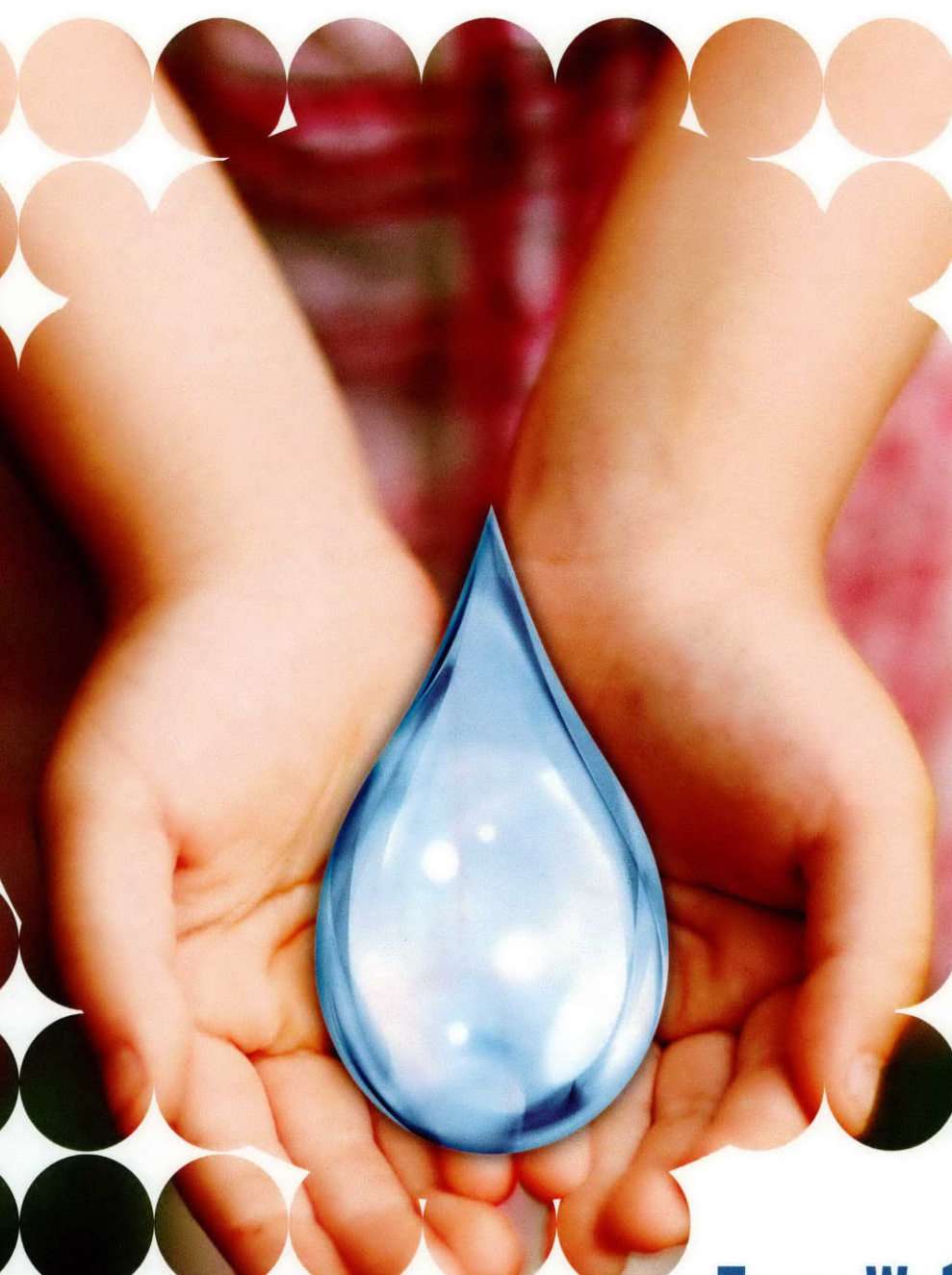


Evaluation of Best Management Practices in Certain Water Conservation Plans

Biennial Report to the Texas Legislature

85th Legislative Session



Texas Water 
Development Board



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Biennial Report to the Texas Legislature

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January 1, 2017

Texas Water 
Development Board

Evaluation of Best Management Practices

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Evaluation of Best Management Practices

Table of Contents

Executive summary.....	1
Introduction.....	2
Best management practices.....	2
Background.....	2
Water conservation plans and minimum requirements.....	5
Review process	6
Evaluating best management practices	7
Analysis.....	7
Results.....	8
Use of best management practices.....	8
Examples of best management practices used in water conservation plans	12
Conclusion	13
Appendix A.....	A-1
Appendix B.....	B-1
Appendix C	C-1

Executive summary

The 83rd Texas Legislature (2013) passed House Bill 3605 requiring the Texas Water Development Board (TWDB), when considering an application for financial assistance from a retail public utility that provides potable water service to 3,300 or more connections, to evaluate the utility's water conservation plan for compliance with the TWDB's best management practices. The TWDB is also required to issue a report to the utility detailing the results of the evaluation and, no later than January 1 of each odd-numbered year, submit a written summary of the results of evaluations to the legislature.

