



Water Conservation Plan

(Pre-Submission – Does not include appendices)

2024



Contents

Acronyms and Abbreviations..... v

A Note from NBU’s Conservation Team..... 1

1 Water Conservation Planning at NBU 1

 1.1 Our Water Conservation Goals 1

 1.2 Conservation Plan Purpose..... 2

2 Water Use Trends 3

 2.1 Historical Per Capita Demand 3

 2.2 Historical Water Use per Customer Type..... 5

 2.3 Outdoor Water Use 6

 2.4 Non-Revenue Water..... 8

3 NBU’s Water Conservation Program 9

 3.1 Conservation Data Management..... 11

 3.1.1 ♦ Conservation Data Analytics and Visualization Solution 11

 3.1.2 ♦ Advanced Metering Infrastructure..... 12

 3.2 Water Conservation Rate Structure 12

 3.3 Non-Revenue Water Program..... 13

 3.3.1 Satellite Leak Detection 13

 3.3.2 Meter Testing Program..... 14

 3.3.3 ♦ Increase Investment in Asset Management 14

 3.4 Landscape Water Transformation Program..... 14

 3.4.1 ♦ Drought Management Plan and Enforcement 14

 3.4.2 ♦ Irrigation System Inspection Program..... 15

 3.4.3 ♦ Home & Commercial Irrigation Assessments with Rebates 16

 3.4.4 ♦ Water-Wise Landscape Rebates 16

 3.4.5 ♦ New Development Ordinance Revisions 16

 3.5 Indoor Water Use Reduction Program 17

 3.5.1 Home and Commercial Assessment for Indoor Use..... 17

 3.5.2 Indoor Water Use Rebates 17

 3.6 Outreach and Education Program 17

 3.6.1 Continuous Consumption Alerts 18

3.6.2 Utility Consumption Reports 19

3.6.3 Top 30 Water User Report..... 19

3.6.4 Top 10 Water Violator Strategy 19

3.6.5 ♦ Water Conservation Education and Outreach Plan 19

3.6.6 ♦ Engage Local Officials and Community Stakeholders..... 20

3.6.7 ♦ Establish Water Conservation Partnerships with Local Trade Organizations 20

4 Five-Year Water Conservation Implementation Plan 21

4.1 Implementation Plan..... 21

4.2 Water Conservation Program Metrics 27

4.3 Approval and Distribution of the Water Conservation Plan 27

4.4 Adaptive Implementation 27

Tables

Table 2-1 2022 Total Annual Usage by Customer Type..... 6

Table 3-1 NBU Water Restrictions in Drought Stages 15

Table 4-1 List of New and Expanded Water Conservation Strategies 21

Table 4-2 Water Conservation Program Responsible Teams and Metrics 25

Figures

Figure 2-1 Customer Groups..... 3

Figure 2-2 NBU Per Capita Water Demand Between 2013-2022 4

Figure 2-3 Historical Water Use Per Customer Group..... 5

Figure 2-4 Number of Customers Per Group..... 6

Figure 2-5 Percentage of Water that is Used for Irrigation 7

Figure 2-6 Average Monthly Irrigation Usage Based on Data from Customers with Separate Irrigation
Meters (2018-2022) 8

Figure 3-1 Water Savings by Conservation Strategy from 2014 to 2022 9

Figure 3-2 NBU’s Roadmap in Reducing Water Consumption 10

Figure 3-3 New Billing System Dashboard 11

Figure 3-4 Rate Advisory Committee..... 12

Figure 3-5 Example Rate Tier Structure for Residential Users 13

Figure 3-6 Leak Detection Equipment 13

Figure 3-7 NBU Partners with Fisher Park Nature Education Center, Headwaters at the Comal, West Side Community Center, and New Braunfels Food Bank to Provide Education on Water Conservation to the Community..... 18

Figure 3-8 Example NBU Social Media Posts on Conservation 18

Figure 3-9 Utility Consumption Reports..... 19

Figure 4-1 Implementation Timeline and Budget for New and Expanded Water Conservation Strategies (in addition to continuing to implement and fund the existing water conservation strategies). 22

Appendices

To be complete upon submission to regulating agencies

- Appendix A: Per Capita Demand Goals
- Appendix B: TWDB and TCEQ Water Conservation Plan Requirements
- Appendix C: TWDB and TCEQ Conservation Strategies
- Appendix D: NBU Utility Profile
- Appendix E: Distribution to Water Planning Groups
- Appendix F: City Council Adoption of the Water Conservation Plan
- Appendix G: NBU Board Approval of the Water Conservation Plan

Acronyms and Abbreviations

AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
ASR	Aquifer Storage and Recovery
BMPs	Best Management Practices
CCS	Conservation and Customer Solutions
CIP	Capital Improvement Plan
FTE	Full-time employees
gpcd	Gallons per capita per day
NBU	New Braunfels Utilities
NRW	Non-revenue water
SAWS	San Antonio Water System
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board

A Note from NBU's Conservation Team

The City of New Braunfels has long been known for its rich heritage, vibrant community, and the pristine waters of the Edwards Aquifer and the Comal and Guadalupe Rivers. As we cherish the beauty and vitality that water brings to our lives, we also bear the responsibility to protect and preserve this invaluable resource.

In this New Braunfels Utilities Water Conservation Plan, we outline the methods and practices necessary to secure the future of our city and its unique natural surroundings. It is a testament to NBU's commitment to sustainable living and responsible stewardship of our water resources.

Amidst the challenges of increasingly severe weather patterns, a rapidly growing population, and the changing demands of our dynamic community, this plan serves as our guidance document. The plan also meets requirements put forth by the Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board (TWDB).

In the pages that follow, you will find strategies, recommendations, and actions that underscore NBU's dedication to water conservation. Together, we embark on this journey, united by our admiration for New Braunfels and a shared responsibility to protect the life-giving force of water that sustains us all. With your help, we can make a difference for our community and our environment.

Let us embrace this plan with open hearts and determined minds, for it is through our actions that we will secure a brighter, more sustainable future for New Braunfels. For more information on current NBU water conservation efforts, please visit us at nbutexas.com/conservation or call us at 830.608.8925.



Andrew Cummings
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1 Water Conservation Planning at NBU

The New Braunfels community has established a vision “to ensure water remains a celebrated and protected feature of our community by collaboratively managing our water resources to safeguard watersheds, waterways and groundwater” (New Braunfels One Water Roadmap). Responsible water resource planning includes a shared community responsibility to proactively pursue water conservation.

In every Central Texas community and across the state, growth is increasing demand for water. In NBU’s service area, population has been increasing at an average of more than 5% per year and rapid growth is forecasted to continue. NBU’s recent Water Resources Plan Update (2023) projects the number of residents in NBU’s service area to double by 2050. Drought conditions further exacerbate the stress on local water supplies.

