

2010 WATER CONSERVATION GRANT PROJECT

PROJECT NUMBER 09-01/WCG

PREPARED BY:
TOWN OF MANSFIELD

PREPARED FOR:

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF RESOURCE PROTECTION

AND

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 1

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YEAR(S) PROJECT CONDUCTED
(May 21, 2010 – June 15, 2012)

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PROJECT SUMMARY

The project goal is to promote water conservation and to identify and reduce unaccounted for water loss from the Town of Mansfield drinking water works and distribution system.

TASK 1: WATER CONSERVATION RETROFIT AND REBATE PROGRAM

To encourage water use reduction efforts the Town of Mansfield, Water Division implemented a Water Conservation Retrofit and Rebate Program. Keeping in line with the project goal, the rebate incentive program is made available only to Mansfield water customers who are connected to the Town's public water system. Residents using private wells are not eligible to participate.

Mansfield water customers who replace a high water use appliance with a qualified low water use appliance (and/or device), and which that meet the proper criteria, are eligible to receive a check rebate from the Town. For the purposes of this grant, the rebate offer applied only to water saving appliances purchased between May 21, 2010 and June 15, 2011.

Using criteria set forth in the EPA grant, the rebate goals for this project include the following:

- ✓ **210 Toilets**; 1.6 gallons per flush toilets replacing older 5 gallons per flush toilets to be rebated at \$100
- ✓ **200 Clothes Washers**; Washers with a water factor of 6.0 gallons per cycle replacing those with 10.0 gallons per cycle (or higher) to be rebated at \$100
- ✓ **165 Dishwashers**; Washers using 5 gallons of water per cycle (or less) replacing those using 8 gallons per cycle or more to be rebated at \$75
- ✓ **15 Programmable Lawn Sprinkler System**; Installation of a moisture sensitive irrigation controller with automatic rain sensor shut off to be rebated at up to \$200

All rebate applications approved by the Water Division meet the minimum rebate criteria as specified.

Methods: The water rebate program is promoted primarily through print media and word of mouth. More than 500 water conservation brochures were printed at the start of the grant period. The content of the 2-sided color brochure includes; the application for rebate, eligibility criteria, water conservation tips and educational outreach. Outreach programs include; offering various water saving devices at no cost (i.e. low flow showerheads, faucet aerators, toilet leak detection tablets), overview of backflow prevention, and optional registration for the Town of Mansfield, Water Email Notification Program. The Water Division made copies of the brochure available for distribution at the local Town Hall Department of Public Works, local appliance dealer, and pdf file download from Town website www.mansfieldma.com. The Water Division publically promoted the water conservation efforts at appropriate community events such as Earth Day, education workshops and through local plumbers serving Mansfield customers.

To apply for a water conservation rebate customers are asked to complete an application form and return it to the Department of Public Works, along with a proof of purchase receipt. A visual in-home inspection by the Water Division served to verify product eligibility based on a list of qualifying appliances shown on the CEE1.org website. The Town requires that the replacement appliance (or device) be installed at the customer's account location in Mansfield, MA. After a satisfactory inspection is complete the customer application is reviewed for approval. Once approved, the check rebate is then processed and mailed directly to the water customer.

Response to the conservation rebate incentive program is very successful. The Water Division continues to receive new rebate application(s) almost daily. Offering a check rebate incentive during the present low economy may be a contributing factor to its success. The grant program afforded the Water Division an opportunity to offset cost for a set number of appliances. The low water use appliances installed during the grant period help to achieve our goal by conserving natural water resources, and at the same time provide additional cost savings to the customer due to reduced water consumption.

