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TARRANT REGIONAL WATER DISTRICT

WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

MAY 2019



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ACKNOWLEDGEMENTS

Tarrant Regional Water District (TRWD) has modified this plan to maintain a consistent and regional approach to water conservation and drought response strategies. Certain sections of the plan were customized to meet the needs of TRWD customers. The plan was prepared pursuant to Texas Commission on Environmental Quality rules.

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TABLE OF CONTENTS

1.	INTRODUCTION AND OBJECTIVES	1-1
2.	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES.....	2-1
2.1	Conservation Plans.....	2-1
2.2	Drought Contingency Plans	2-2
3.	DESCRIPTION OF TRWD SERVICE AREA.....	3-1
4.	SPECIFICATION OF WATER CONSERVATION GOALS	4-1
5.	METERING, WATER USE RECORDS, CONTROL OF UNACCOUNTED WATER, AND LEAK DETECTION AND REPAIR	5-1
5.1	Practices to Measure and Account for Water Diverted	5-1
5.2	Monitoring and Record Management Program for Determining Deliveries, Sales, and Losses	5-1
5.3	Metering and Leak Detection and Repair	5-2
6.	OTHER REQUIRED MEASURES	6-1
6.1	Water Conservation Plans by Wholesale Customers.....	6-1
6.2	Reservoir System Operations.....	6-1
6.3	Water Conservation Implementation Report	6-4
6.4	Coordination with Regional Water Planning Groups	6-4
7.	TRWD WATER CONSERVATION MEASURES TO ASSIST CUSTOMERS	7-1
7.1	Water Conservation Workshops	7-1
7.2	TRWD <i>Model Water Conservation Plan for TRWD Customers</i> and <i>Model Drought Contingency Plan for TRWD Customers</i>	7-1
7.3	Annual Reports	7-2
8.	ADDITIONAL TRWD WATER CONSERVATION MEASURES	8-1
8.1	Indirect Reuse and Recycling of Water	8-1
8.2	Public Education Program	8-1
8.3	In-House Water Conservation Efforts	8-5
9.	ADOPTION AND AUTHORIZATION TO ENFORCE THE WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN	9-1
10.	REVIEW AND UPDATE OF WATER CONSERVATION PLAN.....	10-1
11.	DROUGHT CONTINGENCY PLAN	11-1
11.1	Introduction.....	11-1
11.2	State Requirements for Drought Contingency Plans	11-1
11.3	Provisions to Inform the Public and Opportunity for Public Input..	11-2
11.4	Initiation and Termination of Drought Response Stages	11-2
11.5	Drought and Emergency Response Stages and Measures	11-3
11.6	Procedure for Curtailment of Water Supplies.....	11-14
11.7	Procedure for Granting Variances to the Plan	11-14
11.8	Procedure for Enforcing Mandatory Water Restrictions	11-15
11.9	Coordination with the Regional Water Planning Groups	11-15

11.10	Review and Update of Drought Contingency Plan.....	11-15
11.11	Drought Plan Definitions	11-16

APPENDICES

APPENDIX A	List of References
APPENDIX B	Texas Commission on Environmental Quality Rules on Water Conservation and Drought Contingency Plans for Municipal and Wholesale Water Providers <ul style="list-style-type: none">• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.1 – Definitions (Page B-1)• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.2 – Water Conservation Plans for Municipal Uses by Public Water Suppliers (Page B-4)• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.5 – Water Conservation Plans for Wholesale Water Suppliers (Page B-7)• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter B, Rule §288.20 – Drought Contingency Plans for Municipal Uses by Public Water Suppliers (Page B-9)• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter B, Rule §288.22 – Drought Contingency Plans for Wholesale Water Suppliers (Page B-11)
APPENDIX C	Tarrant Regional Water District Utility Profile
APPENDIX D	TCEQ Water Conservation Implementation Report
APPENDIX E	Annual Water Conservation Reports Submitted to Texas Water Development Board
APPENDIX F	TRWD Customer Water Conservation Report
APPENDIX G	Tarrant Regional Water District Board Resolution Adopting the Water Conservation and Drought Contingency Plan
APPENDIX H	Letter to Region C Water Planning Group
APPENDIX I	Texas Water Code Section 11.039

LIST OF TABLES

Table 3.1	TRWD Direct Customers.....	3-2
Table 3.2	Wholesale Water Customers Served by TRWD’s Primary Customers: the cities of Arlington, Fort Worth, Mansfield and the Trinity River Authority	3-3
Table 3.3	Summary of Wholesale Public Water Supplier Profile for Tarrant Regional Water District	3-6
Table 4.1	Water Use among TRWD’s Primary Customers and their Successive Customers 2014-2018, including Rainfall, Total Water Supplied, Estimated Population, and Total Gallons per Capita per Day	4-2
Table 4.2	Estimated Population of TRWD’s Primary Customers and their Successive Customers 2014-2018 based on Projections from the North Central Texas Council of Governments.....	4-3
Table 4.3	Five-Year and Ten-Year Total Per Capita Water Use Goals for TRWD’s Primary Customers and their Successive Customers (Total GPCD).....	4-4
Table 4.4	Estimated Annual Savings due to Ongoing Conservation Efforts and Drought Contingency Measures, 2014-2018.....	4-5

LIST OF FIGURES

Figure 3.1	Tarrant Regional Water District Service Area and Supply System Map.....	3-5
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TARRANT REGIONAL WATER DISTRICT

Water Conservation and Drought Contingency Plan

MAY 2019

1. INTRODUCTION AND OBJECTIVES

The water supplies upon which we depend on are not endless resources. For one thing, drought conditions are a part of life here in North Texas. Droughts are unpredictable and have a direct impact on our water resources. Without rainfall and runoff, water supply reservoirs are depleted faster than they are replenished. In addition, the number of people living in our region is expected to double in the next 50 years. That means the demand for water will certainly rise – and meeting that need will be a challenge.

Growing population and economic development in North Texas has led to an increase in demands for water supplies. At the same time, local and less expensive sources of water supply are largely developed. In planning and developing new water supplies, water conservation strategies play a vital role in meeting TRWD's projected water needs. The 2017 State Water Plan reports that 9 percent of future water needs in Region C will be met through municipal conservation. Water conservation is the most cost-effective alternative for meeting new water demands. Therefore it is important that we use the water we already have more efficiently.

Over time, conserving water on a daily basis:

- extends the life of existing supplies to meet new water demands
- slows the drain on reservoirs making more water available during times of drought
- reduces peak supply requirements, which reduces wear and tear on existing infrastructure
- defers increases in capital and operating costs for existing systems, and
- delays the need for developing expensive, new water supplies.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has issued guidelines and requirements governing the development of water conservation and drought contingency plans for wholesale water suppliers.^{1, 2} TCEQ guidelines and requirements for wholesale suppliers are included in Appendix B.

TRWD is a regional wholesale public water supplier serving four primary customers, the cities of Arlington, Fort Worth, Mansfield and the Trinity River Authority, and numerous other customers across eleven counties. The service area includes Jack, Wise, Denton, Parker, Tarrant, Johnson, Ellis, Kaufman, Henderson, Navarro and Freestone counties. The

District currently provides water to more than 2 million people. This plan replaces the plan dated May 2014.

The water conservation sections of this plan include measures that are intended to result in ongoing, long-term water savings. The TRWD drought contingency and water emergency response sections of this plan address strategies designed to temporarily reduce water use in response to specific conditions.

The objectives of this water management plan are as follows:

- To reduce water consumption from the levels that would prevail without conservation efforts.
- To reduce the loss and waste of water.
- To improve efficiency in the use of water.
- To document the level of recycling and reuse in the water supply.
- To extend the life of current water supplies by reducing the rate of growth in demand.

This plan includes all the elements required by TCEQ. Some elements go beyond TCEQ requirements. Customers of TRWD wishing to add elements of this plan into their individual plan should coordinate with TRWD. The final adopted versions of customer water conservation and drought contingency plans including appendices, rules, resolutions and ordinances should be provided to TRWD and, if applicable, to TCEQ and the Texas Water Development Board (TWDB).

There are additional water saving measures not specifically mentioned in this plan. TRWD urges all water users to implement the highest level of water saving measures that are feasible. It also encourages all institutional, commercial and industrial entities to further their conservation and reuse efforts to the maximum extent practicable.

2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

2.1 Conservation Plans

The TCEQ rules governing development of water conservation plans for wholesale water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.5 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, a water conservation plan is defined as, “A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s).”¹ The elements in the TCEQ water conservation rules covered in this conservation plan are listed below.

Minimum Conservation Plan Requirements for Wholesale Water Suppliers

TRWD is a wholesale water supplier to cities and other customers in North Central Texas. In addition to municipalities, TRWD serves utility districts, water supply corporations, and smaller entities, such as schools and golf courses. The minimum requirements in the Texas Administrative Code for water conservation plans for wholesale water suppliers are covered in this report as follows:

- 288.5(1)(A) – Description of Service Area – Section 3 and Appendix C
- 288.5(1)(B) – Specific, Quantified Five and Ten year Goals – Section 4
- 288.5(1)(C) – Measure and Account Water Diverted – Section 5.1
- 288.5(1)(D) – Monitoring and Record Management System – Sections 5.2 and 7.4
- 288.5(1)(E) – Program of Metering and Leak Detection and Repair – Section 5.3
- 288.5(1)(F) – Requirement for Water Conservation Plans by Wholesale Customers – Section 6.1
- 288.5(1)(G) – Reservoir System Operation Plan – Section 6.2
- 288.5(1)(H) – Means of Implementation and Enforcement – Section 9
- 288.5(1)(I) – Documentation of Coordination with Regional Water Planning Groups – Section 6.3
- 288.5(3) – Review and Update of Plan – Section 10

Additional Conservation Strategies

The Texas Administrative Code lists additional water conservation strategies that can be adopted by a wholesale supplier but are not required. Additional strategies adopted by Tarrant Regional Water District include the following:

- 288.5(2)(B) – Program to Assist Customers – Section 7

- 288.5(2)(C) – Program for Reuse and/or Recycling – Section 8.1
- 288.5(2)(D) – Other measures – Sections 8.2 (public education) and 8.3 (in-house conservation measures)

2.2 Drought Contingency Plans

The TCEQ rules governing development of drought contingency plans for wholesale water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.22 of the Texas Administrative Code, which is included in Appendix B.

For the purpose of these rules, a drought contingency plan is defined as, “a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s).”² The drought contingency plan for TRWD is contained in Section 11 of this water management plan.

3. DESCRIPTION OF TRWD SERVICE AREA

The Tarrant Regional Water District (TRWD or District) was established in 1924 as a political subdivision of the State of Texas. The District is a regional wholesale water supplier located in North Central Texas. It provides untreated surface water to four primary customers in Tarrant County: the cities of Arlington, Fort Worth and Mansfield, and the Trinity River Authority (TRA). TRWD also provides water to some smaller utilities and other water user groups located near its reservoirs.

In addition to providing their own citizens with clean drinking water, Arlington, Fort Worth, Mansfield and TRA supply neighboring municipalities and/or utility districts with treated water and wastewater services. Tables 3.1 and 3.2 lists TRWD's direct customers (direct and indirect). An indirect customer refers to any successive wholesale customers of TRWD's primary customers.

The District has a total service area population of over 2 million. It is ultimately responsible for serving more than 70 cities across an 11-county area; however, several of those cities are not currently taking water. Figure 3.1 shows the TRWD service area and supply system, which covers 5,891 square miles in Jack, Wise, Denton, Parker, Tarrant, Johnson, Ellis, Kaufman, Henderson, Navarro and Freestone counties. All but one of these counties is located within the Region C Water Planning Group – one of 16 water planning groups established by the Texas Water Development Board (TWDB) to develop and revise comprehensive water plans for the state. Johnson County is part of the Region G Water Planning Group.

TRWD uses a system of reservoirs to meet the water needs of its customers. Most of its raw water supplies originate from reservoirs constructed and managed by the District. They include Lake Bridgeport, Eagle Mountain Lake, Cedar Creek Reservoir and Richland-Chambers Reservoir. Two smaller reservoirs in Tarrant County – Lakes Benbrook and Arlington – are used for terminal storage. The total permitted supply currently available to TRWD is 898,624 acre-feet. However, the firm yield of the reservoir system is lower and stands at 571,298 acre-feet. These totals include 100,465 acre-feet from an indirect reuse project at Richland-Chambers Reservoir. The George W. Shannon Wetlands Water Recycling Facility began operation in October 2013. A future similar reuse project at Cedar Creek Reservoir will add 88,059 acre-feet to the system's supply. Additional information on TRWD's reuse and recycling efforts can be found in Section 8.1.

The District uses pump stations and approximately 153 miles of pipelines to transport water into Tarrant County from Cedar Creek and Richland-Chambers Reservoirs in East Texas. Total pumping capacity from the East Texas Reservoirs is currently 339 million gallons per day (MGD). The water from Lake Bridgeport and Eagle Mountain Lake on the West Fork of the Trinity River is gravity fed into Lake Worth.

Further details of TRWD's reservoir operations can be found in Section 6.2. Table 3.3 summarizes key facts from the wholesale supplier profile.

Table 3.1
TRWD Direct Customers

Arlington, City of	Freestone/Calpine	River Oaks, City of
Azle, City of	Hanson Aggregates	Rockett Special Utility District
Benbrook Water and Sewer	Hawks Creek Golf Club (City of Westworth Village)	Runaway Bay Golf Club
Benbrook, City of	Jacksboro, City of	Runaway Bay, City of
Brazos Electric Cooperative/Jack County	Kemp, City of	Shady Oaks Country Club
Bridgeport Country Club	Ke'Ohana Properties, Ltd.	Springtown, City of
Bridgeport, City of	Lone Star Complex for Mansfield	Star Harbor, City of
Cassco Development Co. (Edwards Ranch)	Long Cove Development, Inc.	Trinity River Authority
Cedar Creek Country Club	Mabank, City of	TXI
Community Water Supply Corporation	Malakoff, City of	Walnut Creek Special Utility District
Corsicana, City of	Mansfield, City of	Waxahachie, City of (TRA Ellis Co Project)
Dynegy/Suez/Wise County Power	Martin Marietta	Weatherford, City of
East Cedar Creek Fresh Water Supply District	McNarosa Ranch	West Cedar Creek MUD
Ennis, City of	Midlothian, City of	West Wise Special Utility District
EXGen	Mira Vista Country Club	Whitestone Golf Club
Fort Worth, City of	Monarch Utilities	Winkler Water Supply Corp.
Fort Worth Country Day School	Resort Golf Club (Eagle Mountain)	Wise County Water Supply District (City of Decatur)
	Ridglea Country Club	

Table 3.2

Wholesale Water Customers Served by TRWD's Primary Customers: the cities of Arlington, Fort Worth, Mansfield and the Trinity River Authority

Arlington:	
Bethesda Water Supply Corporation	City of Grand Prairie
City of Dalworthington Gardens	City of Kennedale
Fort Worth (List includes current and future customers)	
City of Aledo	City of Northlake
Bethesda Water Supply Corporation	City of North Richland Hills
City of Burleson	City of Richland Hills
City of Crowley	City of Roanoke
City of Dalworthington Gardens	City of Saginaw
City of Edgecliff Village	City of Sansom Park Village
City of Everman	City of Southlake
City of Forest Hill	City of Watauga
City of Grand Prairie	City of Westlake
City of Haltom City	City of Westover Hills
City of Haslet	City of Westworth Village
City of Hudson Oaks	City of White Settlement
City of Hurst	City of Willow Park
City of Keller	Dallas-Fort Worth International Airport
City of Kennedale	Trinity River Authority
City of Lake Worth	Trophy Club Municipal Utility District
Mansfield	
City of Grand Prairie	Johnson County Special Utility District
Midlothian	
City of Grand Prairie	City of Venus
Sardis – Lone Elm Water Supply Corp.	

Trinity River Authority	
<u>Cities served through Tarrant County Water Supply Project:</u>	Buena Vista-Bethel Special Utility District
City of Bedford	City of Ferris
City of Colleyville	City of Italy
City of Euless	City of Maypearl
City of Grapevine	City of Palmer
City of North Richland Hills	City of Red Oak
<u>Cities and entities served under the Ellis County contract:</u>	Ellis County Water Control and Improvement District (City of Waxahachie)
Avalon Water and Sewer Service Corporation	Nash-Forreston Water Supply Corporation

Figure 3-1

Tarrant Regional Water District Service Area and Supply System Map



Table 3.3

Summary of Wholesale Public Water Supplier Profile for Tarrant Regional Water District

Water District Service Area:	5,891 square miles
Water Supply Sources (Year Impounded):	Lake Bridgeport (1931) Eagle Mountain Lake (1932) Lake Benbrook (1952) Cedar Creek Reservoir (1965) Richland-Chambers Reservoir (1987) George W. Shannon Wetlands (2013)
Distribution System:	<p>Cedar Creek Pipeline: Year completed: 1971 Length: 75 miles Diameter: 72-inches Maximum capacity: 114 mgd</p> <p>Richland-Chambers Pipeline Year completed: 1989 Length: 78 miles Diameter: 90-inches Maximum capacity: 225 mgd</p> <p>Benbrook Pipeline: Year completed: 1998 Length: 11 miles Diameter: 90-inches</p> <p>Eagle Mountain Pipeline: Year completed: 2008 Length: 20 miles Diameter: 90 and 84-inches</p> <p>Integrated Pipeline: Year completed: Ongoing with significant operations by 2020 Length: 82 miles Diameter: 108 and 84 inches Maximum capacity: 220 mgd</p>
Population (2014 plan): 2013 Estimated Population: Projected Population in 2060:	1,817,900 4,287,600
Population (2019 plan): Estimated Population in 2018: Projected Population in 2060::	1,997,976 4,238,822

4. SPECIFICATION OF WATER CONSERVATION GOALS

TCEQ rules require the adoption of specific water conservation goals to be included in this water conservation plan. The goals must include five and ten year targets for water savings, including, where appropriate, target goals for total use in gallons per capita per day across the District service area. However, as a wholesale water supplier, TRWD does not directly control the water use of its customers nor does it have a direct relationship with retail customers who are the consumers of water.

TRWD does control the operation of its water supply and delivery system and takes action to maximize water and energy efficiency. In areas under its direct control, TRWD adopts the following goals for water conservation and efficiency:

- Keep the level of unaccounted water in the system below 5%, as discussed in Section 5.2.
- Maintain universal metering of customers, meter calibration, and meter replacement and repair, as discussed in Section 5.2.
- Maintain a program of leak detection and repair, as discussed on Section 5.3.
- Continue to use indirect reuse as a major source of water supply, as discussed in Section 8.1.
- Continue to implement in-house water conservation efforts, as discussed in Section 8.4.
- Raise public awareness of water conservation and encourage responsible public behavior by a public education program, as discussed in Section 8.2.

As a wholesale provider, TRWD will assist its customers in the development of water conservation programs. TRWD has developed a *Model Water Conservation Plan for TRWD Customers* and a *Model Drought Contingency Plan for TRWD Customers* that its customers can use to develop their own water conservation and drought contingency plans.