To ensure sufficient water supplies are available to support residential and business water needs for current and future generations, utilities in the region are pursuing various strategies to increase water supply and decrease demand. As local water resources are generally fully allocated, communities including New Braunfels are turning to expensive measures such as importing new water supplies long distances (e.g., over 50 miles) to increase the water supply available to residents. Water conservation is the most economical and sustainable source for water because it aims to proactively reduce the amount of water required to meet customer needs. This less disruptive approach of meeting water needs through reduced demand provides additional benefits that strengthen the community and safeguard our water resources. Water conservation:

- Reduces costs required to accommodate greater demand, thereby reducing future rate increases. Cost savings come from eliminating or delaying the need for additional supplies (which are increasingly expensive as availability decreases), reducing system operating costs, and avoiding additional infrastructure required to accommodate greater demand.
- Increases watershed sustainability; reducing unnecessary usage helps ensure regional water sources remain healthy and reliable supplies now and into the future.
- Reduces environmental impacts, including by reducing the energy requirements associated with pumping and treating water.
- Preserves recreational flows, protects endangered species and local wildlife, and promotes biodiversity for future generations to enjoy by reducing reliance on the Edwards Aquifer and Guadalupe River.

1.1 Our Water Conservation Goals

NBU’s goal for water conservation is to reduce non-revenue, residential, commercial, and institutional water use to postpone or eliminate the need for additional water supplies and to protect our existing water supplies. Specific objectives for NBU’s conservation program include:

- Maintain compliance with the Texas Water Development Board (TWDB) and Texas Commission on Environmental Quality (TCEQ) water conservation and water loss requirements.
- Increase the annual volume of water saved through conservation strategies.
- Develop a robust database management system (information collection and analysis procedures) to better understand water consumption and track conservation activities impact on water resources.
- Promote innovation in water conservation while pursuing cost-effective strategies.

1.2 Conservation Plan Purpose

This Conservation Plan reviews historical water use trends and documents the conservation strategies selected by NBU for implementation from 2024 through 2029. This document also serves to fulfill the Conservation Plan requirements established by TWDB and the Texas Commission on Environmental Quality (TCEQ). Refer to **Appendices A** and **B** for more information on regulatory requirements.

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2 Water Use Trends

The water produced by NBU serves a variety of purposes as illustrated in **Figure 2-1**. There are conservation strategies that could reduce demand for each of these use types, and thus to prioritize conservation efforts and funds, more information is needed. This section describes analysis of NBU’s historical water demands to better understand the opportunities for greatest impact.

RESIDENTIAL		NON-RESIDENTIAL	
Customer Types:		Customer Types:	
 Single-Family freestanding house	 Multi-Family apartments, duplexes, etc.	 Institutional public buildings, hospitals, schools, parks, etc.	 Commercial Businesses hotels, restaurants, stores, banks, etc.
Types of Use:		Types of Use:	
OUTDOOR USE	INDOOR USE	OUTDOOR USE	INDOOR USE
Examples: • Landscape Irrigation • Swimming Pools • Car Washing	Examples: • Bathroom • Kitchen • Laundry	Examples: • Construction • Car Washes • Athletic Fields • Landscape Irrigation	Examples: • Bathroom • Kitchen • Laundry • Medical Equipment • Water Cooling/Heating
NON-REVENUE WATER: Firefighting, Water System Maintenance, Water Line Breaks, Aquifer Storage & Recovery			

Figure 2-1 Customer Groups

2.1 Historical Per Capita Demand

Per capita demand is the average water consumption per resident per day, presented as gallons per capita per day (gpcd). It is calculated by taking total system usage and dividing by the number of residents within the service area. While it provides a standardized metric, this measurement is imprecise as a large percentage of system usage is not tied to the number of residents served by a utility but instead businesses (which can serve and employ individuals outside of the service area), institutions, visitors, and non-revenue water.

As shown in blue in **Figure 2-2**, the average total system water use per resident over the last ten years has varied between 120 and 140 gpcd. Variability in per capita demand from year to year is expected as usage is impacted by a variety of factors including weather and climate changes, economic conditions, regulations, conservation programs, and even pandemics like COVID-19. Due to the various factors that impact gpcd, total per capita demand can be difficult to interpret when evaluating potential conservation programs.

NBU’s gpcd has also been impacted recently by implementation of an Aquifer Storage and Recovery (ASR) demonstration in 2021. This strategic underground water reservoir is a key component of NBU’s water supply resiliency plan. However, producing water to store in this reservoir contributed an additional total per capita demand of 5 gpcd in 2022. The total per capita demand, had ASR not been underway, is shown in orange in **Figure 2-2**.

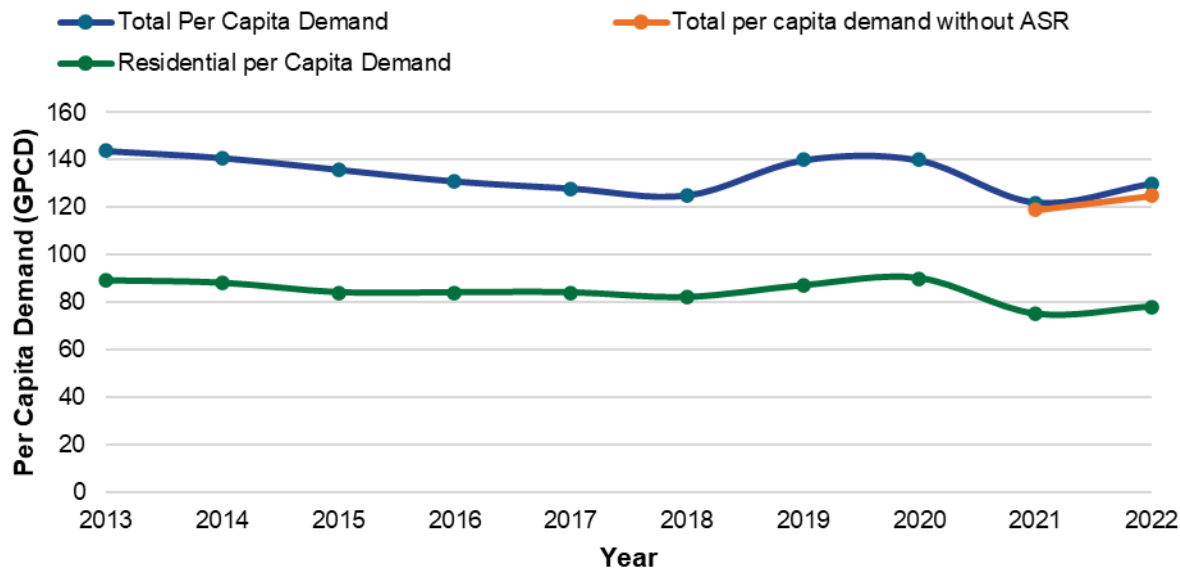


Figure 2-2 NBU Per Capita Water Demand Between 2013-2022

As an alternative metric, the residential per capita demand is also shown in green in **Figure 2-2**, which is the volume of water used by single- and multi-family customers divided by the number of residents in NBU’s service area. Over the last five years, the residential per capita demand has ranged from 75 to 90 gpdc, with water use for the most recent two years below 80 gpdc. As with overall gpdc, residential per capita demand has been slowly decreasing over the last 10 years except during 2019, 2020 and 2022 when slight increases were observed compared to the prior year. This decline could be attributable to a variety of factors including COVID-19, NBU conservation measures, water-saving appliances, and changing demographics (e.g., a larger percentage of multi-family homes). Thus, additional data are required to determine whether the recent trends are indicative of long-term reductions in use for residential customers.