The TWDB initiated the process for evaluation in 2014 and submitted the first Evaluation of Best Management Practices in Certain Water Conservation Plans report to the legislature on January 1, 2015. This is the second report.

In fiscal years 2015 and 2016, the TWDB considered applications for financial assistance from 31 utilities with more than 3,300 connections. They included the cities of Amarillo, Arlington, Austin, Bedford, Beeville, Bonham, Bryan, Euless, Fort Worth, Granbury, Houston, Hutto, Keller, Laredo, McAllen, Mission, Pearland, Pharr, San Marcos, Sulphur Springs, Sweetwater, Waco, Weatherford, and Wichita Falls, as well as Agua Special Utility District, Brushy Creek Municipal Utility District, El Paso Public Service Board, Greater Texoma Utility Authority–Sherman, Laguna Madre Water District, North Alamo Water Supply Corporation, and the San Antonio Water System.

The evaluations showed that the use of best management practices varied from utility to utility. In discussion with utilities regarding water conservation plans as well as in reviewing water conservation plans, we noted that many utilities, while having an active conservation program, do not consider their conservation activities in terms of best management practices. In reviewing the submitted water conservation plans for use of the TWDB's best management practices, we were often hard-pressed to identify best management practices. Although conservation plans are required to have 5- and 10-year targets and goals for water savings, water conservation plans often do not include any estimates of potential water savings from a particular conservation activity.

We will continue to refine the evaluation process and encourage utilities to use the TWDB's Best Management Practices Guide when developing and implementing their water conservation plans.

Introduction

In 2013, the 83rd Texas Legislature passed House Bill 3605 requiring the TWDB to establish thresholds for water loss to use in considering applications for financial assistance. Codified in Texas Water Code Section 17.1245, the bill states:

(a) In passing on an application for financial assistance from a retail public utility that provides potable water service to 3,300 or more connections, the board shall:

- (1) evaluate for compliance with the board's best management practices the utility's water conservation plan required under Section 13.146; and*
- (2) issue a report to a utility detailing the results of the evaluation conducted under Subdivision (1).*

(b) Not later than January 1 of each odd-numbered year, the board shall submit to the legislature a written summary of the results of evaluations conducted under Subsection (a)(1).

The purpose of this report is to evaluate the use of best management practices by a utility that has more than 3,300 connections and applied for financial assistance from the TWDB during fiscal years 2015 or 2016. The evaluation includes a listing of the best management practices used by each utility. It also identifies best management practices that a utility could consider for use when revising its water conservation plan in the future.

We initiated the process for evaluation in 2014 and submitted the first report of Evaluation of Best Management Practices in Certain Water Conservation Plans to the legislature on January 1, 2015. This is the second report.

Best management practices

The following section provides a description and history of best management practices in Texas, requirements for utilities to submit water conservation plans, the TWDB's process for reviewing water conservation plans, and evaluating water conservation plans for use of best management practices.

Background

A best management practice is defined as a voluntary efficiency measure that is intended to save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe.

Evaluation of Best Management Practices

In Texas, best management practices are designed to fit into the state's water resources planning process as one alternative to meet future water needs. As a result, each best management practice should be clearly defined with a schedule of implementation, expected water savings, and costs of implementation.

In 2003, the 73th Texas Legislature under Senate Bill 1094 created the Water Conservation Implementation Task Force (Task Force). One of the responsibilities of the Task Force was to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The Task Force identified, evaluated, and selected best management practices for municipal, industrial, and agricultural water uses and evaluated the costs and benefits for the selected best management practices.

The Task Force developed a *Best Management Practices Guide* in 2004 consisting of 21 municipal, 14 industrial, and 20 agricultural best management practices. Each best management practice has several elements that describe the efficiency measures, implementation techniques, implementation schedules, scope, procedures to estimate water savings, and cost-effectiveness considerations.