TRWD requests water utility customers to provide annual water conservation reports, modeled after the Utility Profile developed by TWDB. A copy of the report is included in Appendix F. TRWD will review these reports and compile the information as part of its own annual conservation report, which will be used to manage TRWD's water conservation program.

In calculating target goals for per capita water savings among its users, TRWD focuses primarily on water use among its four primary customers in Tarrant County. The cities of Arlington, Fort Worth, Mansfield and the Trinity River Authority and their successive customers (listed in Table 3.2) receive an average of 92 percent of all water deliveries. Table 4.1 summarizes annual water use of all customers from 2014 – 2018. The data shown in the table reflect the following:

- Population estimates (Table 4.2) are based on information provided by the North Central Texas Council of Governments (NCTCOG). The art of estimating population is by no means an exact science. The NCTCOG methodology for determining population is based on building permits, occupancy factors and household size factors. The figures are reviewed at a regional level for consistency with other indicators of regional population such as labor force estimates and vital statistics.⁴
- Populations of some TRA customers were adjusted to reflect the percentage of water needs it meets within those cities, (Grapevine: 63 percent; North Richland Hills: 33 percent). Populations were also adjusted for communities that rely on groundwater to supplement water supplies, (Bedford: 85 percent; Colleyville: 100 percent; Euless: 73 percent).
- The District serves approximately 98% of Tarrant County. Its four primary customers and the customers they serve represent approximately 92% of the total Tarrant County population.
- The total gallons per capita per day (gpcd) figures represent all water uses among customers and are calculated by dividing total amount of water diverted for potable use by total population. Water use categories include residential, commercial, institutional, and industrial, as well as process-related and municipal system water losses.
- Rainfall data recorded at DFW International Airport is also included to show the correlation between water use and precipitation. Higher water use is usually observed during periods of below average rainfall. This is predominantly due to an increase in the amount of water used for irrigation.

Table 4.1

Water Use among TRWD's Customers and their Successive Customers 2014-2018, including Rainfall, Total Water Supplied, Estimated Population, and Total Gallons per Capita per Day

Year	Rainfall at DFW Airport (inches)	Total Water Supplied (acre-feet)	Estimated Population	Total Gallons per Capita per Day
2014	21.32	356,150	1,873,136	170
2015	62.61	342,553	1,865,226	164
2016	35.48	340,826	1,910,909	159
2017	36.62	343,986	1,986,266	155
2018	55.97	360,675	1,997,976	161
Current 5-Year Average Per Capita Use among TRWD's Customers without Credit for Reuse.				162

$$\text{Total gpcd} = [(\text{total acre-feet supplied} \times 325,851 \text{ gallons/acre-foot}) / \text{population}] / 365 \text{ days per year}]$$

Table 4.2**Estimated Population Served by TRWD's Primary Customers and their Successive Customers 2014-2018 based on data from the North Central Texas Council of Governments**

Year	Arlington	Fort Worth	Mansfield	Trinity River Authority
2014	378,070	1,117,701	59,410	153,005
2015	379,370	1,133,504	60,400	153,787
2016	380,740	1,202,838	61,460	155,086
2017	382,230	1,217,663	63,670	156,265
2018	383,950	1,236,634	65,660	164,760
Percent increase 2014 - 2018	1.5%	10.6%	10.5%	7.7%

In a special report to the 79th Legislature, the TWDB recommends a minimum annual reduction of one percent total gpcd, based upon a five-year rolling average until at such time as the entity achieves a total gpcd of 140 or less.⁵ Table 4.3 shows projected total per capita water use for TRWD. Table 4.3 also includes TRWD's targets for reduction to total per capita use due to the implementation of this water conservation and drought contingency plan and the plans developed by its customers. The information shown in the table reflects the following:

- The target five and ten-year gpcd goals presented in the 2014 TRWD Water Conservation Plan were 166 for the five-year average in 2018 and 158 for the ten-year average in 2023. The goals represent a minimum annual reduction of one percent total gpcd based on a five-year average.
- The current five-year gpcd average from 2014-2018 is 162. During this period, drought conditions and mandatory watering restrictions were in effect the first year and a half. Restrictions were lifted in spring 2015 once water supply reservoirs were filled due to record rainfall. Since coming out of drought restrictions, there have been significant periods with record high precipitation or record low precipitation with high temperatures. Because of recent variability in weather and customer water use patterns, new five and ten-year goals for this plan are a continuation of the goals presented in the 2014 plan.
- The target for the five-year (2023) total per capita water use for District customers and their successive customers is 158 gallons per capita per day in an average climatic year, as shown in Table 4.3.
- The target for the ten-year (2028) total per capita water use for District customers and their successive customers is 150 gallons per capita per day in an average

climatic year, as shown in Table 4.3. This represents a decrease of 16 gallons per capita per day, or ten percent, from the 2018 five-year average goal of 166 gpcd.

- Projected total per capita water use figures are based on average climate conditions. Per capita water use in years with less precipitation, especially during the summer, may be more than projected here.
- Indirect reuse diversion volumes may be credited against total diversion volumes for the purpose of calculating gpcd for targets and goals. The District has averaged 21,689 acre-feet per year of supplies from indirect reuse over the last 5 years. A conservative estimate of 9 gallons per capita per day credit from indirect reuse is presented for future 5 and 10-year goal calculations.

Table 4.3

**Five-Year and Ten-Year Total Per Capita Water Use Goals for TRWD's
Primary Customers and their Successive Customers
(Total GPCD)**

Description	Year	Target Per capita	Per capita with Reuse
Current 5-Year Average	2014-2018	162	152
Previous 5-Year Goal	2018	166	
5-Year Goal	2023	158	149
10-Year Goal	2028	150	141

Verification of annual water savings are from an annual demand model of TRWD water use. The model was calibrated using water demands among the district's primary customers from 1996 to 2006, before water conservation measures were put in place. The model is used to predict TRWD annual demands without conservation efforts and allows for a comparison with actual demands. The difference between the model's projected demands and actual consumption is assumed to be water savings. It is important to note that all of the highlighted savings cannot be completely attributed to TRWD conservation programs. Many factors such as water rates, customer city conservation efforts, impact of record rainfall amounts, etc. are part of the estimated savings calculation.

Here are some highlights of the savings achieved from ongoing conservation efforts from 2007 through 2018:

- A cumulative savings of over 270 billion gallons or 830,838 acre-feet.
- Over 33 billion gallons in annual average savings over the last five years. Representing an average conservation savings of approximately 90 mgd or almost 102,000 acre-feet per year.
- The annual demand model used to estimate conservation savings is currently under review with a consultant. The intent is to more effectively document the impact of conservation programs. This work should be completed by 2020.

Table 4.4
Estimated Annual Savings Due to Ongoing Water Conservation Efforts and
Drought Contingency Measures, 2007-2018

Year	Billion Gallons	Acre-Feet
2007	8.97	27,534
2008	7.95	24,395
2009	9.44	28,979
2010	9.65	29,612
2011	14.43	44,269
2012	21.86	67,070
2013	32.43	99,541
2014	27.83	85,399
2015	30.51	93,643
2016	33.20	101,888
2017	35.87	110,132
2018	38.57	118,376
Total Savings	270.71	830,838

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5. METERING, WATER USE RECORDS, CONTROL OF UNACCOUNTED WATER, AND LEAK DETECTION AND REPAIR

One of the key elements in water conservation is careful tracking of water use and control of losses. Accurate metering of water deliveries and detection and repair of leaks in the raw water delivery system are important elements of TRWD's program to control losses.

5.1 Practices to Measure and Account for the Amount of Water Diverted

TRWD uses two different methods to measure raw water diversions from its reservoirs. Water supply releases from Lake Bridgeport are made using either a 48-inch gate valve or a 42-inch gate valve. Releases from Eagle Mountain Lake are made using one of two 48-inch diameter gate valves. A discharge rating curve has been developed for each valve at the lakes. This allows for the volumetric flow rate to be calculated based on the size of the valve opening. Periodic calibration of the rating curves occur as additional discharge data is collected. The District measures its raw water diversions from Cedar Creek and Richland-Chambers Reservoirs by meters with accuracy $\pm 5\%$. The master meters are calibrated and repaired or replaced as needed.

5.2 Monitoring and Record Management Program for Determining Deliveries, Sales, and Losses

As a wholesale water supplier, TRWD has instituted a monitoring and record management program to assure that its customers are charged appropriately for their water use. The program includes the following elements:

- Customers with annual demands less than 7,500 acre-feet are required to document their usage in a monthly raw water report. In addition to usage, the report also includes initiation dates, usage dates, customer name changes and meter status changes.
- TRWD performs both scheduled and random readings of customer meters. A minimum of one reading is taken during each of the first three quarters of the year (January through March, April through June, and July through September). One additional reading is taken between September 20 and October 10. In addition, one random reading is performed annually between June 1st and September 30th.
- All meters are documented and the serial number is verified and recorded at each reading.
- Customers with a demand of 7,500 acre-feet or more, or those diverting directly from the pipeline, must provide TRWD with a daily usage total and a monthly reconciliation of usage. Usage volumes are monitored and recorded daily. These data are also verified monthly and annually.
- Customers are required to provide, operate, maintain, and read meters. By contract, meters must have a minimum accuracy of $\pm 5\%$. TRWD can access the meters at all reasonable times and, upon written request, can have the meters calibrated once per

month. In the event that a meter is not functioning properly, the customer is required to either install a new meter, or repair the existing meter within 180 days.

- TRWD has the authority to replace or repair any meter.
- Methods to verify water deliveries include calibration tests, mathematical calculations, and estimations based on historical meter data under similar conditions.
- Over a period from 2013 through 2016, approximately 31 new flowmeters were installed at various pump locations throughout the TRWD system. Nine full port insertion mag meters were installed at the vertical turbine pumps at Benbrook Lake, Richland Chambers Reservoir and Cedar Creek Lake. Twenty-two thermodynamic sensors were installed at horizontal centrifugal pumps. The thermodynamic flowmeters have proven to be extremely accurate, require much less infrastructure than conventional Venturi meters, and have resulted in reduced costs.
- TRWD reconciles the water deliveries and reservoir diversions into daily hydrologic mass balances. All of the District's reservoir levels and local precipitation are monitored from USGS recording stations. Evaporation rates based on data from NOAA are calculated daily with a script that queries real-time data published to the internet. This practice was instituted in 2017. Using all of the above data, daily mass balances of each reservoir are performed to calculate natural inflows.

5.3 Metering and Leak Detection and Repair

The TRWD metering program for raw water is described in Sections 5.1 and 5.2. The following information details the District's program to control, detect and repair leaks of its pipeline system:

- All TRWD water transmission pipelines are pre-stressed concrete cylinder pipe or welded steel cylinder pipe with an internal protective liner and an external protective coating. TRWD's commitment to properly operating a cathodic protection system, pressure transient reduction measures, and a pipeline integrity program have greatly extended the useful life of our pipelines, and have reduced the chance of failure.
- Most joints in TRWD pipelines are designed with bell and spigot joint construction including rubber gasket. Some joints are welded. For larger lines, each joint is also sealed with concrete.
- All TRWD water pipelines are constructed within legally defined and identified rights-of-way, properly registered with authorities in each county.
- TRWD conducts annual inspections of prioritized areas of the Cedar Creek and Richland-Chambers pipelines using an advanced technology to assess the condition of pipe segments. The method, which uses remote field eddy current transformer coupling technology (RFEC/TC), is a non-destructive way of detecting broken wires in pre-stressed concrete pipe. Using GIS tools, TRWD updates the risk of the failure of distressed pipes based on these condition assessments, and prioritizes the

most critical pipes for replacements and repairs. Most pipeline repairs are conducted during the winter when demands are typically at their lowest. In addition to the internal pipe inspections, TRWD personnel also routinely inspect District pumping equipment, facilities, and pipelines for leaks or mechanical problems. Aerial surveillance and ground observations are used to regularly inspect pipeline routes for breaks and leaks. Repairs are undertaken as soon as practicable in order to minimize waste.

- TRWD operates a program for right-of-way identification for construction projects adjacent to District facilities and pipelines in order to minimize leaks caused by pipeline damage during construction.

In 2010, TRWD began conducting annual water loss audits of its pipeline system using AWWA's Water Loss Control Committee's Free Water Audit Software v4.2. The program compares total pumped volumes to billed metered diversions. The results indicate that TRWD losses do not exceed an accepted standard of meter error of five percent, which is one of the goals of TRWD's water conservation program.

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6. OTHER REQUIRED MEASURES

6.1 Requirement for Water Conservation Plans by Wholesale Customers

Every new, renewed or extended contract for the wholesale sale of water by TRWD includes a requirement that the primary wholesale customer, and any wholesale customers of the primary wholesale customer, develop and implement a water conservation plan meeting the requirements of Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code. This requirement extends to each successive wholesale customer in the resale of water. TRWD will provide the model Water Conservation and Drought Contingency plans described in Section 7.2 to all wholesale customers in order to assist them in developing their own plans.

6.2 Reservoir System Operation

Water rights granted to TRWD by the TCEQ allow annual diversions from each reservoir as follows:

Lake Bridgeport (local)	27,000 acre-feet per year
Lake Bridgeport (downstream releases)	66,000 acre-feet per year
Eagle Mountain Lake	159,600 acre-feet per year
Cedar Creek Reservoir	175,000 acre-feet per year
Richland-Chambers Reservoir	210,000 acre-feet per year
Lake Benbrook	72,500 acre-feet per year
Reuse – Richland-Chambers*	100,465 acre-feet per year
Reuse – Cedar Creek*	88,059 acre-feet per year

*The Cedar Creek indirect reuse project represents future water supplies. A schedule for developing a water recycling facility at Cedar Creek Reservoir has not yet been determined. The indirect reuse project at Richland-Chambers Reservoir became fully functional in Fall 2013.

Permitted annual diversions do not reflect the amount of water TRWD can safely deliver to its customers. The following list of sources depicts the firm yield of TRWD's reservoir system. Firm yield of a reservoir is typically defined as the maximum water volume that could be delivered without failure during a repeat of the historical drought of record. TRWD currently uses safe yield to depict its supplies in Region C Regional Water Supply Planning. Safe yield is a more conservative calculation of supply than either permitted or firm yield.

West Fork Reservoirs (includes	
Lake Bridgeport and Eagle Mountain Lake)	79,000 acre-feet per year
Cedar Creek Reservoir	175,000 acre-feet per year
Richland-Chambers Reservoir	210,000 acre-feet per year
Lake Benbrook	6,833 acre-feet per year
Reuse – Richland-Chambers	<u>100,465 acre-feet per year</u>
TOTAL	571,298 acre feet per year

TRWD's water supply network includes seven major reservoirs – Lake Bridgeport, Eagle Mountain Lake, Lake Worth, Cedar Creek Reservoir, Richland-Chambers Reservoir, Lake Arlington and Lake Benbrook. The District's reservoir system operation plan for its various sources of supply seeks to maximize efficiency of water withdrawals within the constraints of existing water rights. Other priorities include providing flood control benefits, maintaining water quality and minimizing potential impacts to recreational users, fish, and wildlife. Each reservoir is operated based on a policy of flood release above the conservation elevation. Due to the geographic locations of the reservoirs, TRWD's reservoirs are often referred to as the "West Fork Reservoirs" (Lake Bridgeport and Eagle Mountain Lake), and the "East Texas Reservoirs" (Cedar Creek Reservoir and Richland-Chambers Reservoir).

Lake Bridgeport, Eagle Mountain Lake and Lake Worth are located on the West Fork of the Trinity River; Lake Bridgeport is located in Wise and Jack counties; Eagle Mountain Lake sits downstream in northwest Tarrant County; and Lake Worth is further downstream in Tarrant County. In addition to water supply, these reservoirs are used to regulate floodwaters on the West Fork. Lake Worth is owned and operated by the City of Fort Worth, but is integral to the TRWD water supply system, as some water treatment plants divert water directly out of Lake Worth.

The District may divert 93,000 acre-feet per year from Lake Bridgeport, of which 78,000 acre-feet per year may be released downstream into Eagle Mountain Lake. TRWD may divert a maximum of 159,600 acre-feet per year from Eagle Mountain. The combined estimated firm yield of Lake Bridgeport and Eagle Mountain Lake is 79,000 acre-feet per year.

Water is gravity fed from Lake Bridgeport to Eagle Mountain Lake, and from Eagle Mountain to Lake Worth. The City of Fort Worth operates water treatment plants that divert water from Eagle Mountain Lake and Lake Worth, and distribute treated water within the City of Fort Worth, as well as to neighboring cities and industries. One of the objectives of the District's operation of the West Fork reservoirs is to maintain the elevation of Lake Worth to support the intake of Fort Worth's Eagle Mountain Water Treatment Plant. TRWD follows a series of operational rules to minimize spills and evaporation, and regulate the elevation in Lake Worth. The TRWD system operation plan calls for a shift in water supply deliveries from the East Texas reservoirs if the combined storage capacity in Lake Bridgeport and Eagle Mountain Lake falls below 50 percent.

In 2008, the Eagle Mountain Connection Project was constructed, which included a 20.5-mile pipeline extension from an existing pipeline at Lake Benbrook to Eagle Mountain Lake, a booster pump station, and balancing reservoir. The Eagle Mountain Connection allows for water from East Texas Reservoirs to be delivered into Eagle Mountain Lake for terminal storage. The additional water helps to meet the water needs of a rapidly growing northwest Tarrant County, and reduces demand on the West Fork during periods of peak demand (summer) and drought. It also supplies the expanded capacity of the city of Fort Worth's Eagle Mountain Water Treatment Plant.

Cedar Creek Reservoir is situated in Kaufman and Henderson counties; Richland-Chambers Reservoir is located in Navarro and Freestone counties; Lake Arlington is located on Village Creek in Tarrant County; and Lake Benbrook is a U.S. Army Corps of Engineers project in southwest Tarrant County. Lake Arlington is owned and operated by the City of Arlington, and is used primarily for terminal storage by TRWD. The City of Arlington and TRA both have plants that divert water directly from Lake Arlington, and provide treated water to their various customers. Lake Benbrook is also used as terminal storage by TRWD. Water can be released from Lake Benbrook into the Clear Fork of the Trinity River to supply Fort Worth's Holly Water Treatment Plant. Water can be pumped from Lake Benbrook back east to Rolling Hills Water Treatment Plant and several other plants that divert directly off the pipeline. Water is pumped from Lake Benbrook westward to supply Westside Water Treatment Plant. Benbrook Water Authority and the City of Weatherford are also supplied directly from Lake Benbrook.

The firm yield of Cedar Creek Reservoir is 175,000 acre-feet per year. A 70-mile pipeline is used to transport water from Cedar Creek into Tarrant County. An outlet on the Cedar Creek pipeline allows TRWD to discharge water into Village Creek which flows into Lake Arlington. Richland-Chambers has a firm yield of 210,000 acre-feet per year. TRWD constructed a 78-mile pipeline to carry water from Richland-Chambers into Tarrant County. Both East Texas pipelines terminate at the City of Fort Worth's Rolling Hills Water Treatment Plant. A pipeline extension from Rolling Hills to Lake Benbrook was completed in 1998. In 2018, the first phases of a new 108" transmission pipeline and large-scale pump station system were completed. This project is known as the Integrated Pipeline and is constructed in partnership with City of Dallas (Dallas). A long-term project with many phases, the IPL is scheduled to have significant operations in place in 2020. This pipeline provides additional supply capacity from existing East Texas Reservoirs, future connection capability with Dallas reservoir supply, and improved technological and online storage functions that greatly increase the versatility and reliability of the water supply system. This system will ultimately be 140 miles in length and is scheduled to be phased in as needed over the next 10 years.

