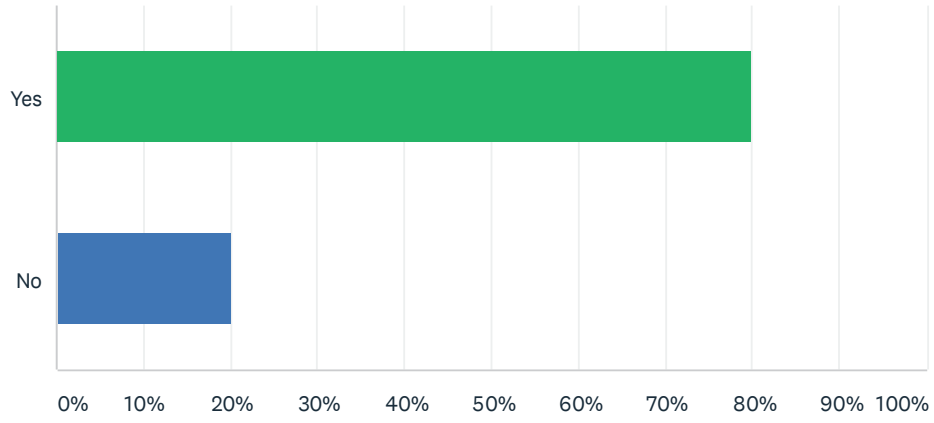
Answered: 51 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	56.86%	29
No	33.33%	17
Unknown	9.80%	5
TOTAL		51

Q2 Did you make any changes to your irrigation system as a result of the system evaluation?

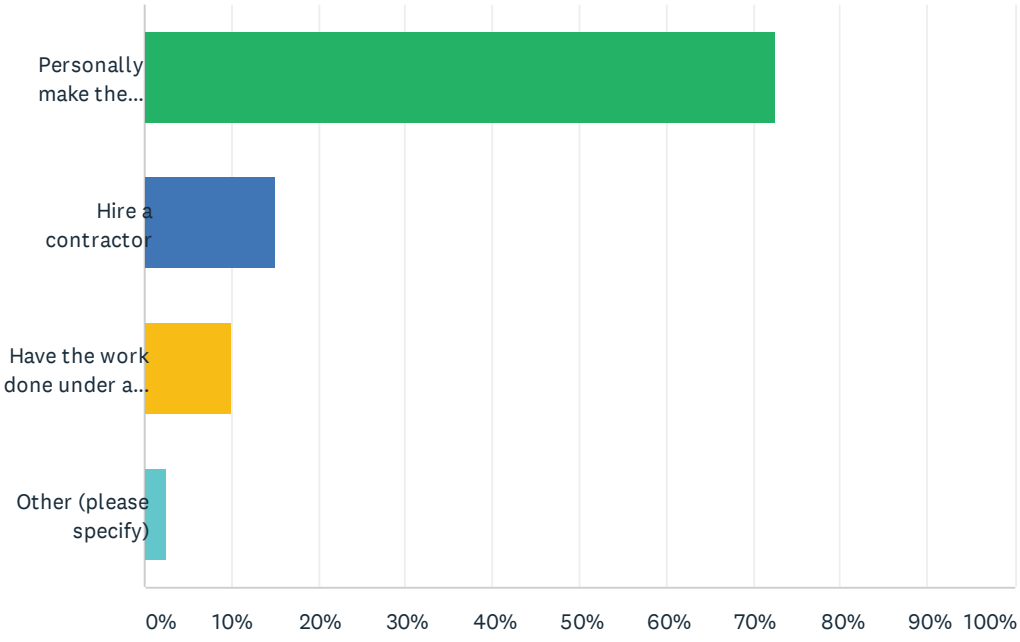
Answered: 50 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	80.00%	40
No	20.00%	10
TOTAL		50

Q3 If you made changes to your system, did you ...

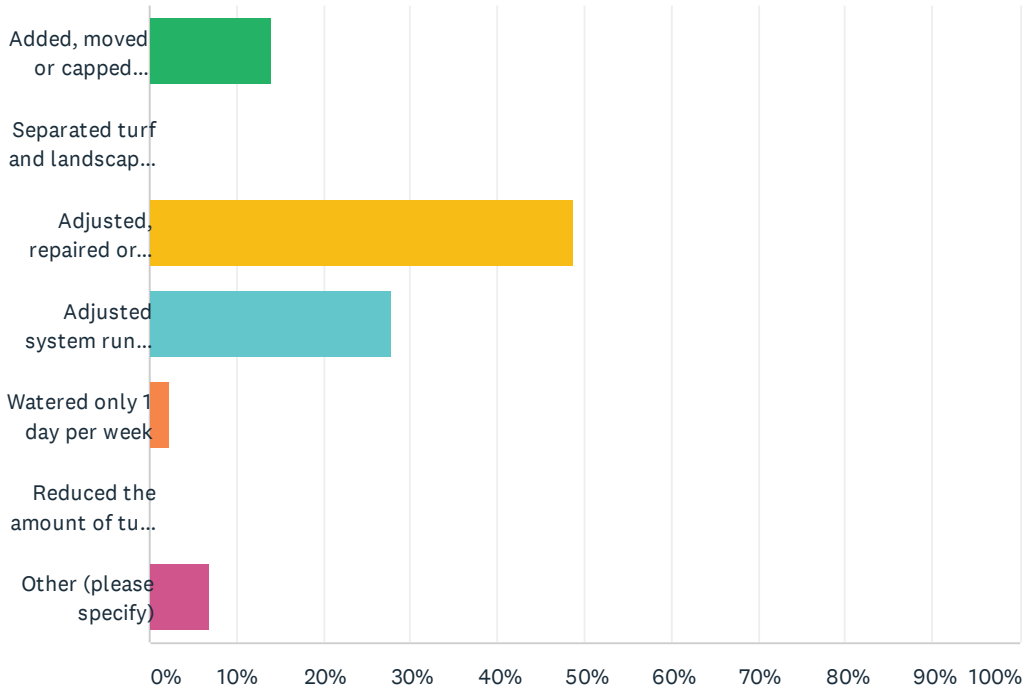
Answered: 40 Skipped: 11



ANSWER CHOICES	RESPONSES	
Personally make the changes	72.50%	29
Hire a contractor	15.00%	6
Have the work done under an existing maintenance contract	10.00%	4
Other (please specify)	2.50%	1
TOTAL		40

Q4 What changes did you make to your irrigation system? (Choose all that apply)

