Disclaimer

This project was conducted with financial assistance from a grant from the Metropolitan Water District of Southern California through Metropolitan’s Innovative Conservation Program (ICP). ICP grants are provided to selected projects to test water savings potential and functional reliability of new water use efficiency devices. The findings of this project, summarized in this report, are solely from the project proponent. Metropolitan does not endorse any particular product, service, or company, including those discussed within this report. The information provided within this report is not certified by Metropolitan and any party referencing this report should verify information as needed for its own purpose.
Report on the Water Savings of “No More Geysers” Automatic Shutoff Device

FINAL REPORT, March 2010
Acknowledgements

No More Geysers (NMG) extends special thanks to U.S. Congressman Darrel Issa, Mr. Jim Hilton, and the landscaping staff at Tri-City Corporate Towers, for participating in this study and allowing NMG to install and monitor our equipment at the Tri-City Corporate Towers in Oceanside, California.

NMG greatly appreciates the cooperation and demonstrated dedication to promoting the growth of small businesses, water conservation, and energy efficiency in the landscape irrigation industry exhibited by the participants in the study.
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I. EXECUTIVE SUMMARY

This report documents an automatic shutoff sprinkler riser field-monitoring project conducted in the landscaped areas surrounding an office building parking complex in Oceanside, California. The project was implemented under a contract between the Metropolitan Water District of Southern California and Slingshot LLC. The project was carried out by No More Geysers LLC1 with support from the property owner and the property management company.

The No More Geysers (NMG) automatic shutoff device conserved a total of 21,280 gallons of water and stopped water flowing from eleven broken sprinkler risers during the course of the project. This equates to nearly thirty-nine percent of the water used at the site during the period. A total of twenty-four risers broke during the course of the project, eleven of them had No More Geysers valves installed and thirteen did not. Based on the differences in the rates of water usage, the project managers estimate the broken risers in the irrigation zones without No More Geysers valves installed went undiscovered for between three and eighteen days.

Using an average of two breaks per riser per year, one NMG valve conserves approximately 3,200 gallons of water per year. With an approximate cost of $0.40 for 200 gallons of water, the NMG valve will reduce water costs at a single nozzle by $6.40 per year.

Where a notional “average” residential property has four irrigation zones, each containing ten nozzles, and NMG would prudently be installed at five of those nozzles, and NMG retail cost is around $60.00 for all 20 nozzles ($3.00 each), the annual cost savings at the property is $68.00.

II. INTRODUCTION

This report documents an automatic shutoff sprinkler riser field-monitoring project conducted in the landscaped areas surrounding an office building complex in Oceanside, California. The project was implemented under a contract with the Metropolitan Water District of Southern California and carried out by No More Geysers LLC with support from the property owner and the property management company.

a. Background

Water is vital to the survival of everything on the planet and is limited in supply. The Earth is made up of more than 70 percent water, but less than 1 percent of that water is available for human use. The rest is either salt water found in oceans, fresh water frozen in the polar ice caps, or too inaccessible for use. While the population and the demand on freshwater resources are increasing, supply remains constant.

i. The Necessity of Water Conservation

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1 No More Geysers LLC is a partial successor in interest to Slingshot LLC. No More Geysers LLC is assisting Slingshot LLC in wrapping up business before Slingshot is dissolved. For purposes of this Final Report, the company names are used interchangeably.
Managing water is a growing concern in the United States. Communities across the country are starting to face challenges regarding water supply and water infrastructure. According to a recent statement by the U.S. Environmental Protection Agency, improving water conservation is one of the most effective ways that communities can manage their water and energy supplies. With less water moving through the system, utility operating costs will decrease. Communities will then avoid costs for treatment chemicals, residuals disposal, and energy associated with water collection, treatment, and disposal. In addition, water conservation can help utilities better manage capacity expansion because necessary expansions can be delayed or reduced in size.

Communities should work towards integrating low impact development practices and water conservation into existing development and new construction to prevent problems in the future. These approaches are less energy intensive than traditional development and can even help to reduce a community’s carbon footprint.

Water conservation is an imperative part of our nation’s sustainability efforts and can have a very real impact on reducing water use. But, water conservation doesn’t only result in water savings. Delivering water to homes requires a great deal of energy. Approximately 4 percent of the nation’s electricity consumption is used moving or treating water and wastewater, and 18 percent of energy use in California is devoted to conveyance of water. Making water distribution more efficient will not only save water and reduce costs, but it will save energy and significantly improve sustainability and increase capital available for infrastructure investment.

ii. Outdoor Water Use

About 30 percent of the water used by the average American household is devoted to outdoor water use. In more arid parts of the country like Southern California, homeowners use as much as 70 percent of their water outdoors. Experts estimate that up to 50 percent of landscape water use goes to waste due to evaporation, wind, or runoff caused by overwatering or broken irrigation systems. In addition to overextending the water supply, landscape irrigation runoff can convey chemical and microbial contaminants into the aquatic environment such as fertilizers, herbicides, salts, and pathogens (increasing non-point source pollution), it can cause significant damage to public and private property, and as a result, it can be a source of liability for the owner of the system from which it flowed.

On any given day, in virtually every neighborhood in California (and many other places on the earth), broken sprinkler risers are literally pouring thousands of gallons of water down storm drains. This water unnecessarily burdens water treatment and reclamation systems and increases the amount of energy required to operate those systems. Commercial and residential outdoor water use in the United States accounts for more than seven billion gallons of water each day, mainly for landscape irrigation. It is certain that a significant portion of this water is lost through broken sprinkler risers. Abating this loss of water will help conserve water and will also reduce energy consumption.

The results of this project demonstrate that No More Geysers conserves a significant amount of water and provides a water and energy conservation measure that can be implemented now.
b. Project Objective

The objective of this demonstration project was to provide measured water savings data from a typical installation of No More Geysers (NMG) automatic shut-off riser and valves.

c. Project Activities and Method

The project activities consisted of identifying and selecting the demonstration site through the site owner, surveying and cataloging the site’s irrigation layout, identifying the test and control group irrigation zones, installing the equipment and measuring the water use over the course of twelve months. The water usage at the demonstration site was measured using in-line water meters installed on individual irrigation zones, one group of zones with NMG installed and the other without.