TRWD manages deliveries from its East Texas reservoirs to meet customer needs and to supplement lake volumes in Eagle Mountain Lake, Lake Arlington, and Lake Benbrook during off-peak periods. The yields from the latter two lakes are less than 10,000 acre-feet per year, so most of the supply is by pipeline delivery. Under normal operating conditions, the District diverts water in excess of demands into Lake Arlington and Lake Benbrook. The goal is to supplement the reservoirs in conjunction with natural hydrologic inflow to maximize terminal storage and meet peak demands during the summer. Using Lake Arlington and Lake Benbrook to provide summertime water deliveries to customers minimizes energy costs.

TRWD has permits for two indirect reuse projects at Richland-Chambers and Cedar Creek Reservoirs. The projects involve diverting return flows in the Trinity River through constructed wetland systems to remove nutrients and sediment. The water is then routed into the reservoirs to supplement yields by nearly 50 percent. The wetland water reuse facility at Richland-Chambers began full operations in Fall 2013. Additional details about the water recycling projects can be found in Section 8.1.

6.3 Water Conservation Implementation Report

Appendix D includes the TCEQ required water conservation implementation report. The report is due to the TCEQ by May 1, 2019, and every five years after that date. This report tracks water demands over a five-year period, and provides an overview of TRWD's water conservation programs. The report also calls for the five and ten year per capita water use goals from the previous water conservation plan. The reporting entity must answer whether or not these goals have been met, and if not, why not. The amount of water savings is also reported.

6.4 Coordination with Regional Water Planning Groups

Appendix H includes a copy of a letter sent to the Chair of Region C water planning group with this water conservation and drought contingency plan.

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7. TRWD WATER CONSERVATION MEASURES TO ASSIST CUSTOMERS

TRWD will implement a number of water conservation measures intended to help direct and indirect customers with their water conservation planning, including:

- Holding water conservation workshops for the staff of customers within its service area.
- Providing model water conservation and drought contingency plans for use by customers in developing their own plans.
- Requiring an annual report on water conservation efforts from customers and developing a district water conservation report.

These measures will allow TRWD to serve as a regional resource for water conservation efforts in its service area.

7.1 Water Conservation Workshops

The District will continue to coordinate water conservation workshops for staff of customer cities (direct and indirect) that receive water from TRWD. Recent workshops have covered topics related to automated metering infrastructure, leak detection, water loss audits, and effective communication. TRWD works with customer cities for workshop topic requests.

In 2007, the District held the first water conservation symposium for its customer cities and it has been an annual event ever since. Speakers from across the nation are invited to share their experience and expertise. Discussions center on key elements of successful water conservation programs. The symposium's success attracted the attention of other water suppliers. Since 2008, the symposium has been jointly coordinated by the region's three major water providers – TRWD, North Texas Municipal Water District, and City of Dallas. In February 2019, Upper Trinity Regional Water District became the fourth regional water provider to join the event as a sponsor and planning partner.

7.2 TRWD Model Water Conservation Plan for TRWD Customers and Model Drought Contingency Plan for TRWD Customers

In order to assist its cities in the development of their own water conservation and drought contingency plans, TRWD will develop a *Model Water Conservation Plan for TRWD Customers* and a *Model Drought Contingency Plan for TRWD Customers*. The model water conservation plan addresses the TCEQ requirements for water conservation plans for municipal use by public water suppliers and includes several provisions that go beyond TCEQ requirements. TRWD will work with its customers to develop water conservation and drought contingency plans using the model plan as a guide.

The model water conservation plan includes the following elements addressing TCEQ requirements for water conservation plans for public water suppliers:

- 288.2(a)(1)(A) – Utility Profile

- 288.2(a)(1)(B) – Record Management, Customer Classification
- 288.2(a)(1)(C) – Specification of Goals
- 288.2(a)(1)(D) – Accurate Metering
- 288.2(a)(1)(E) – Universal Metering
- 288.2(a)(1)(F) – Determination and Control of Unaccounted Water
- 288.2(a)(1)(G) – Public Education and Information Program
- 288.2(a)(1)(H) – Non-promotional Water Rate Structure
- 288.2(a)(1)(I) – Reservoir System Operation Plan
- 288.2(a)(1)(J) – Means of Implementation and Enforcement
- 288.2(a)(1)(K) – Coordination with Regional Water Planning Group
- 288.2(a)(2)(A) – Leak Detection, Repair, and Water Loss Accounting
- 288.2(a)(2)(B) – Record Management System
- 288.2(a)(2)(C) – Requirement for Water Conservation Plans by Wholesale Customers

TRWD's model water conservation plan also includes water conservation strategies that go beyond TCEQ's requirements:

- 288.2(a)(3)(A) – Conservation Oriented Water Rates
- 288.2(a)(3)(B) – Ordinances, Plumbing Codes or Rules on Water-Conserving Fixtures
- 288.2(a)(3)(D) – Reuse and Recycling of Wastewater
- 288.2(a)(3)(F) – Landscape Water Management Ordinance
- 288.2(a)(3)(G) – Monitoring Method

7.3 Annual Reports

One element of TRWD's *Model Water Conservation Plan for TRWD Customers* is a requirement that all water supply customers (direct and indirect) produce annual conservation reports (Appendix F) by May 1 of the following year and submit them to TRWD. TRWD will compile these reports and use them to help generate its own annual water conservation report. The District's report will be used to review the effectiveness of its water conservation program.

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8. ADDITIONAL TRWD WATER CONSERVATION MEASURES

8.1 Indirect Reuse and Recycling of Water

Indirect and/or direct reuse is a major part of future water supply plans for North Texas. TRWD is taking a lead role in water reuse by recycling return flows in the Trinity River. Return flows are a renewable resource as they are made up of water discharged by area wastewater treatment plants. A large portion of those flows originated from reservoirs managed by the District.

Here's how indirect reuse projects work:

- A) Treated water from area lakes is consumed in homes and business.
- B) Water that flows down the drain ends up at a wastewater treatment plant.
- C) Wastewater treatment plants clean the water and release it into the Trinity River. However, discharges from wastewater treatment plants can contain elevated levels of nutrients, such as nitrogen and phosphorus.
- D) As the water flows downstream, it picks up sediments, more nutrients, and other pollutants along the way.
- E) The return flows are captured and pumped into constructed wetlands. The wetlands provide a natural way to remove sediments and nutrients from the river water.
- F) With most of the sediments and nutrients removed, the naturally treated water is returned to area lakes to supplement drinking water supplies.
- G) Water from lakes is pumped to drinking water treatment plants, then back into homes and businesses and reused.

The first of TRWD's two planned indirect reuse projects began supplementing water supplies in fall 2013. The George Shannon Wetlands Water Recycling Facility is a 2,000-acre constructed wetland system adjacent to Richland-Chambers Reservoir. The project is permitted to supply 100,465 acre-feet of treated river water to the reservoir annually, which averages out to more than 89 million gallons per day (MGD).

Another 2,000-acre facility is planned for Cedar Creek Reservoir, as water demands increase. When completed, the second wetland project will add 88,059 acre-feet to the reservoir. These unique projects will ultimately supplement current yields in each reservoir by nearly 50 percent.

8.2 Public Outreach Programs

TRWD will work closely with its customers (direct and indirect) to inform consumers on ways to use water more efficiently. TRWD's public outreach programs are intended to assist and supplement the public outreach efforts of its customers. TRWD's public outreach programs include the following:

Regional Water Conservation Public Awareness Campaign

- TRWD continues to participate in the regional water conservation public awareness campaign with City of Dallas. The current campaign, “Water is Awesome. Use It. Enjoy It. Just Don’t Waste It,” is entering its fourth year and typically includes television, radio, print and digital media. Media outreach is used to increase public awareness on the value of water and encourage adoption of outdoor water efficient behaviors. Since 2009, the regional campaign has been very successful. A recent survey of residents indicates that 57% of respondents found the messages effective, 50% of respondents have changed their behavior to be more efficient as a result of the campaign, and 70 percent water twice per week or less, which was the main message of the previous campaign.

Twice-per-Week Watering Best Management Practices

- Outdoor water use, particularly lawn watering, can account for half or more of annual residential water use – and much more than that during the hot, dry Texas summers. Many homeowners have a tendency to overwater by as much as 2-3 times the amount needed by landscapes. Adopting twice-per-week best management practices on outdoor watering with sprinklers is an effective way to reduce excessive water use and stretch existing supplies.

The District fully supports the efforts of its customer cities to adopt year-round twice-per-week watering schedules. The City of Fort Worth took a lead in this effort by adopting an ordinance in spring 2014. As a result, many of their customer cities have also adopted a similar ordinance.

Residential Sprinkler Evaluation Program

- The Residential Sprinkler Evaluation Program uses trained licensed irrigators to assess residential sprinkler systems. Upon inspection they make recommendations for improving system performance, identify repair needs, and instruct users on how to schedule controllers to eliminate unnecessary outdoor watering. The evaluation also includes an opportunity to educate residents about their sprinkler systems and offer guidance on how much and how long to water throughout the year. In 2018, over 1,800 evaluations were provided throughout Tarrant County.

Demonstration Gardens

- In 2015, TRWD installed a demonstration landscape garden at its main office location. Landscape features for the project include native and adapted plants, natural materials, a rain garden, pervious surfaces and efficient sprinkler system components. In conjunction with the 2017 creation of the Airfield Falls Trailhead on a tributary of the West Fork of the Trinity River, TRWD built a destination water conservation garden with easy public access. Both gardens are used to educate homeowners, developers, civic groups and landscapers about the benefits of water efficient landscaping practices.

ET Weather Station Support and Weather-based Weekly Watering Advice

- TRWD owns and operates four weather stations in Tarrant County. The stations are integrated into the Texas ET Network. Texas ET Network and National Weather Service data is used to calculate accurate weekly watering advice across North Central Texas and the service is map based. Users can sign up to receive weekly emails and/or text messages every Monday for that week's watering advice. The advice is also shared through social media channels and SaveTarrantWater.com. The program gives residents information to water only when needed and to reduce overwatering. It is a regional program and funded by City of Dallas and TRWD. Over 8,000 residents have signed up for the weekly watering advice service.

Drought Outreach and Customer Assistance

- With drought potentially looming on the horizon in any given year, the District offers regional support to customer cities. The support mainly consists of developing media messages for use on television, radio, web, and in print outlets. The media effort focuses on educating water users on drought stage restrictions and mandatory outdoor watering schedules. In the past, TRWD has covered the cost of printing sign materials for customer use throughout its service area.

Save Tarrant Water Online Presence

- The District manages SaveTarrantWater.com as a resource to consumers. Program information, do-it-yourself videos, and Green Pros listing can be found on the website. Save Tarrant Water is also active on social media as a way to promote new information, provide tips, and support customer efforts.

School Education Support

- Educating future water users about water conservation is a key responsibility of water providers. The District currently partners with several communities on a shared-cost basis to provide 5th grade classes with the Water Wise educational toolkit. The program kits and activities put water knowledge and conservation center stage at school and at home. The kits provide students and their families with the tools needed to audit and retrofit their homes with water saving devices. The District continues to evaluate school education support programs to expand knowledge of the importance of water conservation for future generations.

Learn and Grow Program

- Since 2017, TRWD has had an agreement with the Tarrant County Master Gardener Association to provide education and outreach. Services include community presentations, workshops, event participation and innovative projects. Tarrant County customer cities can request presentations from a pre-approved topic list. Example include: basic landscape design, native and adapted plants, vegetable gardening, and rainwater harvesting. At every program presentation, the speaker provides information about TRWD, local water supplies and the importance of

water conservation. TRWD outreach materials are also provided at community events. In 2018, the program produced 111 activities with over 5,100 participants.

Institutional, Commercial and Industrial (ICI) Water Efficiency Assessments

- In 2018, TRWD provided contracted water efficiency assessments to two local school districts. The assessments provide an inventory of all indoor water-using fixtures and appliances. Cooling towers and sprinkler systems are also inspected. Recommendations for fixture replacements and process improvements are backed with estimated costs and payback periods. The assessments consider water, wastewater, energy and chemical savings. TRWD will continue to work with local school districts for ICI water efficiency assessments. If school district participation decreases, TRWD will coordinate with customer cities to identify potential commercial and industrial customers.

Regional Public Event Coordination

- TRWD has worked with customer cities, master gardeners and licensed irrigators to provide a regional DIY Sprinkler Expo event in May 2017 and 2018. In February 2019, partners worked together to offer two “Newcomer’s Guide to Gardening in North Texas” programs. Regional events are coordinated with and promoted by customer cities and are open to the general public. TRWD will continue to work with our customers to offer regional public event opportunities every year.

Conservation Coordinators Collaboration

- The District supports and encourages customer cities to implement conservation programs. Traditionally, TRWD has invited customers to one or two meetings a year to discuss programs, issues and collaboration opportunities. Those meetings will continue but will also be supplemented with monthly conference calls throughout the year. The goal is to increase communication, collaboration and program implementation with all customer cities.

Water Efficient Recognized Green Professional Program

- The Water Efficient Recognized Green Professional Program (Green Pros) was developed in 2016 with the Texas A&M AgriLife Extension Service in Tarrant County. Held annually during winter, participants attend 5 half-day courses over 9 weeks. Topics include water conservation, low impact design, turfgrass, irrigation and low water-use plants. The target audience of the program are green industry professionals such as landscapers, designers, and irrigators. Completing the program provides the participant the opportunity to be listed on SaveTarrantWater.com as a “Green Pro.” Over 100 Green Pros have been recognized through the program.

8.3 In-House Water Conservation Efforts

TRWD has and will continue to implement an in-house water conservation program with the following efforts:

- Wherever possible, landscapes will use native or adapted drought tolerant plants, trees and shrubs.
- Irrigation at TRWD facilities will occur before 10 a.m. and after 6 p.m. year-round in order to lower losses due to evaporation.
- Irrigation will be limited to the amount needed to promote survival and health of plants and lawns. The District has eliminated irrigation at some pump station locations altogether.
- Irrigation will be avoided on Saturday and Sunday if possible, since these are periods of high water use by the public.
- Irrigation will be done with untreated source water wherever feasible and reasonable.

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9. ADOPTION AND AUTHORIZATION TO ENFORCE THE WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

Appendix G contains a copy of the resolution approved by the TRWD Board of Directors adopting the amended water conservation and drought contingency plan. The General Manager of TRWD is authorized to implement and enforce, to the extent provided herein, the water conservation and drought contingency plan. As discussed in Section 7.3 TRWD will prepare a water conservation report every year, incorporating the reports required from direct and indirect customers. This report will be used to review the effectiveness of TRWD's water conservation program, and results will be reported to the TRWD Board of Directors.

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10. REVIEW AND UPDATE OF WATER CONSERVATION PLAN

TCEQ requires that water conservation plans be updated prior to May 1, 2009, and every five years thereafter. TRWD will review and update this plan as appropriate based on new or updated information.

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11. DROUGHT CONTINGENCY PLAN

11.1 Introduction

The purpose of this drought contingency plan is as follows:

- To conserve the available water supply in times of drought and emergency
- To maintain supplies for domestic water use, sanitation, and fire protection
- To protect and preserve public health, welfare, and safety
- To minimize the adverse impacts of water supply shortages
- To minimize the adverse impacts of emergency water supply conditions.

TRWD and its customer cities experienced Stage 1 drought restrictions from 2011-2012 and 2013-2015. Fortunately, water supply reservoirs have not dropped below 75% capacity since. With that experience, the District has taken a more active role in educating the public about the importance of reducing water waste and being prepared for the next drought.

11.2 State Requirements for Drought Contingency Plans

This drought contingency plan is consistent with the Texas Commission on Environmental Quality (TCEQ) guidelines and requirements for the development of drought contingency plans by wholesale water suppliers, contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.22 of the Texas Administrative Code. This rule is included in Appendix B.

Minimum Requirements

TCEQ's minimum requirements for drought contingency plans are addressed in the following subsections of this report:

- 288.22(a)(1) – Provisions to Inform the Public and Provide Opportunity for Public Input – Section 11.3
- 288.22(a)(2) – Coordination with the Regional Water Planning Group – Section 11.9
- 288.22(a)(3) – Criteria for Initiation and Termination of Drought Stages – Section 11.4
- 288.22(a)(4) – Drought and Emergency Response Stages – Section 11.5
- 288.22(a)(5) – Procedures for Initiation and Termination of Drought Stages – Section 11.5
- 288.22(a)(6) – Specific, Quantified Targets for Water Use Reductions – Section 11.5

- 288.22(a)(7) – Specific Measures to Be Implemented during Each Drought Stage – Section 11.5
- 288.22(a)(8) – Provision for Wholesale Contracts to Require Water Distribution According to Texas Water Code §11.039 – Sections 11.5 and 11.6.
- 288.22(a)(9) – Procedures for Granting Variances to the Plan – Section 11.7
- 288.22(a)(10) – Procedures for Enforcement of Mandatory Restrictions – Section 11.8
- 288.22(b) – Notification of Implementation of Mandatory Measures – Section 11.4
- 288.22(c) – Review and Update of Plan – Section 11.10

11.3 Provisions to Inform the Public and Opportunity for Public Input

TRWD provided opportunity for public input in the development of this drought contingency plan by the following means:

- Several meetings with customer representatives were held to discuss and coordinate the development of this plan.
- The District will provide the draft plan to anyone requesting a copy.
- The proposed plan was posted to SaveTarrantWater.com web site (April 2019) providing the public an opportunity to review and comment on the plan in writing.
- Public comment was available at the Tarrant Regional Water District board meeting held at the District offices in Fort Worth at 9:30 a.m. on Tuesday, April 16, 2019.

11.4 Initiation and Termination of Drought Response Stages

Initiation of Drought Response Stage

The General Manager may order the implementation of a drought response stage or water emergency when one or more water supply trigger conditions is met. The following actions will be taken when a drought stage is initiated:

- The designated representative(s) of primary wholesale customers will be notified by email, mail, telephone, or fax that provides details of the reasons for initiation of the drought stage.
- The public will be notified through local media following the notification of primary wholesale customers.
- If any mandatory provisions of the drought contingency plan are activated, TRWD will notify TCEQ within five business days.

Notwithstanding the foregoing, the General Manager may decide, under special circumstances, not to order the implementation of a drought response stage or water emergency even though one or more of the trigger criteria for the stage are met. Factors

which could influence such a decision include, but are not limited to, the time of year, weather conditions, the anticipation of replenished water supplies, or the anticipation that additional facilities will become available to meet needs.