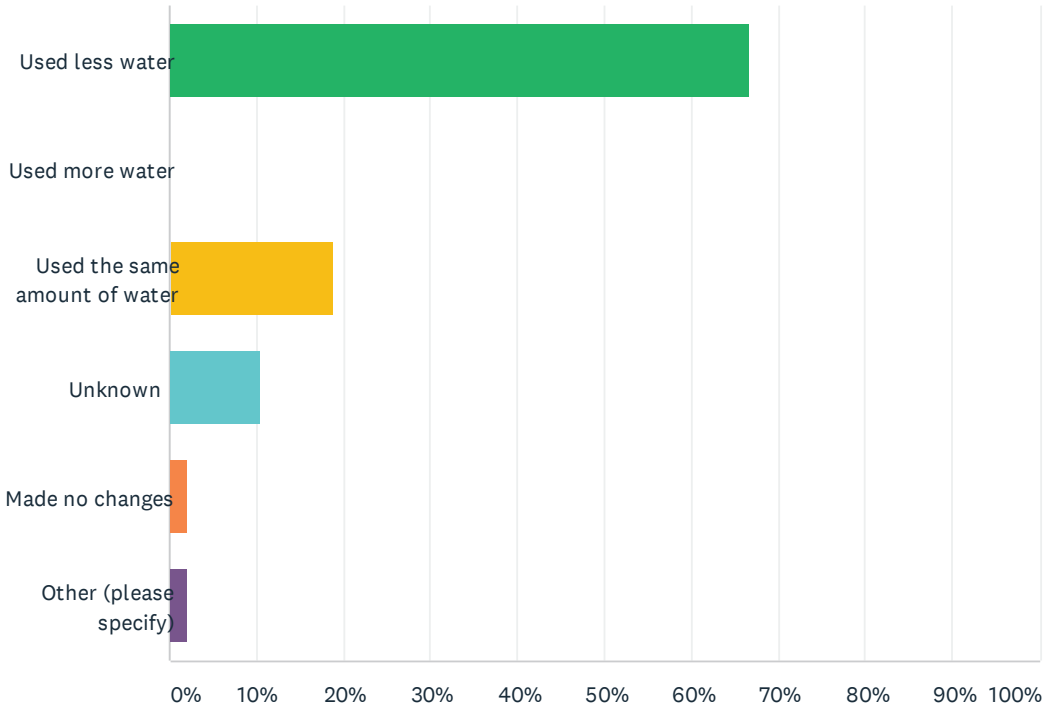
Answered: 43 Skipped: 8



ANSWER CHOICES	RESPONSES	
Added, moved or capped sprinkler heads	13.95%	6
Separated turf and landscape zones	0.00%	0
Adjusted, repaired or replaced sprinkler heads	48.84%	21
Adjusted system run times	27.91%	12
Watered only 1 day per week	2.33%	1
Reduced the amount of turf grass	0.00%	0
Other (please specify)	6.98%	3
TOTAL		43

Q5 Did you notice a change in your water usage as a result of any changes made?

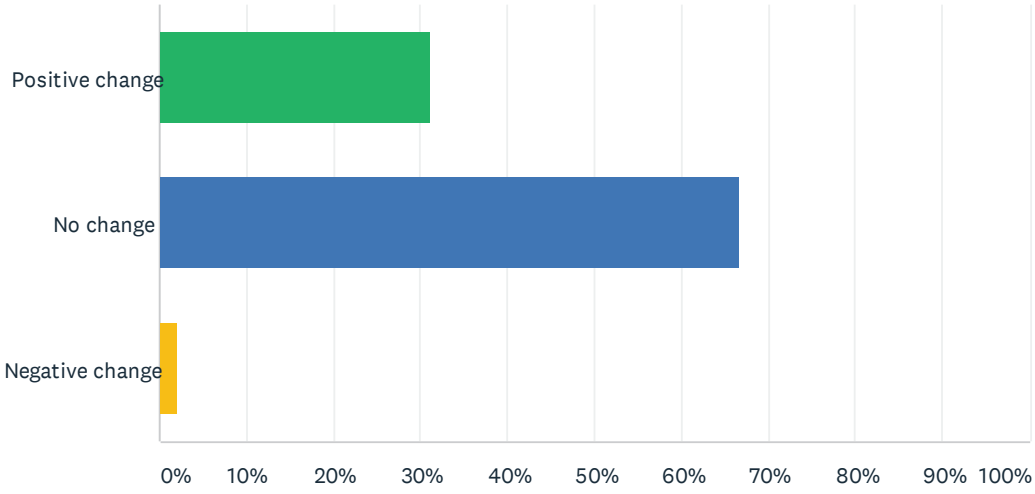
Answered: 48 Skipped: 3



ANSWER CHOICES	RESPONSES	
Used less water	66.67%	32
Used more water	0.00%	0
Used the same amount of water	18.75%	9
Unknown	10.42%	5
Made no changes	2.08%	1
Other (please specify)	2.08%	1
TOTAL		48

Q6 Did you notice any changes in your lawn/landscaping?

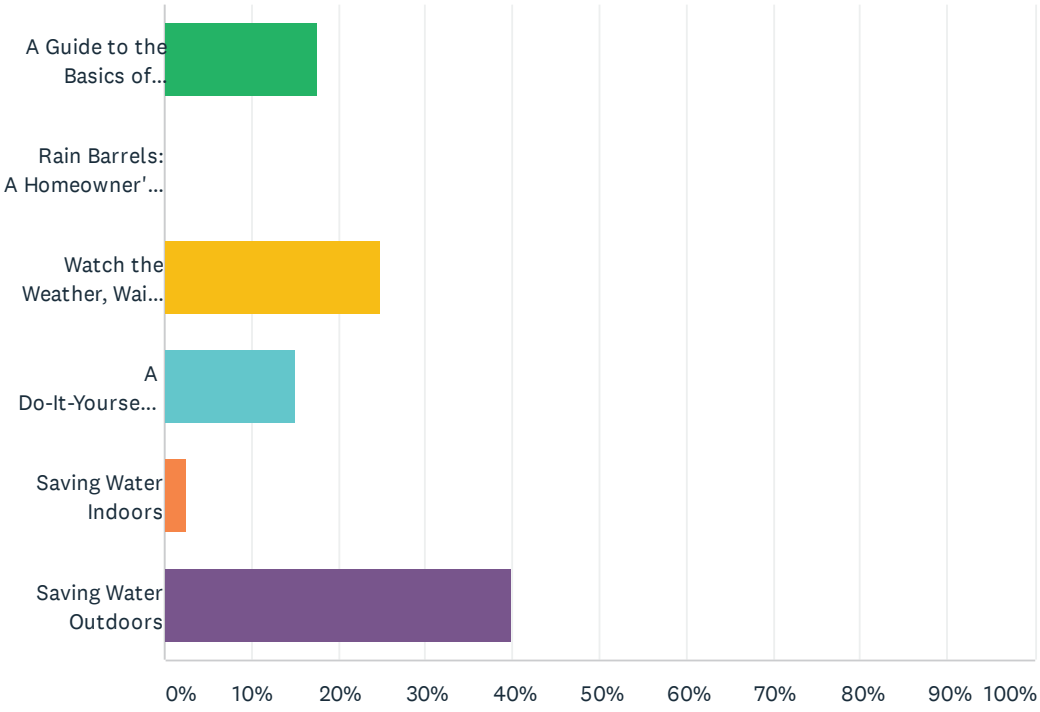
Answered: 48 Skipped: 3



ANSWER CHOICES	RESPONSES	
Positive change	31.25%	15
No change	66.67%	32
Negative change	2.08%	1
TOTAL		48

Q7 Which education information provided was most helpful?