What is a good per capita demand?

Recognizing the need to address the global water shortage crisis, global industry leaders have partnered with public and civil society institutions to form the 50L Home coalition¹. This coalition has adapted a goal of achieving a future at home water use of only 50L per day per person, which is equivalent to 13 gpdc! These industry leaders are striving to accelerate innovation of sustainable and financially viable solutions to achieve this goal.

Peer water systems implementing proactive conservation programs can also provide reference points for consideration. Southern Nevada Water Authority (providing water to Las Vegas) has a goal to achieve 105 gpdc as the total per capita demand by 2035. Locally in central Texas, San Antonio Water System (SAWS) aims to reduce total per capita demand to 88 gpdc and residential per capita demand to 55 gpdc by 2070. Austin Water has also projected achieving a per capita demand for potable water of 79 gpdc by 2070. However, consideration of differences in community characteristics, such as percent multi-family, are important to consider when comparing against these goals.

While progress has been made, a more significant reduction in per account water usage is needed to ensure NBU existing water supplies are not only sufficient to meet demand but are also protected and preserved. As there are no expected national or state regulations in the near-future that would restrict usage further by individual water users (the most recent was the United States Energy Policy Act of 1992 which required new structures to have water-saving appliances), intentional conservation strategies are needed to achieve the necessary decreases in per-customer water usage.

2.2 Historical Water Use per Customer Type

Total water use across each customer group for the last 10 years is shown in **Figure 2-3**. Single-family customers used the greatest total volume of water, ranging from 65% to 70% of total demand over this time period. However, water use has increased for each customer group. Increased demand of 39% for single-family customers, 38% for multi-family customers, 37% for institutional customers, and 32% for commercial customers has been observed since 2013.

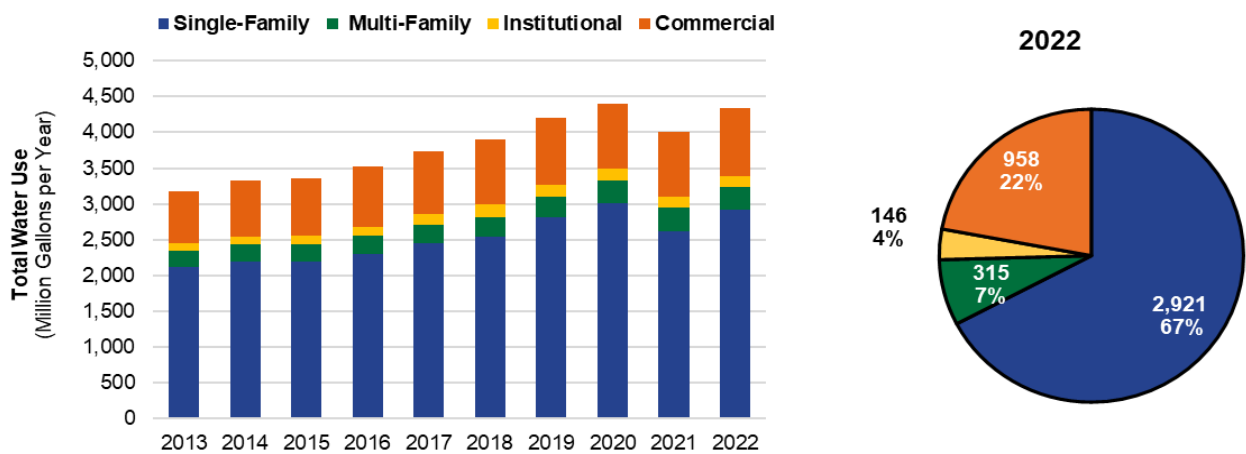


Figure 2-3 Historical Water Use Per Customer Group

This increase in system water demand correlates with the increase in the number of customers served by NBU. Between 2013 and 2022 (**Figure 2-4**), the total number of customers has increased from 29,315 to 45,588 – a 55% increase. There has been a 57% increase in single-family customers, 62% increase in multi-family customers, 9% increase in institutional customers, and 23% increase in commercial customers.

The amount of water used by individual customers varies widely by customer type. **Table 2-1** presents the total amount of water used and number of accounts in each customer group for 2022, and the resulting average usage per customer. The high system-wide water use by single-family households is due to the high percentage of NBU's customers that are living in single-family homes, as the amount used per single-family account is significantly lower than the other account types. On the other hand, although the number of multi-family, commercial, and institutional accounts are much lower than single-family, the average water use per account is greater. Therefore, conservation initiatives focused on commercial and institutional customers could yield significant impact per customer. For example, if one commercial customer reduced their water consumption by

¹ [50L Home White Paper.pdf \(50lhome.org\)](#)

10%, it could save approximately 43,000 gallons of water annually on average. In contrast, one single-family customer reducing their use by 10% only saves approximately 8,400 gallons and thus comparable water savings would require 5 residential customers to participate. These data illustrate why conservation strategies targeting commercial customers can have a significant impact on system-wide demand while only requiring changes by a small number of customers.

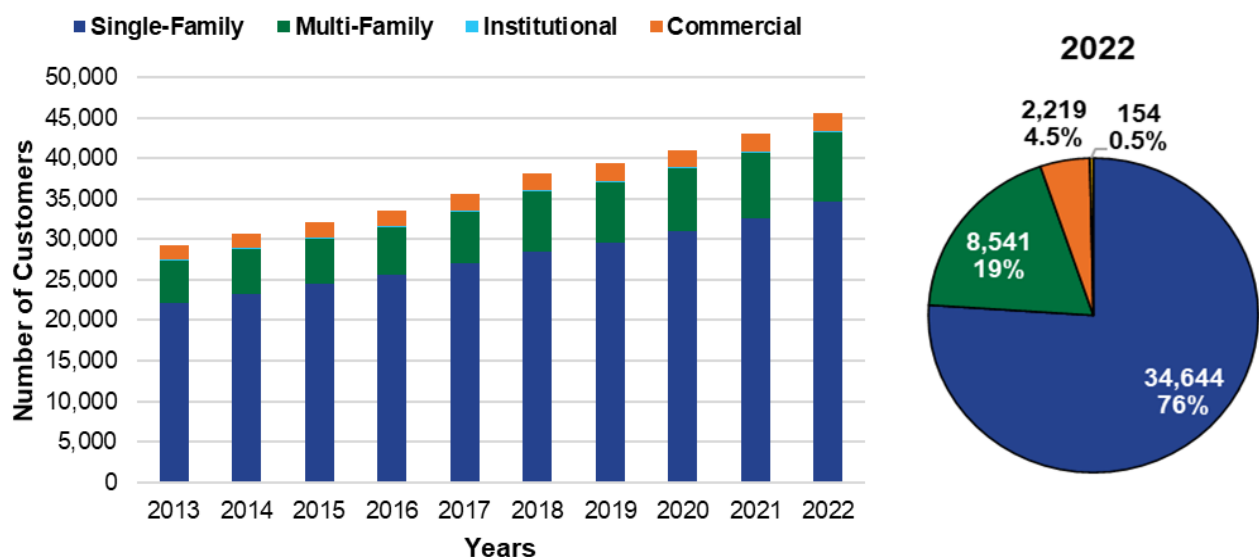


Figure 2-4 Number of Customers Per Group

Table 2-1 2022 Total Annual Usage by Customer Type

Customer Group	Total Annual Water Use per Customer Group (gallons)	Number of Customers	Average Annual Usage by Customer (gallons per customer)
Single-Family	2,921,000,000	34,600	26,600
Multi-Family	315,000,000	474	665,000
Commercial	958,000,000	2,220	432,000
Institutional	146,000,000	154	948,000