The best management practices contained in the *Best Management Practices Guide* are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe. They are not exclusive of other meaningful conservation techniques that an entity might use in formulating a state-required water conservation plan. At the discretion of each user, a best management practice can be implemented individually, in whole or in part, or be combined with other best management practices or with other water conservation techniques to form a comprehensive water conservation program. The adoption of any best management practice is entirely voluntary, although it is recognized that once adopted, certain practices may require implementation with local laws such as a city ordinance or resolution.

The Water Conservation Advisory Council (Council) succeeded the Task Force. Created by the 80th Regular Session of the Texas Legislature with the passage of Senate Bill 3 and House Bill 4 in 2007, the Council is charged with monitoring trends in water conservation implementation and new technologies for possible inclusion as best management practices. Since 2007, the Council has reviewed the existing list of best management practices created by the Task Force and has either developed additional best management practices or has updated existing best management practices as needed (Table 1).

Working with the TWDB and the Texas Commission on Environmental Quality, the Council established a stakeholder process to review and revise best management practices. Changes to the *Best Management Practices Guide* are vetted by appropriate subject matter experts, interest

Evaluation of Best Management Practices

Table 1. Current best management practices (Source: *Municipal Best Management Practices Guide*, 2004).

Conservation coordinator
Cost-effectiveness analysis
Water survey for single-family and multi-family customers
Water conservation pricing
Wholesale agency assistance programs
Metering of all new connections and retrofit of existing connections
System water audit and water loss control
Athletic field conservation
Golf course conservation
Landscape irrigation conservation and incentives
Park conservation
Residential landscape irrigation evaluation
Public information
School education
Small utility outreach and education
Partnerships with nonprofit organizations
Conservation programs for industrial, commercial, and institutional accounts
Residential clothes washer incentive program
Showerhead, aerator, and toilet flapper retrofit
Toilet replacement programs
WaterWise landscape design and conversion programs
New construction graywater
Industrial, commercial, and institutional incentive programs
Rainwater harvesting and condensate reuse
Water reuse
Prohibition on wasting water

groups, and state agencies. The intention is that the guide remains a living document that incorporates changes or additions on an ongoing basis. Periodic solicitations are made to encourage reviews by the user community. As appropriate, the Council makes recommendations for future revisions to the guide.

After reviewing recommended updates approved by the Council, and in consultation with the Texas Commission on Environmental Quality, we consider approving the changes and updating the online *Best Management Practices Guide*. The guide now includes 26 municipal, 15 industrial, 21 agricultural, and 4 wholesale best management practices. The *Municipal Best Management Practices Guide* can be found at <http://www.twdb.texas.gov/conservation/BMPs/Mun/index.asp>.

Water conservation plans and minimum requirements

A water conservation plan is a strategy or combination of strategies to reduce the consumption of water, reduce the loss or waste of water, improve or maintain water use efficiency, or increase recycling and reuse of water. It also contains measures intended to meet the targets and goals identified in the plan.

An entity must submit a water conservation plan in these circumstances:

- It is a retail public water supplier with 3,300 or more connections.
- The entity is applying to the TWDB for financial assistance of more than \$500,000.
- The entity has certain surface water rights through the Texas Commission on Environmental Quality.

The TWDB conservation staff receives and reviews the water conservation plans for the first two instances above. In the third instance, although a copy of the water conservation plan is provided to the TWDB by the entity, the Texas Commission on Environmental Quality is responsible for reviewing the entity's water conservation plans.

A water conservation plan must meet certain minimum requirements and should be no older than five years. A water conservation plan should also include a utility profile, which is an evaluation of the applicant's water and wastewater system and customer water use characteristics, to identify water conservation opportunities. The plan should also set water conservation goals. The plan should provide information in response to minimum requirements. If the plan does not provide information for each minimum requirement, the applicant should include in the plan an explanation of why the requirement is not applicable.

The current water conservation plan minimum requirements can be found in Texas Administrative Code Chapter §363.15(b)(1) and include the following:

- A utility profile that includes the water sales and use for the following classifications: residential (both for single-family and multi-family), commercial, institutional, industrial, agricultural, and wholesale, as appropriate.
- Five-year and 10-year targets that are specific and quantified for water savings and include goals for water loss programs in gallons per capita per day and goals for municipal use and residential use in gallons per capita per day. A base use figure should be included to be able to calculate savings.
- A schedule for implementing the plan to achieve the applicant's targets and goals.
- A method for tracking the implementation and effectiveness of the plan. The plan should measure progress annually and evaluate the progress toward meeting the goals.