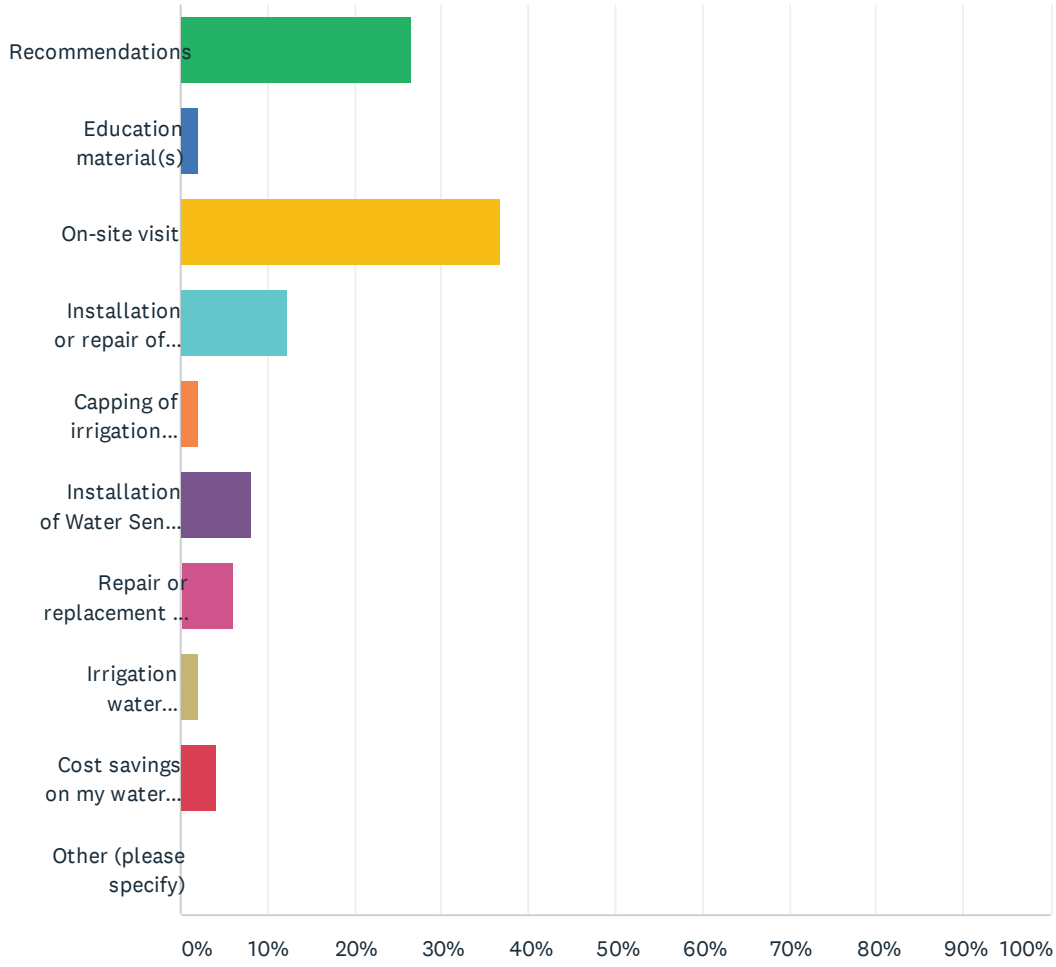
Answered: 40 Skipped: 11



ANSWER CHOICES	RESPONSES	
A Guide to the Basics of Micro-Irrigation	17.50%	7
Rain Barrels: A Homeowner's Guide	0.00%	0
Watch the Weather, Wait to Water!	25.00%	10
A Do-It-Yourself Guide to Florida Friendly Fertilizing	15.00%	6
Saving Water Indoors	2.50%	1
Saving Water Outdoors	40.00%	16
TOTAL		40

Q8 What was the most helpful part of the evaluation?

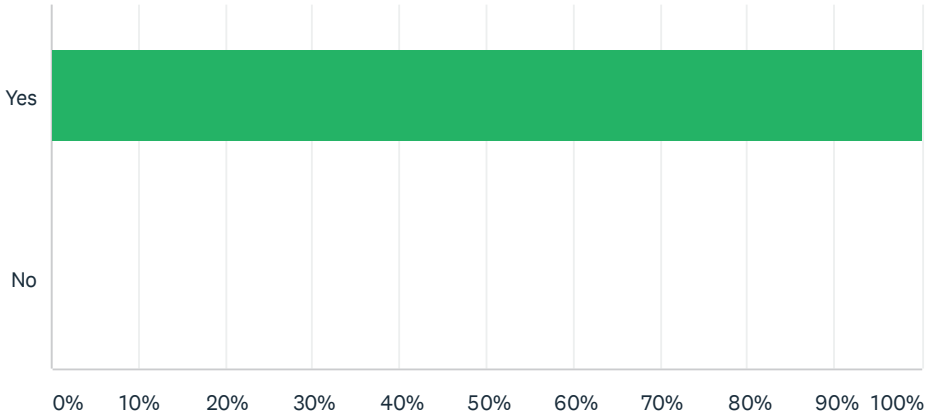
Answered: 49 Skipped: 2



ANSWER CHOICES	RESPONSES	
Recommendations	26.53%	13
Education material(s)	2.04%	1
On-site visit	36.73%	18
Installation or repair of rain sensor	12.24%	6
Capping of irrigation heads	2.04%	1
Installation of Water Sense Controller	8.16%	4
Repair or replacement of irrigation heads	6.12%	3
Irrigation water consumption/application calculations	2.04%	1
Cost savings on my water bill	4.08%	2
Other (please specify)	0.00%	0
TOTAL		49

Q9 Would you recommend this program to a neighbor?

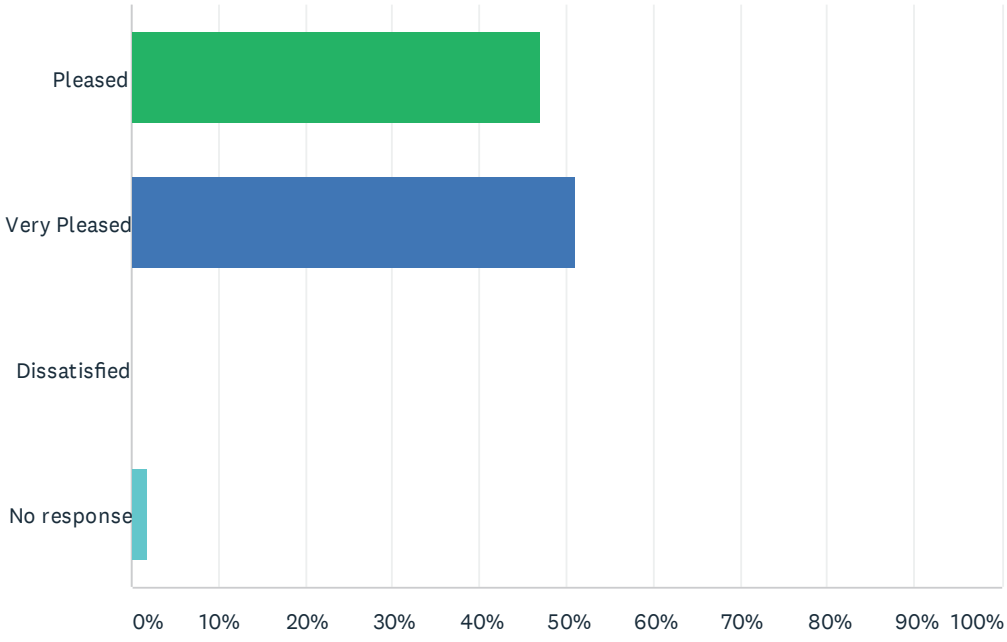
Answered: 50 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	100.00%	50
No	0.00%	0
TOTAL		50

Q10 Overall, how would you rate the irrigation system evaluation:

Answered: 51 Skipped: 0



ANSWER CHOICES	RESPONSES	
Pleased	47.06%	24
Very Pleased	50.98%	26
Dissatisfied	0.00%	0
No response	1.96%	1
TOTAL		51

Q11 Other comments:

Answered: 17 Skipped: 34

A little less usage a few months.

Jack did an EXCELLENT and THOROUGH job in fixing things that he could and explaining the entire process to me.

No remediation recommended.

He was great to work with. Educated me in multiple ways.

Jack Overdorff was very knowledgeable and easy to work with.

The auditor replaced the rain gauge to our system.

Jack was very through! He mapped my system, adjusted watering times and replaced my rain sensor. Reduced my water consumption and my bill.

A comprehensive survey of our system layout and performance.

I was in good shape, but pleased to have this confirmed. (as I remember)

Jack provided many useful suggestions and changed settings that resulted in a great lawn appearance. The knowledge that I gain from his evaluations is extremely beneficial to my conserving the amount of water my outdoor system uses. This is a great program and Jack does a terrific job of sharing the results of his study. Thanks for this program and the positive impact that it has had on my irrigation water consumption.

Wish he had installed a rain sensor.

Mr. Jack Overdorff was knowledgeable and thorough. This is a great program. It should be provided at low cost or no cost to homeowners in citrus county so they may understand how to use their irrigation properly and conservatively.

Inspector said that the water usage was appropriate for the size of our property.

By having him check my system, it let me know if I was doing things right or provided ways to improve.