The project was carried out by installation of the NMG valve on eighty-five (85) existing sprinkler heads in the landscaped area surrounding the parking lots of an office complex in Oceanside, CA, and then monitoring water usage at the site where the NMG valves are installed for a period of twelve months. Water savings was measured by comparison of water usage at the zones where the NMG valves were installed and water usage at the analogous (control) zones where no NMG valves were installed. Usage rates were calculated by the use of in-line water meters isolated on each zone in the landscape irrigation system. Table 1 below shows the number of sprinkler heads in each zone.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Zone No.</th>
<th>Number of heads</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMG</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>11</td>
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<td>Total:</td>
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<td>85</td>
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<tr>
<td>Control</td>
<td>11</td>
<td>10</td>
</tr>
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<td></td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>15</td>
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<td></td>
<td>20</td>
<td>15</td>
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<tr>
<td></td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

The first phase of the project included a survey of the demonstration site to match up analogous irrigation sprinkler heads and zones. This phase of the project began immediately after the site was identified. After the analogous heads and zones were identified, the individual sprinkler heads at the each zone were fitted with an NMG valve.

Each irrigation zone with NMG valves installed was fitted with an in-line gallon-per-minute water meter to capture accurate data about water use in that system. The analogous zone was also fitted with an in-line water meter to capture data on water usage there. As sprinkler head breaks were discovered, each break was documented and a replacement NMG riser and pin
was installed on to the existing NMG valve. The monitoring and measurement of water use were continued for a period of twelve months.

The project managers identified and selected the demonstration site as one where riser breaks occur often and the impact of those breaks was acutely experienced by the property owner. Heads were chosen for installation of a NMG valve because of a location with a historically high breakage rate, a location that makes the head more susceptible to breakage, a location where the risk of property damage from erosion in the case of a break is high, or a location where the risk of storm drain contamination from excessive runoff is high. Also considered were reports from the property manager that in the years prior to the start of the demonstration project, the property owner experienced multiple riser breaks where the runoff was significant enough to cause damage to the real property that far exceeded the cost of replacing the broken risers.

d. Project Challenges

Initially, the project managers identified a demonstration site at a Sweetwater High School District school in southern San Diego County, but subsequent to contract award by MWD, the site owner backed out on its willingness to provide a site for the project. As a result, the project managers were forced to spend an unforeseen amount of time, resources and energy identifying and selecting an alternative location. The project managers experienced significant reluctance to participate in the demonstration project from managers and owners of suitable locations, which caused the site selection process to take a very long time. The project managers found, by conducting interviews with the owners of potential locations, that often the reluctance to participate was driven by the response the owners received from their landscape managers. When the owner asked the landscaper about the NMG product, it was unrecognized by the landscaper and perceived as something that might create problems in the irrigation system. While awareness of the problem the NMG solves was universal among landscapers and property owners, finding a property owner willing to test the product proved more difficult than expected.

Another challenge the project managers experienced was that property owners have no baseline of their outdoor water use and thus no context by which to judge water savings generated by the NMG. This challenge is caused by the fact that landscape irrigation systems are most often not separately metered (there was not a single location identified during the site choice process which was separately metered).

II. SETUP AND INSTRUMENTATION

A total of nine (9) water meters were used in the project, each installed downstream from the sprinkler valves and timer and upstream from the first sprinkler head in the zone. Eighty-five NMG devices were installed in the project in four irrigation zones. Five control zones, with a total of eighty-five sprinkler heads, had water meters installed. The water meters and NMG valves were installed using industry standard practices. It is unknown whether the irrigation system at the demonstration site is installed in accordance with any widely accepted landscape industry standard. The site was checked for broken risers and meter readings were conducted at least every two weeks and raw data was reported to MWD in project updates. The quarterly reports submitted to MWD are attached to this final report at Appendix B.
The irrigation zones were selected as a test or control respectively based on the number and type of spray nozzles contained in each zone. Consideration was given to spray nozzle location relative to walkways, curbs and higher traffic areas where breakage is most common, and to ensure the control and test zones were as closely analogous as possible.
III. FIELD SITE DESCRIPTION

The demonstration site is an approximately 75,000 square foot parking lot adjacent to a mid-rise office building located in Oceanside, CA. The irrigation zones where the demonstration was conducted are located in the perimeter and the landscaped medians of the parking lot.

IV. RESULTS AND DISCUSSION

The irrigation zones with No More Geysers installed used 21,280 fewer gallons of water during the test period. In the zones with NMG installed, 33,780 gallons of water was consumed by the irrigation system. In the control zones, 55,060 gallons was consumed. This equates to nearly a thirty-nine percent (39%) conservation rate over the entire project. At times during the test period, the savings rate was as high as fifty-one percent (51%) and as low as eleven percent (11%). Even if savings rates only occurred at the lowest rate recorded during this project, the product would be a cost effective way to significantly reduce outdoor water use.

The overall incidence of riser breakage was not as high as the program managers expected, but the incidence of breakage between the test and control sites was almost equal (11 and 13 respectively). The similarity in frequency of breakage allows for a meaningful comparison between the test and control zones and a conclusion that the demonstration project was successful. However, the project managers recognize the benefits testing on a larger scale would present.

Table 2 shows the incidence of breakage by month. As expected, higher breakage rates occurred during summer months when the businesses in the buildings experienced the greatest volume of customers.

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2 The property, known as the Tri-City Corporate Towers, located at 3156 Vista Way, Oceanside, CA 92054, houses mixed-use office space, and has a very high volume of traffic in the parking lot and into and out of the buildings.

3 See e.g., Appendix B, Report for the month of October 2009.
Table 3 shows the estimated water loss per zone based on (1) the number of risers broken in that zone during the test period, (2) laboratory test water loss rates where NMG is not installed, (3) an estimated average time of two weeks between actual break and discovery of the break, and (4) the frequency of the irrigation cycle being four times a week for twenty minutes a cycle.

For example, zone 20 experienced one break during the test period. NMG saves 10 gallons per minute, the system cycled 8 times in the two weeks before the break was discovered for 160 minutes of run time, resulting in just over 1600 gallons being wasted through the one broken riser.

Using an average of two breaks per riser per year, one NMG valve conserves approximately 3,200 gallons of water per year. With an approximate cost of $0.40 for 200 gallons of water, the NMG valve will reduce water costs at a single nozzle by $6.40 per year.

Where a notional “average” residential property has four irrigation zones, each containing ten nozzles, and NMG would prudently be installed at five of those nozzles, and NMG retail cost is around $60.00 for all 20 nozzles ($3.00 each), the annual cost savings at the notional residential property is $68.00. It is important to note that this savings estimate does not take into account the external costs of downstream runoff and associated non-point source pollution, which a residential property owner would not experience directly, but would probably pay through state and local taxes. The estimate also assumes that no other property damage is incurred as a result of the riser break; if that type of damage occurs, the cost of repairs can increase dramatically.

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4 Independent laboratory test report on NMG, attached hereto at Appendix C.
5 Id.
No major instances of erosion or other property damage due to sprinkler head breakage occurred as a result of breaks in the control zone. Some topsoil erosion was experienced in zone 5 due to the frequent breaks.