2.3 Outdoor Water Use

Especially in hot climates, a large percentage of water is used outdoors, including for landscape irrigation, watering home foundations, or filling up swimming pools and fountains. Approximately one third of NBU's customers have a separate irrigation meter, which allows for some measurement of outdoor usage. **Figure 2-5** summarizes the water usage for this group of customers, highlighting that over half of water usage is for irrigation, on average. Note that the amount of outdoor water usage may be even higher than presented here, as water withdrawn from external spouts and for pools and fountains is generally not measured by irrigation meters.

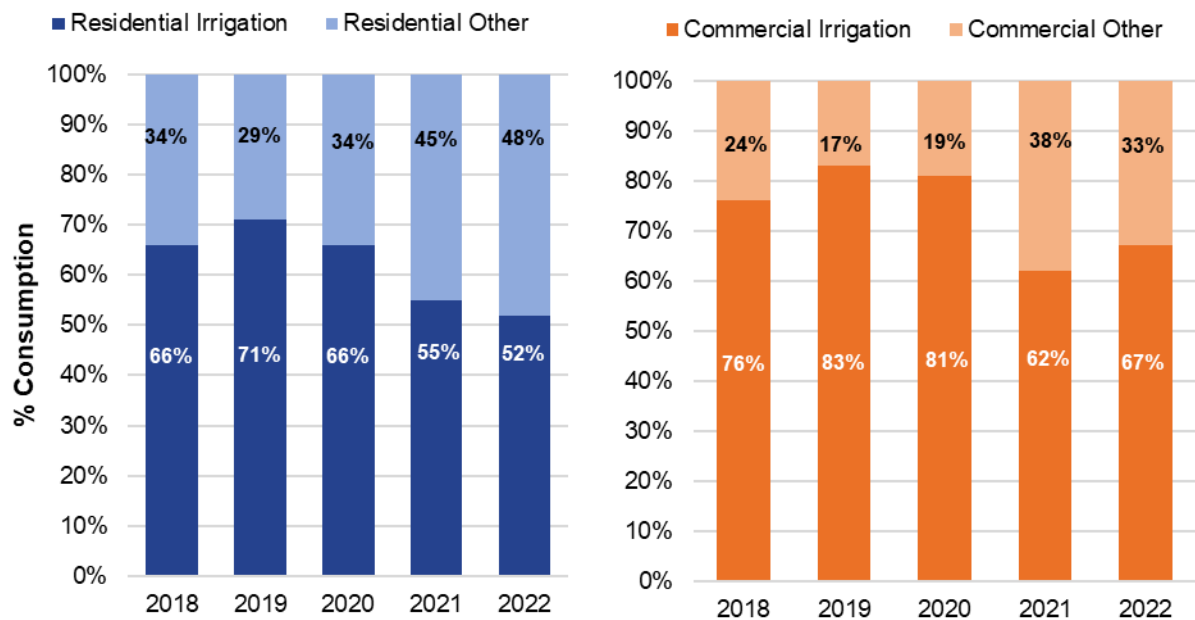


Figure 2-5 Percentage of Water that is Used for Irrigation
Data presented are approximate and based on average usage data for all accounts compared to average irrigation usage data for customers with irrigation meters.

Figure 2-6 further illustrates the impact of weather on water usage. The most water is used for irrigation between August and October during warm, dry weather, and the lowest water use is in February and March. For commercial customers, the peak month's irrigation usage is over three times that of winter month usage.

For 2022, the total estimated amount of water used for irrigation within the NBU service area was over two billion gallons, or an average of almost seven million gallons per day. These data suggest that reduction of water used for irrigation has the potential to significantly decrease NBU's system demand.

Irrigation meters provide customers with greater awareness to encourage conservation.

Irrigation meters are a critical tool for conserving water at home and at work. Irrigation meters allow customers to better track water use by type and understand opportunities for reducing water use and water bills. For example, irrigation meters can identify irrigation system water leaks quickly. Further, irrigation water meter data also helps customers ensure lawns and plants are receiving the optimal amount of water, thereby, prevent overwatering and ensuring landscaping remains healthy and beautiful.

Since 2007, NBU's water connection policy has required all new irrigation systems for single-family residences and small commercial buildings with a site plan of 10,000 square feet or less to have separate irrigation meters. However, it wasn't until 2019 that the water connection policy was made enforceable by connecting it to the City's Drought Management Ordinance. This enforcement tool has correlated with an increase in NBU's number of customers with irrigation meters. However, today, only one third of NBU customers have irrigation meters. Greater investment in inspections and enforcement would result in an even greater number of customers with irrigation meters.

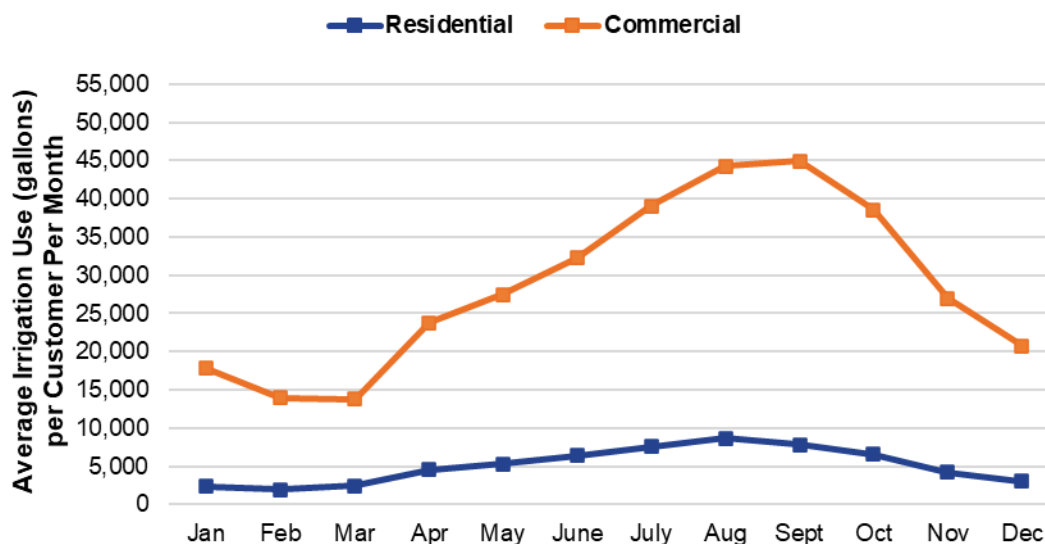


Figure 2-6 Average Monthly Irrigation Usage Based on Data from Customers with Separate Irrigation Meters (2018-2022)