Evaluation of Best Management Practices

- A master meter to measure and account for the amount of water diverted from the source of supply.
- A program of universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.
- Measures to determine and control water loss.
- A continuous program of leak detection, repair, and water loss accounting for the transmission, delivery, and distribution system to control water loss.
- A program of continuing education and information regarding water conservation.
- A water rate structure that is not "promotional" and does not encourage the excessive use of water.
- A means of implementation and enforcement, evidenced by adopting the plan.
- If the applicant will use the project financed by the TWDB to furnish water or wastewater services to another supplying entity that in turn will furnish water or wastewater services to the ultimate consumer, the requirements for the water conservation plan also pertain to these supplier entities.
- Documentation that the regional water planning group for the service area of the applicant has been notified of the applicant's water conservation plan.
- Formal adoption of the water conservation plan by the governing body of the entity.
- Annual reporting on the progress in implementing each of the minimum requirements in the water conservation plan.

The water conservation plan may also include other conservation methods or techniques that the applicant deems appropriate.

Review process

As required by Texas Water Code Section 17.1425, the TWDB reviews the water conservation plan of each retail public water supplier with 3,300 or more connections that applies for financial assistance from the TWDB. We note the data and information from this review in the Water Conservation Review sheet, which is included in the entity's application write-up provided to the TWDB as part of the application package (Appendix A). During review of an applicant's water conservation plan, the TWDB also reviews the applicant's utility profile, which is submitted along with its water conservation plan. The TWDB considers data such as the entity's historical water use in relationship to its water use goals, the use of best management practices in the water conservation plan, and the process by which the entity determined its water use goals. If necessary, we contact the entity for clarification or additional information. The Utility Profile Form can be found at <http://www.twdb.texas.gov/conservation/municipal/plans/UP.asp>.

Evaluating best management practices

The TWDB has established a process to evaluate a utility's use of best management practices as presented in its water conservation plan. When the TWDB receives an application for financial assistance from a utility with more than 3,300 connections, staff reviews the water conservation plan that is included in the application. Staff identifies all the best management practices listed in the plan and tabulates them against the current list of 26 municipal best management practices described in the Municipal Best Management Practices Guide (Appendix B). Staff also notes the best management practices that a utility may wish to consider in their future water conservation plans. This tabulated information is sent to the utility via regular mail (for an example, see Appendix C).

Analysis

In fiscal years 2015 and 2016, the TWDB staff reviewed the water conservation plans of 31 utilities that have more than 3,300 connections and who submitted financial applications to the TWDB (Table 2). The entities included the cities of Amarillo, Arlington, Austin, Bedford, Beeville, Bonham, Bryan, Euless, Fort Worth, Granbury, Houston, Hutto, Keller, Laredo, McAllen, Mission, Pearland, Pharr, San Marcos, Sulphur Springs, Sweetwater, Waco, Weatherford, and Wichita Falls as well as Agua Special Utility District, Brushy Creek Municipal Utility District, El Paso Public Service Board, Greater Texoma Utility Authority–Sherman, Laguna Madre Water District, North Alamo Water Supply Corporation, and San Antonio Water System. The number of connections of those utilities ranged from 3,360 to 662,982.

For the purpose of this report, a connection is determined to be the same as that defined in Texas Administrative Code, Title 30, Chapter §290.38(15):

A single family residential unit or each commercial or industrial establishment to which drinking water is supplied from the system.

As an example, the number of service connections in an apartment complex would be equal to the number of individual apartment units. When enough data is not available to accurately determine the number of connections to be served or being served, the population served is divided by three and used as the number of connections for calculating system capacity requirements.

Results

In discussions with utilities regarding their water conservation plans and in reviewing their plans, we noted that many utilities, although having an active conservation program, do not consider their conservation activities in terms of best management practices. Although conservation plans are required to have 5- and 10-year targets and goals for water savings, the plans often do not include any estimates of potential water savings from a particular conservation activity.

In evaluating the submitted water conservation plans for compliance with the TWDB's best management practices, we were often hard-pressed to identify best management practices. An example of this would be a utility that promoted the replacement of older water use fixtures, such as toilets, with high-efficiency models. Although it is a conservation activity, we consider this to be an education best management practice, as opposed to a toilet replacement best management practice, since the activity promotes the replacement of toilets rather than directly supporting the replacement of toilets. Also, most water conservation plans do not include any discussion of the process a utility may use to determine what best management practices to include in its water conservation plan.