This service was very helpful!

The rain sensor was replaced by your tech, but the irrigation system does not work unless we bypass the rain sensor.

Question 4 does not allow multiple answers. I did several of the recommendations. When selecting other, there is no place to specify.

Appendix E

Water Use Data by Utility

#	City	Evaluation Date	Unadjusted Data (gallons per year, %) 12-Month Pre- Usage	12-Month Post Usage	Year One Gallons Saved	Year One % Saved	Adjusted Data (gallons per year, %) 12-Month Pre- Usage	12-Month Post Usage	Year One Gallons Saved	Year One % Saved	Explanation of adjusted data
					Citrus County						
1	Inverness	12/4/2018	298,000	170,000	128,000	43%	298,000	170,000	128,000	43%	
2	Hernando	12/4/2018	268,000	172,000	96,000	36%	268,000	172,000	96,000	36%	
3	Beverly Hills	12/13/2018	304,000	110,000	194,000	64%	304,000	110,000	194,000	64%	
4	Hernando	12/13/2018	429,000	114,000	315,000	73%	429,000	114,000	315,000	73%	
5	Beverly Hills	12/17/2018	286,000	297,000	-11,000	-4%	286,000	297,000	-11,000	-4%	
6	Hernando	1/9/2019	294,000	382,000	-88,000	-30%	294,000	382,000	-88,000	-30%	
7	Homosassa	1/14/2019	233,000	187,000	46,000	20%	233,000	187,000	46,000	20%	
8	Homosassa	1/14/2019	296,000	206,000	90,000	30%	296,000	206,000	90,000	30%	
9	Homosassa	1/22/2019	376,000	330,000	46,000	12%	376,000	330,000	46,000	12%	
10	Homosassa	1/22/2019	242,000	130,000	112,000	46%	242,000	130,000	112,000	46%	
11	Homosassa	1/22/2019	250,000	269,000	-19,000	-8%	250,000	269,000	-19,000	-8%	
12	Citrus Springs	1/18/2019	242,000	211,000	31,000	13%	242,000	211,000	31,000	13%	
13	Hernando	1/18/2019	413,000	343,000	70,000	17%	413,000	343,000	70,000	17%	
14	Hernando	1/28/2019	250,000	273,000	-23,000	-9%	250,000	273,000	-23,000	-9%	
15	Hernando	1/28/2019	263,000	259,000	4,000	2%	263,000	259,000	4,000	2%	
16	Hernando	1/28/2019	310,000	207,000	103,000	33%	310,000	225,818	84,182	27%	single month of 0 post data adjusted
17	Homoasassa	1/31/2019	254,000	127,000	127,000	50%	254,000	127,000	127,000	50%	
18	Homosassa	1/31/2019	332,000	101,000	231,000	70%	332,000	101,000	231,000	70%	
19	Hernando	2/4/2019	252,000	143,000	109,000	43%	252,000	143,000	109,000	43%	
20	Hernando	2/2/2019	285,000	243,000	42,000	15%	285,000	243,000	42,000	15%	
21	Hernando	2/4/2019	313,000	221,000	92,000	29%	313,000	221,000	92,000	29%	
22	Hernando	2/5/2019	312,000	333,000	-21,000	-7%	312,000	333,000	-21,000	-7%	
23	Inverness	2/5/2019	265,000	116,000	149,000	56%	265,000	116,000	149,000	56%	
24	Lecanto	2/7/2019	298,000	315,000	-17,000	-6%	298,000	315,000	-17,000	-6%	
25	Inverness	2/7/2019	303,000	116,000	187,000	62%	303,000	198,857	104,143	34%	adjusted for 5 months of missing post data missing
26	Inverness	2/7/2019	248,000	254,000	-6,000	-2%	248,000	254,000	-6,000	-2%	
27	Beverly Hills	2/11/2019	267,000	277,000	-10,000	-4%	267,000	277,000	-10,000	-4%	
28	Hernando	2/11/2019	242,000	151,000	91,000	38%	242,000	151,000	91,000	38%	
29	Inverness	2/13/2019	287,000	274,000	13,000	5%	287,000	274,000	13,000	5%	
30	Hernando	2/22/2019	316,000	288,000	28,000	9%	316,000	288,000	28,000	9%	
31	Citrus Springs	2/22/2019	244,000	9,000	235,000	96%	0	0	0	--	removed because of 9 month missing in post data
32	Homosassa	2/27/2019	237,000	171,000	66,000	28%	237,000	171,000	66,000	28%	
33	Beverly Hills	3/6/2019	356,000	239,000	117,000	33%	356,000	239,000	117,000	33%	
34	Hernando	3/6/2019	276,000	264,000	12,000	4%	276,000	264,000	12,000	4%	
35	Hernando	3/8/2019	301,000	282,000	19,000	6%	301,000	282,000	19,000	6%	
36	Hernando	3/12/2019	237,000	127,000	110,000	46%	237,000	127,000	110,000	46%	
37	Hernando	3/12/2019	260,000	257,000	3,000	1%	260,000	257,000	3,000	1%	
38	Homosassa	6/21/2019	367,000	45,000	322,000	88%	367,000	45,000	322,000	88%	
39	Homosassa	6/21/2019	230,000	241,000	-11,000	-5%	230,000	241,000	-11,000	-5%	
40	Citrus Springs	6/25/2019	389,000	121,000	268,000	69%	389,000	161,333	227,667	59%	3 months of 0 post data adjusted
41	Beverly Hills	6/25/2019	769,000	548,000	221,000	29%	485,455	548,000	-62,545	-13%	single data point of extreemly high pre usage adjusted
42	Citrus Springs	6/25/2019	434,000	304,000	130,000	30%	434,000	304,000	130,000	30%	
43	Lecanto	7/1/2019	288,000	220,000	68,000	24%	288,000	220,000	68,000	24%	
44	Beverly Hills	7/1/2019	342,000	446,000	-104,000	-30%	342,000	446,000	-104,000	-30%	
45	Beverly Hills	7/1/2019	297,000	218,000	79,000	27%	297,000	218,000	79,000	27%	
46	Homosassa	7/12/2019	342,000	318,000	24,000	7%	342,000	318,000	24,000	7%	
47	Homosassa	7/12/2019	379,000	185,000	194,000	51%	379,000	185,000	194,000	51%	