2.4 Non-Revenue Water

Non-revenue water (NRW) is the total volume of distributed water which is not billed to customers. This volume can be due to actual water lost in the distribution system, such as due to a main break or theft; unmetered water such as that used for firefighting or flushing; or data errors such as those caused by inaccurate water meters. NBU has an interdepartmental team that focuses on reducing non-revenue water. Based on data from 2019 to 2021, the volume of non-revenue water for NBU's system ranged from 820 to 860 million gallons annually. Of this volume, 480 to 640 million gallons were due to actual water losses, which translates to about 12 to 17 gallons per capita per day.

The Texas Water Development Board recently established new non-revenue water thresholds for Texas water systems. Above the actual water loss (real loss) threshold of 30 gallons per connection per day, utilities must use a portion of any financial assistance received to further reduce non-revenue water. In 2022, NBU's system had 50 gallons lost per connection per day. There is potential to further reduce non-revenue water volumes.

Further, conservation initiatives focused on reducing non-revenue water are attractive as they require no changed behavior by customers, provide long-term savings, and support overall utility priorities. However, even the most optimized water systems have some unavoidable water losses, and some reduction strategies can be expensive or require a high level of effort to implement.

3 NBU's Water Conservation Program

Since 2007, NBU has been proactively implementing water conservation programs. NBU has a dedicated Water Conservation Team (Conservation and Customer Solutions) that directs these programs, which cover a range of conservation approaches including incentives, ordinances, and outreach and education. Over the last five years, NBU has implemented sixteen conservation strategies, which are described in detail in the subsequent sections. NBU continuously evaluates the effectiveness of these conservation strategies to track impact and ensure maximum return on investment. Review of potential savings, costs, and customer participation helps determine whether each program should be continued or even expanded in the next year.

Figure 3-1 summarizes estimated water savings for five of the ongoing conservation initiatives since NBU began this tracking method in 2014. Calculations incorporate the number of customers participating, the average savings observed per customer, and industry guidance. The savings for satellite leak detection are currently being calculated for the years 2021 and 2022; total savings for those years will be significantly higher once those estimates are added.

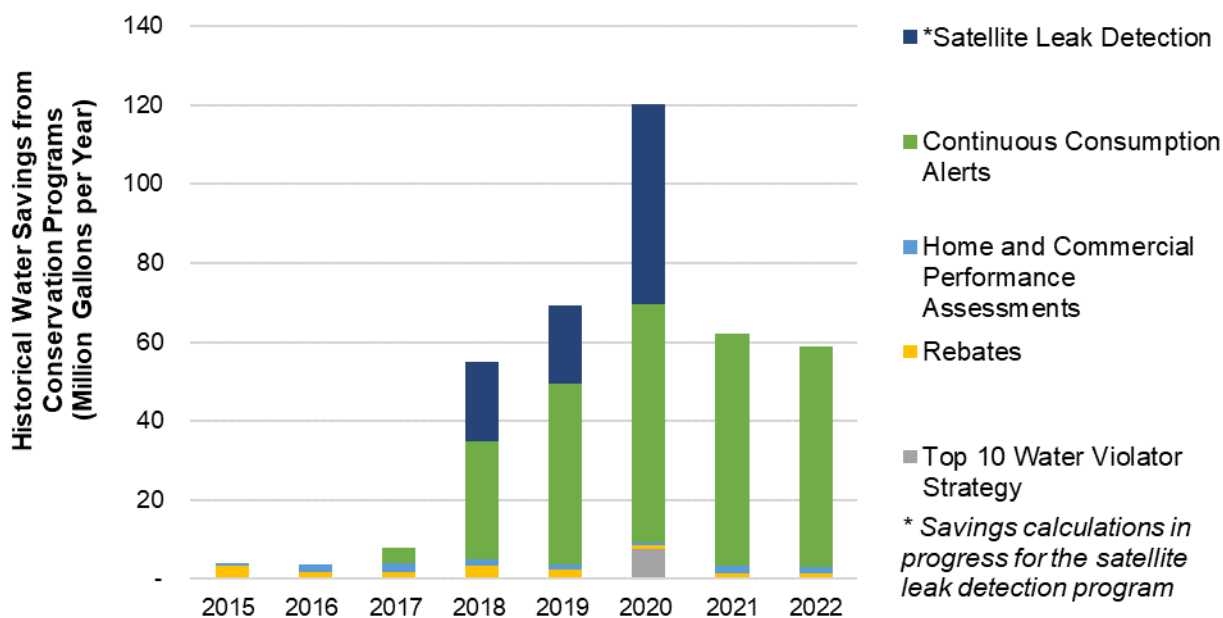


Figure 3-1 Water Savings by Conservation Strategy from 2014 to 2022

It is difficult to estimate water savings for the remaining conservation strategies, such as outreach and education, as changes in customer behavior are difficult to track to a single educational event and may require multiple points of contact before changes are realized. Thus, for other programs NBU tracks alternative measures, such as the number of NBU customers reached each year. In 2022, NBU conducted 41 outreach events, reaching 3,000 customers.

While per person water usage has decreased since inception of these conservation strategies (**Figure 2-4**), NBU has a goal to further reduce water use per person to stretch existing water supplies. Achieving further reduction will require re-evaluation of priorities and increased investment in conservation strategies. Thus, as part of this

new five-year Conservation Plan, NBU conducted an industry scan of over 50 potential conservation strategies to identify additional initiatives to implement over the next five years.

Figure 3-2 summarizes the process applied to select conservation strategies to initiate between 2024 and 2029. First, potential strategies not currently implemented by NBU were identified based on industry guidance and experience by other utilities. This long list was narrowed down by applying the five screening criteria shown in **Figure 3-2**. These criteria were selected by NBU to prioritize applicability, diversification, and effectiveness. Fourteen strategies were identified through this screening; these were further evaluated relative to resource requirements, potential benefits, and utility priorities to develop a balanced portfolio of conservation strategies to include in the Conservation Plan.