Use of best management practices

The use of best management practices varied from utility to utility (Table 2). Twenty-three of the 26 municipal best management practices are being used by at least one utility evaluated in this report. Each of the utilities used the Metering of All New Connections and Retrofit of Existing Connections, the System Water Audit and Water Loss Control, and the Public Information best management practices, but none of the utilities used the Park Conservation, the Small Utility Outreach and Education, or the New Construction Graywater best management practices in its water conservation plan. As an example of the range of plans, the San Antonio Water System water conservation plan included 20 best management practices, and the City of Beeville included four best management practices in its water conservation plan.

The most widely used best management practices are those that directly address the minimum requirements of a water conservation plan.

All the best management practices implemented by a utility may not be included in its water conservation plan. The City of Austin is one example. Austin offers residential landscape irrigation evaluations and conservation programs for industrial, commercial, and institutional accounts; it provides free conservation tools such as aerators, showerheads, soil moisture meters, and tree gators; and it offers rebates for landscape conversion, rainwater harvesting, and pool covers, just to name a few. In all, Austin has applied approximately 15 best management

Evaluation of Best Management Practices

practices, but their water conservation plan only discusses eight, and those are not specifically listed, making it difficult to accurately identify its best management practices.

Table 2. List of utilities and identified best management practices.

Authority name	Agua SUD	Brushy Creek MUD	City of Amarillo	City of Arlington	City of Austin	City of Bedford	City of Beeville	City of Bonham	City of Bryan	City of Euless	City of Fort Worth	City of Granbury	City of Houston	City of Hutto	City of Keller	City of Laredo	City of McAllen	City of Mission	City of Pearland	City of Pharr	City of San Marcos	City of Sulphur Springs	City of Sweetwater	City of Waco	City of Weatherford	City of Wichita Falls	El Paso PSB	GTUA - Sherman	Laguna Madre WD	North Alamo WSC	San Antonio WS	
Conservation coordinator											✓										✓						✓				✓	
Cost-effective analysis											✓																					✓
Water survey for single-family and multi-family customers											✓																✓					
Water conservation pricing	✓	✓	✓	✓	✓			✓		✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Wholesale agency assistance programs											✓												✓									✓
Metering of all new connections and retrofit of existing connections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
System water audit and water loss control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Athletic field conservation											✓																					✓
Golf course conservation																																✓
Landscape irrigation conservation and incentives			✓			✓			✓		✓				✓		✓	✓			✓				✓	✓	✓	✓				✓

Evaluation of Best Management Practices

Authority name	Agua SUD	Brushy Creek MUD	City of Amarillo	City of Arlington	City of Austin	City of Bedford	City of Beeville	City of Bonham	City of Bryan	City of Euless	City of Fort Worth	City of Granbury	City of Houston	City of Hutto	City of Keller	City of Laredo	City of McAllen	City of Mission	City of Pearland	City of Pharr	City of San Marcos	City of Sulphur Springs	City of Sweetwater	City of Waco	City of Weatherford	City of Wichita Falls	El Paso PSB	GTUA - Sherman	Laguna Madre WD	North Alamo WSC	San Antonio WS
Park conservation																															
Residential landscape irrigation evaluation				✓																							✓			✓	
Public information	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
School education			✓	✓				✓		✓		✓		✓	✓				✓				✓			✓	✓	✓	✓		
Small utility outreach and education																															
Partnerships with nonprofit organizations			✓		✓																						✓				
Conservation programs for industrial, commercial, and institutional accounts			✓	✓							✓					✓						✓						✓		✓	
Residential clothes washer incentive program				✓							✓											✓								✓	
Showerhead, aerator, and toilet flapper retrofit				✓							✓	✓				✓					✓		✓				✓			✓	
Toilet replacement programs				✓							✓					✓						✓								✓	
WaterWise landscape design and conversion programs			✓													✓						✓								✓	
New																															

Evaluation of Best Management Practices

Authority name	Agua SUD	Brushy Creek MUD	City of Amarillo	City of Arlington	City of Austin	City of Bedford	City of Beeville	City of Bonham	City of Bryan	City of Euless	City of Fort Worth	City of Granbury	City of Houston	City of Hutto	City of Keller	City of Laredo	City of McAllen	City of Mission	City of Pearland	City of Pharr	City of San Marcos	City of Sulphur Springs	City of Sweetwater	City of Waco	City of Weatherford	City of Wichita Falls	El Paso PSB	GTUA - Sherman	Laguna Madre WD	North Alamo WSC	San Antonio WS
construction graywater																															
Industrial, commercial and institutional incentive programs										✓																					
Rainwater harvesting and condensate reuse																					✓						✓				✓
Water reuse			✓	✓	✓				✓		✓	✓				✓	✓			✓	✓		✓	✓			✓		✓	✓	
Prohibition on wasting water			✓	✓	✓	✓	✓			✓	✓				✓	✓			✓					✓			✓			✓	