RETROFIT PROGRAM SUMMARY

Toilet Rebates

Toilet Rebates	EXISTING FLOW RATE	NEW FLOW RATE	DAILY USE NEW TOILET (5.05 uses per person 2.46 people per household)	DAILY SAVINGS (col. 2 minus – col. 3 x 5.05 x 2.46)	TOTAL SAVINGS PER HOUSEHOLD (Daily savings x 365 days)	TOTAL ANNUAL SAVINGS (column 1 x column 6)
154	5	1.6	20 gal per day	42 gal per day	15,000 gpy	2,310,000. gal

¹ Residential End Uses of Water, 1999, American Water Works Association, states that people use the toilet at home 5.05 times per day.

Results: 154 toilet rebates were replaced under this grant project (1.6 gallons per flush models were installed). We categorized older toilets at 5.0 gallon flush for purpose of estimating savings and based our calculation using a local town census population average of 2.46 people per household. We estimate total annual savings of 2,310,000 gallons worth \$1,021 in pumping and treatment costs.

Dishwasher Rebates

Dishwasher Rebates	EXISTING FLOW RATE	NEW FLOW RATE	WEEKLY USE PER HOUSEHOLD ²	WEEKLY SAVINGS PER APPLIANCE (col. 2 minus – col. 3 x 5.38)	TOTAL SAVINGS PER HOUSEHOLD PER YEAR	TOTAL ANNUAL SAVINGS (column 1 x column 6)
153	8	5	5.38 times per week	16 gal per week	5,900 gpy	900,000

²Dishwasher Survey Report, 1999, CEE, states that people use the dishwasher at home 5.38 times per week.

Results: 153 dishwasher rebates issued. The average water rate for dishwashers replaced is reduced from 8 gallons to 5 gallons per cycle. We estimate total annual savings of 900,000 gallons worth \$398 in pumping and treatment costs.

Clothes Washer Rebates

Number of Clothes Washers	Existing clothes washer use (gal) ³	New clothes washer rate = 13 (gal) ³	WEEKLY USE PER HOUSEHOLD	WEEKLY SAVINGS PER APPLIANCE (col. 2 minus – col. 3 x 7.5)	TOTAL SAVINGS PER HOUSEHOLD PER YEAR	Total annual savings (column 1 x column 6 - gal)
200	27	13	7.5 times per week	105	38,000	7,670,000

³Numbers taken from Energy Star website

Results: 200 clothes washer rebates. The water savings is based on the minimum criteria of gallons used with the average number of gallons used for that appliance. We estimate total annual savings of 7,100,000 gallons worth \$3,154 in pumping and treatment costs.

Lawn Sprinkler Rain Sensor Irrigation Shut off Device:

Results: 2 rain sensors rebates. Rebates were issued for the cost of the shut off device and installation up to \$200.00.

PROJECT DIFFICULTIES

WBE/MBE PARTICIPATION: Attempts to incorporate WBE/MBE goals within the scope of this project were unsuccessful due to limited opportunity. All project tasks were completed in-house with the exception of print services for a conservation brochure and finding a distributor to purchase water saving devices.

The Water Division searched the SOMBA website, internet, and local businesses in our area to locate a possible WBE/MBE business vendor who could provide the outside resources needed. No matches were found. At the midpoint of the grant period the conservation supplies budget was exhausted and it was determined that it was not possible for the Town to utilize a WBE/MBE in any other capacity. To address this issue the Water Division submitted a Request for Waiver to the Department of Environmental Protection, and approval was granted 6/11/2011.

REBATE VERIFICATION: On some occasions the older appliance being replaced was not available for visual inspection it was removed from the property at the same time the new appliance was delivered. In this situation, the customer was asked for written verification that the fixture being replaced meets the eligible rebate criteria as stated in the rebate offer along with the complete description of the appliance (model #, gallon usage, etc.).

REPORTING: The May-June timeframe to submit the 4th and final quarterly report conflicts with Annual DEP report deadlines required to comply with MassDEP Drinking Water Regulations (i.e. water quality report, annual statistical report, etc.). This created an overload of administrative work to be done by the public water supply in March April May, and June.