48	Homosassa	7/12/2019	327,000	65,000	262,000	80%	327,000	65,000	262,000	80%	
49	Lecanto	7/19/2019	544,000	282,000	262,000	48%	544,000	282,000	262,000	48%	
50	Lecanto	7/19/2019	754,000	541,000	213,000	28%	754,000	541,000	213,000	28%	
51	Inverness	7/22/2019	345,000	343,000	2,000	1%	345,000	343,000	2,000	1%	
52	Inverness	7/22/2019	449,000	492,000	-43,000	-10%	449,000	492,000	-43,000	-10%	
53	Hernando	7/22/2019	354,000	300,000	54,000	15%	354,000	300,000	54,000	15%	
54	Lecanto	8/6/2019	328,000	190,000	138,000	42%	328,000	190,000	138,000	42%	
55	Lecanto	8/6/2019	250,000	231,000	19,000	8%	250,000	231,000	19,000	8%	
56	Lecanto	8/6/2019	497,000	475,000	22,000	4%	497,000	475,000	22,000	4%	
57	Inverness	8/12/2019	403,000	201,000	202,000	50%	403,000	201,000	202,000	50%	
58	Inverness	8/12/2019	308,000	266,000	42,000	14%	308,000	266,000	42,000	14%	
59	Inverness	8/12/2019	284,000	324,000	-40,000	-14%	309,818	324,000	-14,182	-5%	one month of missing pre data adjusted
60	Hernando	8/23/2019	301,000	373,000	-72,000	-24%	301,000	373,000	-72,000	-24%	
61	Hernando	8/26/2019	371,000	387,000	-16,000	-4%	371,000	387,000	-16,000	-4%	
62	Hernando	8/27/2019	416,000	139,000	277,000	67%	416,000	166,800	249,200	60%	two months of missing post data adjusted
63	Hernando	8/27/2019	336,000	228,000	108,000	32%	336,000	248,727	87,273	26%	one month of missing post data adjusted
64	Hernando	8/27/2019	329,000	222,000	107,000	33%	329,000	222,000	107,000	33%	
65	Citrus Springs	9/4/2019	293,000	172,000	121,000	41%	293,000	172,000	121,000	41%	
66	Hernando	9/4/2019	330,000	251,000	79,000	24%	330,000	251,000	79,000	24%	
67	Inverness	9/11/2019	383,000	325,000	58,000	15%	383,000	325,000	58,000	15%	
68	Inverness	9/11/2019	505,000	623,000	-118,000	-23%	505,000	623,000	-118,000	-23%	
69	Homosassa	9/17/2019	286,000	173,000	113,000	40%	286,000	173,000	113,000	40%	
70	Crystal River	9/18/2019	370,000	228,000	142,000	38%	370,000	228,000	142,000	38%	
71	Homosassa	10/16/2019	357,000	308,000	49,000	14%	357,000	308,000	49,000	14%	
72	Homosassa	10/16/2019	312,000	310,000	2,000	1%	312,000	310,000	2,000	1%	
73	Hernando	10/24/2019	304,000	229,000	75,000	25%	304,000	229,000	75,000	25%	
74	Beverly Hills	10/30/2019	292,000	268,000	24,000	8%	292,000	268,000	24,000	8%	
75	Beverly Hills	11/20/2019	396,000	383,000	13,000	3%	396,000	383,000	13,000	3%	
76	Inverness	2/4/2020	751,000	374,000	377,000	50%	751,000	374,000	377,000	50%	
77	Beverly Hills	4/1/2020	437,000	300,000	137,000	31%	437,000	300,000	137,000	31%	
Citrus County Subtotals			26,088,000	19,617,000	6,471,000	25%	25,586,273	19,798,536	5,787,737	23%	
Hernando County											
1	Spring Hill	1/24/2019	263,200	342,600	-79,400	-30%	263,200	342,600	-79,400	-30%	
2	Spring Hill	1/24/2019	464,900	347,700	117,200	25%	464,900	347,700	117,200	25%	
3	Spring Hill	1/24/2019	391,100	135,800	255,300	65%	391,100	135,800	255,300	65%	
4	Spring Hill	1/23/2019	441,300	256,400	184,900	42%	441,300	256,400	184,900	42%	
5	Brooksville	1/23/2019	231,200	61,700	169,500	73%	231,200	61,700	169,500	73%	
6	Spring Hill	1/23/2019	241,000	169,400	71,600	30%	241,000	290,400	-49,400	-20%	5 months of post data adjusted
7	Spring Hill	2/13/2019	272,100	243,800	28,300	10%	272,100	243,800	28,300	10%	
8	Spring Hill	2/13/2019	227,300	127,300	100,000	44%	227,300	138,873	88,427	39%	one month of missing post data adjusted
9	Spring Hill	2/15/2019	481,700	139,800	341,900	71%	481,700	139,800	341,900	71%	
10	Spring Hill	2/15/2019	168,800	329,400	-160,600	-95%					removed because 6 months of 0 pre data
11	Spring Hill	2/15/2019	380,100	401,700	-21,600	-6%	380,100	401,700	-21,600	-6%	
12	Spring Hill	2/21/2019	323,000	294,700	28,300	9%	323,000	294,700	28,300	9%	
13	Spring Hill	2/21/2019	341,800	320,300	21,500	6%	341,800	320,300	21,500	6%	
14	Spring Hill	2/21/2019	328,200	330,800	-2,600	-1%	328,200	330,800	-2,600	-1%	
15	Spring Hill	2/21/2019	317,600	259,400	58,200	18%	346,473	311,280	35,193	10%	1 month of missing data pre and 2 months of post 0 data adjusted
16	Spring Hill	2/21/2019	409,300	232,200	177,100	43%	409,300	232,200	177,100	43%	
17	Weekie Wachee	2/26/2019	502,200	202,700	299,500	60%	502,200	202,700	299,500	60%	
18	Spring Hill	3/5/2019	260,100	291,300	-31,200	-12%	260,100	291,300	-31,200	-12%	
19	Spring Hill	3/5/2019	269,200	229,100	40,100	15%	269,200	229,100	40,100	15%	
20	Spring Hill	3/5/2019	225,400	223,400	2,000	1%	225,400	223,400	2,000	1%	
21	Ridge Manor	3/8/2019	305,200	280,000	25,200	8%	305,200	280,000	25,200	8%	