Notes:

- GTUA = Greater Texoma Utility Authority
- MUD = Municipal Utility District
- PSB = Public Service Board
- SUD = Special Utility District
- WD = Water District
- WS = Water System
- WSC = Water Supply Corporation

There are three best management practices that the TWDB Conservation staff think are underused and that each utility should consider implementing when updating its water conservation plan. These are the following:

- Water conservation coordinator – a designated coordinator can assist in providing focus on conservation efforts, and this best management practice can be implemented at little or no cost.
- Partnerships with nonprofit organizations – working closely with organizations such as local Master Gardner programs, Scout troops, service organizations, and youth groups can provide the utility with a presence in the community and increase its public awareness and involvement.

Evaluation of Best Management Practices

- Water waste – fixing leaks and broken sprinkler heads and time of day watering can often be very beneficial in promoting community awareness and in ensuring the efficient use of water.

Examples of best management practices used in water conservation plans

This section presents example elements of best management practices being used by some utilities.

City of Bedford (15,034 connections) adopted landscape water management regulations as part of its water conservation plan. The regulations are intended to minimize waste in landscape irrigation and include allowances for time of day watering during the summer. The city requires that all new irrigation systems include rain and freeze sensors capable of multiple programming. Any non-residential irrigation system installed before August 1, 2008, may not be operated after August 1, 2010, without being equipped with rain and freeze sensors.

Bedford also requires that all new irrigation systems be in compliance with state design and installation regulations (TAC Title 30, Part 1, Chapter 344), which include the following:

- Prohibition of irrigation systems that spray directly onto impervious surfaces or onto other non-irrigated areas. (Wind-driven water drift will be taken into consideration.)
- Prohibition of use of poorly maintained sprinkler systems that waste water.
- Prohibition of outdoor watering during any form of precipitation.
- Enforcement of the regulations by a system of warnings followed by fines for continued or repeat violations.

Brushy Creek Municipal Water District (5,500 connections) has included a program for small water meter testing, maintenance, and replacement to ensure that the district's water meters are performing at optimum efficiency. The District's program will address meter replacement, testing, and installation, as well as reporting for meters that are 1-inch or smaller. In 2009, the district began a meter change-out program, replacing manual read with automatic read meters to assist in reducing the district's water loss.

City of Fort Worth (273,628 connections) evaluated all the best management practices outlined in the Water Conservation Best Management Practices Guide during the update of its water conservation plan. The city's evaluation included looking at the best management practices the city has implemented and the proposed implementation date for additional strategies. The evaluation also looked at the potential savings in 2020 and 2025, the proposed cost in 2020 and 2025, the cost per 1,000 gallons, whether the practice will have an impact to

Evaluation of Best Management Practices

revenues (low, medium, or high), and whether the practice has other benefits such as additional supply sources, revenue recovery, or education component.

The city has also implemented several best management practices ranging from rebate and incentive programs to conservation programs for industrial, commercial, and institutional accounts. The city contracts with a vendor to offer comprehensive audits to these customers. These audits generally consist of a review of the current water use for the customer, their processes, and an audit of their irrigation system (if applicable). All of the analyses from the report is then summarized into a report detailing recommended improvements, costs, savings, and return on investment.

City of Laredo (76,602 connections) initiated a high-efficiency toilet rebate program in 2012. The program is designed to replace older, water-wasting toilets with new high-efficiency toilets that carry the WaterSense label. For each toilet replaced (maximum of two toilets per household), Laredo provides a \$100 rebate applied as a credit on the participant's water account. A water conservation inspector verifies installations, and old toilets are transported to the city's landfill.

San Antonio Water System (662,982 connections) lists water restrictions in the city's Code of Ordinances for commercial dining facilities, vehicle washing facilities, vacuum systems, coin-operated washing machines, and commercial building hot water lines. New commercial buildings installing air conditioning systems are required to have a single, independent condensate wastewater line for collection and reuse.