V. CONCLUSION

The results of this project show that No More Geysers is a viable water conservation product and solution to the problem of broken sprinkler risers. The project also demonstrates that a small number of breaks in a landscape irrigation system can result in significant water loss, which makes the case for widespread use of NMG even more compelling. As government entities and consumers seek ways to conserve water, the NMG should be a recommended product. In addition, the product mitigates erosion, silting and sedimentation of storm drains, and non-point source pollution.

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6 It is impossible to know how long each broken sprinkler head went undiscovered during the monitoring period. The estimates provided are based on the meter readings, the landscaping contractor’s maintenance schedule, water pressure at the site, and the setting of the automatic sprinkler system.
No More Geysers
www.nomoregeysers.com

Report on the Water Savings of “No More Geysers” Automatic Shutoff Device

FINAL REPORT, March 2010

APPENDIX A
ITEMIZED ACTUAL COST BREAKDOWN AND FINAL INVOICE
### Timeline of all project actions:

<table>
<thead>
<tr>
<th>Month</th>
<th>Action Description</th>
<th>Billable Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2008</td>
<td>Received Notice to proceed from MWD, began manufacturing, arranged preliminary meeting with School District</td>
<td>3.5 hrs project mgmt</td>
</tr>
<tr>
<td>February 2008</td>
<td>Conducted preliminary meeting with School District, awaiting documentation of sprinkler system layout and notice from School to proceed with installation</td>
<td>1 hr project mgmt</td>
</tr>
<tr>
<td>March 2008</td>
<td>Notified by School District of their request to delay implementation of project. Confirmed justification for delay with School District officials. Received first article from factory, identified manufacturing flaws and rejected shipment.</td>
<td>8 hrs project mgmt</td>
</tr>
<tr>
<td>April 2008</td>
<td>Received check from MWD. Received product from factory, approved and accepted.</td>
<td>8 hrs project mgmt</td>
</tr>
<tr>
<td>May 2008</td>
<td>Awaiting notice to proceed from School District</td>
<td>0</td>
</tr>
<tr>
<td>June 2008</td>
<td>Received notice to proceed from School District, set date of install for July 9-15.</td>
<td>1 hr project mgmt</td>
</tr>
<tr>
<td>July 2008</td>
<td>School District notified Slingshot LLC of its decision to not go forward with the project citing inapplicability of solution to the School’s properties. Began search for new project location.</td>
<td>3 hrs project mgmt</td>
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<tr>
<td>August 2008</td>
<td>Continued search for new project location.</td>
<td>2.5 hrs project mgmt</td>
</tr>
<tr>
<td>September 2008</td>
<td>Continued search for new project location.</td>
<td>2.5 hrs project mgmt</td>
</tr>
<tr>
<td>October 2008</td>
<td>Continued search for new project location.</td>
<td>2.5 hrs project mgmt</td>
</tr>
<tr>
<td>November 2008</td>
<td>Identified new project location.</td>
<td>10 hrs project mgmt</td>
</tr>
<tr>
<td>December 2008</td>
<td>Began site preparation and installation at new project site.</td>
<td>26 hrs project mgmt and site preparation</td>
</tr>
<tr>
<td>January 2009</td>
<td>Completed site preparation and installation.</td>
<td>136 hrs install (total install includes 85 NMG, 9 water meters, adapters, and irrigation couplings)</td>
</tr>
<tr>
<td>February 2009</td>
<td>Project maintenance</td>
<td>10 hrs project mgmt</td>
</tr>
</tbody>
</table>
March 2009  Project maintenance
    Total billable: 10 hrs project mgmt
April 2009   Project maintenance
    Total billable: 10 hrs project mgmt
May 2009    Project maintenance
    Total billable: 10 hrs project mgmt
June 2009   Project maintenance
    Total billable: 10 hrs project mgmt
July 2009   Project maintenance
    Total billable: 10 hrs project mgmt
August 2009 Project maintenance
    Total billable: 10 hrs project mgmt
September 2009  Project maintenance
    Total billable: 10 hrs project mgmt
October 2009 Project maintenance
    Total billable: 10 hrs project mgmt
November 2009 Project maintenance
    Total billable: 10 hrs project mgmt
December 2009 Project maintenance
    Total billable: 10 hrs project mgmt

INVOICE & CONTRACT FINANCIAL ACCOUNTING

Total Proposed Project Price: $15,957.50

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<th>Itemized Description</th>
<th>Unit Price</th>
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<td>350 ea NMG valve sets:</td>
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<tr>
<td>100 ea riser/pin replacement sets:</td>
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<td>350 NMG valve set installation:</td>
<td>$15.00</td>
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<td>4 ea Water Meters:</td>
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Actual Project Costs: $

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<th>Unit Price</th>
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<tr>
<td>85 ea NMG valve sets:</td>
<td>$3.02</td>
<td>$256.70</td>
</tr>
<tr>
<td>11 ea riser/pin replacement sets:</td>
<td>$1.00</td>
<td>$11.00</td>
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<tr>
<td>Description</td>
<td>Actual Cost</td>
<td>Total Cost</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
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<td>------------</td>
</tr>
<tr>
<td>85 NMG valve set installation:</td>
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<td>9 ea Water Meters:</td>
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<td>Demonstration period field labor:</td>
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<td>$2400.00</td>
</tr>
<tr>
<td>Project Management:</td>
<td></td>
<td></td>
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<tr>
<td>- 2 site visits/month &amp; associated activity</td>
<td>---</td>
<td>$7556.00</td>
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<tr>
<td>General and Administrative:</td>
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</table>
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www.nomoregeysers.com

Report on the Water Savings of “No More Geysers” Automatic Shutoff Device

FINAL REPORT, March 2010

APPENDIX B
ICP INTERIM PROGRESS REPORTS AS SUBMITTED
Ms. Diane Harrelson  
The Metropolitan Water District of Southern California  
P.O. Box 54153  
Los Angeles, CA 90054-0153

June 30, 2008

Dear Ms. Harrelson,

    Slingshot LLC submits the attached project progress report in accordance with Exhibit B of Innovative Conservation Program Agreement No. 033-2007.

    If you have any questions or concerns, please contact the undersigned.

    Sincerely,

    **Signed/**

Chris Eader  
619-437-9222
June 30, 2008

PROGRESS REPORT for Innovative Conservation Program Agreement No. 033-2007

I. Summary

The start of this project was delayed from March 2008 to July 2008 at the request of the Sweetwater School District. Project is scheduled to begin recording water use by mid-July. Due to the delay, water savings calculation will run through the end of the 2008-2009 school year (approx. June ’09), in order to record data for a complete 12-month period and to capture the highest traffic times at the school.