The trigger conditions in this plan pertaining to TRWD's system volume were established following an intensive study of the North Texas climate and its impact on water supplies by Hydrosphere, an engineering firm based in Boulder, Colorado. The 2007 study projected the effects of simulated weather patterns on the combined storage capacity of TRWD reservoirs. Using computer simulations, Hydrosphere compared the water savings that would be achieved at various trigger points with and without outdoor watering restrictions in place. Under severe drought conditions, the estimated water savings that would be achieved by implementing this plan would extend water supplies by several weeks.

Termination of a Drought Stage

The General Manager will order the termination of a drought response stage or water emergency when the conditions for termination are met. The following actions will be taken when a drought stage is terminated:

- The designated representative(s) of primary wholesale customers will be notified by email, mail, telephone, or fax that provides details of the reasons for termination of the drought stage.
- The public will be notified through local media following the notification of primary wholesale customers.
- When mandatory provisions of the drought contingency plan that have been activated are terminated, TRWD will notify the Executive Director of the TCEQ within five business days.

Notwithstanding the foregoing, the General Manager may decide, under special circumstances, not to order the termination of a drought response stage or water emergency even though conditions for termination of the stage are met. Factors which could influence such a decision include, but are not limited to, the time of year, weather conditions, or the anticipation of potential changes in conditions that warrant the continuation of the drought stage.

11.5 Drought and Emergency Response Stages and Measures

Stage 1, Water Watch

Triggering and Terminating Conditions

- Total combined raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 75% (25% depleted) of conservation storage capacity.
- Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate.

- One or more of TRWD's water supply sources has become limited in availability.
- Water demand is projected to approach the limit of permitted supply.
- Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species).
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- The General Manager finds that conditions warrant the declaration of a Stage 1 drought.

Subject to preceding paragraphs regarding the Termination of a Drought Response stage, Stage 1, Water Watch, will be terminated when the total combined raw water supply in TRWD's West Fork and East Texas reservoirs exceeds 95% of conservation storage or remains above 85% for 90 consecutive days, whichever occurs first.

Goal for Use Reduction

The goal for water use reduction under Stage 1, Water Watch, is to decrease use by five percent. If circumstances warrant, the General Manager can set a goal for greater water use reduction.

Water Use Reduction Actions under Stage 1, Water Watch

The General Manager may order the implementation of any of the actions listed below, as deemed necessary. Measures imposing mandatory requirements on customers require notification to TCEQ. TRWD must notify TCEQ within five business days if any mandatory measures are implemented.

- Require customers (including indirect customers) to initiate Stage 1 in their drought contingency plans. Indirect customers include any successive wholesale customers of TRWD's primary wholesale customers to the extent provided for in water sales contracts.

All Water Users

- Maximum of twice per week watering for hose-end sprinklers and automatic irrigation systems based on odd/even addresses and day of week schedule.

Stage 1, Water Watch, Outdoor Watering Schedules		
Monday	No Outdoor Watering	Water System Recovery Day
Tuesday and Friday	Non-Residential Sites	Apartments, Parks, Common Areas, HOA's, Businesses
Wednesday and Saturday	Residential Addresses Ending in Even Numbers	0,2,4,6,8
Thursday and Sunday	Residential Addresses Ending in Odd Numbers	1,3,5,7,9

Exceptions:

- Watering with a handheld hose, soaker hose or drip irrigation may occur any day and any time.
- Watering of trees and structural foundations may occur any day and any time by means of handheld hose, soaker hose, or drip irrigation.
- The use of water necessary to protect the health, safety, or welfare of the public.
- Water use necessary for the repair of an irrigation system, plumbing line, fountain, etc. in the presence of person making repair.
- Variances may be available through the District for the following:
 - Establishing new turfgrass and/or landscaping. Variances granted for establishing new turfgrass or landscaping will be for a maximum of 30 days from the date of approval then maximum of twice per week watering schedule applies.
 - Variances do not apply to the installation (over seeding) of cool season grasses.
 - Outdoor watering at addresses with large multi-station irrigation systems may take place in accordance with a variance granted by the District, if the District determines that a property cannot be completely irrigated under the twice per week schedule. Under such variance, no irrigation station will be allowed to water more than twice per week.
 - Areas open to the public and have high-impact from frequent use may be allowed additional watering with a variance granted by the District if it is deemed to be beneficial to serve and protect the community facility or amenity.
 - Restrictions do not apply to locations using well water, reclaimed water, or other alternative water sources.
- No watering with hose-end sprinklers and/or automatic spray irrigation systems between the hours of 10 a.m. and 6 p.m.

- Prohibit using water in such a manner as to allow runoff or other waste, including:
 - failure to repair a controllable leak, including, broken sprinkler heads, leaking valves, leaking or broken pipes or faucets;
 - operating an irrigation system with: (a) a broken head; (b) a head that is out of adjustment and spraying into the street, parking area, or sidewalk; or (c) a system that is misting/fogging due to excessive water pressure; or
 - allowing any water to: (a) run off property forming a stream of water for a distance of 50 feet or greater; (b) run into a storm drain; or (c) pond to a depth of ¼ inch or greater; or
 - allowing or causing an irrigation system or other lawn watering device to operate during any form of precipitation or when temperatures are at or below 32 degrees Fahrenheit.
- All users are encouraged to use native and adapted drought tolerant plants in landscaping.
- Discourage hosing of paved areas.
- Discourage hosing of buildings or other structures for purposes other than fire protection or surface preparation prior to painting or maintenance.
- Washing of any motor vehicle, motorbike, boat, trailer, airplane, or other vehicle shall be limited to the use of a hand-held bucket or a hand-held hose equipped with a positive-pressure shutoff nozzle for quick rinses. Vehicle washing may be done at any time on the premises of a commercial car wash or commercial service station. Companies with automated on-site vehicle washing facilities may wash its vehicles at any time.
- Discourage the filling, draining, or refilling of swimming pools, wading pools, hot tubs and Jacuzzi type pools except to maintain adequate water levels for structural integrity, proper operation and maintenance, and/or to alleviate an issue that poses a public safety risk.

City and Local Governments

- Review conditions and problems that caused Stage 1. Take corrective action.
- Increase public education efforts on ways to reduce water use.
- Increase enforcement efforts.
- Intensify leak detection and repair efforts.
- Audit all city and local government irrigation systems to ensure proper condition, settings, and operation.
- Identify and encourage voluntary reduction measures by high-volume water users through water use audits.
- Landscape watering of municipal parks, golf courses and athletic fields is restricted to a twice per week watering schedule; or twice per week per irrigation station if a variance is granted by the Water District. (See exceptions to outdoor

watering restrictions in all water users category above for facilities with large multi-station irrigation systems.)

Exceptions:

- Golf courses may water greens and tee boxes as necessary, however, use of spray irrigation may not be done between 10 a.m. and 6 p.m. Encouraged to reduce water use by five percent.
- Watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events may occur as necessary to protect the health and safety of the players, staff, or officials present for athletic events. Encouraged to reduce water use by five percent.
- Reduce non-essential water use. As used herein, non-essential water uses are those that do not have a health or safety impact and are not needed to meet the core function of the agency.
- Notify wholesale customers of actions being taken and request them to implement the same drought stage and measures.

Commercial or Industrial

- All actions listed above for all water users apply to commercial and industrial users.
- Landscape watering of parks, golf courses and athletic fields is restricted to the twice per week watering schedule; or twice per week per irrigation station if a variance is granted by the water provider. (See exceptions to outdoor watering restrictions in all water users category above for facilities with large multi-station irrigation systems.)

Exceptions:

- Golf courses may water greens and tee boxes as necessary, however, use of spray irrigation may not be done between 10 a.m. and 6 p.m. Encouraged to reduce water use by five percent.
- Watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events may occur as necessary to protect the health and safety of the players, staff, or officials present for athletic events. Encouraged to reduce water use by 5 five percent.
- Stock at commercial plant nurseries is exempt from Stage 1 watering restrictions.
- Hotels, restaurants, and bars are encouraged to serve drinking water to patrons per request only.
- Hotels are encouraged to implement laundry conservation measures by encouraging patrons to reuse linens and towels.

- Car wash facilities must keep equipment in good working order, which should include regular inspections to be sure there are no leaks, broken or misdirected nozzles, and that all equipment is operating efficiently.
- All commercial and industrial customers are encouraged to audit irrigation systems to ensure proper condition, settings, and operation. If irrigation audit or repair occurs during restricted watering times or days, a sign indicating such work is taking place must be placed in public view until job is completed.

Stage 2, Water Warning

Triggering and Terminating Conditions

- Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity.
- Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate.
- One or more of TRWD's water supply sources has become limited in availability.
- Water demand is projected to approach the limit of permitted supply.
- Supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species).
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- The General Manager finds that conditions warrant the declaration of a Stage 2 drought.

Subject to preceding paragraphs regarding the Termination of a Drought Response stage, Stage 2, Water Warning, will be terminated when the Total combined raw water supply in TRWD's West Fork and East Texas reservoirs exceeds 75% of conservation storage or remains at or above 70% for 30 consecutive days, whichever occurs first.

Goal for Use Reduction

The goal for water use reduction under Stage 2, Water Warning, is to decrease use by 10 percent. If circumstances warrant, the General Manager can set a goal for greater water use reduction.

Water Use Reduction Actions under Stage 2, Water Warning

The General Manager may order the implementation of any of the actions listed below, as deemed necessary. Measures imposing mandatory requirements on customers require notification to TCEQ. TRWD must notify TCEQ within five business days if any mandatory measures are implemented.

- Continue actions under Stage 1.

- Require customers (including indirect customers) to initiate Stage 2 in their drought contingency plans. Indirect customers include any wholesale customer of TRWD's primary wholesale customers to the extent provided for in water sales contracts.
- Initiate engineering studies to evaluate water supply alternatives should conditions worsen.

All Water Users

- Maximum of once per week watering for hose-end sprinklers and automatic irrigation systems at each service address.
- An effort will be made by TRWD and its primary customers to coordinate once per week watering schedules to simplify messages passed to customers through the news media. However, due to the variation in water storage and delivery systems of TRWD customers, specific watering days per address may vary across TRWD's service area.

Exceptions:

- Watering with a handheld hose, soaker hose or drip irrigation may occur any day and any time.
- Watering of trees and structural foundations may occur any day and any time by means of handheld hose, soaker hose, or drip irrigation.
- Variances may be available through the District for the following:
 - All users are encouraged to wait until the current drought or emergency situation has passed before establishing new landscaping. Variances granted for establishing new turfgrass or landscaping will be for a maximum of 30 days from the date of approval then maximum of once-per-week watering schedule applies.
 - Variances do not apply to the installation (over seeding) of cool season grasses.
 - Outdoor watering at addresses with large multi-station irrigation systems may take place in accordance with a variance granted by the District, if the District determines that a property cannot be completely irrigated under the once per week schedule. Under such variance, no irrigation station will be allowed to water more than once per week.
 - Areas open to the public and have high-impact from frequent use may be allowed additional watering with a variance granted by the District if it is deemed to be beneficial to serve and protect the community facility or amenity.
 - Restrictions do not apply to well water, reclaimed water, or other alternative water sources.
- Encourage the use of covers for all types of pools, hot tubs, and Jacuzzi type pools when not in use.

City and Local Governments

In addition to the actions listed above:

- Continue actions under Stage 1.
- Review conditions or problems that caused Stage 2. Take corrective action.
- Increase frequency of media releases on water supply conditions.
- Further accelerate public education efforts on ways to reduce water use.
- Landscape watering of municipal parks, golf courses and athletic fields is restricted to a once-per-week schedule; or once-per-week per irrigation station if a variance is granted by the water provider. (See Stage 1 exceptions to outdoor watering restrictions in all water users category for facilities with large multi-station irrigation systems.)

Exceptions:

- Golf courses may water greens and tee boxes as necessary, however, use of spray irrigation may not be done between 10 a.m. and 6 p.m. Encouraged to reduce water use by ten percent.
- Watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events may occur as necessary to protect the health and safety of the players, staff, or officials present for athletic events. Encouraged to reduce water use by ten percent.
- Eliminate non-essential water use. As used herein, non-essential water uses are those that do not have any health or safety impact and are not needed to meet the core function of the agency.
- Notify wholesale customers of actions being taken and request them to implement the same drought stage and measures.

Commercial or Industrial

- All actions listed above for all water users apply to commercial and industrial users.
- Landscape watering of municipal parks, golf courses and athletic fields is restricted to a once-per-week schedule; or once-per-week per irrigation station if a variance is granted by the water provider. (See Stage 1 exceptions to outdoor watering restrictions in all water users category for rules that apply to facilities with large multi-station irrigation systems.)

Exceptions:

- Golf courses may water greens and tee boxes as necessary, however, use of spray irrigation may not be done between 10 a.m. and 6 p.m. Encouraged to reduce water use by ten percent.

- Watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events may occur as necessary to protect the health and safety of the players, staff, or officials present for athletic events. Encouraged to reduce water use by ten percent.

Stage 3, Water Emergency

Triggering and Terminating Conditions

- Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity.
- Water demand exceeds the amount that can be delivered to customers.
- Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate.
- One or more of TRWD's water supply sources has become limited in availability.
- Water demand is projected to approach the limit of permitted supply.
- Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species).
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- The General Manager finds that conditions warrant the declaration of a Stage 3 drought.

Subject to preceding paragraphs regarding the Termination of a Drought Response stage, Stage 3, Water Emergency, will be terminated when the total combined raw water supply in TRWD's West Fork and East Texas reservoirs exceeds 60% of conservation storage or remains at or above 55% for 30 consecutive days, whichever occurs first.

Goal for Use Reduction

The goal for water use reduction under Stage 3, Water Emergency, is to decrease use by 20 percent. If circumstances warrant, the General Manager can set a goal for greater water use reduction.

Actions Available under Stage 3, Water Emergency

The General Manager can order the implementation of any of the actions listed below, as deemed necessary. Measures imposing mandatory requirements on customers require notification to TCEQ. TRWD must notify TCEQ within five business days if these measures are implemented.

- Continue actions under Stages 1 and 2.

- Require customers (including indirect customers) to initiate Stage 3 in their drought contingency plans. Indirect customers include any wholesale customer of TRWD's primary wholesale customers to the extent provided for in water sales contracts. .

All Water Users

- Prohibit all outdoor watering with hose-end sprinklers and automatic irrigation systems, including at parks, golf courses, and sports fields.

Exceptions:

- Watering with hand-held hose, soaker hose or drip irrigation system may occur any day and any time.
- Watering of trees and structural foundations may occur any day and any time by means of handheld hose, soaker hose, or drip irrigation.
- Restrictions do not apply to well water, reclaimed water, or other alternative water sources.
- Irrigation of new landscapes and/or turfgrass installations is prohibited by means of automatic irrigation system or hose-end sprinkler. Variances may be granted for those landscape projects started prior to the initiation of stage 3 drought restrictions. However, variances will not be granted for the irrigation of new landscape and/or turfgrass installations after the initiation of Stage 3 drought restrictions.
- Prohibit washing of paved areas by any means except where a variance is granted to alleviate a possible public health and safety risk. Any pressure/power washing activities must be performed by a professional pressure/power washing service provider utilizing high efficiency equipment and a vacuum recovery system where possible.
- Prohibit hosing of buildings or other structures for purposes other than fire protection or surface preparation prior to painting with high-pressure equipment. Services must be performed by a professional pressure/power washing service provider utilizing high efficiency equipment and a vacuum recovery system where possible.
- Vehicle washing is restricted to commercial car washes, commercial service stations, or professional washing services only. This includes home and charity car washing. The washing of garbage trucks and vehicles used to transport food and/or other perishables may take place as necessary for health, sanitation, or public safety reasons.
- Prohibit permitting of private pools. Pools already permitted may be completed and filled. Existing private and public pools may add water to maintain pool levels, but may not be drained and refilled.
- Prohibit the operation of ornamental fountains or ponds that use potable water except where necessary to support aquatic life or water quality.

City and Local Governments

- Continue actions under Stages 1 and 2.
- Review conditions or problems that caused Stage 3. Take corrective action.
- Increase frequency of media releases explaining emergency situation and/or water supply conditions. .
- Landscape watering at municipal parks, golf courses, and sports fields is prohibited. Variances may be granted by the water provider under special circumstances.

Exceptions:

- Golf course greens and tee boxes may be watered by hand as necessary.
- Variances may be available for watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events to protect the health and safety of the players, staff, or officials present for the athletic event.
- Professional and college sports fields (playing fields with a stadium only – not surrounding landscaping) may be watered as necessary to maintain league standards.
- Institute a mandated reduction in deliveries to all wholesale customers. Such a reduction will be distributed as required by Texas Water Code §11.039.
- If TRWD has imposed a reduction in water available to customers, impose the same percent reduction on wholesale customers.

Commercial or Industrial

- All actions listed above for all water users apply to commercial and industrial users. Landscape watering of municipal parks, golf courses and athletic fields is prohibited. Variances may be granted by the water provider under special circumstances.

Exceptions:

- Golf course greens and tee boxes may be watered by hand, as necessary.
- Variances may be available for watering of athletic fields (field only, does not include surrounding landscaped areas) used for organized sports practice, competition, or exhibition events to protect the health and safety of the players, staff, or officials present for the athletic event.
- Professional and college sports fields (playing fields with a stadium only – not surrounding landscaping) may be watered as necessary to maintain league standards.
- Require hotels, restaurant, and bars to serve drinking water to patrons on an “on demand” basis.

- Require hotels to implement laundry conservation measures by encouraging patrons to reuse linens and towels.
- Stock at commercial plant nursery may be watered by hand only with a handheld hose, hand-held watering can, soaker hose, or drip irrigation system.
- Commercial and industrial water users may be required to reduce water use by a set percentage as determined by the Water District.

11.6 Procedure for Curtailment of Water Supplies

Any mandatory reduction to deliveries from TRWD to its customers shall be distributed as required by Texas Water Code §11.039, which is attached as Appendix I. In addition, every wholesale water supply contract entered into or renewed after adoption of this plan, including contract extensions, shall include a provision that water will be distributed in accordance with the Texas Water Code §11.039 in case of a water shortage resulting from drought.

To the extent not prevented by enforcement of provisions in the Water District's wholesale contracts in effect before November 28, 1999, TRWD will implement pro rata curtailment of water deliveries pursuant to Texas Water Code §11.039.

11.7 Procedure for Granting Variances to the Plan

The General Manager may grant temporary variances for existing water uses otherwise prohibited under this drought contingency plan to a customer if one or more of the following conditions are met:

- Failure to grant such a variance would cause an emergency condition adversely affecting health, sanitation, or fire safety for the public or the person requesting the variance.
- Compliance with this plan cannot be accomplished due to technical or other limitations.
- Alternative methods that achieve the same level of reduction in water use can be implemented.

Variances shall be granted or denied at the discretion of the General Manager. All petitions for variances should be in writing and should include the following information:

- Name and address of petitioner(s)
- Purpose of water use
- Specific provisions from which relief is requested
- Detailed statement of the adverse effect of the provision from which relief is requested
- Description of the relief requested
- Period of time for which the variance is sought

- Alternative measures that will be taken to reduce water use
- Other pertinent information.