Weatherford (11,537 connections) has adopted the provisions of House Bill 1656, passed by the 80th Legislature in 2007, as part of the Planning & Development Department Irrigation System Application. The bill requires cities with populations greater than 20,000 to require a plan of new irrigation systems, installation inspection, and a final walk-through. The city, in conjunction with other regional cities, has implemented year-round water conservation measures, limiting watering to no more than twice per week according to an odd/even schedule.

Conclusion

As a result of this evaluation, the following conclusions can be made:

- Utilities generally do not consider their water conservation activities in terms of best management practices.
- The best management practices most widely used in water conservation plans are those that address the minimum requirements of a water conservation plan.

Evaluation of Best Management Practices

- The extent to which a utility may have considered the different best management practices before deciding on their inclusion in its water conservation plan remains uncertain.
- It is also uncertain what best management practices a utility has implemented that may not be included in its water conservation plan.

The TWDB staff will continue to refine the evaluation process and encourage utilities to use the TWDB's *Best Management Practices Guide* when developing and implementing their water conservation plans.



Appendix A

Sample water conservation review

Evaluation of Best Management Practices

WATER CONSERVATION REVIEW

Entity: City of Good Waters

Review date: July 2016

WATER CONSERVATION PLAN DATE: March 2013 **Approvable** **Adopted**

	Total GPCD	Residential GPCD	Water Loss GPCD	Water Loss Percent
Baseline	150	109	9	6
5-year Goal	120	90	7	6
10-year Goal	100	80	5	5

WATER LOSS AUDIT YEAR: 2015

Total water loss (GPCD): 14
 Total no. of connections: 27052

Total water loss (percent): 12
 Length of mains (miles): 693

Wholesale Water
 Connections per mile: 39

If > 16 connections per mile and > 3,000 connections, Infrastructure Leakage Index (ILI): 2.4

WATER LOSS THRESHOLDS:

Apparent Loss Gallons per connection per day	Real Loss Gallons per mile per day	Real Loss Gallons per connection per day	Apparent Threshold Gallons per connection per day	Real Threshold Gallons per mile per day	Real Threshold Gallons per connection per day
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
5	NA	38	12	NA	48

If population ≤ 10K, connections/mile < 32 :

If population ≤ 10K, connections/mile ≥ 32 :

If population > 10K :

Does the appl cant meet Water Loss Threshold requirements? Yes No NA

ADDITIONAL INFORMATION:

According to its water conservation plan, the City plans to implement long-term measures to reduce the major causes of unaccounted-for-water, including testing and replacing meters on an "as needed basis" and purchasing or borrowing leak detection equipment to implement a leak detection program. Its current program consists of addressing leaks and breaks as they are called in by customers or sighted by City personnel. The City prioritizes water leaks and usually addresses them within 30 minutes. Production meters are calibrated annually. Computer systems are used to maintain accounts and identify fluctuating meter readings that may indicate leaks or problematic meters.

The City also plans to increase public and employee awareness of water conservation, especially in the summer, by providing conservation brochures, displaying posters in City buildings, and utilizing printed media, radio, and television for public announcements regarding conservation and water-related issues. The City encourages the use of Xeriscape gardening and landscaping techniques, as well as using water efficient irrigation, such as drip.

STAFF NOTES AND RECOMMENDATIONS:

None.

Evaluation of Best Management Practices

DEFINITIONS

Adopted refers to a water conservation plan that meets the minimum requirements of the water conservation plan rules and has been formally approved and adopted by the applicant's governing body.

Apparent loss refers to unauthorized consumption, meter inaccuracy, billing adjustments, and waivers.

Approvable refers to a water conservation plan that substantially meets the minimum requirements of the water conservation plan rules but has not yet been adopted by the applicant's governing body.

Best Management Practices are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and that can be implemented within a specific time frame.

GPCD means gallons per capita per day.

Infrastructure Leakage Index (ILI) is the current annual real loss divided by the unavoidable annual real loss (theoretical minimum real loss) and only applies to utilities with more than 5,000 connections, average pressure greater than 35 psi, and a connection density of more than 32 connections per mile. The **ILI** is recommended to be less than 3 if water resources are greatly limited and difficult to develop, between 3 and 5 if water resources are adequate to meet long-term needs but water conservation is included in long-term water planning, and between 5 and 8 if water resources are plentiful, reliable, and easily extracted. The **ILI** is recommended as a benchmarking tool, but until there is increased data validity of the variables used in the calculation, the **ILI** should be viewed with care.

NA means not applicable.

Produced water is the total amount of water purchased or produced by the utility.

Real loss comes from main breaks and leaks, storage tank overflows, customer service line breaks, and leaks.