II. List of Project Sites

Olympia High School
1925 Magdellena Avenue
Chula Vista, CA 91913

Otay Ranch High
1250 Olympic Parkway
Chula Vista, CA 91913

III. Water savings to date

No documented water savings to date. Project implementation was delayed until July 2008 by the Sweetwater School District. Project is due to be installed July 9-15 and the next progress report will contain water savings data.

IV. Project actions to date

January 2008
Received Notice to proceed from MWD, began manufacturing,
arranged preliminary meeting with School District
Total billable: 3.5 hrs project mgmt
February 2008  Conducted preliminary meeting with School District, awaiting documentation of sprinkler system layout and notice from School to proceed with installation
Total billable: 1 hrs project mgmt

March 2008  Notified by School District of their request to delay implementation of project. Confirmed justification for delay with School District officials. Received first article from manufacturer, identified manufacturing flaws and rejected shipment.
Total billable: 8 hrs project mgmt

April 2008  Received check from MWD. Received new product from manufacturer, approved and accepted.
Total billable: 8 hrs project mgmt

May 2008  Awaiting notice to proceed from School District
Total billable: 0

June 2008  Received notice to proceed from School District, set date of install for July 9-15.
Total billable: 1 hr project mgmt

V. Costs to date

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Project Management:</td>
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<td>General and Admin.:</td>
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<td>Materials:</td>
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<tr>
<td>Total:</td>
<td>$1662.50</td>
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</tbody>
</table>
Ms. Diane Harrelson  
The Metropolitan Water District of Southern California  
P.O. Box 54153  
Los Angeles, CA 90054-0153

September 30, 2008

Dear Ms. Harrelson,

Slingshot LLC submits the attached project progress report in accordance with Exhibit B of Innovative Conservation Program Agreement No. 033-2007.

If you have any questions or concerns, please contact the undersigned.

Sincerely,

**//Signed/**

Chris Eader  
619-437-9222
I. **Summary**

During this period the original project’s property owner (Sweetwater High School District) decided that it could not participate in the project. The School claimed that the No More Geysers system is incompatible with the new irrigation system at the School’s properties. Slingshot LLC suggested using the No More Geysers product at other properties within the School District which do not have the new irrigation system, but the School declined despite the obvious benefits it would receive from being the proponent of this project.

While we are disappointed at this setback, Slingshot LLC remains committed to the completion of the demonstration project and is actively pursuing a new location through the both the City and County of San Diego. Slingshot LLC has received positive feedback from the City and the County and we are engaged in discussions with both organizations to identify a final location for the project. We expect to come to a decision on the location within the next 60 days and will initiate the project as soon as possible after the new site is identified.

II. **List of Project Sites**

TBD

III. **Water savings to date**

No documented water savings to date. Project implementation at the Sweetwater School District was cancelled. Slingshot LLC principals have been working with officials at the City of San Diego to find an appropriate site for the implementation of the demonstration project. A new site location choice is expected by the end of the calendar year (2008) with initiation of the project shortly thereafter.
IV. **Detail of all project actions to date**

**January 2008**  
Received Notice to proceed from MWD, began manufacturing, arranged preliminary meeting with School District  
Total billable: 3.5 hrs project mgmt

**February 2008**  
Conducted preliminary meeting with School District, awaiting documentation of sprinkler system layout and notice from School to proceed with installation  
Total billable: 1 hrs project mgmt

**March 2008**  
Notified by School District of their request to delay implementation of project. Confirmed justification for delay with School District officials. Received first article from manufacturer, identified manufacturing flaws and rejected shipment.  
Total billable: 8 hrs project mgmt

**April 2008**  
Received check from MWD. Received new product from manufacturer, approved and accepted.  
Total billable: 8 hrs project mgmt

**May 2008**  
Awaiting notice to proceed from School District  
Total billable: 0

**June 2008**  
Received notice to proceed from School District, set date of install for July 9-15.  
Total billable: 1 hr project mgmt

**July 2008**  
School District notified Slingshot LLC of its decision to not go forward with the project citing inapplicability of solution to the School’s properties. Began search for new project location.  
Total billable: 3 hrs project mgmt

**August 2008**  
Continued search for new project location.  
Total billable: 2.5 hrs project mgmt

**September 2008**  
Continued search for new project location.  
Total billable: 2.5 hrs project mgmt

V. **Total costs to date**

**Reporting Period Apr 08 – Jun 08**

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management</td>
<td>$500.00</td>
</tr>
<tr>
<td>General and Admin.</td>
<td>$275.00</td>
</tr>
<tr>
<td>Materials</td>
<td>$887.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1662.50</strong></td>
</tr>
</tbody>
</table>
Reporting Period Jul 08 – Sep 08

Project Management: $500.00
General and Admin.: $0
Materials: $0
Total: $500.00

Project Total to Date: $2162.50
Ms. Diane Harrelson  
The Metropolitan Water District of Southern California  
P.O. Box 54153  
Los Angeles, CA 90054-0153

December 31, 2008

Dear Ms. Harrelson,

Slingshot LLC submits the attached project progress report in accordance with Exhibit B of Innovative Conservation Program Agreement No. 033-2007.

If you have any questions or concerns, please contact the undersigned.

Sincerely,

**//Signed/***  

Chris Eader  
619-437-9222
PROGRESS REPORT for Innovative Conservation Program Agreement No. 033-2007

I. Summary

During this period a new site for the project was located and installation was started. Initially, we identified two sites for the project, but later determined that the commercial office park setting offered the best opportunity to demonstrate the utility of the product.

II. List of Project Sites

The property is a commercial office building complex located at 3142 Vista Way, Oceanside, CA 92085.

III. Water savings to date

No documented water savings to date. Project implementation at the office park is underway. Expect completion of the installation by January. Water savings will be documented in accordance with the ICP agreement.

IV. Detail of all project actions to date

<table>
<thead>
<tr>
<th>Month</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2008</td>
<td>Received Notice to proceed from MWD, began manufacturing,</td>
</tr>
<tr>
<td></td>
<td>arranged preliminary meeting with School District</td>
</tr>
<tr>
<td></td>
<td>Total billable: 3.5 hrs project mgmt</td>
</tr>
<tr>
<td>February 2008</td>
<td>Conducted preliminary meeting with School District, awaiting</td>
</tr>
<tr>
<td></td>
<td>documentation of sprinkler system layout and notice from School to</td>
</tr>
<tr>
<td></td>
<td>proceed with installation</td>
</tr>
<tr>
<td></td>
<td>Total billable: 1 hrs project mgmt</td>
</tr>
<tr>
<td>March 2008</td>
<td>Notified by School District of their request to delay</td>
</tr>
<tr>
<td></td>
<td>implementation of project. Confirmed justification for delay with</td>
</tr>
</tbody>
</table>
School District officials. Received first article from manufacturer, identified manufacturing flaws and rejected shipment.
Total billable: 8 hrs project mgmt

