Castle Pines North Metropolitan District
Irrigation Control System Demonstration
95% Completion Report
February 2009

Grant Recipient: Castle Pines North Metropolitan District
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As described in the Application for Water Efficiency Grant, the Castle Pines North Metropolitan District (District) has installed an irrigation management system to optimize irrigation rates and increase water savings. Installation of the irrigation management system will assist the District in meeting its targeted water savings goal of 175 to 220 AFY by 2014, as outlined in Conservation Goal #1 of the District's Water Conservation Plan that has been approved by the Colorado Water Conservation Board (CWCB). Additionally, Conservation Goal #3 specifically calls for monitoring of District irrigation water use on parks and open space. This irrigation management system will provide a detailed set of monitoring data for each irrigation zone.

This 95% Completion Report is in partial fulfillment of CWCB's Water Efficiency Grant Program requirements. This document contains a summary of the project status, a discussion of the preliminary findings and obstacles, and a description of project modifications.

Project Status

The District has completed the installation of the irrigation management system and the system is operational. This installation is detailed in Task 1 and 2 of the scope of work provided in the Application for Water Efficiency Grant. These tasks involved the installation of the weather station, central control station, meters, valves, and communication accessories needed to manage the irrigation on Upper Coyote Ridge Park, Lower Coyote Ridge Park, Retreat Park, South Open Space Park, North Open Space Park, and Daniels Gate Park. Table 1 indicates that all work associated with Tasks 1 and 2 has been completed.

Table 1 Project Schedule

Action Item	Anticipated Completion Disclosed in the Application for Water Efficiency Grant	Status and Revised Anticipated Completion
Order Phase I materials and initiate installation	Middle of July 2007	Completed end of September 2007
Complete installation of Phase I materials	Mid/End of October 2007	Completed end of October 2007
Complete set up/training and begin operations of Phase I	Mid/End of October 2007	Completed May 2008
Submit 50 percent completion reports to CWCB	End of October 2007	Submitted to CWCB end of December 2007
Complete installation of Phase II materials	End of October 2007	Completed May 2008
Submit 95 percent completion report to CWCB	Beginning of November 2007	Anticipate submission to CWCB February 2009
Complete set up and begin operation of Phase II new equipment	Beginning of 2008 irrigation season	Completed May 2008
Submit final completion report to CWCB	2008 irrigation season	Anticipate completion end of 2009 irrigation season
Collect monitoring data and estimate 2008 & 2009 irrigation water savings	End of 2008 irrigation season	Anticipate completion end of 2009 irrigation season

The District completed the set up and began operations of the Phase II equipment in May 2008. The District will submit the final completion report at the end of the 2009 irrigation season when a full set of irrigation data will be available for analysis. The District has collected monthly data from both Phases I and II. Data collection began in June 2008.

Goals and Objectives

The District has met their goals and objectives for the installation of the CALSENSE Irrigation Control System. The equipment was successfully installed.

Preliminary Findings and Obstacles

The installation of the irrigation management system equipment was achieved as planned and no major obstacles were encountered. However, the District encountered several challenges with the operational set up of the central control station, communications system, and the weather station.

- *Central control station:* The District experienced difficulty in programming the central control station computer. Remote assistance from the CALSENSE contractor did not prove to be sufficient and a CALSENSE technician had to be brought in to address the programming issues onsite.

- *Communications system:* The original plan for communication involved the use of wireless technology. This did not work because of the locations of some of the valve meters and controllers in relation to the central control station computer.

The District subsequently set up a system using cell phone technology that has met the District's needs. This was the most difficult portion of this entire project.

- *Weather station:* Initially the weather output data from the weather station was too detailed for the District's purposes and cumbersome to read. The District purchased a software program that consolidated the data into a readable format. Additionally, the District has taken output data from the weather station and placed it on their web site for residents to monitor real time weather conditions in Castle Pines North.