Residential GPCD is the amount of water per capita used solely for residential use and ideally includes both single and multi-family customer use.

Total baseline GPCD is the amount of all water purchased or produced by the utility divided by the service area population and then divided by 365.

Total water loss is the sum of the apparent and real water losses.

Water loss is the difference between the input volume and the authorized consumption within a water system. Water Loss consists of real losses and apparent losses.

Water Loss Thresholds are levels of real and apparent water loss determined by the size and connection density of a retail public utility, at or above which a utility receiving financial assistance from the Texas Water Development Board must use a portion of that financial assistance to mitigate the utility's system water loss.



Appendix B

Sample utility evaluation table

**City of Good Waters
Evaluation of best management practices
2014 water conservation plan**

BMPs	BMPs used	BMPs to consider for future WCP revisions	Comments
Conservation coordinator		✓	This BMP can provide important focus on your conservation programs and can be adopted without an associated cost.
Cost-effective analysis			
Water survey for single-family and multi-family customers			
Water conservation pricing	✓		
Wholesale agency assistance programs			
Metering of all new connections and retrofit of existing connections	✓		
System water audit and water loss control	✓		
Athletic field conservation			
Golf course conservation			
Landscape irrigation conservation and incentives			
Park conservation			
Residential landscape irrigation evaluation			
Public information	✓		
School education		✓	This BMP can help advance conservation education in your local schools, especially since Good Waters ISD has been identified as being four of the top five highest water users in the District.
Small utility outreach and education			
Partnerships with nonprofit organizations		✓	Partnering with organizations like Efficiency County Master Gardeners can help provide additional conservation education and outreach to your customers.
Conservation programs for industrial, commercial, and institutional accounts		✓	This BMP can help advance conservation education in your local schools, especially since Good Waters ISD has been identified as being four of the top five highest water users in the District.
Residential clothes washer incentive program			
Showerhead, aerator, and toilet flapper retrofit			
Toilet replacement programs			
WaterWise® landscape design and conversion programs			
New construction graywater			
Industrial, commercial and institutional incentive programs			
Rainwater harvesting and condensate reuse			

Evaluation of Best Management Practices

BMPs	BMPs used	BMPs to consider for future WCP revisions	Comments
Water reuse			
Prohibition on wasting water		✓	This BMP can be beneficial for saving water, as well as a public awareness, and can be adopted without an associated cost.

Notes:

- BMP -- Best management practice
- ISD -- Independent school district
- WCP -- Water conservation plan

Please refer to the TWDB's Municipal Best Management Practices Guide for additional information about each BMP. The guide is available at <http://www.twdb.texas.gov/conservation/BMPs/Mun/index.asp>.



Appendix C

Sample utility evaluation letter



Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

SAMPLE LETTER

December 15, 2016

The Honorable Watersaver
Mayor of Good Waters
P.O. Box 777
Good Waters, TX 77700

Dear Mayor Watersaver:

The City of Good Waters (City) recently applied for financial assistance from the Texas Water Development Board (TWDB). As part of that application, you submitted a water conservation plan for the City which includes 5- and 10-year goals for total water use, residential water use, and water loss in gallons per capita per day. The City's water conservation plan should outline how it plans to achieve those goals through different water conservation activities and the use of water conservation best management practices as appropriate.

House Bill 3605, passed by 83rd Texas Legislature in 2013, requires the TWDB to evaluate an applicant's water conservation plan for use of best management practices in TWDB's Best Management Practices Guide and provide a report to the applicant detailing the results of the evaluation.

Enclosed with this letter is TWDB's evaluation of the City's water conservation plan. The enclosed table shows the best management practices that TWDB conservation staff has identified in the City's water conservation plan. The table also shows best management practices that the City may want to consider when it revises its water conservation plan in the future.

The TWDB's Municipal Best Management Practices Guide can be found at <http://www.twdb.texas.gov/conservation/BMPs/Mun/index>. The guide can be a great resource when reviewing potential water conservation activities for implementation.

If you have any questions regarding this evaluation, your water conservation plan, or about TWDB's best management practices, please feel free to contact John Sutton of our Municipal Conservation staff at 512-463-7988 or john.sutton@twdb.texas.gov. Thank you for your interest in conserving Texas' most precious resource – water.

Respectfully,

Robert E. Mace
Deputy Executive Administrator of Water Science and Conservation

Enclosures

Our Mission : To provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas	: Board Members : Bech Bruun, Chairman Kathleen Jackson, Board Member Peter Lake, Board Member : : Jeff Walker, Executive Administrator
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