April 2008
Received check from MWD. Received new product from manufacturer, approved and accepted.
Total billable: 8 hrs project mgmt

May 2008
Awaiting notice to proceed from School District
Total billable: 0

June 2008
Received notice to proceed from School District, set date of install for July 9-15.
Total billable: 1 hr project mgmt

July 2008
School District notified Slingshot LLC of its decision to not go forward with the project citing inapplicability of solution to the School’s properties. Began search for new project location.
Total billable: 3 hrs project mgmt

August 2008
Continued search for new project location.
Total billable: 2.5 hrs project mgmt

September 2008
Continued search for new project location.
Total billable: 2.5 hrs project mgmt

October 2008
Continued search for new project location.
Total billable: 2.5 hrs project mgmt

November 2008
Identified new project location.
Total billable: 10 hrs project mgmt

December 2008
Began site preparation and installation at new project site.
Total billable: 26 hrs project mgmt and site preparation
V. **Total costs to date**

**Reporting Period Apr 08 – Jun 08**

- Project Management: $500.00
- General and Admin.: $275.00
- Materials: $887.50
- Total: $1662.50

**Reporting Period Jul 08 – Sep 08**

- Project Management: $500.00
- General and Admin.: $0
- Materials: $0
- Total: $500.00

**Reporting Period Oct 08 – Dec 08**

- Project Management: $2,156.00
- General and Admin.: $75.00
- Materials: $0
- Total: $2,231.00

**Project Total to Date:** $4,393.50
Ms. Diane Harrelson  
The Metropolitan Water District of Southern California  
P.O. Box 54153  
Los Angeles, CA 90054-0153  

March 31, 2009  

Dear Ms. Harrelson,  

Slingshot LLC submits the attached project progress report in accordance with Exhibit B of Innovative Conservation Program Agreement No. 033-2007.  

If you have any questions or concerns, please contact the undersigned.  

Sincerely,  

**//Signed//**  

Chris Eader  
619-437-9222
March 31, 2009

PROGRESS REPORT for Innovative Conservation Program Agreement No. 033-2007

I. Summary

During this period the installation and implementation of the project was completed.

II. List of Project Sites

The property is a commercial office building complex located at 3142 Vista Way, Oceanside, CA 92085.

III. Water savings to date

No documented water savings to date. Project implementation was completed and no sprinklers have been broken since monitoring began.

IV. Detail of all project actions to date

January 2008  
Received Notice to proceed from MWD, began manufacturing, arranged preliminary meeting with School District  
Total billable: 3.5 hrs project mgmt

February 2008  
Conducted preliminary meeting with School District, awaiting documentation of sprinkler system layout and notice from School to proceed with installation  
Total billable: 1 hrs project mgmt

March 2008  
Notified by School District of their request to delay implementation of project. Confirmed justification for delay with School District officials. Received first article from manufacturer, identified manufacturing flaws and rejected shipment.  
Total billable: 8 hrs project mgmt
April 2008  Received check from MWD. Received product from manufacturer, approved and accepted.
Total billable: 8 hrs project mgmt

May 2008  Awaiting notice to proceed from School District
Total billable: 0

June 2008  Received notice to proceed from School District, set date of install for July 9-15.
Total billable: 1 hr project mgmt

July 2008  School District notified Slingshot LLC of its decision to not go forward with the project citing inapplicability of solution to the School’s properties. Began search for new project location.
Total billable: 3 hrs project mgmt

August 2008  Continued search for new project location.
Total billable: 2.5 hrs project mgmt

September 2008  Continued search for new project location.
Total billable: 2.5 hrs project mgmt

October 2008  Continued search for new project location.
Total billable: 2.5 hrs project mgmt

November 2008  Identified new project location.
Total billable: 10 hrs project mgmt

December 2008  Began site preparation and installation at new project site.
Total billable: 26 hrs project mgmt and site preparation

January 2009  Completed site preparation and installation.
Total billable: 136 hrs install (total install includes 200 NMG, 7 water meters, adapters, and irrigation couplings)

February 2009  Project maintenance
Total billable: 10 hrs project mgmt

March 2009  Project maintenance
Total billable: 10 hrs project mgmt
V. Total costs to date

Reporting Period Apr 08 – Jun 08

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Project Management</td>
<td>$500.00</td>
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<tr>
<td>General and Admin.</td>
<td>$275.00</td>
</tr>
<tr>
<td>Materials</td>
<td>$887.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1662.50</strong></td>
</tr>
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</table>

Reporting Period Jul 08 – Sep 08

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Project Management</td>
<td>$500.00</td>
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<tr>
<td>General and Admin.</td>
<td>$0</td>
</tr>
<tr>
<td>Materials</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$500.00</strong></td>
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Reporting Period Oct 08 – Dec 08

<table>
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<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Project Management</td>
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<tr>
<td>General and Admin.</td>
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<td>Materials</td>
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<td><strong>Total</strong></td>
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Reporting Period Jan 09 – Mar 09

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Project Management</td>
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</tr>
<tr>
<td>NMG install</td>
<td>$4,800.00</td>
</tr>
<tr>
<td>Meter install</td>
<td>$3,500.00</td>
</tr>
<tr>
<td>General and Admin.</td>
<td>$0</td>
</tr>
<tr>
<td>Materials</td>
<td>$</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$9,400.00</strong></td>
</tr>
</tbody>
</table>

Project Total to Date: $13,793.50
Ms. Diane Harrelson  
The Metropolitan Water District of Southern California  
P.O. Box 54153  
Los Angeles, CA 90054-0153

September 30, 2009

Dear Ms. Harrelson,

Slingshot LLC, submits the attached project progress report in accordance with Exhibit B of Innovative Conservation Program Agreement No. 033-2007.

Slingshot LLC has been acquired by No More Geysers LLC (also a California LLC). Slingshot LLC has not yet been dissolved, but is in the process of winding up business. If MWD desires to novate the ICP Agreement from Slingshot to No More Geysers, we are prepared to execute the required documents. Otherwise, our suggestion is that Slingshot LLC continues to perform for the remainder of the ICP period of performance as part of its winding up activities.

If you have any questions or concerns, please contact the undersigned.

Sincerely,

**//Signed//**

Chris Eader  
619-522-0743
PROGRESS REPORT for Innovative Conservation Program Agreement No. 033-2007

I. Summary

During this period project maintenance was performed. Project comprises water meters on approximately 100 sprinkler heads with No More Geysers valves, and 100 heads without. On the heads with the No More Geysers valves, 31,867 gallons of water was used. On the heads without No More Geysers valves, 43,720 gallons was used. 11,853 gallons of water were saved as a result of the No More Geysers valves being used on the system, for an approximate savings of 27% total.