Project Modifications

The following modifications have been made to the project as originally scoped in the Application for Water Efficiency Grant:

- *Communications system:* As previously discussed, the District is now using a cell phone technology system rather than the originally scoped radio system. The costs for both communication systems are the same and will not affect the project budget.

- *Weather station software program:* The new weather station software program required an additional $880 for the software equipment and will require staff time to set up and learn. The software also uses Windows XP and will likely require the purchase of a new, more reliable computer that is compatible with Windows XP. The additional costs for the software program and hardware will not affect the requested funding amount from the CWCB as presented in the Application for Water Efficiency Grant.

- *Weather data:* The District is uploading the weather station output data onto a District website. The public is able to access this site to obtain real-time weather data. The site also promotes information on water conservation and includes a link to the District's water conservation program. It is anticipated that this will increase exposure to water conservation education. The additional costs to set up the website and weather station data exchange has been incurred by the District as external project expenses and as such did not change the project budget or requested amount of CWCB funding as presented in the Application for Water Efficiency Grant.

- *Public Outreach:* During the summer of 2008, the District spent considerable time and effort promoting this project. The District coordinated and participated in three separate workshops during which the control system was presented to HOA management companies, HOA board members, and HOA landscape contractors. As a result of this effort, one HOA has budgeted for the acquisition of the Calsense Irrigation Control System. It is hoped that this system will be installed in 2009.

Summary

The District has successfully completed the installation of the CALSENSE Irrigation System. Although several obstacles were encountered, the District was able to address each issue without significant delays. The District is very pleased with the overall operation of the system. Not only has the system alerted our irrigation technicians to numerous broken heads but it has saved the District many thousands of gallons of water resulting from main line breaks. In one particular case the District's system reported a water main break at the North Open Space Park that was leaking 281 gallons per minute. This leak occurred at 3:10 AM on a Saturday morning and ran for 2 minutes before being shut off by the CALSENSE system. It is very possible that because of the location of this leak and the time and day of the leak, it could have gone undetected for a minimum of 24 hours. Had this leak gone undetected the District would have wasted 404,640 gallons of water in a 24 hour timeframe. This amount of water is roughly equal to one month's water use for 80 households.

Castle Pines North Metropolitan District
Work Completed to Date
January 31, 2009

Table 1 Estimate of Costs and Cost-Sharing Allocation Presented in the Application for Water Efficiency Grant

		Estimated Expenditures						Funding Sources			
		Ewing Irrigation		Clearwater Landscaping	Parker Electric	District Staff Costs					
Task	Description	CALSENSE Material	Technical Asisstance	Installation of Pull in Wire	Installation of Electrical Equipment	Staff Labor Costs	TOTAL	District Match (Cash Funds)	CWCB Grant	District Match (In-kind Services)	Total
1.0	Phase I Installation	$30,054	$2,000	$1,500	$3,000	$9,072	$45,626	$7,213	$29,341	$9,072	$45,626
2.0	Phase II Installation	$29,276	$1,600	$3,000	$0	$6,262	$40,138	$7,026	$26,850	$6,262	$40,138
3.0	Operational Set Up & Initial Monitoring	$0	$0	$0	$0	$7,643	$7,643	$0	$0	$7,643	$7,643
Total		**$59,330**	**$3,600**	**$4,500**	**$3,000**	**$22,977**	**$93,407**	**$14,239**	**$56,191**	**$22,977**	**$93,407**

Table 2 Expenditures and Cost Share Allocation as of January 31, 2009

		Actual Expenditures						Funding Sources			
		Ewing Irrigation		Clearwater Landscaping/ Materials	Parker Electric	District Staff Costs					
Task	Description	CALSENSE Material	Technical Assistance	Installation of Pull in Wire	Installation of Electrical Equipment	Staff Labor Costs	TOTAL	District Match (Cash Funds)	CWCB Grant Invoice	District Match (In-kind Services)	Total
1.0	Phase I Installation	$29,176	$0	$1,383	$0	$9,260	$39,820	$1,219	$8,713.36 ($20,627.64 to be invoiced)	$9,260	$19,192
2.0	Phase II Installation	$35,149	$0	$1,638	$0	$6,600	$43,386	$9,936	$26,850	$6,600	$43,386
3.0	Operational Set Up & Initial Monitoring	$0	$0	$0	$0	$6,580	$6,580	$0	$0	$6,580	$6,580
Total		**$64,325**	**$0**	**$3,021**	**$0**	**$22,439**	**$89,785**	**$11,155**	**$35,563**	**$22,439**	**$69,157**