22	Spring Hill	3/15/2019	380,700	298,600	82,100	22%	380,700	298,600	82,100	22%	
23	Spring Hill	3/15/2019	240,400	236,300	4,100	2%	240,400	236,300	4,100	2%	
24	Spring Hill	3/15/2019	252,700	283,500	-30,800	-12%	252,700	283,500	-30,800	-12%	
25	Hernando Beach	4/23/2019	103,000	57,500	45,500	44%	103,000	57,500	45,500	44%	
26	Spring Hill	4/24/2019	214,000	176,900	37,100	17%	214,000	192,982	21,018	10%	one month of 0 post data adjusted
27	Spring Hill	5/17/2019	227,500	216,800	10,700	5%	227,500	216,800	10,700	5%	
28	Spring Hill	8/22/2019	132,600	303,200	-170,600	-129%	132,600	303,200	-170,600	-129%	
29	Spring Hill	8/22/2019	489,200	226,800	262,400	54%	489,200	226,800	262,400	54%	
30	Spring Hill	8/22/2019	241,800	127,100	114,700	47%	241,800	127,100	114,700	47%	
31	Spring Hill	8/29/2019	363,700	264,300	99,400	27%	396,764	288,327	108,436	27%	one month of missing pre and 0 post data adjusted
32	Spring Hill	8/29/2019	538,500	411,500	127,000	24%	538,500	411,500	127,000	24%	
33	Spring Hill	9/5/2019	167,500	227,000	-59,500	-36%	167,500	227,000	-59,500	-36%	
34	Weeki Wachee	9/12/2019	553,000	211,200	341,800	62%	553,000	211,200	341,800	62%	
35	Spring Hill	9/12/2019	471,500	225,300	246,200	52%	471,500	225,300	246,200	52%	
36	Spring Hill	9/17/2019	341,400	502,300	-160,900	-47%	341,400	502,300	-160,900	-47%	
37	Spring Hill	9/30/2019	457,000	368,100	88,900	19%	457,000	368,100	88,900	19%	
38	Spring Hill	9/30/2019	341,200	211,800	129,400	38%	341,200	211,800	129,400	38%	
39	Spring Hill	9/30/2019	324,700	289,200	35,500	11%	324,700	289,200	35,500	11%	
40	Spring Hill	10/17/2019	327,300	322,800	4,500	1%	327,300	322,800	4,500	1%	
41	Spring Hill	10/17/2019	321,600	222,700	98,900	31%	321,600	222,700	98,900	31%	
42	Spring Hill	10/30/2019	329,200	212,000	117,200	36%	329,200	212,000	117,200	36%	
43	Spring Hill	11/20/2019	806,885	1,175,325	-368,440	-46%	806,885	1,175,325	-368,440	-46%	
44	Spring Hill	2/12/2020	247,300	173,600	73,700	30%	247,300	173,600	73,700	30%	
45	Weeki Wachee	4/20/2020	314,700	265,100	49,600	16%	314,700	265,100	49,600	16%	
46	Spring Hill	4/20/2020	320,200	274,300	45,900	14%	320,200	274,300	45,900	14%	
47	Spring Hill	4/20/2020	178,700	100,800	77,900	44%	178,700	100,800	77,900	44%	
48	Weeki Wachee	5/6/2020	233,200	215,300	17,900	8%	233,200	215,300	17,900	8%	
49	Weeki Wachee	5/6/2020	73,500	78,800	-5,300	-7%	98,000	72,327	25,673	26%	3 month of 0 pre data adjusted, 1 month of missing post data adjusted
50	Weeki Wachee	5/12/2020	469,300	505,500	-36,200	-8%	469,300	505,500	-36,200	-8%	
51	Weeki Wachee	5/12/2020	349,900	259,400	90,500	26%	349,900	259,400	90,500	26%	
52	Spring Hill	5/18/2020	178,400	38,800	139,600	78%	194,618	42,327	152,291	78%	one month of 0 pre and post data adjusted
53	Brooksville	5/18/2020	276,300	201,600	74,700	27%	276,300	201,600	74,700	27%	
54	Spring Hill	6/11/2020	279,800	380,600	-100,800	-36%	279,800	380,600	-100,800	-36%	
55	Spring Hill	6/11/2020	0	0	0	--	0	0	0	--	removed because customer moved
56	Brooksville	7/29/2020	126,200	174,200	-48,000	-38%	137,673	174,200	-36,527	-27%	one month of 0 pre data adjusted
57	Brooksville	7/29/2020	283,800	172,400	111,400	39%	283,800	172,400	111,400	39%	
Hernando County Subtotals			17,801,385	14,630,125	3,171,260	18%	17,746,712	14,522,341	3,224,371	18%	
Marion County											
1	Ocala	1/11/2019	176,000	157,000	19,000	11%	176,000	157,000	19,000	11%	
2	Ocala	1/11/2019	481,000	361,000	120,000	25%	481,000	361,000	120,000	25%	
3	Ocala	1/11/2019	293,000	227,000	66,000	23%	293,000	227,000	66,000	23%	
4	Ocala	1/15/2019	320,000	199,000	121,000	38%	320,000	199,000	121,000	38%	
5	Ocala	1/15/2019	302,000	214,000	88,000	29%	302,000	214,000	88,000	29%	
6	Ocala	1/15/2019	167,000	156,000	11,000	7%	167,000	156,000	11,000	7%	
7	Ocala	1/17/2019	469,000	199,000	270,000	58%	469,000	199,000	270,000	58%	
8	Ocala	1/17/2019	479,000	241,000	238,000	50%	479,000	241,000	238,000	50%	
9	Ocala	1/30/2019	315,000	242,000	73,000	23%	315,000	242,000	73,000	23%	
10	Ocala	1/30/2019	373,000	208,000	165,000	44%	373,000	208,000	165,000	44%	
11	Ocala	1/30/2019	350,000	291,000	59,000	17%	350,000	291,000	59,000	17%	
12	Ocala	2/18/2019	308,000	195,000	113,000	37%	308,000	195,000	113,000	37%	
13	Ocala	2/18/2019	262,000	183,000	79,000	30%	262,000	183,000	79,000	30%	
14	Ocala	2/18/2019	356,000	394,000	-38,000	-11%	356,000	394,000	-38,000	-11%	
15	Ocala	3/1/2019	292,000	201,000	91,000	31%	292,000	201,000	91,000	31%	

16	Ocala	3/1/2019	90,000	116,000	-26,000	-29%	90,000	116,000	-26,000	-29%	
17	Ocala	3/3/2019	297,000	152,000	145,000	49%	297,000	152,000	145,000	49%	
18	Ocala	3/3/2019	296,000	174,000	122,000	41%	296,000	174,000	122,000	41%	
19	Ocala	3/29/2019	241,000	174,000	67,000	28%	241,000	174,000	67,000	28%	
20	Ocala	3/29/2019	260,000	309,000	-49,000	-19%	260,000	309,000	-49,000	-19%	
21	Ocala	4/8/2019	364,000	286,000	78,000	21%	364,000	286,000	78,000	21%	
22	Ocala	6/7/2019	366,000	440,000	-74,000	-20%	366,000	440,000	-74,000	-20%	
23	Ocala	6/7/2019	469,000	290,000	179,000	38%	469,000	290,000	179,000	38%	
24	Ocala	6/7/2019	307,000	283,000	24,000	8%	307,000	283,000	24,000	8%	
25	Ocala	6/7/2019	127,000	152,000	-25,000	-20%	127,000	152,000	-25,000	-20%	
26	Ocala	6/18/2019	243,000	134,000	109,000	45%	243,000	229,714	13,286	5%	5 months of 0 post data adjusted
27	Ocala	6/18/2019	273,000	230,000	43,000	16%	273,000	230,000	43,000	16%	
28	Ocala	6/18/2019	254,000	254,000	0	0%	254,000	254,000	0	0%	
29	Ocala	6/18/2019	296,000	140,000	156,000	53%	296,000	140,000	156,000	53%	
30	Ocala	9/18/2019	241,000	242,000	-1,000	0%	241,000	242,000	-1,000	0%	
31	Ocala	9/18/2019	292,000	219,000	73,000	25%	292,000	219,000	73,000	25%	
32	Ocala	9/19/2019	285,000	274,000	11,000	4%	285,000	274,000	11,000	4%	
33	Ocala	9/25/2019	258,000	260,000	-2,000	-1%	258,000	260,000	-2,000	-1%	
34	Ocala	9/25/2019	282,000	271,000	11,000	4%	282,000	271,000	11,000	4%	
35	Ocala	9/25/2019	295,000	200,000	95,000	32%	295,000	200,000	95,000	32%	
36	Ocala	10/9/2019	347,000	181,000	166,000	48%	347,000	181,000	166,000	48%	
37	Ocala	10/9/2019	251,000	159,000	92,000	37%	251,000	159,000	92,000	37%	
38	Ocala	10/9/2019	246,000	187,000	59,000	24%	246,000	187,000	59,000	24%	
39	Ocala	10/11/2019	226,000	153,000	73,000	32%	226,000	153,000	73,000	32%	
40	Ocala	10/11/2019	287,000	298,000	-11,000	-4%	287,000	298,000	-11,000	-4%	
41	Ocala	10/11/2019	317,000	231,000	86,000	27%	317,000	231,000	86,000	27%	
42	Ocala	10/11/2019	330,000	195,000	135,000	41%	330,000	195,000	135,000	41%	
43	Ocala	10/18/2019	324,000	490,000	-166,000	-51%	324,000	490,000	-166,000	-51%	
44	Ocala	10/18/2019	284,000	199,000	85,000	30%	284,000	199,000	85,000	30%	
45	Ocala	10/18/2019	244,000	232,000	12,000	5%	244,000	232,000	12,000	5%	
46	Ocala	10/22/2019	245,000	187,000	58,000	24%	245,000	187,000	58,000	24%	
47	Ocala	10/22/2019	460,000	452,000	8,000	2%	460,000	452,000	8,000	2%	
48	Ocala	10/22/2019	269,000	86,000	183,000	68%	269,000	86,000	183,000	68%	
49	Ocala	11/7/2019	272,000	234,000	38,000	14%	272,000	234,000	38,000	14%	
50	Ocala	11/7/2019	262,000	294,000	-32,000	-12%	262,000	294,000	-32,000	-12%	
51	Ocala	11/7/2019	215,000	158,000	57,000	27%	215,000	158,000	57,000	27%	
52	Ocala	11/8/2019	203,000	237,000	-34,000	-17%	203,000	237,000	-34,000	-17%	
53	Ocala	11/8/2019	183,000	143,000	40,000	22%	183,000	143,000	40,000	22%	
54	Ocala	11/15/2019	430,000	245,000	185,000	43%	430,000	245,000	185,000	43%	
55	Ocala	11/15/2019	285,000	189,000	96,000	34%	285,000	189,000	96,000	34%	
56	Ocala	11/15/2019	429,000	307,000	122,000	28%	429,000	307,000	122,000	28%	
57	Dunellon	12/3/2019	283,000	249,000	34,000	12%	283,000	249,000	34,000	12%	
58	Ocala	12/3/2019	134,000	167,000	-33,000	-25%	134,000	167,000	-33,000	-25%	
59	Dunellon	12/3/2019	224,000	150,000	74,000	33%	224,000	150,000	74,000	33%	
60	Ocala	12/4/2019	409,000	208,000	201,000	49%	409,000	208,000	201,000	49%	
61	Ocala	12/4/2019	272,000	208,000	64,000	24%	272,000	208,000	64,000	24%	
62	Ocala	12/4/2019	285,000	245,000	40,000	14%	285,000	245,000	40,000	14%	
63	Ocala	1/8/2020	267,000	241,000	26,000	10%	267,000	241,000	26,000	10%	
64	Ocala	1/8/2020	266,000	204,000	62,000	23%	266,000	204,000	62,000	23%	
65	Ocala	1/8/2020	279,000	289,000	-10,000	-4%	279,000	289,000	-10,000	-4%	
66	Ocala	1/29/2020	144,000	142,000	2,000	1%	144,000	142,000	2,000	1%	
67	Ocala	1/29/2020	262,000	221,000	41,000	16%	262,000	221,000	41,000	16%	
68	Ocala	1/29/2020	347,000	265,000	82,000	24%	347,000	265,000	82,000	24%	