II. List of Project Sites

The property is a commercial office building complex located at 3142 Vista Way, Oceanside, CA 92085.

III. Water savings to date

Water savings to date are: 11,853 gallons of water or 27% savings.

IV. Detail of all project actions to date

January 2008    Received Notice to proceed from MWD, began manufacturing, arranged preliminary meeting with School District
                Total billable: 3.5 hrs project mgmt

February 2008   Conducted preliminary meeting with School District, awaiting documentation of sprinkler system layout and notice from School to proceed with installation
                Total billable: 1 hrs project mgmt
March 2008  Notified by School District of their request to delay implementation of project. Confirmed justification for delay with School District officials. Received first article from manufacturer, identified manufacturing flaws and rejected shipment. Total billable: 8 hrs project mgmt

April 2008  Received check from MWD. Received product from manufacturer, approved and accepted. Total billable: 8 hrs project mgmt

May 2008  Awaiting notice to proceed from School District Total billable: 0

June 2008  Received notice to proceed from School District, set date of install for July 9-15. Total billable: 1 hr project mgmt

July 2008  School District notified Slingshot LLC of its decision to not go forward with the project citing inapplicability of solution to the School’s properties. Began search for new project location. Total billable: 3 hrs project mgmt

August 2008  Continued search for new project location. Total billable: 2.5 hrs project mgmt

September 2008  Continued search for new project location. Total billable: 2.5 hrs project mgmt

October 2008  Continued search for new project location. Total billable: 2.5 hrs project mgmt

November 2008  Identified new project location. Total billable: 10 hrs project mgmt

December 2008  Began site preparation and installation at new project site. Total billable: 26 hrs project mgmt and site preparation

January 2009  Completed site preparation and installation. Total billable: 136 hrs install (total install includes 85 NMG, 9 water meters, adapters, and irrigation couplings)

February 2009  Project maintenance Total billable: 10 hrs project mgmt

March 2009  Project maintenance Total billable: 10 hrs project mgmt
April 2009  Project maintenance
Total billable: 10 hrs project mgmt

May 2009  Project maintenance
Total billable: 10 hrs project mgmt

June 2009  Project maintenance
Total billable: 10 hrs project mgmt

July 2009  Project maintenance
Total billable: 10 hrs project mgmt

August 2009  Project maintenance
Total billable: 10 hrs project mgmt

September 2009  Project maintenance.
Total billable: 10 hrs project mgmt

Total costs to date

Reporting Period Apr 08 – Jun 08

Project Management: $500.00
General and Admin.: $275.00
Materials: $887.50
Total: $1662.50

Reporting Period Jul 08 – Sep 08

Project Management: $500.00
General and Admin.: $0
Materials: $0
Total: $500.00

Reporting Period Oct 08 – Dec 08

Project Management: $2,156.00
General and Admin.: $75.00
Materials: $0
Total: $2,231.00

Reporting Period Jan 09 – Mar 09

Project Management: $1,100.00
NMG install: $4,800.00
Meter install: $3,500.00
General and Admin.: $0
Materials: $
Total: $9,400.00

Reporting Period Apr 09 – Jun 09
Project Management: $1,650.00
General and Admin.: $75.00
Materials: $0
Total: $1,725.00

Reporting Period Jul 09 – Sep 09
Project Management: $1,650.00
General and Admin.: $75.00
Materials: $0
Total: $1,725.00

Project Total to Date: $17,243.50
Report on the Water Savings of “No More Geysers” Automatic Shutoff Device

FINAL REPORT, March 2010

APPENDIX C
INDEPENDENT LABORATORY TEST REPORT
January 11, 2009

This is a report on the laboratory measurements made on the NMG (No More Geysers) units. Reference is also made to the attached file that shows hydrozone layout on which the hydraulic measurements were made.

Step #1 - Setup the hydrozone configured as shown on the attached sketch. Adjust the inlet pressure so as to provide 30 psi at location P2.

Step #2 - Measure the flow rate thru the system first w/o the NMG units, 8.8 gpm. Measure the flow rate w/ NMG units installed, 8.6 gpm. Using the catalog values for the individual sprayers a value of 9.24 gpm is suggested. The presence of the NMG units in the system causes a small, 2.3% reduction in flow rate. These were full length NMG units.

Step #3 - Measure the pressure loss in the system resulting from the installation of the NMG units. The pressure loss w/o NMG units installed was 0.77 psi. The pressure loss w/ NMG installed was 0.80 psi. The number of NMG segments in place during the pressure loss determination had no effect on the pressure loss measurement. The presence of the NMG units in the hydro zone caused a minor 0.1% increase in pressure loss.

Step #4 - Measure the hydro zone flow rate w/ and w/o the NMG units in place for different location in the hydro zone.

<table>
<thead>
<tr>
<th>Sprinkler location</th>
<th>w/o NMG</th>
<th>w/ NMG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lat 2, sprinkler 3</td>
<td>15.6 gpm</td>
<td>7.3 gpm</td>
</tr>
<tr>
<td>Lat 2, sprinkler 2</td>
<td>16.8 gpm</td>
<td>7.3 gpm</td>
</tr>
<tr>
<td>Lat 2, sprinkler 1</td>
<td>17.9 gpm</td>
<td>8.1 gpm</td>
</tr>
<tr>
<td>Lat 1, sprinkler 3</td>
<td>19.1 gpm</td>
<td>8.1 gpm</td>
</tr>
<tr>
<td>Lat 1, sprinkler 2</td>
<td>17.2 gpm</td>
<td>7.4 gpm</td>
</tr>
<tr>
<td>Lat 1, sprinkler 1</td>
<td>16.1 gpm</td>
<td>7.4 gpm</td>
</tr>
</tbody>
</table>

Average 17.1 gpm  Average  7.6 gpm

Using the average flow rates of 17.1 gpm and 7.6 gpm, if any sprinkler in the hydro zone is removed and the outlet is not fitted with a NMG unit, 95 gallons of water will be wasted during a 10-minute irrigation run time.