Table 3 Staff Hours as of December 31, 2007								
		District Staff Hours and Costs						
Task	Description	Manager Hours	Metro District Park & Open Space Manager Hours	Parks and Open Space Maintenance Foreman Hours	Parks/Utility Maintenance Worker Hours	Communications Consultant Hours	Total Staff Hours	Staff Labor Costs
	Rates	$48.22	$38.14	$27.61	$12.00	$50.00	n/a	n/a
1.0	Phase I Installation	10	24	100	80	0	214	$5,119
2.0	Phase II Installation	5	5	20	0	0	30	$984
3.0	Operational Set Up & Initial Monitoring	5	5	40	0	0	50	$1,536
Total		**20**	**34**	**160**	**80**	**0**	**294**	**$7,639**

Table 4 Staff Hours as of January 31, 2009								
		District Staff Hours and Costs						
Task	Description	Manager Hours	Metro District Park & Open Space Manager Hours	Parks and Open Space Maintenance Foreman Hours	Parks/Utility Maintenance Worker Hours	Communications Consultant Hours	Total Staff Hours	Staff Labor Costs
	Rates	$48.22	$38.14	$27.61	$12.00	$50.00	n/a	n/a
1.0	Phase I Installation	10	24	250	80	0	364	$9,260
2.0	Phase II Installation	10	15	140	140	0	305	$6,600
3.0	Operational Set Up & Initial Monitoring	10	15	140	80	14	259	$6,580
Total		**30**	**54**	**530**	**300**	**14**	**928**	**$22,439**

Table 5 Invoice Record

Task	Approximate Invoice Date*	Vendor	Amount	Billing Category
	6/1/2007	Ewing (flow meters)	$1,030.00	CALSENSE material
	6/8/2007	Ewing (wire)	$434.28	CALSENSE material
	6/28/2007	Clearwater (pull pipe and wire)	$575.00	Clear Water Landscaping/Materials
	7/12/2007	Ewing (2 quick pads)	$916.54	CALSENSE material
	8/7/2007	Ewing (clocks, wire for system)	$17,021.67	CALSENSE material
	8/14/2007	Ewing (weather station)	$8,975.00	CALSENSE material
	8/31/2007	Home Depot (concrete)	$67.73	Clear Water Landscaping/Materials
	9/5/2007	Home Depot (cement mixer)	$47.70	Clear Water Landscaping/Materials
	9/5/2007	Home Depot (conduit)	$30.78	Clear Water Landscaping/Materials
	9/11/2007	Home Depot (conduit)	$23.98	Clear Water Landscaping/Materials
	9/14/2007	Ewing (radio transmitters)	$799.00	CALSENSE material
Phase I	10/12/2007	ACC (dig trench for weather st)	$638.00	Clear Water Landscaping/Materials
	11/12/2007	Ewing (wire for new installs)	$968.64	CALSENSE material
	11/28/2007	Ewing (master valve, flow meter, boxes)	$6,486.07	CALSENSE material
	12/6/2007	Clearwater (pull pipe and wire)	$887.65	Clear Water Landscaping/Materials
	12/30/2007	Ewing (controllers & radio)	$27,221.00	CALSENSE material
	3/19/2008	Ewing	$263.41	CALSENSE material
	3/24/2008	Ewing	$174.64	CALSENSE material
	3/24/2008	Ewing	$34.91	CALSENSE material
Phase II	4/30/2008	Clearwater	$750.00	Clear Water Landscaping/Materials
Total through 1/31/09			**$67,346.00**	