69 Ocala	2/4/2020	343,000	394,000	-51,000	-15%	343,000	394,000	-51,000	-15%	
70 Ocala	2/4/2020	401,000	293,000	108,000	27%	401,000	293,000	108,000	27%	
71 Ocala	2/4/2020	601,000	219,000	382,000	64%	601,000	219,000	382,000	64%	
72 Ocala	2/24/2020	450,000	442,000	8,000	2%	450,000	442,000	8,000	2%	
73 Ocala	2/24/2020	479,000	304,000	175,000	37%	522,545	304,000	218,545	42%	one month of 0 pre data adjusted
74 Ocala	2/26/2020	260,000	322,000	-62,000	-24%	260,000	322,000	-62,000	-24%	
75 Ocala	2/26/2020	455,000	305,000	150,000	33%	455,000	305,000	150,000	33%	
76 Ocala	2/26/2020	376,000	282,000	94,000	25%	376,000	282,000	94,000	25%	
77 Ocala	3/2/2020	691,000	512,000	179,000	26%	691,000	512,000	179,000	26%	
78 Ocala	3/2/2020	275,000	280,000	-5,000	-2%	300,000	280,000	20,000	7%	one month of 0 pre data adjusted
79 Ocala	3/2/2020	370,000	248,000	122,000	33%	370,000	248,000	122,000	33%	
80 Ocala	4/27/2020	817,000	260,000	557,000	68%	817,000	312,000	505,000	62%	two months of 0 post data adjusted
81 Ocala	4/27/2020	587,000	472,000	115,000	20%	587,000	472,000	115,000	20%	
82 Ocala	5/5/2020	374,000	358,000	16,000	4%	374,000	358,000	16,000	4%	
83 Ocala	5/5/2020	588,000	237,000	351,000	60%	588,000	237,000	351,000	60%	
Marion County Subtotals		26,827,000	20,442,000	6,385,000	24%	26,895,545	20,589,714	6,305,831	23%	
VCCDD-LSSA										
1 The Villages	3/7/2019	365,570	77,760	287,810	79%	365,570	77,760	287,810	79%	
2 The Villages	3/7/2019	272,150	222,780	49,370	18%	272,150	222,780	49,370	18%	
3 The Villages	3/7/2019	360,020	397,530	-37,510	-10%	360,020	397,530	-37,510	-10%	
4 The Villages	3/14/2019	367,460	188,400	179,060	49%	367,460	188,400	179,060	49%	
5 The Villages	3/14/2019	291,400	240,400	51,000	18%	291,400	240,400	51,000	18%	
6 The Villages	3/14/2019	282,590	165,710	116,880	41%	282,590	165,710	116,880	41%	
7 The Villages	3/14/2019	325,890	228,570	97,320	30%	325,890	228,570	97,320	30%	
8 The Villages	3/27/2019	431,840	255,600	176,240	41%	431,840	255,600	176,240	41%	
9 The Villages	3/27/2019	317,790	269,070	48,720	15%	317,790	269,070	48,720	15%	
10 The Villages	3/27/2019	269,530	185,860	83,670	31%	269,530	185,860	83,670	31%	
11 The Villages	4/8/2019	303,210	124,540	178,670	59%	303,210	186,810	116,400	38%	4 months of 0 post data adjusted
12 The Villages	4/18/2019	274,990	195,710	79,280	29%	274,990	195,710	79,280	29%	
13 The Villages	4/18/2019	449,430	313,590	135,840	30%	449,430	313,590	135,840	30%	
14 The Villages	5/1/2019	287,550	264,690	22,860	8%	287,550	264,690	22,860	8%	
15 The Villages	5/1/2019	535,770	445,150	90,620	17%	535,770	445,150	90,620	17%	
16 The Villages	5/8/2019	297,330	153,900	143,430	48%	297,330	230,850	66,480	22%	4 months of 0 post data adjusted
17 The Villages	5/8/2019	301,180	192,310	108,870	36%	301,180	192,310	108,870	36%	
18 The Villages	5/9/2019	307,080	153,870	153,210	50%	307,080	153,870	153,210	50%	
19 The Villages	7/18/2019	293,140	294,900	-1,760	-1%	293,140	294,900	-1,760	-1%	
VCCDD-LSSA Subtotals		6,333,920	4,370,340	1,963,580	31%	6,333,920	4,509,560	1,824,360	29%	
NSCUDD-VWCA										
1 The Villages	12/19/2018	124,820	189,710	-64,890	-52%	124,820	189,710	-64,890	-52%	
2 The Villages	12/19/2018	252,630	247,070	5,560	2%	252,630	247,070	5,560	2%	
3 The Villages	12/19/2018	304,140	280,580	23,560	8%	304,140	280,580	23,560	8%	
4 The Villages	12/19/2018	262,330	280,910	-18,580	-7%	262,330	280,910	-18,580	-7%	
5 The Villages	12/19/2018	186,360	165,900	20,460	11%	186,360	165,900	20,460	11%	
6 The Villages	12/27/2018	131,750	144,980	-13,230	-10%	131,750	144,980	-13,230	-10%	
7 The Villages	12/27/2018	271,020	240,070	30,950	11%	271,020	240,070	30,950	11%	
8 The Villages	12/27/2018	150,920	288,090	-137,170	-91%	181,104	288,090	-106,986	-59%	two months of 0 pre data adjusted
9 The Villages	12/28/2018	219,760	251,470	-31,710	-14%	219,760	251,470	-31,710	-14%	
10 The Villages	1/8/2019	12,720	124,090	-111,370	-876%	0	0	0		removed because > 6 month of pre inspection data not available
11 The Villages	1/8/2019	214,380	180,380	34,000	16%	214,380	180,380	34,000	16%	
12 The Villages	1/8/2019	41,000	51,060	-10,060	-25%	49,200	51,060	-1,860	-4%	two months of 0 pre data adjusted
13 The Villages	4/8/2019	307,920	224,200	83,720	27%	307,920	224,200	83,720	27%	
14 The Villages	4/8/2019	452,140	307,710	144,430	32%	452,140	307,710	144,430	32%	