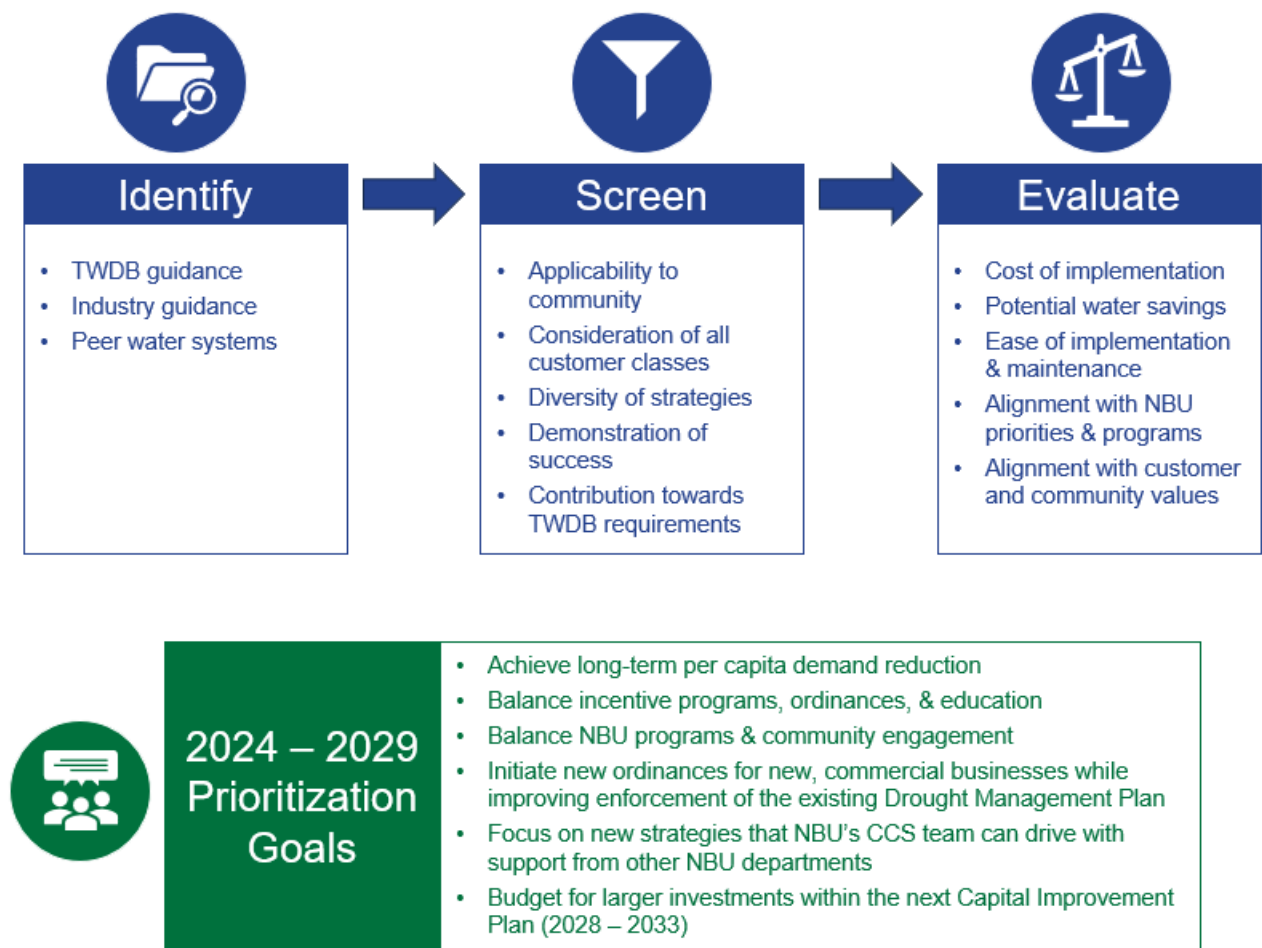


Figure 3-2 NBU's Roadmap in Reducing Water Consumption

This approach outlined in **Figure 3-2** ensured that NBU's portfolio of existing, expanded, and new conservation strategies aligned with NBU's goals and priorities for the next 5 years. Evaluation criteria and prioritization goals were established with a broad range of stakeholders including directors and managers from multiple departments, the conservation team, and NBU Executive Leadership. The resulting conservation strategies fit into six conservation priority programs for NBU:

- **Conservation Data Management (Section 3.1):** Implementation of digital tools to provide automated and actionable data to drive effective decision-making.
- **Water Conservation Rate Structure (Section 3.2):** Continue recommending water services pricing that encourages and rewards water conservation, while also ensuring that utility costs are adequately covered.
- **Non-Revenue Water Program (Section 3.3):** Reduction of water lost including through the distribution system.
- **Landscape Water Transformation Program (Section 3.4):** Expansion and optimization of rebates, ordinances, and inspections that focus on reduction of outdoor water use.
- **Indoor Water Use Rebate (Section 3.5):** Continuation of rebates intended to increase use of water-efficient appliances and fixtures.
- **Outreach and Education (Section 3.6.2):** Development and implementation of an enhanced outreach and education program, including tailored outreach to high volume users and new community partnerships.

The remainder of this section describes existing and planned NBU initiatives in these categories. All ongoing activities will be continued, and those that will be added or expanded are indicated with a water droplet (💧).

3.1 Conservation Data Management

The availability of automated and actionable data is critical to efficiently evaluate the effectiveness of conservation programs and make informed decisions about resource allocation. NBU annually calculates various conservation-related metrics including average customer usage, estimated water savings from conservation programs, and water loss. However, currently these processes are largely manual and information collection and analysis is very labor intensive. Thus, over the next year, NBU will implement a new data analytics and visualization solution that will provide continuous consumption data and automated reports and dashboards for analysis. In addition, over the next five years, opportunities to better leverage data from NBU's advanced metering infrastructure (AMI) will be incorporated.

3.1.1 💧 Conservation Data Analytics and Visualization Solution



Figure 3-3 New Billing System Dashboard

NBU is implementing a new billing system (**Figure 3-3**) that will provide tools to manage water demand and conservation. For customers, the software provides easy-to-use interfaces and alerts for tracking water usage and opportunities for savings.

In addition, this software will provide NBU staff information they need to analyze customer usage in real time to support conservation planning and efforts. For example, targeted outreach could be sent to users with high or increased water usage. As a result, the database will allow NBU to keep track of programs that have been widely accepted by their customers and restart programs that were previously too laborious to conduct without automated data analytics.

3.1.2 💧 Advanced Metering Infrastructure

Traditionally, water usage has been captured by meter readers who physically view and document usage information – typically once a quarter. Over the last 10 years, NBU has undergone an extensive effort to get more timely usage information. They have installed Advanced Metering Infrastructure (AMI) registers at 85% of customer meters to date, which provide near-real-time meter readings. An additional 14% of customers have Automated Meter Reading (AMR) which allows for automated collection of data, but not as frequently as AMI (AMR meters are generally read monthly).

An important application of these data for the conservation program are Continuous Consumption Alerts (**Section 3.6.2**). Continuous water usage often indicates an issue, such as a running toilet or break in the customer water line, and real-time customer notification allows them to investigate and address the issue and minimize water wasted. USEPA estimates that a single leaky fixture can waste 180 gallons of water per month². Over the next 5 years, NBU will be investigating additional opportunities to leverage AMI for water conservation and evaluating the feasibility of reaching 100% AMI throughout the system. Grant funding that could support full AMI implementation will also be considered.