11.8 Procedure for Enforcing Mandatory Water Restrictions

Water District customers (direct and indirect) shall provide TRWD with an order, ordinance, or resolution to demonstrate adequate enforcement provisions for the customer's own drought contingency plan.

Mandatory water use restrictions may be imposed in Stage 1, Stage 2, and Stage 3 drought stages. These mandatory water use restrictions will be enforced by warnings and penalties as follows:

- On the first violation, the customer will be given a written warning that they have violated one or more of the mandatory water use restrictions.
- After a second violation, TRWD will notify the customer of its intent to publish the name and contact phone numbers of any entity in violation of this water conservation and drought contingency plan in local print media and on its Web site. In addition, TRWD will require the customer to implement a more comprehensive public education and outreach program in a manner that increases the public's awareness about mandatory water use restrictions and the current drought status. The customer will also be required to submit documentation to TRWD of the steps it has taken to ensure compliance with this water conservation and drought contingency plan within 90 days after receiving the second notice of violation.
- TRWD may petition the Texas Commission on Environmental Quality to initiate formal enforcement action against customers that repeatedly fail to comply with the mandatory water use restrictions implemented during any stage of this water conservation and drought contingency plan.

11.9 Coordination with the Regional Water Planning Groups

Appendix H includes a copy of a letter sent to the Chair of the Region C water planning group with this water conservation and drought contingency plan.

11.10 Review and Update of Drought Contingency Plan

As required by TCEQ rules, TRWD reviewed this drought contingency plan in 2019 and will do so every five years thereafter. The plan will be updated as appropriate based on new or updated information.

11.11 Drought Contingency Plan Definitions

Term	Definition
Aesthetic Water Use	Water use for ornamental or decorative features, such as fountains, reflecting pools, and water gardens.
Alternative Water Source	Water produced by a source other than a water treatment plant and is not considered potable. These sources can include, but are not limited to: reclaimed/recycled water, collected rain water, collected grey water, private well water.
Athletic field	A sports playing field, the essential feature of which is turf grass, used primarily for organized sports for schools, professional sports, or sanctioned league play.
Automatic Irrigation System	A site specific system of delivering water generally for landscaping via a system of pipes or other conduits installed below ground that automatically cycles water use through water emitters to a preset program, whether on a designated timer or through manual operation.
Aquatic Life	A vertebrate organism dependent upon an aquatic environment to sustain its life.
Conservation	Those practices, techniques, and technologies that reduce water consumption; reduce the loss or waste of water; improve the efficiency in water use; and increase the recycling and reuse of water so that supply is conserved and made available for other or future uses.
Customer	Any person, company, or organization using water supplied by TRWD or through an entity supplied by TRWD.
Drip irrigation	An irrigation system (drip, porous pipe, etc.) that applies water at a predetermined controlled low-flow levels directly to the roots of the plant
Drought Contingency Plan	A strategy or combination of strategies for temporary supply management and demand management responses to temporary or potentially recurring water supply shortages and other water supply emergencies.

Term	Definition
Fountain	An artificially created jet, stream or flow of water, a structure, often decorative, from which a jet, stream or flow of water issues.
Golf Course	An irrigated and landscaped playing area made up of greens, tees, fairways, roughs and related areas used for the playing of golf.
Hand-held hose	A hose physically held by one person, fitted with a manual or automatic shutoff nozzle.
Hose-end Sprinkler	A device through which water flows from a hose to a sprinkler to water any lawn or landscape.
Hosing	To spray, water, or wash with a water hose.
Irrigation system	A system of fixed pipes and water emitters that apply water to landscape plants or turfgrass, including, but not limited to: in-ground and permanent irrigation systems.
Lake, lagoon, or pond	Artificially created body of fresh or salt water.
Landscape irrigation use	Water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, right-of-ways, medians and entry ways.
“New landscape”	A landscape: <ul style="list-style-type: none">a. Installed during construction of a new house, multi-family dwelling, or commercial building;b. Installed as part of a governmental entity’s capital improvement project; or Alters more than one-third the area of an existing landscape.

Term	Definition
Non-essential water use	<p>Water uses that are not required for the protection of public health, safety and welfare, such as:</p> <ul style="list-style-type: none">a. Irrigating landscape areas, including parks, athletic fields, and golf courses, except as otherwise provided under this plan;b. Washing any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas; except to alleviate a public health and safety issue;c. Washing any automobile, motorbike, boat (and/or trailer), airplane, or other vehicle except where required by law for safety and sanitary purposes.d. Washing buildings or structures for purposes other than immediate fire protection, or other uses provided under this plan;e. Filling, refilling, or adding to any swimming pools or Jacuzzi-type pools, except to maintain safe operating levels;f. Filling or operation of a fountain or pond for aesthetic or scenic purposes except when necessary to support aquatic life;g. Failure to repair a controllable leak within a reasonable time period after being directed to do so by formal notice; andh. Drawing from hydrants for construction purposes or any other purpose other than firefighting or protection of public drinking water supplies.
Park	<p>A non-residential or multifamily tract of land, other than a golf course, maintained by a city, private organization, or individual, as a place of beauty or public recreation and available for use to the general public.</p>
Power/Pressure washer	<p>A machine that uses water or a water-based product applied at high pressure to clean impervious surfaces.</p>
Power/Pressure washer (High-Efficiency)	<p>A machine that uses water or a water-based product applied at 1500 pounds per square inch (PSI) or greater.</p>

Term	Definition
Reclaimed Water	Municipal wastewater effluent that is given additional treatment and distributed for reuse in certain applications. Also referred to as recycled water.
Soaker hose	A flexible hose that is designed to slowly emit water across the entire length and connect directly to a flexible hose or spigot. Does not include hose that by design or use sends a fine spray in the air. It is not considered drip irrigation.
Structural Foundation	The lowest and supporting layer of a structure.
Swimming pool	Any structure, basin, chamber, or tank including hot tubs, containing an artificial body of water for swimming, diving, or recreational bathing, and having a depth of two (2) feet or more at any point.
Well Water	Water that has been, or is, obtained from the ground by digging, boring, or drilling to access an underground aquifer.

APPENDIX A
LIST OF REFERENCES

Appendix A
List of References

- (1) Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter A, Rules 288.1, 288.2 and 288.5, downloaded from [https://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=288&sch=A&rl=Y](https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=288&sch=A&rl=Y), May 2014.
- (2) Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter B, Rule 288.20 and 288.22, downloaded from [https://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=288&sch=B&rl=Y](https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=288&sch=B&rl=Y), May 2014.
- (3) Texas Water Development Board, Report 362, “Water Conservation Best Management Practices Guide,” Water Conservation Implementation Task Force, available online at: http://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R362_BMPGuide.pdf, November 2004.
- (4) North Central Texas Council of Governments, Regional Data Center, <http://data-nctcoggis.opendata.arcgis.com>, April 2019.
- (5) Texas Water Development Board Special Report and Water Conservation Implementation Task Force, Report to the 79th Legislature, http://www.twdb.texas.gov/conservation/resources/doc/WCITF_Leg_Report.pdf, November 2004.

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APPENDIX B

**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES
ON WATER CONSERVATION AND DROUGHT CONTINGENCY
PLANS FOR MUNICIPAL AND WHOLESALE WATER
PROVIDERS**

APPENDIX B

Texas Commission on Environmental Quality Rules on Water Conservation and Drought Contingency Plans for Wholesale Water Suppliers

Texas Administrative Code	
TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A	WATER CONSERVATION PLANS
RULE §288.1	Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

- (1) Agricultural or Agriculture--Any of the following activities:
 - (A) cultivating the soil to produce crops for human food, animal feed, or planting seed or for the production of fibers;
 - (B) the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or non-soil media by a nursery grower;
 - (C) raising, feeding, or keeping animals for breeding purposes or for the production of food or fiber, leather, pelts, or other tangible products having a commercial value;
 - (D) raising or keeping equine animals;
 - (E) wildlife management; and
 - (F) planting cover crops, including cover crops cultivated for transplantation, or leaving land idle for the purpose of participating in any governmental program or normal crop or livestock rotation procedure.
- (2) Agricultural use--Any use or activity involving agriculture, including irrigation.
- (3) Best management practices--Voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and that can be implemented within a specific time frame.
- (4) Conservation--Those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.
- (5) Commercial use--The use of water by a place of business, such as a hotel, restaurant, or office building. This does not include multi-family residences or agricultural, industrial, or institutional users.

- (6) Drought contingency plan--A strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s).
- (7) Industrial use--The use of water in processes designed to convert materials of a lower order of value into forms having greater usability and commercial value, and the development of power by means other than hydroelectric, but does not include agricultural use.
- (8) Institutional use--The use of water by an establishment dedicated to public service, such as a school, university, church, hospital, nursing home, prison or government facility. All facilities dedicated to public service are considered institutional regardless of ownership.
- (9) Irrigation--The agricultural use of water for the irrigation of crops, trees, and pastureland, including, but not limited to, golf courses and parks which do not receive water from a public water supplier.
- (10) Irrigation water use efficiency--The percentage of that amount of irrigation water which is beneficially used by agriculture crops or other vegetation relative to the amount of water diverted from the source(s) of supply. Beneficial uses of water for irrigation purposes include, but are not limited to, evapotranspiration needs for vegetative maintenance and growth, salinity management, and leaching requirements associated with irrigation.
- (11) Mining use--The use of water for mining processes including hydraulic use, drilling, washing sand and gravel, and oil field re-pressuring.
- (12) Municipal use--The use of potable water provided by a public water supplier as well as the use of sewage effluent for residential, commercial, industrial, agricultural, institutional, and wholesale uses.
- (13) Nursery grower--A person engaged in the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or nonsoil media, who grows more than 50% of the products that the person either sells or leases, regardless of the variety sold, leased, or grown. For the purpose of this definition, grow means the actual cultivation or propagation of the product beyond the mere holding or maintaining of the item prior to sale or lease, and typically includes activities associated with the production or multiplying of stock such as the development of new plants from cuttings, grafts, plugs, or seedlings.
- (14) Pollution--The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to the public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.
- (15) Public water supplier--An individual or entity that supplies water to the public for human consumption.

- (16) Residential use--The use of water that is billed to single and multi-family residences, which applies to indoor and outdoor uses.
- (17) Residential gallons per capita per day--The total gallons sold for residential use by a public water supplier divided by the residential population served and then divided by the number of days in the year.
- (18) Regional water planning group--A group established by the Texas Water Development Board to prepare a regional water plan under Texas Water Code, §16.053.
- (19) Retail public water supplier--An individual or entity that for compensation supplies water to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants when that water is not resold to or used by others.
- (20) Reuse--The authorized use for one or more beneficial purposes of use of water that remains unconsumed after the water is used for the original purpose of use and before that water is either disposed of or discharged or otherwise allowed to flow into a watercourse, lake, or other body of state-owned water.
- (21) Total use--The volume of raw or potable water provided by a public water supplier to billed customer sectors or nonrevenue uses and the volume lost during conveyance, treatment, or transmission of that water.
- (22) Total gallons per capita per day (GPCD)--The total amount of water diverted and/or pumped for potable use divided by the total permanent population divided by the days of the year. Diversion volumes of reuse as defined in this chapter shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.
- (23) Water conservation plan--A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s).
- (24) Wholesale public water supplier--An individual or entity that for compensation supplies water to another for resale to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants as an incident of that employee service or tenancy when that water is not resold to or used by others, or an individual or entity that conveys water to another individual or entity, but does not own the right to the water which is conveyed, whether or not for a delivery fee.
- (25) Wholesale use--Water sold from one entity or public water supplier to other retail water purveyors for resale to individual customers.

Source Note: The provisions of this §288.1 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective August 15, 2002, 27 TexReg 7146; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective January 10, 2008, 33 TexReg 193; amended to be effective December 6, 2012, 37 TexReg 9515

Texas Administrative Code

TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A	WATER CONSERVATION PLANS
RULE §288.2	Water Conservation Plans for Municipal Uses by Public Water Suppliers

-
- (a) A water conservation plan for municipal water use by public water suppliers must provide information in response to the following. If the plan does not provide information for each requirement, the public water supplier shall include in the plan an explanation of why the requirement is not applicable.
- (1) Minimum requirements. All water conservation plans for municipal uses by public water suppliers must include the following elements:
- (A) a utility profile in accordance with the Texas Water Use Methodology, including, but not limited to, information regarding population and customer data, water use data (including total gallons per capita per day (GPCD) and residential GPCD), water supply system data, and wastewater system data;
 - (B) a record management system which allows for the classification of water sales and uses into the most detailed level of water use data currently available to it, including, if possible, the sectors listed in clauses (i) - (vi) of this subparagraph. Any new billing system purchased by a public water supplier must be capable of reporting detailed water use data as described in clauses (i) - (vi) of this subparagraph:
 - (i) residential;
 - (I) single family;
 - (II) multi-family;
 - (ii) commercial;
 - (iii) institutional;
 - (iv) industrial;
 - (v) agricultural; and,
 - (vi) wholesale.
 - (C) specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in total GPCD and residential GPCD. The goals established by a public water supplier under this subparagraph are not enforceable;

- (D) metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply;
 - (E) a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement;
 - (F) measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.);
 - (G) a program of continuing public education and information regarding water conservation;
 - (H) a water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water;
 - (I) a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies; and
 - (J) a means of implementation and enforcement which shall be evidenced by:
 - (i) a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the water supplier; and
 - (ii) a description of the authority by which the water supplier will implement and enforce the conservation plan; and
 - (K) documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.
- (2) Additional content requirements. Water conservation plans for municipal uses by public drinking water suppliers serving a current population of 5,000 or more and/or a projected population of 5,000 or more within the next ten years subsequent to the effective date of the plan must include the following elements:
- (A) a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system;
 - (B) a requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.
- (3) Additional conservation strategies. Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements

in paragraphs (1) and (2) of this subsection, if they are necessary to achieve the stated water conservation goals of the plan. The commission may require that any of the following strategies be implemented by the water supplier if the commission determines that the strategy is necessary to achieve the goals of the water conservation plan:

- (A) conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
 - (B) adoption of ordinances, plumbing codes, and/or rules requiring water-conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;
 - (C) a program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;
 - (D) reuse and/or recycling of wastewater and/or graywater;
 - (E) a program for pressure control and/or reduction in the distribution system and/or for customer connections;
 - (F) a program and/or ordinance(s) for landscape water management;
 - (G) a method for monitoring the effectiveness and efficiency of the water conservation plan; and
 - (H) any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.
- (b) A water conservation plan prepared in accordance with 31 TAC §363.15 (relating to Required Water Conservation Plan) of the Texas Water Development Board and substantially meeting the requirements of this section and other applicable commission rules may be submitted to meet application requirements in accordance with a memorandum of understanding between the commission and the Texas Water Development Board.
- (c) A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan every five years to coincide with the regional water planning group.

Source Note: The provisions of this §288.2 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective December 6, 2012, 37 TexReg 9515

	Texas Administrative Code
<u>TITLE 30</u>	ENVIRONMENTAL QUALITY
<u>PART 1</u>	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
<u>CHAPTER 288</u>	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
<u>SUBCHAPTER A</u>	WATER CONSERVATION PLANS
<u>RULE §288.5</u>	Water Conservation Plans for Wholesale Water Suppliers

A water conservation plan for a wholesale water supplier must provide information in response to each of the following paragraphs. If the plan does not provide information for each requirement, the wholesale water supplier shall include in the plan an explanation of why the requirement is not applicable.

- (1) Minimum requirements. All water conservation plans for wholesale water suppliers must include the following elements:
 - (A) a description of the wholesaler's service area, including population and customer data, water use data, water supply system data, and wastewater data;
 - (B) specific, quantified five-year and ten-year targets for water savings including, where appropriate, target goals for municipal use in gallons per capita per day for the wholesaler's service area, maximum acceptable water loss, and the basis for the development of these goals. The goals established by wholesale water suppliers under this subparagraph are not enforceable;
 - (C) a description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply;
 - (D) a monitoring and record management program for determining water deliveries, sales, and losses;
 - (E) a program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system;
 - (F) a requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of this chapter. If the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter;

- (G) a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plans shall include optimization of water supplies as one of the significant goals of the plan;
 - (H) a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan; and
 - (I) documentation of coordination with the regional water planning groups for the service area of the wholesale water supplier in order to ensure consistency with the appropriate approved regional water plans.
- (2) Additional conservation strategies. Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of paragraph (1) of this section, if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:
- (A) conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
 - (B) a program to assist agricultural customers in the development of conservation pollution prevention and abatement plans;
 - (C) a program for reuse and/or recycling of wastewater and/or graywater; and
 - (D) any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.
- (3) Review and update requirements. The wholesale water supplier shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. A wholesale water supplier shall review and update the next revision of its water conservation plan every five years to coincide with the regional water planning group.

Source Note: The provisions of this §288.5 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective December 6, 2012, 37 TexReg 9515

	Texas Administrative Code
TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER B	DROUGHT CONTINGENCY PLANS
RULE §288.20	Drought Contingency Plans for Municipal Uses by Public Water Suppliers

(a) A drought contingency plan for a retail public water supplier, where applicable, must include the following minimum elements.

- (1) Minimum requirements. Drought contingency plans must include the following minimum elements.
 - (A) Preparation of the plan shall include provisions to actively inform the public and affirmatively provide opportunity for public input. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.
 - (B) Provisions shall be made for a program of continuing public education and information regarding the drought contingency plan.
 - (C) The drought contingency plan must document coordination with the Regional Water Planning Groups for the service area of the retail public water supplier to insure consistency with the appropriate approved regional water plans.
 - (D) The drought contingency plan must include a description of the information to be monitored by the water supplier, and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.
 - (E) The drought contingency plan must include drought or emergency response stages providing for the implementation of measures in response to at least the following situations:
 - (i) reduction in available water supply up to a repeat of the drought of record;
 - (ii) water production or distribution system limitations;
 - (iii) supply source contamination; or
 - (iv) system outage due to the failure or damage of major water system components (e.g., pumps).
 - (F) The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and

drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.

- (G) The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:
 - (i) curtailment of non-essential water uses; and
 - (ii) utilization of alternative water sources and/or alternative delivery mechanisms with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).
 - (H) The drought contingency plan must include the procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.
 - (I) The drought contingency plan must include procedures for granting variances to the plan.
 - (J) The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions, including specification of penalties (e.g., fines, water rate surcharges, discontinuation of service) for violations of such restrictions.
- (2) Privately-owned water utilities. Privately-owned water utilities shall prepare a drought contingency plan in accordance with this section and incorporate such plan into their tariff.
 - (3) Wholesale water customers. Any water supplier that receives all or a portion of its water supply from another water supplier shall consult with that supplier and shall include in the drought contingency plan appropriate provisions for responding to reductions in that water supply.
- (b) A wholesale or retail water supplier shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan.
 - (c) The retail public water supplier shall review and update, as appropriate, the drought contingency plan, at least every five years, based on new or updated information, such as the adoption or revision of the regional water plan.