15	The Villages	4/18/2019	383,110	382,360	750	0%	383,110	382,360	750	0%	
16	The Villages	5/9/2019	262,610	307,290	-44,680	-17%	262,610	307,290	-44,680	-17%	
17	The Villages	6/26/2019	231,850	268,540	-36,690	-16%	231,850	268,540	-36,690	-16%	
18	The Villages	6/26/2019	242,960	202,570	40,390	17%	242,960	202,570	40,390	17%	
19	The Villages	6/26/2019	266,420	254,780	11,640	4%	266,420	254,780	11,640	4%	
20	The Villages	7/24/2019	321,830	346,310	-24,480	-8%	321,830	346,310	-24,480	-8%	
21	The Villages	7/24/2019	306,720	209,710	97,010	32%	306,720	209,710	97,010	32%	
22	The Villages	7/29/2019	291,900	228,760	63,140	22%	291,900	228,760	63,140	22%	
23	The Villages	7/29/2019	240,600	186,700	53,900	22%	240,600	186,700	53,900	22%	
24	The Villages	8/5/2019	177,500	169,330	8,170	5%	177,500	169,330	8,170	5%	
25	The Villages	8/13/2019	225,170	236,530	-11,360	-5%	225,170	236,530	-11,360	-5%	
26	The Villages	8/13/2019	333,840	190,830	143,010	43%	333,840	208,178	125,662	38%	one month of 0 post data adjusted
27	The Villages	8/13/2019	331,290	299,050	32,240	10%	331,290	299,050	32,240	10%	
28	The Villages	10/4/2019	258,430	145,840	112,590	44%	258,430	145,840	112,590	44%	
29	The Villages	10/4/2019	286,640	288,060	-1,420	0%	286,640	288,060	-1,420	0%	
30	The Villages	10/21/2019	268,350	207,420	60,930	23%	268,350	207,420	60,930	23%	
31	The Villages	10/21/2019	291,590	271,210	20,380	7%	291,590	271,210	20,380	7%	
32	The Villages	10/21/2019	424,940	406,900	18,040	4%	424,940	406,900	18,040	4%	
33	The Villages	2/27/2020	284,980	288,990	-4,010	-1%	284,980	288,990	-4,010	-1%	
34	The Villages	2/27/2020	299,120	142,260	156,860	52%	299,120	142,260	156,860	52%	
35	The Villages	2/27/2020	270,540	130,200	140,340	52%	270,540	130,200	140,340	52%	
36	The Villages	3/2/2020	310,020	162,210	147,810	48%	310,020	162,210	147,810	48%	
37	The Villages	3/2/2020	256,200	162,670	93,530	37%	256,200	162,670	93,530	37%	
38	The Villages	3/3/2020	276,520	163,060	113,460	41%	276,520	163,060	113,460	41%	
39	The Villages	3/5/2020	310,770	150,890	159,880	51%	310,770	150,890	159,880	51%	
40	The Villages	3/5/2020	296,920	232,030	64,890	22%	296,920	232,030	64,890	22%	
41	The Villages	3/5/2020	281,730	101,160	180,570	64%	281,730	101,160	180,570	64%	
42	The Villages	3/5/2020	286,050	164,880	121,170	42%	286,050	164,880	121,170	42%	
43	The Villages	3/12/2020	240,860	226,430	14,430	6%	240,860	226,430	14,430	6%	
44	The Villages	3/12/2020	268,420	139,320	129,100	48%	268,420	139,320	129,100	48%	
45	The Villages	3/12/2020	260,570	241,390	19,180	7%	312,684	241,390	71,294	23%	2 months of 0 pre data adjusted
46	The Villages	5/7/2020	278,940	158,850	120,090	43%	278,940	158,850	120,090	43%	
47	The Villages	5/7/2020	289,020	166,300	122,720	42%	289,020	166,300	122,720	42%	
NSCUDD_VWCA Subtotals			12,288,300	10,209,050	2,079,250	17%	12,366,078	10,102,308	2,263,770	18%	
Grand Total for Phase V			89,338,605	69,268,515	20,070,090	22%	88,928,528	69,522,460	19,406,069	22%	

Appendix F

Summary of Follow-ups

Appendix F. Phase 5 Q040 Follow-Up Summary

Utility / Count	Evaluation Number	Number of Recommendations	Number of Changes Implemented	Percent of Changes Implemented
Citrus				
1	10	16	7	43.75%
2	11	11	3	27.27%
3	14	10	6	60.00%
4	15	14	8	57.14%
5	17	16	8	50.00%
6	18	10	7	70.00%
7	19	8	5	62.50%
8	39	15	8	53.33%
9	45	11	7	63.64%
10	46	9	5	55.56%
11	48	8	4	50.00%
12	69	16	7	43.75%
13	72	11	8	72.73%
14	73	18	15	83.33%
15	77	16	13	81.25%
Subtotal				58.28%
Hernando				
1	16	9	7	77.78%
2	17	27	18	66.67%
3	21	6	3	50.00%
4	22	26	18	69.23%
5	23	19	15	78.95%
6	40	14	12	85.71%
Subtotal				71.39%
Marion				
1	4	10	3	30.00%
2	15	17	11	64.71%
3	20	6	4	66.67%
Subtotal				53.79%
VCCDD				
1	2	6	4	66.67%
2	3	21	10	47.62%
3	8	13	9	69.23%
4	9	7	4	57.14%
5	12	9	6	66.67%
6	20	11	7	63.64%
Subtotal				61.83%

Utility / Count	Evaluation Number	Number of Recommendations	Number of Changes Implemented	Percent of Changes Implemented
NSCUDD				
1	15	3	1	33.33%
2	18	6	3	50.00%
3	20	12	8	66.67%
4	21	9	4	44.44%
5	32	9	2	22.22%
6	33	9	4	44.44%
7	34	7	5	71.43%
8	37	14	8	57.14%
9	38	12	4	33.33%
10	39	6	1	16.67%
11	40	12	6	50.00%
12	44	5	2	40.00%
Subtotal				44.14%
	Program Total			56.30%
	Enhanced Evaluations	5		
	Core Evaluations	37		

Appendix G

SWFWMD Cooperative Funding Initiative
Water Conservation Cost Effectiveness Calculation

Appendix G: SWFWMD Cooperative Funding Initiative Water Conservation Project Cost Effectiveness Calculator

Description: A calculation of the cost to develop the project, amortized at 8%, versus the effectiveness of the project over its anticipated life. The calculation enables all types of projects to be compared to each other, as well as other potential uses (investments) of District funds.

Instructions:

1) Enter component type in the "Project/components" column
2) Enter the amount of water conserved into the water savings column. Use the other tabs of this workbook to calculate savings.
3) Enter the total estimated cost of the project (see below for guidelines)
4) Enter the Service life for component - use the figures provided on the right-hand side of this sheet, unless better information is provided
5) Voila! The $/kgal will automatically calculate
6) In instances when there are multiple components with varying service lives, a weighted average will need to be calculated.
7) Save this workbook and all calculations in your project folder for future reference

Water savings (gpd) = Amount of water conserved or made available by the total project

	Inputs
	Calculation factors (if adjusted, provide rational)
	Results

Interest rate (annual %) = **8.000%**

Project / components	Water savings (gpd)	Total Estimated Cost*	Service Life	$/kgal	% of total savings	Weighted $/Kgal	Weighted average $ Kgal
Core Evaluations	25,505	$60,934	5	$1.64	0.479723884	$0.79	$1.70
Enhanced Evaluaitons (Citrus County)	4,969	$10,126	5	$1.40	0.093461987	$0.13	
Enhanced Evaluations (Marion and Hernando County)	22,692	$60,879	5	$1.84	0.426814129	$0.79	
Total	**53,166**	**$131,939**	5	$ 1.70			

*** Total Estimated Cost - Include all elements that apply, such as:**

Program administration (may include consulting fees)
Devices/materials (may include advertising materials, but not including staff time or equipment purchased by the cooperator, such as printers or office space
Data analysis (may include consultant fees, but not cooperator staff time)
Reporting (costs of report production)
Marketing/Education (all print work must be done through an outside vendor to qualify for reimbursement)