WATER CONSERVATION PUBLIC OUTREACH PROGRAM

Tours: As part of an ongoing program, the Water Division “Water Wiz” conducted 5 public tours of its Water Treatment Facility during the grant period. Program participants included students from a local elementary school and high school, water professionals, and the general public. Attendees were provided with a plant tour followed by a brief Q & A conservation workshop with visual demonstrations, conservation tips, and a water activity book hand-out (for youth groups).

Save Water with Free Devices: The Water Division further encourages water conservation efforts by purchasing a variety of small household water saving devices, and making them available for distribution to Mansfield water customers at no cost. Types of devices include; low-flow shower heads (1.5 gpm), sink aerators (1.0 gpm), toilet leak tablet kits, and home filtration devices. Supplies are limited to 2 per household. The response to this offer is relatively low compared to the appliance rebate program, although both were promoted in the same water conservation program brochure. Total of **67** devices were distributed during the grant period.

MANPOWER: A staff of 8 water employees worked in various capacities to complete the tasks outlined in the scope of work. The length of the grant program is one year, May 21, 2010 through June 15, 2011.

Water Division performed leak detection using in-house manpower. 2-man crews worked evening shifts for leak detection in addition to regular day shift hours.

Processing an Application for Water Rebate is a multi-step process.

- Customer completes and submits Application to Department of Public Works office.
- DPW Clerk receives the application, schedules the inspection appointment with customer and creates a work order.
- Water operators receive the work order and perform on-site visual inspection of the appliance to verify eligibility
- Water Administrator prepares completed application for Water Operations Manager signature of approval. Obtains vendor identification number as necessary
- Once approved, the rebate specified is entered into the computer on a warrant for payment.
- Each application is copied and kept on file for tabulating purposes and to respond to follow up status calls.

Lessons Learned – *For the benefit of others, please provide an honest assessment of the project in terms of your experience. Did you have difficulty meeting project timelines? Did the project encounter site constraints, design obstacles, or permitting difficulties? What advice would you give to other grantees and prospective program applicants?*

In order to satisfy the terms and conditions of the grant program, the Water Division spent a substantial number hours tracking and documenting deliverables for each task outlined in the scope of work. The man-hours required for report preparation, and to implement each task throughout the year was more time consuming than anticipated.

Unanticipated success of the rebate program resulted in a substantial number of man hours being dedicated to tracking and documenting deliverables in accordance with the terms and

conditions of the grant program. Additional steps required to verify grant eligibility, and to process each rebate application took time away from day-to-day work responsibilities. Water suppliers who plan to implement this type of program should be prepared to encounter a heavier volume of administrative duties.

The DEP Grant Coordinator role is a very helpful resource. It would benefit the person responsible for competing the grant reporting to be involved with the application process have knowledge of the scope of work and administrative responsibilities

Public water suppliers have multiple annual report deadlines which must be met between May and June, in order to comply with Mass-DEP Drinking Water Program Regulations. Due to a lengthy report preparation process for annual reports to the State, it was a challenge to keep up-to-date with documentation needed for the 4th and final grant reporting period deadline.

TASK 2: LEAK DETECTION SURVEY

Licensed water operators employed by the Town of Mansfield, Massachusetts completed a comprehensive leak detection survey on approximately 139 miles of the Town's water distribution system. The survey took place during a six week period between the months of March 11, 2011 and April 25, 2011.

Survey Methodology

The Town of Mansfield, Water Division used acoustical leak detection equipment standard in the field, to perform its leak detection survey. To ensure optimum results, and for safety reasons, the work would take place during weeknights between the hours of 12:00 A.M. midnight and 6:00 A.M. weather permitting.

Operator

To achieve maximum results the Town has performed its own Leak Detection for a number of years. Rotating two-man crews, consisting of Certified Drinking Water Operators employed by the PWS, were assigned to complete the leak detection survey and repairs. Based on past history, the staff expertise working for the PWS has proven to be an advantage in locating more leaks than past vendors hired to perform Leak Detection. Salaries for this task were included in the scope of the grant.