Source Note: The provisions of this §288.20 adopted to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384

Texas Administrative Code

<u>TITLE 30</u>	ENVIRONMENTAL QUALITY
<u>PART 1</u>	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
<u>CHAPTER 288</u>	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
<u>SUBCHAPTER B</u>	DROUGHT CONTINGENCY PLANS
RULE §288.22	Drought Contingency Plans for Wholesale Water Suppliers

- (a) A drought contingency plan for a wholesale water supplier must include the following minimum elements.
- (1) Preparation of the plan shall include provisions to actively inform the public and to affirmatively provide opportunity for user input in the preparation of the plan and for informing wholesale customers about the plan. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.
 - (2) The drought contingency plan must document coordination with the regional water planning groups for the service area of the wholesale public water supplier to insure consistency with the appropriate approved regional water plans.
 - (3) The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.
 - (4) The drought contingency plan must include a minimum of three drought or emergency response stages providing for the implementation of measures in response to water supply conditions during a repeat of the drought-of-record.
 - (5) The drought contingency plan must include the procedures to be followed for the initiation or termination of drought response stages, including procedures for notification of wholesale customers regarding the initiation or termination of drought response stages.
 - (6) The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this paragraph are not enforceable.
 - (7) The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:
 - (A) pro rata curtailment of water deliveries to or diversions by wholesale water customers as provided in Texas Water Code, §11.039; and

- (B) utilization of alternative water sources with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).
- (8) The drought contingency plan must include a provision in every wholesale water contract entered into or renewed after adoption of the plan, including contract extensions, that in case of a shortage of water resulting from drought, the water to be distributed shall be divided in accordance with Texas Water Code, §11.039.
- (9) The drought contingency plan must include procedures for granting variances to the plan.
- (10) The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions including specification of penalties (e.g., liquidated damages, water rate surcharges, discontinuation of service) for violations of such restrictions.
- (b) The wholesale public water supplier shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan.
- (c) The wholesale public water supplier shall review and update, as appropriate, the drought contingency plan, at least every five years, based on new or updated information, such as adoption or revision of the regional water plan.

Source Note: The provisions of this §288.22 adopted to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384

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APPENDIX C
TARRANT REGIONAL WATER DISTRICT WHOLESALE PUBLIC
WATER SUPPLIER UTILITY PROFILE

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

CONTACT INFORMATION

Name of Utility: Tarrant Regional WD

Public Water Supply Identification Number (PWS ID):

Certificate of Convenience and Necessity (CCN) Number:

Surface Water Right ID Number: 3375-A, 3379, 3808-B, 3809-C, 3810-A, 3811, 3812, 3813, 4976-D, 5035-D, 5157-A, 5589, 5688, 5806, 12735

Wastewater ID Number:

Contact: First Name: Dustan Last Name: Compton

Title: Regional Conservation Manager

Address: 800 East Northside Dr. City: Fort Worth State: TX

Zip Code: 76102 Zip+4: Email: dustan.compton@trwd.com

Telephone Number: 8177204358 Date: 5/1/2019

Is this person the designated Conservation Coordinator? ☒ Yes ☐ No

Regional Water Planning Group: C

Groundwater Conservation District:

Our records indicate that you:

☒ Received financial assistance of \$500,000 or more from TWDB

☒ Have a surface water right with TCEQ

A. Population and Service Area Data

1. Current service area size in square miles: 5,891

Attached file(s):

File Name	File Description
TRWD Service Area Final.jpg	TRWD Service Area

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

2. Historical service area population for the previous five years, starting with the most current year.

Year	Historical Population Served By Wholesale Water Service
2018	1,997,976
2017	1,986,266
2016	1,910,909
2015	1,865,226
2014	1,873,139

3. Projected service area population for the following decades.

Year	Projected Population Served By Wholesale Water Service
2020	2,388,293
2030	2,869,306
2040	3,312,374
2050	3,753,214
2060	4,238,882

4. Described source(s)/method(s) for estimating current and projected populations.

Population served for the previous five years was estimated based on data published by the North Central Texas Council of Governments (NCTCOG). NCTCOG provides estimated population by city for each year. Some of the communities within TRWD's service area do not purchase 100% of their water from TRWD, as they have supplemental water supply sources (i.e., groundwater). In these cases, only that portion of the population which is supplied by TRWD was included in the total population served. One example of this is North Richland Hills, which purchased approximately 63% of its raw water from TRWD in 2018, and obtained the remaining 37% from supplemental sources. In this case, only 63% of the total population for North Richland Hills listed in the NCTCOG report was included in the calculated population served for 2018. Projected decadal populations for 2020 through 2060 were obtained from projections developed for the 2021 Region C Water Plan.

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

B. System Input

System input data for the previous five years.

Total System Input = Self-supplied + Imported

Year	Water Produced in Gallons	Purchased/Imported Water in Gallons	Total System Input	Total GPD
2018	132,755,386,033	0	132,755,386,033	363,713,386
2017	124,889,450,424	0	124,889,450,424	342,162,878
2016	104,033,790,551	0	104,033,790,551	285,024,084
2015	127,582,250,503	0	127,582,250,503	349,540,412
2014	110,080,265,414	0	110,080,265,414	301,589,768
Historic Average	119,868,228,585	0	119,868,228,585	328,406,106

C. Water Supply System

Attached file(s):

File Name	File Description
TRWD Water Supply System Description.pdf	TRWD Water Supply System Description

1. Designed daily capacity of system in gallons
2. Storage Capacity
 - 2a. Elevated storage in gallons:
 - 2b. Ground storage in gallons:

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

D. Projected Demands

1. The estimated water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

Year	Population	Water Demand (gallons)
2020	2,388,293	160,461,414,738
2021	2,436,394	163,255,847,744
2022	2,484,496	166,050,280,750
2023	2,532,897	168,844,713,755
2024	2,580,698	171,639,146,761
2025	2,628,800	174,433,579,767
2026	2,676,901	177,228,012,773
2027	2,725,002	180,022,445,779
2028	2,773,103	182,816,878,784
2029	2,821,205	185,611,311,790

2. Description of source data and how projected water demands were determined.

The population projections were calculated from the actual 2018 population determined based on NCTCOG data, as well as the population projections for 2020 and 2030 from the 2021 Region C population data. The population for each year was linearly interpolated between these three years of known data.

The water demand projections were calculated using the same methodology.

E. High Volume Customers

1. The annual water use for the five highest volume
RETAIL customers.

Customer	Water Use Category	Annual Water Use	Treated or Raw
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2. The annual water use for the five highest volume
WHOLESALE customers.

Customer	Water Use Category	Annual Water Use	Treated or Raw
City of Fort Worth	Municipal	71,026,068,321	Raw
City of Arlington	Municipal	19,394,325,669	Raw
Trinity River Authority	Municipal	10,820,860,008	Raw
City of Mansfield	Municipal	4,979,980,833	Raw
Calpine/Freestone	Industrial	1,672,919,034	Raw

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

F. Utility Data Comment Section

Additional comments about utility data.

Section II: System Data

A. Wholesale Water Supplier Connections

1. List of active wholesale connections by major water use category.

Water Use Category Type	Total Wholesale Connections (Active + Inactive)	Percent of Total Connections
Municipal	27	50.94 %
Industrial	9	16.98 %
Commercial	0	0.00 %
Institutional	17	32.08 %
Agricultural	0	0.00 %
Total	53	100.00 %

2. Net number of new wholesale connections by water use category for the previous five years.

	Net Number of New Wholesale Connections					
Year	Municipal	Industrial	Commercial	Institutional	Agricultural	Total
2018	0	0	0	0	0	0
2017	0	0	0	0	0	0
2016	0	0	0	0	0	0
2015	0	0	0	0	0	0
2014	0	0	0	0	0	0

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

B. Accounting Data

For the previous five years, the number of gallons of WHOLESALE water exported (sold or transferred) to each major water use category.

Year	Municipal	Industrial	Commercial	Institutional	Agricultural	Total
2018	113,625,749,000	3,500,782,772	0	399,847,653	0	117,526,379,425
2017	109,117,544,900	2,690,684,877	0	279,918,678	0	112,088,148,455
2016	106,809,304,500	3,983,508,674	0	265,720,668	0	111,058,533,842
2015	107,151,524,500	4,066,834,741	0	402,789,821	0	111,621,149,062
2014	111,859,068,981	3,740,830,597	0	451,949,289	0	116,051,848,867

C. Annual and Seasonal Water Use

1. The previous five years' gallons of treated water provided to WHOLESALE customers.

Month	Total Gallons of Treated Water				
	2018	2017	2016	2015	2014
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					0
Total					0

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

2. The previous five years' gallons of raw water provided to WHOLESALE customers.

Month	Total Gallons of Raw Water				
	2018	2017	2016	2015	2014
January	8,200,526,527	6,884,925,854	7,259,760,483	6,857,607,024	7,044,929,071
February	6,275,074,983	6,671,249,693	7,310,563,181	6,067,978,647	6,413,048,789
March	7,618,374,970	8,363,186,199	7,870,594,235	6,963,099,592	8,322,203,667
April	8,538,918,213	8,383,713,144	7,979,957,004	7,327,892,850	8,780,398,385
May	11,067,683,453	10,960,531,915	8,127,381,552	6,970,214,505	10,229,881,658
June	13,704,696,892	10,302,914,462	10,244,135,702	9,501,995,367	10,433,968,672
July	16,267,148,029	12,057,711,206	13,512,939,501	13,655,078,979	12,506,626,237
August	14,435,012,589	10,889,639,070	12,884,136,221	16,239,363,050	14,116,888,599
September	9,506,071,808	11,698,125,395	11,180,744,129	13,439,352,517	11,953,121,182
October	7,948,335,962	9,743,819,384	10,251,810,979	11,079,999,891	10,803,434,492
November	7,067,581,888	8,548,978,282	7,918,364,139	7,197,324,564	7,971,980,365
December	6,896,954,345	7,583,353,877	6,518,146,708	6,321,094,124	7,475,367,760
Total	117,526,379,659	112,088,148,481	111,058,533,834	111,621,001,110	116,051,848,877

3. Summary of seasonal and annual water use.

	Summer WHOLESALE (Treated + Raw)	Total WHOLESALE (Treated + Raw)
2018	44,406,857,510	117,526,379,659
2017	33,250,264,738	112,088,148,481
2016	36,641,211,424	111,058,533,834
2015	39,396,437,396	111,621,001,110
2014	37,057,483,508	116,051,848,877
Average in Gallons	38,150,450,915.20	113,669,182,392.20

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

D. Water Loss

Water Loss data for the previous five years.

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2018	6,637,769,302	9	5.00 %
2017	6,244,472,521	9	5.00 %
2016	5,201,689,528	7	5.00 %
2015	6,379,112,525	9	5.00 %
2014	5,504,013,271	8	5.00 %
Average	5,993,411,429	8	5.00 %

E. Peak Day Use

Average Daily Water Use and Peak Day Water Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Ratio (peak/avg)
2018	321,990,081	482683233	1.4991
2017	307,090,817	361415921	1.1769
2016	304,269,955	398274037	1.3089
2015	305,810,961	428222145	1.4003
2014	317,950,270	402798733	1.2669

F. Summary of Historic Water Use

Water Use Category	Historic Average	Percent of Connections	Percent of Water Use
Municipal	109,712,638,376	50.94 %	96.52 %
Industrial	3,596,528,332	16.98 %	3.16 %
Commercial	0	0.00 %	0.00 %
Institutional	360,045,221	32.08 %	0.32 %
Agricultural	0	0.00 %	0.00 %

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

G. System Data Comment Section

Section II. D Water Loss - The AWWA Water Audit worksheet has been used in the past to estimate water losses from the TRWD system. Due to the enclosed nature of the system, and the limited points of connection, water losses typically seen by municipalities do not regularly occur. Because of this, when completing the AWWA form, the water losses calculated are largely influenced by the estimated meter error entered as part of the input data. The approximate meter error typically assumed for the TRWD system is +/- 5%.

Section II.E Peak Day Use - TRWD does not respond to daily fluctuations in demand. Typically, changes in pumping rates are made monthly, or even less frequently. Individual water treatment plants served by TRWD react to meet instantaneous changes in demand. There are points within the TRWD system that provide flexibility in responding to daily changes in demand. These include balancing reservoirs, storage tanks, and terminal storage reservoirs.

Section III: Wastewater System Data

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s) in gallons per day:

2. List of active wastewater connections by major water use category.

Water Use Category	Metered	Unmetered	Total Connections	Percent of Total Connections
Municipal			0	0.00 %
Industrial			0	0.00 %
Commercial			0	0.00 %
Institutional			0	0.00 %
Agricultural			0	0.00 %
Total			0	100.00 %

3. Percentage of water serviced by the wastewater system:

 %

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

4. Number of gallons of wastewater that was treated by the utility for the previous five years.

Month	Total Gallons of Treated Water				
	2018	2017	2016	2015	2014
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

5. Could treated wastewater be substituted for potable water?

☐ Yes
 ☐ No

B. Reuse Data

1. Data by type of recycling and reuse activities implemented during the current reporting period.

Type of Reuse	Total Annual Volume (in gallons)
On-site Irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (park,golf courses)	
Agricultural	
Discharge to surface water	
Evaporation Pond	
Other	8,296,990,000
Total	8,296,990,000

UTILITY PROFILE FOR WHOLESALE WATER SUPPLIER

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APPENDIX D

**TCEQ WATER CONSERVATION
IMPLEMENTATION REPORT**



WATER CONSERVATION IMPLEMENTATION REPORT FORM AND SUMMARY OF UPDATES/REVISIONS TO WATER CONSERVATION PLAN

(Texas Water Code §11.1271(b) and Title 30 Texas Administrative Code §288.30(1) to (4))

Please note, this form replaces the following forms: TCEQ-20645 (Non-Public Water Suppliers) and TCEQ-20646 (Public Water Suppliers)

This Form is applicable to the following entities:

1. Water Right Holders of 1,000 acre-feet or more for municipal, industrial, and other non-irrigation uses.
2. Water Right Holders of 10,000 acre-feet or more for irrigation uses.

The above noted entities are required by rule to submit updates to their water conservation plan(s) and water conservation implementation report(s) every five years. The most current five-year submittal deadline is May 1st, 2019. See 30 Texas Administrative Code (TAC) §288.30(1) to (4). Entities must also submit any revisions to their water conservation plan within 90 days of adoption when the plans are revised in between the five-year submittal deadlines. This form may be used for the five-year submittal or when revisions are made to the water conservation plans in the interim periods between five-year submittals. Please complete the form as directed below.

1. Water Right Holder Name: Tarrant Regional Water District
2. Water Right Permit or Certificate Nos. Certificates of Adjudication Nos. 08-3808 (Lake Bridgeport), 08-3809 (Eagle Mountain Lake) 08-4796 (Cedar Creek Reservoir) and 08-5035 (Richland Chambers Reservoir) as well as Permit 5157 (Lake Benbrook)
3. Please Indicate by placing an 'X' next to all that Apply to your Entity:

Water Right Holder of 1,000 acre-feet or more for non-irrigation uses

- ☐ Municipal Water Use by Public Water Supplier
☒ Wholesale Public Water Supplier
☐ Industrial Use
☐ Mining Use
☐ Agriculture Non-Irrigation

Water Right Holder of 10,000 acre-feet or more for irrigation uses

- ☐ Individually-Operated Irrigation System
☐ Agricultural Water Suppliers Providing Water to More Than One User

Water Conservation Implementation Reports/Annual Reports

4. Water Conservation Annual Reports for the previous five years were submitted to the Texas Water Development Board (TWDB) for each of the uses indicated above as required by 30 TAC §288.30(10)(C)? Yes ☒ No ☐

TCEQ no longer requires submittal of the information contained in the detailed implementation report previously required in Forms TCEQ-20645 (Non-Public Water Suppliers) and TCEQ-20646 (Public Water Suppliers). However, the Entity must be up-to-date on its Annual Report Submittals to the TWDB.

Water Conservation Plans

5. For the five-year submittal (or for revisions between the five-year submittals), attach your updated or revised Water Conservation Plan for each of the uses indicated in Section 3, above. Every updated or revised water conservation plan submitted must contain each of the minimum requirements found in the TCEQ rules and must be duly adopted by the entity submitting the water conservation plan. Please include evidence that each water conservation plan submitted has been adopted.
- Rules on minimum requirements for Water Conservation Plans can be found in 30 TAC 288.
http://texreg.sos.state.tx.us/public/readtac%24ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288
 - Forms which include the minimum requirements and other useful information are also available to assist you. Visit the TCEQ webpage for Water Conservation Plans and Reports. https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/conserve.html

Call 512-239-4691 or email to wcp@tceq.texas.gov for assistance with the requirements for your water conservation plan(s) and report(s).

6. For each Water Conservation Plan submitted, state whether the five and ten-year targets for water savings and water loss were met in your *previous* water conservation plan.
Yes ☒ No ☐

If the targets were not met, please provide an explanation.

7. For each five-year submittal, does each water conservation plan submitted contain *updated* five and ten-year targets for water savings and water loss?
Yes ☒ No ☐

If yes, please identify where in the water conservation plan the updated targets are located (page, section).

Chapter 4 on page 4-4

8. In the box below (or in an attachment titled "Summary of Updates or Revisions to Water Conservation Plans), please identify any other revisions/updates made to each water conservation plan that is being updated or revised. Please specify the water conservation plan being updated and the location within the plan of the newly adopted updates or revisions.

Minor updates are provided in Chapter 3 "Description of TRWD Service Area" to reflect current pumping capacity, addition of major pipeline, and customers and Chapter 6 "Other Required Measures" related to reservoir system operations and inclusion of the integrated pipeline.

Chapter 8 "Additional TRWD Water Conservation Measures" includes revisions and inclusions of previous and new public outreach programs.

9. Form Completed by (Point of Contact): Dustan Compton
(If different than name listed above, owner and contact may be different individual(s)/entities)
- Contact Person Title/Position: Dustan Compton/Regional Conservation Manager
- Contact Address: 800 East Northside Dr., Fort Worth, TX 76102
- Contact Phone Number: 817-720-4358 Contact Email Address: dustan.compton@trwd.com

Signature: 

Date: 5/1/19

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APPENDIX E

ANNUAL WATER CONSERVATION REPORTS SUBMITTED TO TEXAS WATER DEVELOPMENT BOARD

Water Conservation Plan Annual Report Wholesale Water Supplier

CONTACT INFORMATION

Name of Utility: Tarrant Regional WD

Public Water Supply Identification Number (PWS ID):

Certification of Convenience and Necessity (CCN) Number:

Surface Water Right ID Number: 3375-A, 3379, 3808-B, 3809-C, 3810-A, 3811, 3812, 3813, 4976-D, 5035-D, 5157-A, 5589, 5688, 5806, 12735

Wastewater ID Number:

Check all that apply:

- ☐ Retail Water Supplier
☒ Wholesale Water Supplier
☐ Wastewater Treatment Utility

Address: 800 E. Northside Dr. City: Fort Worth Zip Code: 76102

Email: dustan.compton@trwd.com Telephone Number: 8177204358

Regional Water Planning Group: C

Groundwater Conservation District:

Contact: First Name: Dustan Last Name: Compton

Title: Regional Conservation Manager

Is this person the designated Conservation Coordinator? ☒ Yes ☐ No

Regional Water Planning Group: C

Groundwater Conservation District:

Reporting Period (Calendar year):

Period Begin (mm/yyyy): 01/2018 Period End (mm/yyyy): 12/2018

Check all that apply:

- ☒ Received financial assistance of \$500,000 or more from TWDB
☒ Have a surface water right with TCEQ

SYSTEM DATA

1. For this reporting period, provide the total volume of wholesale water exported (transferred or sold):

117,526,379,425

2. For this reporting period, does your billing/accounting system have the capability to classify customer into the Wholesale Customer Categories?