3.2 Water Conservation Rate Structure

NBU initiated a new water rate structure beginning August 1, 2023 that varies rates for fiscal years 2024 and 2025 based upon customer water use. This rate structure was developed based on feedback from NBU's first Rate Advisory Committee (**Figure 3-4**). The Committee of 18 community members was appointed by the NBU Board of Trustees and each member represents a constituency across NBU's service territory. The Rate Advisory Committee was replaced with the Community Advisory Panel (CAP) in 2023. The CAP will be engaged in future rate structure updates.

The approved rate structure maintains the best practice of encouraging and rewarding water conservation, while also ensuring that utility costs are adequately covered. This was accomplished with an increasing block



Figure 3-4 Rate Advisory Committee

² <https://www.epa.gov/watersense/residential-toilets>

rate system which—in addition to the flat fee for fixed costs—includes a variable rate for volume of water consumed, with higher rates as water consumption increases. There are four cost rate blocks or tiers for residential customers summarized in **Figure 3-5** based on the volume of water used.

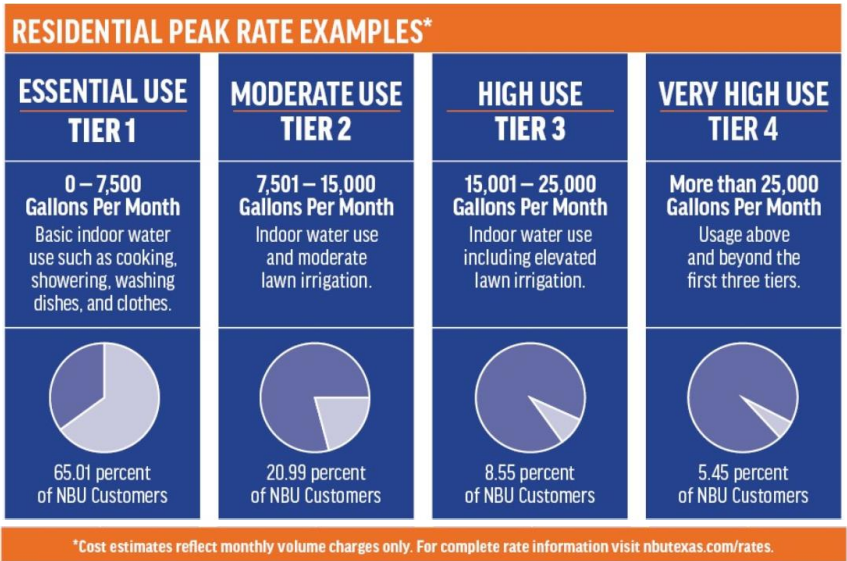


Figure 3-5 Example Rate Tier Structure for Residential Users

3.3 Non-Revenue Water Program

NBU has developed an interdepartmental approach to managing non-revenue water. Non-revenue water (NRW) is the total volume of distributed water which is not billed to customers, such as due to a main break, firefighting, or meter inaccuracies. This team is successfully implementing innovative technologies to reduce water loss, including advanced metering infrastructure (**Section 3.1.2**), satellite leak detection, and meter testing, and is focusing on increasing investment in asset management. They perform annual audits to evaluate quantities and trends in overall water loss and its components, as described **Section 2.4**. Additionally, NBU manages the distribution system pressure based on the procedures in NBU’s Distribution System Operations Manual.

NBU serves as both an electric and water provider. Thus, continuing to evaluate both NBU electric and water infrastructure for opportunities to reduce water (and electric) usage will also be an important component of NBU’s long-term management of non-revenue water.

3.3.1 Satellite Leak Detection

NBU began using satellite leak detection technology in 2018 to reduce water losses. This technology uses satellite images to identify areas that have high soil moisture which could indicate a drinking water leak. The NBU service area is scanned on a quarterly basis and NBU field crews are dispatched to areas



Figure 3-6 Leak Detection Equipment

identified as potential leaks to verify the leaks and conduct any needed repairs. **Figure 3-6** shows an interface that field staff use to identify leaks. Annual water savings due to this program have been estimated to range from 20 to 50 million gallons (**Figure 3-1**). NBU will continue this program to identify and correct new or growing leaks.

3.3.2 Meter Testing Program

Meter testing is an important component of water conservation as malfunctioning meters often underread usage and result in misidentification of actual water usage as water loss. NBU has active meter testing programs for both production meters and customer meters. Production meters measure and account for water pumped into the NBU distribution system from NBU's water supplies. NBU will continue a testing and calibration program for all production meters. Additionally, all new and existing customers are required to have a meter. NBU will continue a testing customer meters, as-needed or as requested, and replacing meters that are under-registering. NBU is also establishing a framework for future meter testing programs.

3.3.3 💧 Increase Investment in Asset Management

The threat of leaks and breaks increases as infrastructure ages, and in the next 10 years, 20% of NBU's water mains will be nearing the end of their estimated useful life. Timely repair and replacement of failing or aging assets are critical aspects of utility management that help minimize risk of failure, prevent disruptions to water service, and continue to minimize water loss. NBU is currently developing an Aging Infrastructure Plan which will provide a long-term investment plan with recommended budgets per year to achieve NBU's target level of risk and service, in alignment with the utility-wide asset management program being expanded. This plan will then inform the budgets requested in the FY 2029 – 2033 Capital Improvement Plan (CIP) for water main repair and replacement. NBU currently has \$48 million budgeted for infrastructure repair and replacement for fiscal years 2024 through 2028; projects include, but are not limited to, water meters, tank decommission, water tank rehabilitations, and infrastructure replacement packages.

3.4 Landscape Water Transformation Program

Over half of average water use by NBU customers is associated with landscape irrigation and other outdoor water use (52% of residential water use and 67% of commercial water use across the last five years as shown in **Figure 2-5**). Thus, NBU is designing a new, more comprehensive Landscape Water Transformation Program. This enhanced program will provide a combined portfolio of incentives and requirements to reduce outdoor water use in New Braunfels.

3.4.1 💧 Drought Management Plan and Enforcement

The City of New Braunfels has a Water Conservation and Drought Management Ordinance (No. 2019-17), which is enforced by NBU. Year-round landscape watering for all customers is limited to two days per week based on the last digit of the address and cannot be conducted between 10:00 am – 8:00 pm. During a drought, landscape watering is restricted further, as summarized in **Table 3-1**, based on the drought stage declared by the City. The ordinance includes additional restrictions depending on the drought. For example, installation of turfgrass is limited in Stage 3, and the refilling of ornamental lakes or fountains with potable water is prohibited during all drought stages. Additionally, park and athletic fields are required to submit water conservation plans. The ordinance further encourages additional voluntary reductions by all customers in all industries, such as only

serving water to customers at restaurants upon request. For a complete list of activities prohibited during a drought, visit [NBU Ordinance 2019-17](#).