Name	Title	Grade	Years Experience
S. Bishop	Chief Water Operator	D3/T2	28
S. Precourt	Water Distribution Forman	D4T3	13
M. Gregory	Heavy Equipment Water Operator	D1	15
K. O'Donnell	Water Treatment Foreman	T3/D4 (in training)	23
P. Ruta	Water Operator	T2/D4	17
S. Reese	Water Operator	T3	3

Equipment

During the leak detection shift, the operator used AquaScope leak detector equipment with microphone, amplifier, head phones, and ground microphone.

A marked Town of Mansfield vehicle with strobe flashers and caution sign "leak detection ahead" was used to safety escort staff working in the roadway

(2) Ratcheting hydrant wrenches with a 33 inch handle were purchased by the Town for the purpose of making repairs. This was a match contribution purchase in the amount of \$292.94.

Survey Standard Operating Procedures (SOPs)

The water division performed the leak detection by listening on every accessible hydrant and

gate valve, and by walking directly over the pipeline listening with ground microphones at 8-10 foot intervals. These devices are capable of detecting water leakage of approximately 1/2 gallons per minute (gpm).

Reporting

Leak detection information such as; street location, findings, and recommendations were recorded daily in log book maintained by the Water Distribution Foreman. A total of 11 leaks were documented during the leak detection period; 4 service leaks and 7 fire hydrant leaks. The Town estimated 9.559 (mg) water was lost due to leaks in the distribution system.

TOWN OF MANSFIELD - SURVEY LEAK SUMMARY

DATE LEAK DETECT	DATE LEAK FIXED	LOCATION	ESTIMATED LEAK RATE (gpm)	ESTIMATED WATE LOSS (gallon/year)	COST (\$/year)	% OF ANNUAL PRODUCTION COST
7/23/10	7/23/10	60 Pine St. Hydrant Leak	2	587,520	260	.0008
7/28/10	7/28/10	11 Village Rd. Hydrant Leak	3	902,880	399	.0012
7/28/10	7/28/10	35 Lantern Ln. Hydrant Leak	4	1,203,840	522	.0016
7/29/10	7/29/10	110 Forbes Blvd. Hydrant Leak	1	302,400	695	.0022
7/28/10	7/29/10	290 Forbes Blvd. Hydrant Leak	1	302,400	138	.0004
8/10/10	8/10/10	73 Brook St. Service Leak	4	1,278,720	565	.0018
8/13/10	8/13/10	137 Willow St. Service Leak	2	648,000	286	.0009
8/17/10	8/19/10	Maple St. Hydrant #593 Leak	2	656,640	290	.0009
9/2/10	9/2/10	44 Tanya Dr. Service Leak	3	1,058,400	468	.0015
9/1/10	9/5/10	40 North St. Service Leak	4	1,428,480	632	.0020
9/16/10	9/16/10	20 Cottage St. Service Leak	4	1,491,840	660	.0021
		Total 2010 Estimated Volume Loss		9,861,120	4,915	.0154

LEAK REPAIR

Each of the 11 leaks identified by the Town of Mansfield Water Division during the survey period, were prioritized and repaired according to industry standards. All leaks were repaired within a one week period from the time the leak was detected.

METER REPLACEMENT PROGRAM

Mansfield Water continues to monitor and replace meter read equipment as needed. The Water Division is planning to implement a system-wide meter replacement program in 2013.

CONCLUSION

Town of Mansfield, Water Division remains diligent in its effort to maintain its infrastructure, promote education and conservation awareness, and protect the public water supply at all times. Having the ability to off-setting a portion of these program costs through the DEP Conservation Grant Program is helpful.

The Town of Mansfield Water Conservation Incentive Program remains ongoing at this time. A leak detection program will be complete during the summer months and the water hydrant maintenance program is scheduled in the fall season.