☒ Yes ☐ No

Wholesale Customers Categories*

- Municipal
- Industrial
- Commercial
- Institutional
- Agricultural

**Recommended Customer Categories for classifying customer water use. For definitions, refer to [Guidance and Methodology on Water Conservation and Water Use](#).*

3. For this reporting period, select the category(s) used to calculate wholesale customer water usage:

- ☒ Municipal
- ☒ Industrial
- ☐ Commercial
- ☒ Institutional
- ☐ Agricultural

4. For this reporting period, enter the gallons of **WHOLESALE water exported** (transferred or sold). Enter zero if a Customer Category does not apply.

Wholesale Customer Category	Gallons ¹ Exported (transferred or sold)	Number of Customers
Municipal	113,625,749,000	27
Industrial	3,500,782,772	9
Commercial	0	0
Institutional	399,847,653	17
Agricultural	0	0
Total Gallons¹	117526379425	53

¹Municipal + Industrial + Commercial + Institutional + Agricultural = Wholesale Water Exported

Water Use Accounting

	Total Gallons During the Reporting Period
Water Produced: Water from permitted sources such as rivers, lakes, streams, and wells	132,755,386,033
Wholesale Water Imported: Purchased wholesale water transferred into the system.	0
System Input: Total water supplied to system and available for use. Produced + Imported = System Input	132,755,386,033
Wholesale Water Exported: Wholesale water sold or transferred out of the system.	117,526,379,425
Gallons Per Day: Wholesale Water Exported / 365 = Gallons Per Day	321,990,081
Population: Estimated total population for municipal customers.	1,997,976
Gallons Per Capita Per Day: Wholesale Exported / Population / 365 = Gallons Per Capita Per Day	161

Provide the breakdown of Wholesale Water Exported into Raw and Treated water volumes.

	Gallons
Raw Wholesale Water Exported	117,526,379,425
Treated Wholesale Water Exported	0

Provide the specific and quantified five and ten-year targets as listed in your most current Water Conservation Plan.

	Date to Achieve Target	Specified and Quantified Targets
Five-year target	2019	166 gpcd
Ten-year target	2024	158 gpcd

Water Conservation Programs and Activities

1. Water Conservation Plan.

2014

What year did your entity adopt or revise their most recent Water Conservation Plan?

Does The Plan incorporate **Best Management Practices**?

☒ Yes

☐ No

2. Water Conservation Programs

Has your entity implemented any type of water conservation activity or program?

☒ Yes

☐ No

If yes, select the type(s) of Best Management Practices or water conservation strategies implemented during this reporting period.

	Wholesale Supplier Activities and Practices
<input type="checkbox"/>	Agricultural Conservation Programs
<input checked="" type="checkbox"/>	Conservation Analysis & Planning
<input type="checkbox"/>	Conservation Rate Structures
<input type="checkbox"/>	Conservation Technology
<input checked="" type="checkbox"/>	Education & Public Awareness
<input type="checkbox"/>	Industrial Conservation Programs
<input type="checkbox"/>	Leak Detection/Water Loss Program
<input type="checkbox"/>	Rebate, Retrofit, and Incentive Programs
<input type="checkbox"/>	Regulatory & Enforcement
<input checked="" type="checkbox"/>	System Operations
<input checked="" type="checkbox"/>	Water Efficient Landscape Programs
<input checked="" type="checkbox"/>	Water Use Audits
<input type="checkbox"/>	Other

3. Recycle/Reuse (Water or Wastewater Effluent)

For this reporting period, provide direct and indirect reuse activities.

Reuse Activity	Estimated Volume (in gallons)
On-site irrigation	0
Plant wash down	0
Chlorination/de-chlorination	0
Industrial	0
Landscape irrigation (parks, golf courses)	0
Agricultural	0
Other	8,296,990,000
Estimated Volume of Reuse	8,296,990,000

The total indirect reuse for wetlands diversion to Richland-Chambers Reservoir was 8,296,990,000 gallons in 2018.

4. Water Savings

For this reporting period, estimate the savings that resulted from water conservation activities and programs.

Estimated Gallons Saved/Conserved	Estimated Gallons Recycled/Reused	Total Volume of Water Saved ¹	Dollar Value of Water Saved ²
38,572,937,976	8,296,990,000	46,869,927,976	48,601,902

¹Estimated Gallons Saved + Estimated Gallons Recycled/Reused = Total Volume Saved

²Estimated this value by taking into account water savings, the cost of treatment or purchase of water, and deferred capital cost due to conservation.

5. Program Effectiveness

In your opinion, how would you rank the overall effectiveness of your conservation programs and activities?

Less Than Effective	Somewhat Effective	Highly Effective	Does Not Apply
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

6. What might your entity do to improve the effectiveness of your water conservation program?

Expand public education and outreach, promote weekly watering advice, increase adoption of water use ordinances among our customer cities, and work with customers to develop and support conservation programs for their communities.

Note: Institutional water use consists of water use of our irrigation customers, primarily golf courses. None of the use in this category can be classified as agriculture use because it is not used for the cultivation of crops.

Conservation savings based on internal regression model of TRWD's annual water use. It compares estimated demands that would have occurred without conservation versus actual demands. Dollar value of water saved does not take into account deferred capital costs. It represents the value of the estimated gallons conserved - if it were to be pumped, sold and consumed at a rate of \$1.26 per 1,000 gallons sold. We are currently updating the conservation savings model with a consultant and anticipate the savings to be more accurate in t

7. Select the areas for which you would like to receive more technical assistance.

	Technical Assistance Areas
<input type="checkbox"/>	Agricultural Best Management Practices
<input type="checkbox"/>	Wholesale Best Management Practices
<input type="checkbox"/>	Industrial Best Management Practices
<input type="checkbox"/>	Drought Contingency Plans
<input type="checkbox"/>	Landscape Efficient Systems
<input type="checkbox"/>	Leak Detection and Equipment
<input type="checkbox"/>	Educational Resources
<input type="checkbox"/>	Water Conservation Plans
<input type="checkbox"/>	Water IQ: Know Your Water
<input type="checkbox"/>	Water Loss Audits
<input type="checkbox"/>	Rainwater Harvesting
<input type="checkbox"/>	Recycling and Reuse

Water Conservation Plan Annual Report Wholesale Water Supplier

CONTACT INFORMATION

Name of Utility: Tarrant Regional WD

Public Water Supply Identification Number (PWS ID):

Certification of Convenience and Necessity (CCN) Number:

Surface Water Right ID Number: 3375-A, 3379, 3808-B, 3809-C, 3810-A, 3811, 3812, 3813, 4976-D, 5035-D, 5157-A, 5589, 5688, 5806, 12735

Wastewater ID Number:

Check all that apply:

- ☐ Retail Water Supplier
☒ Wholesale Water Supplier
☐ Wastewater Treatment Utility

Address: 800 E. Northside Dr. City: Fort Worth Zip Code: 76102

Email: dustan.compton@trwd.com Telephone Number: 8177204358

Regional Water Planning Group: C

Groundwater Conservation District:

Contact: First Name: Dustan Last Name: Compton

Title: Regional Conservation Manager

Is this person the designated Conservation Coordinator? ☒ Yes ☐ No

Regional Water Planning Group: C

Groundwater Conservation District:

Reporting Period (Calendar year):

Period Begin (mm/yyyy): 01/2017 Period End (mm/yyyy): 12/2017

Check all that apply:

- ☒ Received financial assistance of \$500,000 or more from TWDB
☒ Have a surface water right with TCEQ

SYSTEM DATA

1. For this reporting period, provide the total volume of wholesale water exported (transferred or sold):

112,609,064,481

2. For this reporting period, does your billing/accounting system have the capability to classify customer into the Wholesale Customer Categories?

☒ Yes ☐ No

Wholesale Customers Categories*

- Municipal
- Industrial
- Commercial
- Institutional
- Agricultural

**Recommended Customer Categories for classifying customer water use. For definitions, refer to [Guidance and Methodology on Water Conservation and Water Use](#).*

3. For this reporting period, select the category(s) used to calculate wholesale customer water usage:

- ☒ Municipal
☒ Industrial
☐ Commercial
☒ Institutional
☐ Agricultural

4. For this reporting period, enter the gallons of **WHOLESALE water exported** (transferred or sold). Enter zero if a Customer Category does not apply.

Wholesale Customer Category	Gallons ¹ Exported (transferred or sold)	Number of Customers
Municipal	109,638,460,926	28
Industrial	2,690,684,877	8
Commercial		
Institutional	279,918,678	20
Agricultural		
Total Gallons¹	112609064481	56

¹Municipal + Industrial + Commercial + Institutional + Agricultural = Wholesale Water Exported

Water Use Accounting

	Total Gallons During the Reporting Period
Water Produced: Water from permitted sources such as rivers, lakes, streams, and wells	112,609,064,481
Wholesale Water Imported: Purchased wholesale water transferred into the system.	0
System Input: Total water supplied to system and available for use. Produced + Imported = System Input	112,609,064,481
Wholesale Water Exported: Wholesale water sold or transferred out of the system.	112,609,064,481
Gallons Per Day: Wholesale Water Exported / 365 = Gallons Per Day	308,517,985
Population: Estimated total population for municipal customers.	1,986,266
Gallons Per Capita Per Day: Wholesale Exported / Population / 365 = Gallons Per Capita Per Day	155

Provide the breakdown of Wholesale Water Exported into Raw and Treated water volumes.

	Gallons
Raw Wholesale Water Exported	112,609,064,481
Treated Wholesale Water Exported	

Provide the specific and quantified five and ten-year targets as listed in your most current Water Conservation Plan.

	Date to Achieve Target	Specified and Quantified Targets
Five-year target	2019	166 gpcd
Ten-year target	2024	158 gpcd

Water Conservation Programs and Activities

1. Water Conservation Plan.

2014

What year did your entity adopt or revise their most recent Water Conservation Plan?

Does The Plan incorporate **Best Management Practices**?

☒ Yes

☐ No

2. Water Conservation Programs

Has your entity implemented any type of water conservation activity or program?

☒ Yes

☐ No

If yes, select the type(s) of Best Management Practices or water conservation strategies implemented during this reporting period.

	Wholesale Supplier Activities and Practices
<input type="checkbox"/>	Agricultural Conservation Programs
<input checked="" type="checkbox"/>	Conservation Analysis & Planning
<input type="checkbox"/>	Conservation Rate Structures
<input type="checkbox"/>	Conservation Technology
<input checked="" type="checkbox"/>	Education & Public Awareness
<input type="checkbox"/>	Industrial Conservation Programs
<input checked="" type="checkbox"/>	Leak Detection/Water Loss Program
<input type="checkbox"/>	Rebate, Retrofit, and Incentive Programs
<input type="checkbox"/>	Regulatory & Enforcement
<input checked="" type="checkbox"/>	System Operations
<input checked="" type="checkbox"/>	Water Efficient Landscape Programs
<input checked="" type="checkbox"/>	Water Use Audits
<input type="checkbox"/>	Other

3. Recycle/Reuse (Water or Wastewater Effluent)

For this reporting period, provide direct and indirect reuse activities.

Reuse Activity	Estimated Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other	3,029,000,000
Estimated Volume of Reuse	3,029,000,000

The total indirect reuse for wetlands diversion to Richland-Chambers Reservoir was 3,029,000,000 gallons in 2017.

4. Water Savings

For this reporting period, estimate the savings that resulted from water conservation activities and programs.

Estimated Gallons Saved/Conserved	Estimated Gallons Recycled/Reused	Total Volume of Water Saved ¹	Dollar Value of Water Saved ²
35,823,000,000		35,823,000,000	44,778,750

¹Estimated Gallons Saved + Estimated Gallons Recycled/Reused = Total Volume Saved

²Estimated this value by taking into account water savings, the cost of treatment or purchase of water, and deferred capital cost due to conservation.

5. Program Effectiveness

In your opinion, how would you rank the overall effectiveness of your conservation programs and activities?

Less Than Effective	Somewhat Effective	Highly Effective	Does Not Apply
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

6. What might your entity do to improve the effectiveness of your water conservation program?

Expand public education and outreach campaign, promotion of our weekly watering advice, increase adoption of twice per week watering restrictions among cities in Tarrant County and work with our customers to develop and support water conservation programs for their communities.

Note: Institutional water use consists of water use of our irrigation customers, primarily golf courses. None of the use in this category can be classified as agricultural use, because it is not used for the cultivation of crops.

Note: Conservation savings based on internal regression model of TRWD's annual water use. It compares estimated demands that would have occurred without conservation versus actual demands.

Note: Dollar value of water saved does not take into account deferred capital cost. It represents the value of the estimated gallons conserved - if it were to be pumped, sold, and consumed at an in-district rate of approximately \$1.25 per 1,000 gallons sold.

7. Select the areas for which you would like to receive more technical assistance.

	Technical Assistance Areas
<input type="checkbox"/>	Agricultural Best Management Practices
<input type="checkbox"/>	Wholesale Best Management Practices
<input type="checkbox"/>	Industrial Best Management Practices
<input type="checkbox"/>	Drought Contingency Plans
<input type="checkbox"/>	Landscape Efficient Systems
<input type="checkbox"/>	Leak Detection and Equipment
<input type="checkbox"/>	Educational Resources
<input type="checkbox"/>	Water Conservation Plans
<input type="checkbox"/>	Water IQ: Know Your Water
<input type="checkbox"/>	Water Loss Audits
<input type="checkbox"/>	Rainwater Harvesting
<input type="checkbox"/>	Recycling and Reuse

Water Conservation Plan Annual Report Wholesale Water Supplier

CONTACT INFORMATION

Name of Utility: Tarrant Regional WD

Public Water Supply Identification Number (PWS ID):

Certification of Convenience and Necessity (CCN) Number:

Surface Water Right ID Number: 3375-A, 3379, 3808-B, 3809-C, 3810-A, 3811, 3812, 3813, 4976-D, 5035-D, 5157-A, 5589, 5688, 5806, 12735

Wastewater ID Number:

Check all that apply:

- ☐ Retail Water Supplier
☒ Wholesale Water Supplier
☐ Wastewater Treatment Utility

Address: 800 E. Northside Dr. City: Fort Worth Zip Code: 76102

Email: dustan.compton@trwd.com Telephone Number: 8177204358

Regional Water Planning Group: C

Groundwater Conservation District:

Contact: First Name: Dustan Last Name: Compton

Title: Regional Conservation Manager

Regional Water Planning Group: C

Groundwater Conservation District:

Reporting Period (Calendar year):

Period Begin (mm/yyyy): 01/2016 Period End (mm/yyyy): 12/2016

Check all that apply:

- ☒ Received financial assistance of \$500,000 or more from TWDB
☒ Have a surface water right with TCEQ

SYSTEM DATA

1. For this reporting period, provide the total volume of wholesale water exported (transferred or sold):

111,058,533,834

2. For this reporting period, does your billing/accounting system have the capability to classify customer into the Wholesale Customer Categories?

☒ Yes ☐ No

Wholesale Customers Categories*

- Municipal
- Industrial
- Commercial
- Institutional
- Agricultural

**Recommended Customer Categories for classifying customer water use. For definitions, refer to [Guidance and Methodology on Water Conservation and Water Use](#).*

3. For this reporting period, select the category(s) used to calculate wholesale customer water usage:

- ☒ Municipal
☒ Industrial
☐ Commercial
☒ Institutional
☐ Agricultural

4. For this reporting period, enter the gallons of **WHOLESALE water exported** (transferred or sold). Enter zero if a Customer Category does not apply.

Wholesale Customer Category	Gallons Exported (transferred or sold)	Number of Customers
Municipal	106,809,304,492	27
Industrial	3,983,508,674	8
Commercial		
Institutional	265,720,668	22
Agricultural		
Total Gallons¹	111058533834	57

¹Municipal + Industrial + Commercial + Institutional + Agricultural = Wholesale Water Exported

Water Use Accounting

	Total Gallons During the Reporting Period
Water Produced: Water from permitted sources such as rivers, lakes, streams, and wells	111,058,533,834
Wholesale Water Imported: Purchased wholesale water transferred into the system.	
System Input: Total water supplied to system and available for use. Produced + Imported = System Input	111,058,533,834
Wholesale Water Exported: Wholesale water sold or transferred out of the system.	111,058,533,834
Gallons Per Day: Wholesale Water Exported / 365 = Gallons Per Day	304,269,956
Population: Estimated total population for municipal customers.	1,910,909
Gallons Per Capita Per Day: Wholesale Exported / Population / 365 = Gallons Per Capita Per Day	159

Provide the breakdown of Wholesale Water Exported into Raw and Treated water volumes.

	Gallons
Raw Wholesale Water Exported	111,058,533,834
Treated Wholesale Water Exported	

Provide the specific and quantified five and ten-year targets as listed in your most current Water Conservation Plan.

	Date to Achieve Target	Specified and Quantified Targets
Five-year target	2019	166 gpcd
Ten-year target	2024	158 gpcd

Water Conservation Programs and Activities

1. Water Conservation Plan.

2014

What year did your entity adopt or revise their most recent Water Conservation Plan?

Does The Plan incorporate **Best Management Practices**? ☒ Yes ☐ No

2. Water Conservation Programs

Has your entity implemented any type of water conservation activity or program?

☐ Yes ☐ No

If yes, select the type(s) of Best Management Practices or water conservation strategies implemented during this reporting period.

	Wholesale Supplier Activities and Practices
<input type="checkbox"/>	Agricultural Conservation Programs
<input checked="" type="checkbox"/>	Conservation Analysis & Planning
<input type="checkbox"/>	Conservation Rate Structures
<input type="checkbox"/>	Conservation Technology
<input checked="" type="checkbox"/>	Education & Public Awareness
<input type="checkbox"/>	Industrial Conservation Programs
<input checked="" type="checkbox"/>	Leak Detection/Water Loss Program
<input type="checkbox"/>	Rebate, Retrofit, and Incentive Programs
<input type="checkbox"/>	Regulatory & Enforcement
<input checked="" type="checkbox"/>	System Operations
<input checked="" type="checkbox"/>	Water Efficient Landscape Programs
<input checked="" type="checkbox"/>	Water Use Audits
<input type="checkbox"/>	Other

3. Recycle/Reuse (Water or Wastewater Effluent)

For this reporting period, provide direct and indirect reuse activities.

Reuse Activity	Estimated Volume (in gallons)
On-site irrigation	

Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other	0
Estimated Volume of Reuse	0

Total wetlands diversion to Richland Chambers Reservoir was 0 gallons in 2016 due to excessive rainfall

4. Water Savings

For this reporting period, estimate the savings that resulted from water conservation activities and programs.