Edward Norum
Agricultural Engineer
PROJECT TITLE
NO MORE GEYSERS – Sweetwater High School Demonstration Project

PROJECT DESCRIPTION

a. **Project Innovation:**
   This demonstration project involves installation of the patent-pending NO MORE GEYSERS (NMG) valve on three hundred and fifty (350) existing sprinkler heads at a high school in the Sweetwater Union High School District. The NMG valve is an automatic shut-off valve for landscape sprinkler systems. The valve attaches to the existing system between the water supply line and the sprinkler head. When the sprinkler head breaks away (due to some trauma, for example, a lawnmower, pedestrian, or bicyclist accidentally impacting the head), the valve is automatically activated and stops the flow of water. The NMG valve is a patent-pending product. The NMG valve consists of a tubular body equipped with an internally positioned ball bearing, a retaining rod, and a riser (see attached figures).

b. **Water, Energy, and Environmental Benefits:**
   The NMG valve saves water and prevents runoff. As a result, the valve reduces erosion, storm drain contamination, and storm drain silting. The valve saves downstream energy that would be used for reclamation, contamination prevention, and pollution abatement. Use of the valve maintains embedded energy in the water delivery system by maintaining the necessary back-pressure in the system. The back pressure saves upstream energy that would be used to pump out water through the broken sprinkler.

c. **Regional Applicability:**
   This product is widely applicable to commercial, residential, private, and public landscapes. In-ground landscape sprinkler systems are abundant throughout southern California. In sprinkler systems without the NMG valve installed, when a sprinkler head is impacted and breaks, water flows freely out of the system until the break is discovered and repaired. Most sprinkler systems are set on automatic timers to run at night, making detection of broken sprinkler heads difficult. Many breaks go undetected for days or even weeks, resulting in hundreds of gallons of wasted water in each system. Often, sprinkler systems experience such failures multiple times in a year, resulting in billions of gallons of wasted water each year state-wide.

d. **Readiness to Proceed:**
   Slingshot LLC has already performed all necessary research and development associated with this project. Our injection molding facility is ready for full rate production of the NMG valve upon notice of the award of this project.
INNOVATIVE CONSERVATION PROGRAM
PROPOSAL

I. Project Title

No More Geysers – Sweetwater School District Demonstration Project

II. Project Proponent Organization

Slingshot LLC (A MWD Certified Small Business Enterprise)
411 10th Street
Coronado, CA 92118
(619) 437-9222
FEIN: 87-0758368

III. Other Participating Entities

Sweetwater Union High School District
1130 Fifth Avenue
Chula Vista, CA 91911-2896
(619) 691-5500
http://www.suhsd.k12.ca.us

IV. Project Manager and Management Team

- Sweetwater District Point of Contact:
  - Mr. Jim Clark - (619) 858-4440
- Slingshot LLC Project Managers:
  - Mr. Chris Eader - (619) 437-9222
    411 10th Street, Coronado, CA 92118
    nomoregeysers@hotmail.com
    - Twenty-five years experience in landscape and construction trades.
    - Thirteen years experience as owner/operator of sole proprietorship engaged in
      landscape irrigation system installation and maintenance.
  - Mr. Charles Monette - (703) 309-8448
    8477 Canyon Oak Drive, Springfield, VA 22153
    saveswater@gmail.com
    - Certified Project Manager
    - Eight years experience in federal project and contract management
    - Ten years experience in landscaping and construction trades
    - J.D. 2007 George Washington University Law School
    - B.S. 1999 San Diego State University
V. Project Description

A. A Problem in Landscape Sprinkler Systems

When a sprinkler head is broken away from the water supply pipe (this usually occurs at the sprinkler riser), or the riser is otherwise broken, the rate of water flow increases at the break, and the increased water pressure often produces a “geyser” in the intended irrigation area. As a result of the water flowing freely and abundantly, the intended and unintended irrigation areas may be flooded, eroded or otherwise damaged. Moreover, a significant amount of water is wasted as the result of the unrestricted flow. Also, without the restricting back pressure provided by a normally functioning sprinkler head, the remaining heads in the system operate at less than their intended pressure. This produces suboptimal irrigation results throughout the intended irrigation area. Thus, the entire sprinkler system is adversely affected by a single sprinkler head or riser break.

In sprinkler systems without the No More Geysers (NMG) automatic shut-off valve, when a sprinkler head or riser breaks, water flows freely out of the system until the break is discovered and repaired. Many sprinkler systems are set on automatic timers to run late at night or during the early hours of the morning. Therefore, breaks in the system often go undetected for days or even weeks, resulting in hundreds of gallons of wasted water in each system when breaks occur. Many sprinkler systems experience such breaks multiple times a year, resulting in millions of gallons of wasted water each year nationwide.

B. The Solution: The No More Geysers Auto Shut Off Valve

The No More Geysers (NMG) valve (please see attached figures) is comprised of a tubular fitting equipped with an internally positioned ball bearing, a retaining rod, and a riser. The NMG valve is installed between a sprinkler head and the water supply line. The retaining rod is situated inside the riser, and a sprinkler head connects to the riser, which stabilizes the retaining rod inside the riser. The stabilized retaining rod is thus configured to physically prevent the ball from obstructing the flow of water to the sprinkler head. The retaining rod and the riser are designed with multiple corresponding cutoff points for adjusting the rod and riser length to adapt for the various depths of in-ground supply lines found in landscape sprinkler systems.

The outer casing of the riser is designed with a stress point which breaks when the sprinkler head or other part of the riser is impacted. When the riser breaks at the stress point, the sprinkler head and the retaining pin move and the water pressure causes the ball bearing to seat inside the fitting, stopping the flow of water out of the system. This also provides the required back pressure to ensure proper operation of the remaining operable sprinkler heads.

C. Testing

Preliminary product testing was conducted at a residence in San Diego using a standard single “zone” of a sprinkler system consisting of six sprinkler heads (four half heads and two quarter heads).

Using a gallon-per-minute water meter installed in-line and a standard water pressure gauge, the following process was followed and results were obtained:
1. Ran the “zone” with all sprinkler heads intact at maximum available water pressure for ten minutes (typical cycle time for a landscape sprinkler system) to establish the baseline water usage per cycle, which was 70 gallons.
2. Broke off one of the sprinkler heads and ran the system for ten minutes. Here the meter showed 140 gallons of water flowed from the system.
3. Installed the NMG riser in place of the broken riser and sprinkler head and ran the system for ten minutes. This time the meter showed that 49 gallons flowed through the system during the test period.
4. This simple test showed a water savings of 91 gallons in ten minutes or 65% when the head is broken and the NMG system is used.

Based on our more than twenty years of experience in the residential landscaping business, on average, a broken sprinkler head goes undiscovered and un-repaired for about seven days, and on average, sprinkler systems break about twice a year. A conservative estimate using our test results shows the potential for savings of approximately 637 gallons per week or 1,274 gallons per year at each location.

The market for this valve is obvious. The valve quickly pays for itself through lower water bills, and it has wide application to residential and commercial end users, as well as public entities.

D. Major Benefits of Using the No More Geysers Auto Shut Off Riser

1. Reduces or eliminates water waste through the sprinkler system when a break occurs at the head or riser.
2. Stops the free flow of water through broken or damaged sprinkler heads and risers.
   a. Reduces or eliminates potential damage from free-flowing stream of water.
   b. Stopping the free flow of water through the broken riser maintains water pressure in the rest of the system, allowing normal flow of water to the remaining properly operating sprinkler heads and proper irrigation in the intended areas.
3. Prevents damage to the (more expensive) sprinkler head because the riser is designed to break at specific points and with less force than a sprinkler head, this break-away feature also ensures operation of the automatic shut-off mechanism.
4. Maintains embedded energy in the water delivery system.
5. Reduces demand for energy required to reclaim, treat, or otherwise deal with runoff.