Estimated Gallons Saved/Conserved	Estimated Gallons Recycled/Reused	Total Volume of Water Saved¹	Dollar Value of Water Saved²
32,070,907,122		32,070,907,122	37,936,676

¹Estimated Gallons Saved + Estimated Gallons Recycled/Reused = Total Volume Saved

²Estimated this value by taking into account water savings, the cost of treatment or purchase of water, and deferred capital cost due to conservation.

5. Program Effectiveness

In your opinion, how would you rank the overall effectiveness of your conservation programs and activities?

Less Than Effective	Somewhat Effective	Highly Effective	Does Not Apply
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

6. What might your entity do to improve the effectiveness of your water conservation program?

Expand public education and outreach campaign, make weekly watering advice more accessible, increase adoption of twice per week watering restrictions among cities in Tarrant County and work with our customers to develop and support water conservation programs for their communities.

Note: Institutional water use consist of water use of our irrigation customers, primarily golf courses. None of the use in this category can be classified as agricultural use, because it is not used for the cultivation of crops.

Note: Conservation savings based on model of TRWD's annual water use developed by Alan Plummer, Inc. It compares estimated demands that would have occurred without conservation versus actual demands.

Note: Dollar value of water saved does not take into account deferred capital cost. It represents the value of the estimated gallons conserved - if it were to be pumped, sold, and consumed at an in-district rate of approximately \$1.1829 per 1,000 gallons sold.

7. Select the areas for which you would like to receive more technical assistance.

	Technical Assitance Areas
<input type="checkbox"/>	Agricultural Best Management Practices
<input type="checkbox"/>	Wholesale Best Management Practices
<input type="checkbox"/>	Industrial Best Management Practices
<input type="checkbox"/>	Drought Contingency Plans
<input type="checkbox"/>	Landscape Efficient Systems
<input type="checkbox"/>	Leak Detection and Equipment
<input type="checkbox"/>	Educational Resources
<input type="checkbox"/>	Water Conservation Plans
<input type="checkbox"/>	Water IQ: Know Your Water
<input type="checkbox"/>	Water Loss Audits
<input type="checkbox"/>	Rainwater Harvesting
<input type="checkbox"/>	Recycling and Reuse

Water Conservation Plan Annual Report

Wholesale Water Supplier

CONTACT INFORMATION

Name of Entity: _____

Public Water Supply Identification Number (PWS ID): _____

CCN Number: _____

Water Rights ID Number: _____

Wastewater ID Number: _____

Check all that apply:

Retail Water Supplier

Wholesale Water Supplier

Wastewater Treatment Utility

Address: _____ City: _____ Zip Code: _____

Email: _____ Telephone Number: _____

Regional Water Planning Group: _____ [Map](#)

Groundwater Conservation District: _____ [Map](#)

Form Completed By: _____ Title: _____

Date: _____

Reporting Period (**calendar year**):

Period Begin (mm/yyyy) _____ Period End (mm/yyyy) _____

Check all that apply:

Received financial assistance of \$500,000 or more from TWDB

Have 3,300 or more retail connections

Have a surface water right with TCEQ

SYSTEM DATA

1. For this reporting period, provide the **total volume of wholesale water exported** (transferred or sold): _____ gallons

2. For this reporting period, does your billing/accounting system have the capability to classify customers into the Wholesale Customer Categories?

Yes

No

3. For this reporting period, select the category(s) used to calculate wholesale customer water usage:

Municipal
 Industrial
 Commercial
 Institutional
 Agricultural

Wholesale Customer Categories*

- Municipal
- Industrial
- Commercial
- Institutional
- Agricultural

**Recommended Customer Categories for classifying customer water use. For definitions, refer to [Guidance and Methodology on Water Conservation and Water Use](#).*

4. For this reporting year, enter the gallons of **WHOLESALE water exported** (transferred or sold). Enter zero if a Customer Category does not apply.

Wholesale Customer Category	Gallons Exported (transferred or sold)	Number of Customers
Municipal		
Industrial		
Commercial		
Institutional		
Agricultural		
Total Gallons¹		

¹ Municipal + Industrial + Commercial + Institutional + Agricultural = Wholesale Water Exported

Water Use Accounting

	Total Gallons During the Reporting Period
Water Produced: Water from permitted sources such as rivers, lakes, streams, and wells.	
Wholesale Water Imported: Purchased wholesale water transferred into the system.	
System Input: Total water supplied to system and available for use.	Produced + Imported = System Input
Wholesale Water Exported: Wholesale water sold or transferred out of the system.	
Gallons Per Day:	Wholesale Water Exported ÷ 365 = Gallons Per Day
Population: Estimated total population for municipal customers.	
Gallons Per Capita Per Day:	(Wholesale Exported ÷ Population) ÷ 365 = Gallons Per Capita Per Day

Provide the breakdown of Wholesale Water Exported into Raw and Treated water volumes.

	Gallons
Raw Wholesale Water Exported	
Treated Wholesale Water Exported	

Provide the **specific and quantified five and ten-year targets** as listed in your most current Water Conservation Plan.

	Date to Achieve Target	Specified and Quantified Targets
Five-year target		
Ten-year target		

Water Conservation Programs and Activities

1. Water Conservation Plan

What year did your entity adopt or revise their most recent Water Conservation Plan? _____

Does The Plan incorporate [Best Management Practices](#)? Yes No

2. Water Conservation Programs

Has your entity implemented any type of water conservation activity or program?

Yes No

If yes, select the type(s) of Best Management Practices or water conservation strategies implemented during this reporting period.

Wholesale Supplier Activities and Practices
Agricultural Conservation Programs Conservation Analysis & Planning Conservation Rate Structures Conservation Technology Education & Public Awareness Industrial Conservation Programs Leak Detection/ Water Loss Program Rebate, Retrofit, and Incentive Programs Regulatory & Enforcement System Operations Water Efficient Landscape Programs Water Use Audits

Other activities, list or describe.

3. Recycle/Reuse (Water or Wastewater Effluent)

For this reporting period, provide direct and indirect reuse activities.

Reuse Activity	Estimated Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other, please describe:	
Estimated Volume of Reuse	

4. Water Savings

For this reporting period, estimate the savings that resulted from water conservation activities and programs.

Estimated Gallons Saved/Conserved	Estimated Gallons Recycled/Reused	Total Volume of Water Saved ¹	Dollar Value of Water Saved ²

1. Estimated Gallons Saved + Estimated Gallons Recycled/Reused = Total Volume Saved

2. Estimate this value by taking into account water savings, the cost of treatment or purchase of water, and deferred capital costs due to conservation.

5. Program Effectiveness

In your opinion, how would you rank the overall effectiveness of your conservation programs and activities?

Less Than Effective	Somewhat Effective	Highly Effective	Does Not Apply

6. What might your entity do to improve the effectiveness of your water conservation program?

7. Select the areas for which you would like to receive technical assistance:

Agricultural Best Management Practices
 Wholesale Best Management Practices
 Industrial Best Management Practices
 Drought Contingency Plans
 Landscape Efficient Systems
 Leak Detection and Equipment
 Educational Resources

Water Conservation Plans
 Water IQ: Know Your Water
 Water Loss Audits
 Rainwater Harvesting Systems
 Recycling and Reuse

Water Conservation Plan Annual Report

Wholesale Water Supplier

CONTACT INFORMATION

Name of Entity: _____

Public Water Supply Identification Number (PWS ID): _____

CCN Number: _____

Water Rights ID Number: _____

Wastewater ID Number: _____

Check all that apply:

☐ Retail Water Supplier

☐ Wholesale Water Supplier

☐ Wastewater Treatment Utility

Address: _____ City: _____ Zip Code: _____

Email: _____ Telephone Number: _____

Regional Water Planning Group: _____ [Map](#)

Groundwater Conservation District: _____ [Map](#)

Form Completed By: _____ Title: _____

Date: _____

Reporting Period (**check only one**):

☐ Fiscal Period Begin(mm/yyyy) _____ Period End(mm/yyyy) _____

☐ Calendar Period Begin(mm/yyyy) _____ Period End(mm/yyyy) _____

Check all that apply:

☐ Received financial assistance of \$500,000 or more from TWDB

☐ Have 3,300 or more retail connections

☐ Have a surface water right with TCEQ

SYSTEM DATA

1. For this reporting period, provide the **total volume of wholesale water exported** (transferred or sold): _____ gallons

2. For this reporting period, does your billing/accounting system have the capability to classify customers into the Wholesale Customer Categories?

Yes

No

3. For this reporting period, select the category(s) used to calculate wholesale customer water usage:

Municipal
 Industrial
 Commercial
 Institutional
 Agricultural

Wholesale Customer Categories*

- Municipal
- Industrial
- Commercial
- Institutional
- Agricultural

**Recommended Customer Categories for classifying customer water use. For definitions, refer to [Guidance and Methodology on Water Conservation and Water Use](#).*

4. For this reporting year, enter the gallons of **WHOLESALE water exported** (transferred or sold). Enter zero if a Customer Category does not apply.

Wholesale Customer Category	Gallons Exported (transferred or sold)	Number of Customers
Municipal		
Industrial		
Commercial		
Institutional		
Agricultural		
.....Total		

Water Use Accounting

	Total Gallons During the Reporting Period
Water Produced: Water from permitted sources such as rivers, lakes, streams, and wells.	
Wholesale Water Imported: Purchased wholesale water transferred into the system.	
System Input: Total water supplied to system and available for use.	Produced + Imported = System Input
Wholesale Water Exported: Wholesale water sold or transferred out of the system.	
Gallons Per Day:	Wholesale Water Exported ÷ 365 = Gallons Per Day
Population: Estimated total population for municipal customers.	
U S # h)	Municipal Exported ÷ Municipal Population ÷ 365 = Municipal Gallons Per Capita Per Day

Provide the **specific and quantified five and ten-year targets** as listed in your most current Water Conservation Plan.

	Date to Achieve Target	Specified and Quantified Targets
Five-year target		
Ten-year target		

Water Conservation Programs and Activities

1. Water Conservation Plan

What year did your entity adopt or revise their most recent Water Conservation Plan? _____

Does The Plan incorporate [Best Management Practices](#)? Yes No

2. Water Conservation Programs

Has your entity implemented any type of water conservation activity or program?

Yes No

If yes, select the type(s) of Best Management Practices or water conservation strategies implemented during this reporting period.

Wholesale Supplier Activities and Practices
Agricultural Conservation Programs Conservation Analysis & Planning Conservation Rate Structures Conservation Technology Education & Public Awareness Industrial Conservation Programs Leak Detection/ Water Loss Program Rebate, Retrofit, and Incentive Programs Regulatory & Enforcement System Operations Water Efficient Landscape Programs Water Use Audits

Other activities, list or describe.

3. Recycle/Reuse (Water or Wastewater Effluent)

For this reporting period, provide direct and indirect reuse activities.

Reuse Activity	Estimated Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other, please describe:	
Estimated Volume of Reuse	

4. Water Savings

For this reporting period, estimate the savings that resulted from water conservation activities and programs.

Estimated Gallons Saved/Conserved	Estimated Gallons Recycled/Reused	Total Volume of Water Saved ¹	Dollar Value of Water Saved ²

1. Estimated Gallons Saved + Estimated Gallons Recycled/Reused = Total Volume Saved

2. Estimate this value by taking into account water savings, the cost of treatment or purchase of water, and deferred capital costs due to conservation.

5. Program Effectiveness

In your opinion, how would you rank the overall effectiveness of your conservation programs and activities?

Less Than Effective	Somewhat Effective	Highly Effective	Does Not Apply

6. What might your entity do to improve the effectiveness of your water conservation program?

7. Select the areas for which you would like to receive technical assistance:

Agricultural Best Management Practices
 Wholesale Best Management Practices
 Industrial Best Management Practices
 Drought Contingency Plans
 Landscape Efficient Systems
 Leak Detection and Equipment
 Educational Resources

Water Conservation Plans
 Water IQ: Know Your Water
 Water Loss Audits
 Rainwater Harvesting Systems
 Recycling and Reuse

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APPENDIX F

TRWD CUSTOMER

WATER CONSERVATION REPORT

APPENDIX F
Customer Water Conservation Report
Due May 1 of Every Year

Name of Entity: _____

Address & Zip: _____

Telephone Number: _____ **Fax:** _____

Form Completed By: _____

Title: _____

Signature: _____ **Date:** _____

Name and Phone Number of Person/Department responsible for implementing a water conservation program:

UTILITY PROFILE

I. POPULATION CUSTOMER DATA

A. Population and Service Area Data

1. Attach a copy of your service area map.
2. Service area size (square miles): _____
3. Current population of service area: _____
4. Current population served by utility:
 - a: water _____
 - b: wastewater _____
5. Population served by water utility service area for the previous five years:
6. Projected population for in the following decades:

<u>Year</u>	<u>Population</u>	<u>Year</u>	<u>Population</u>
_____	_____	2020	_____
_____	_____	2030	_____
_____	_____	2040	_____

_____ 2050 _____
 _____ 2060 _____

7. List specific source(s)/method(s) for the calculation of current and projected population:

B. Customers Data

Senate Bill 181 requires that uniform consistent methodologies for calculating water use and conservation be developed and available to retail water providers and certain other water use sectors as a guide for preparation of water use reports, water conservation plans, and reports on water conservation efforts. A water system must provide the most detailed level of customer and water use data available to it, however, any new billing system purchased must be capable of reporting data for each of the sectors listed below.

1. Current number of active connections by user type. Check whether multi-family service is counted as Residential ____ or Commercial ____.

Treated water users	Metered	Not-metered	Totals
Residential:			
Single Family			
Multi-Family			
Commercial			
Industrial/mining			
Institutional			
Agriculture			
Other/Wholesale			

2. List the new number of new connections per year for most recent three years:

Year			
Treated water users	Metered	Not-metered	Totals
Residential:			
Single Family			
Multi-Family			
Commercial			
Industrial/mining			
Institutional			
Agriculture			
Other/Wholesale			

3. List annual water use for the five highest volume customers.

	Customer	Use (1,000 gallons / year)	Treated / Raw Water
(1)			
(2)			
(3)			
(4)			
(5)			

II. WATER USE DATA FOR SERVICE AREA

A. Water Accounting Data

1. Amount of water use for previous five years (in 1,000 gal.):

Please indicate: Diverted Water _____

Treated Water _____

Total Diverted and Treated Water Deliveries and Sales by Month					
Month	Year				
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

Describe how the above figures were determined (e.g., from a master meter located at the point of a diversion from the source or located at a point where raw water enters the treatment plant, or from water sales).

2. Amount of water (in 1,000 gallons) delivered (sold) as recorded by the following account types for the past five years.

Account Types	Year				
Residential					
Single Family					
Multi-Family					
Commercial					
Industrial/Mining					
Institutional					
Agricultural					
Other/Wholesale					

3. List previous records for water loss (the difference between water diverted or treated and water delivered or sold). The goal for percent of unaccounted for water is 12%.

<u>Year</u>	<u>Amount (gal.)</u>	<u>% of Total Water Diverted or Treated</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. List previous five years records for water reuse. Reuse is the authorized use for one or more beneficial purposes of use of water that remains unconsumed after the water is used for the original purpose of use and before that water is either disposed of or discharged or otherwise allowed to flow into a watercourse, lake or other body of state-owned water.

<u>Year</u>	<u>Amount (gal.)</u>	<u>% of Total Water Diverted or Treated</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Municipal per capita water use (in gallons per day) for previous five years. Municipal per capita water use is the sum total of water diverted into a water supply system for residential, commercial, and public and institutional uses divided by total population served. GPCD includes water losses.

<u>Year</u>	<u>Population</u>	<u>Total Water Diverted (or Treated)(1,000 gal.)</u>	<u>Municipal Per Capita Use (GPCD)</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Source of Population data: _____

B. Projected Water Demands

If applicable, attach or cite projected water supply demands for next ten years using information such as population trends, historical water use, and economic growth in the service area and any additional water supply requirement for such growth.

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APPENDIX G

TARRANT REGIONAL WATER DISTRICT BOARD RESOLUTION ADOPTING THE WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

**RESOLUTION OF THE BOARD OF DIRECTORS
OF**

TARRANT REGIONAL WATER DISTRICT

ADOPTING THE WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

WHEREAS, Tarrant Regional Water District, a Water Control and Improvement District (the "District"), as a wholesale water supplier, is required by the Texas Commission on Environmental Quality to develop (a) a water conservation plan pursuant to Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.5 of the Texas Administrative Code and (b) a drought contingency plan pursuant to Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.22 of the Texas Administrative Code; and

WHEREAS, the District recognizes the importance of a long-term approach to conserving water supplies by reducing the volume of water withdrawn from its reservoirs, reducing the loss or waste of water, improving water use efficiency, and increasing the recycling and reuse of water; and

WHEREAS, the plan provides significant benefits to the District, its customers, and the public they serve through the implementation of year-round water saving strategies to increase District reservoir storage volumes during wet or dry weather conditions.

NOW, THEREFORE, be it resolved by the Board of Directors of the District that the Water Conservation and Drought Contingency Plan attached hereto as Exhibit A is adopted this 16th day of April, 2019, as the controlling policy of the District.

TARRANT REGIONAL WATER DISTRICT, a
Water Control and Improvement District

By: _____

Jack Stevens
President, Board of Directors

ATTEST:

By: _____

Leah M. King
Secretary, Board of Directors

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APPENDIX H

LETTER TO REGION C

WATER PLANNING GROUP

APPENDIX H

Letter to Region C Water Planning Group

May 1, 2019

Mr. Kevin Ward
Chair, Region C Water Planning Group
Trinity River Authority
P.O. Box 60
Arlington, TX 76004

Dear Mr. Ward:

Enclosed please find a copy of the recently adopted water conservation and drought contingency plan for the Tarrant Regional Water District. I am submitting a copy of this plan to the Region C Water Planning Group in accordance with the Texas Water Development Board and Texas Commission on Environmental Quality rules. The Board of the Tarrant Regional Water District adopted the attached plan on April 16, 2019.

Sincerely,

James M. Oliver
General Manager
Tarrant Regional Water District

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APPENDIX I

TEXAS WATER CODE SECTION 11.039

APPENDIX I

Texas Water Code Section 11.039

§ 11.039. Distribution of Water During Shortage

(a) If a shortage of water in a water supply not covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the water to be distributed shall be divided among all customers pro rata, according to the amount each may be entitled to, so that preference is given to no one and everyone suffers alike.

(b) If a shortage of water in a water supply covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the person, association of persons, or corporation owning or controlling the water shall divide the water to be distributed among all customers pro rata, according to:

(1) the amount of water to which each customer may be entitled; or

(2) the amount of water to which each customer may be entitled, less the amount of water the customer would have saved if the customer had operated its water system in compliance with the water conservation plan.

(c) Nothing in Subsection (a) or (b) precludes the person, association of persons, or corporation owning or controlling the water from supplying water to a person who has a prior vested right to the water under the laws of this state.

Amended by Acts 1977, 65th Leg., p. 2207, ch. 870, § 1, eff. Sept. 1, 1977.

Amended by Acts 2001, 77th Leg., ch. 1126, § 1, eff. June 15, 2001.

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