E. Sweetwater Union High School Demonstration Project

This demonstration project involves installation of the NMG valve on three hundred and fifty (350) existing sprinkler heads at a high school in the Sweetwater Union High School District and then monitoring water usage at the school where the NMG valves are installed for a period of twelve months. Water savings is measured by comparison of water usage at the site where the NMG valve is installed and usage at an analogous (control) school where no NMG valves are installed. Usage rates will be calculated by the use of in-line water meters isolated on the landscape irrigation system. Usage rates during the demonstration period will also be compared to historical usage rates for the schools involved in the demonstration and in schools of similar size in the remainder of the District. Major instances of erosion or other water damage
due to sprinkler head breakage will be recorded by written report as they occur at the control school or at any other site in the District.

The first phase of the project includes a survey of the demonstration and control High School campuses to match up analogous sprinkler head locations between the sites. This phase of the project begins immediately after the grant is awarded. After the analogous heads and zones are cataloged, the individual sprinkler heads at the demonstration school are fitted with an NMG valve. Heads are chosen for installation of a NMG valve because of a location with a historically high breakage rate, a location that makes the head more susceptible to breakage, a location where the risk of property damage from erosion in the case of a break is high, or a location where the risk of storm drain contamination from excessive runoff is high.

Each sprinkler system with NMG valves installed is fitted with an in-line gallon-per-minute water meter to capture accurate data about water use in that system. The analogous system at the control school is also fitted with an in-line water meter to capture data on water usage there. As sprinkler head breaks occur at the demonstration school, each break is documented and a replacement NMG riser and pin is installed on to the existing NMG valve. The monitoring and measurement of water use are continued for a period of one year (twelve months). The results are then compiled, compared, and contrasted in the final report.

Within sixty days after the end of the twelve-month demonstration period, the final report is submitted to MWD detailing all sprinkler head breaks at both schools during the demonstration, any water damage occurring from the breaks, differences in the water usage rates between the two locations, cost of replacement parts for both locations, and any other pertinent information gathered during the project. The report will be provided to MWD in both electronic (Microsoft word on CD) and paper (8-1/2 x 11) formats.

The demonstration will be conducted at the following schools:

Olympia High School          Otay Ranch High
1925 Magdellena Avenue       1250 Olympic Parkway
Chula Vista, CA 91913         Chula Vista, CA 91913

VI. Funding Amount Requested

Total amount requested: $15,957.50

We respectfully request advance payment of: $7,978.75 (50%)

VII. Project Start Date

Project start date is the date of award. As described above, the site analysis and mapping of analogous zones and systems will be conducted while the valve sets are being manufactured. During this time, after the valve locations have been identified, the water meters will be installed. The production lead time for the proposed batch of 350 valve sets is four weeks including time for shipping from our production facility in mainland China. Therefore, installation of the valves will occur approximately four to five weeks from the date of award. Installation of the valve sets will be completed within two weeks (ten working days), and the monitoring period will begin approximately seven weeks after the date of award (around Thanksgiving 2007).
VIII. Project Completion Date

Project completion date is estimated to be February 15, 2009, approximately sixty days after the end of the twelve month monitoring period. The sixty days will allow for accurate compilation, comparison and analysis of the data collected during the demonstration period.

IX. Project Innovation

The NMG valve functions as a check valve in landscape sprinkler systems. It is a unique product that was invented to fill need in the industry – there are currently no products on the market that address the problem of broken sprinkler head water loss in the same way that the NMG valve does.

X. Water, Energy and Environmental Benefits

The NMG valve was conceived out of the need to abate the unwanted loss of water due to sprinkler system damage. As discussed above, in sprinkler systems without the NMG valve installed, when a sprinkler head is impacted and breaks, water flows freely out of the system until the break is discovered and repaired. Most sprinkler systems are set on automatic timers to run at night, making detection of broken sprinkler heads difficult. Many breaks go undetected for days or even weeks, resulting in hundreds of gallons of wasted water in each system. Often, sprinkler systems experience such failures multiple times in a year, resulting in millions of gallons of wasted water each year state-wide.

The major water, energy and environmental benefits of the NMG valve are:

- Reduces or eliminates water waste through the sprinkler system when a break occurs at the head or riser.
- Stops the free flow of water through broken or damaged sprinkler heads and risers.
  - Reduces or eliminates potential damage from free-flowing stream of water.
  - Stopping the free flow of water through the broken riser maintains water pressure in the rest of the system, allowing normal flow of water to the remaining properly operating sprinkler heads and proper irrigation in the intended areas.
- Prevents damage to the (more expensive) sprinkler head because the riser is designed to break at specific points and with less force than a sprinkler head, this break-away feature also ensures operation of the automatic shut-off mechanism.
- Maintains embedded energy in the water delivery system.
- Reduces demand for energy required to reclaim, treat, or otherwise deal with runoff.

XI. REGIONAL APPLICABILITY

The NMG valve is the preeminent choice for the MWD ICP grant. Because of its unique design, water saving characteristics, and affordability, the NMG valve has wide application to both public and private landscape sprinkler systems across southern California and the nation.
In-ground landscape sprinkler systems are abundant throughout southern California. Also, southern California has a track record of leadership in the area of environmental stewardship and in particular, water conservation. The California Department of Water Resources, the Metropolitan Water District, and the San Diego County Water Authority have all recently recognized the importance of outdoor water conservation. The recent drought years have made water conservation a hot topic and the focus has shifted from indoor conservation to water use outside of the home. The NMG valve represents a way to keep lawns green and maintain environmental stewardship through loss control.

XII. Cost Effectiveness

The NMG valve’s design is simple, yet entirely effective, and the simplicity of the design leads to a low cost for the consumer which will in turn allow for widespread use. Because the cost to the purchaser is so low, the product also pays for itself in a very short time. The amount of water saved by using just one NMG valve can easily pay for the cost of the valve and most of the installation.

While the costs of this project are significant in comparison to the cost of the valves and replacement parts, the bulk of those costs are found in the installation of the NMG valves, field maintenance during the demonstration period, and project management. Presumably, state agencies procuring NMG valves would perform these functions internally or through established contractor relationships where the additional costs would be more marginal.

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<tr>
<th>Item Description</th>
<th>Unit Price</th>
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XIII. Readiness to Proceed

Slingshot LLC has already performed all necessary research and development associated with this project. Our injection molding facility is ready for full rate production of the NMG valve upon notice of the award of this project.