Table 3-1 NBU Water Restrictions in Drought Stages

Drought Stage	Landscape Irrigation with a Hose-End Sprinkler or In-Ground Irrigation System is Allowed: (during designated times)	Landscape Irrigation with a Soaker Hose, Handheld Hose, Drip Irrigation System, or Bucket is Allowed:
Year-Round	Two days per week	Any day at any time
I	One day per week	
II	One day per week	Any day during designated times
III	One day every two weeks	

NBU plans to update the Drought Management Plan and increase investment for drought management to allow for more complete enforcement of the plan. Engagement of the CAP is recommended, and discussion should include potential opportunities for improving both drought and year-round irrigation watering restrictions to support the long-term conservation goal of delaying the need for additional water supply. For example, peer systems (e.g., Austin, San Antonio) have implemented year-round restrictions for watering to one day a week. Case studies^{3,4} have shown that restricting watering to one day a week can decrease water use for irrigation even further, especially for high volume users, when supplemented by an active outreach and enforcement campaign.

3.4.2 💧 Irrigation System Inspection Program

Since 2007, NBU has required all new irrigation systems for single-family residences and small commercial buildings with a site plan of 10,000 square feet or less to have separate irrigation meters. However, it wasn't until 2019 that the water connection policy was made enforceable by connecting it to the City's Drought Management Ordinance. This has correlated with an increase in NBU's number of residential irrigation meters from approximately 6,000 in 2018 to over 10,000 in 2021 (an increase of 78%). Similarly, commercial irrigation meters increased from approximately 650 to over 800 during the same period (an increase of 16%). Other irrigation system ordinance requirements include the use of rain sensors to avoid watering during and following rain events, zonal systems to irrigate each landscape zone according to its water needs, and a minimum irrigation area and flow direction requirements to avoid watering adjacent impervious surfaces.

Inspection of new irrigation systems is currently performed by the City of New Braunfels (not NBU). However, to help support the increasing number of new irrigation meters, especially for unincorporated areas outside of the City's permitting authority, NBU plans to increase resources for irrigation meter inspections through the

³ Warner, Laura A., et al. "Insights from residents under year-round irrigation restrictions to improve water conservation impacts." *AWWA Water Science*, vol. 5, no. 4, 2023, <https://doi.org/10.1002/aws2.1348>.

⁴ Mackenzie, J. Boyer, et al. "Water Conservation Benefits of Long-Term Residential Irrigation Restrictions in Southwest Florida." *Journal AWWA*, vol. 110, no. 2, 2018, <https://doi.org/10.5942/jawwa.2018.110.0019>.

Conservation Resource Inspection Program. These additional resources would allow for streamlining the inspection process by having a single inspector licensed to complete backflow prevention inspections, irrigation inspections, and customer service inspections. Further, the increase in resourcing would provide more holistic enforcement of and education on (in collaboration with **Section 3.6.2**) existing irrigation system codes.

3.4.3 💧 Home & Commercial Irrigation Assessments with Rebates

Currently, NBU provides free irrigation assessments to both residential and commercial customers upon request. Common recommendations from these assessments include installing smart irrigation controllers, adding high efficiency sprinkler nozzles, and repairing leaks in customer lines or outdoor faucets. However, the NBU Conservation Team recognizes the opportunity to increase the impact. Over the next five years, this program will be expanded by:

- Ensuring that assessments incorporate all best practices for reduction of water usage
- Increasing outreach and education to increase the number of customers participating
- Introducing customizable rebates for customers that complete an assessment, providing incentive to implement the water-saving opportunities identified through the assessment
- Improving program tracking

3.4.4 💧 Water-Wise Landscape Rebates

Currently, NBU supports the following water-wise landscape rebates: Drought Tolerant Tree, Rain Barrel, Irrigation Zone Removal, Grass Removal, Healthy Soil, Gardening Guide, and Custom Commercial rebates. NBU is planning to develop a streamlined rebate program that combines all existing rebate options. Instead of customer applying separately for various rebate types and receiving a standard amount, the rebate can be tied to water savings expected from recommended water-saving activities. This makes applying easier for customers, more effectively ties utility investment to anticipated benefit, and allows for consideration of water-wise landscape projects beyond those specifically listed. NBU could also provide rebates through this program for installation of low impact development landscaping, such as the conversion of impervious pavement to pervious rock cover, to reduce runoff and promote recharge of our water supplies.

In collaboration with **Section 3.6.7**, NBU is planning to partner with the irrigation vendors and provide them training on various irrigation rebate programs that NBU currently enforces to their customers. As a result, when customers reach out to vendors, they can inform about the specific customer-focused irrigation rebate programs. This collaboration will assist NBU to attract more customers to adopt their rebate programs.

3.4.5 💧 New Development Ordinance Revisions

Over the next five years, NBU plans to pursue ordinance revisions that promote the use of water-wise landscaping for new residential and commercial customers. Similar ordinances by other Central Texas communities have required new customers to limit the use of turf grass, use only drought-tolerant plants and grass, and use pervious ground covers to reduce runoff and promote recharge of our water supplies. NBU will research requirements implemented by other communities and will engage community stakeholders to discuss potential requirements for the New Braunfels community. This engagement is already underway as the City of New Braunfels considers updates to the Land Development Ordinance, to be finalized by the end of 2024

3.5 Indoor Water Use Reduction Program

NBU has an existing program to support existing and new customers with reducing water use inside homes and commercial businesses. NBU staff provide support in identifying opportunities to reduce water use and also provide rebates for upgrading indoor appliances.

3.5.1 Home and Commercial Assessment for Indoor Use

NBU provides free water assessments to both its residential and commercial customers. During assessments, NBU reviews historical data use trends, inspects the inside and exterior of the home or business for possible leaks, and provides suggestions on how to better conserve water and energy while lowering costs. Customers can go to the NBU website to schedule their assessment or contact NBU Customer Service or Conservation and Customer Solutions (CCS) to schedule over the phone.

3.5.2 Indoor Water Use Rebates

NBU continues to offer rebates to customers for improving indoor water use efficiency. Indoor rebates are available to residential customers for upgrading to ultra-high efficiency toilets and ultra-high efficiency washing machines. Additionally, NBU offers a custom commercial rebate to provide a financial incentive for commercial customers to improve indoor water use.

3.6 Outreach and Education Program

NBU outreach and education programs provide information to new and existing customers to promote water conservation and efficient use. Educational materials highlight NBU's existing conservation programs, educate the community about drought stages, provide tips for water savings and identification of leaks, and provide customers with utility contact information. NBU uses a variety of outreach formats and delivery methods including text and phone alerts, mailed brochures, emailed newsletters, hand-delivered flyers, online videos, workshops and hands-on activities such as at the Headwaters at the Comal facility (**Figure 3-7**), checklists, bill inserts, and social media posts. **Figure 3-8** shows examples of NBU'S social media posts emphasizing water conservation. NBU has four specific outreach strategies that have been and will continue to be implemented, and NBU will be evaluating three new potential outreach strategies as part of a new Water Conservation Education and Outreach Plan that will be developed. These strategies are described in the following subsections.

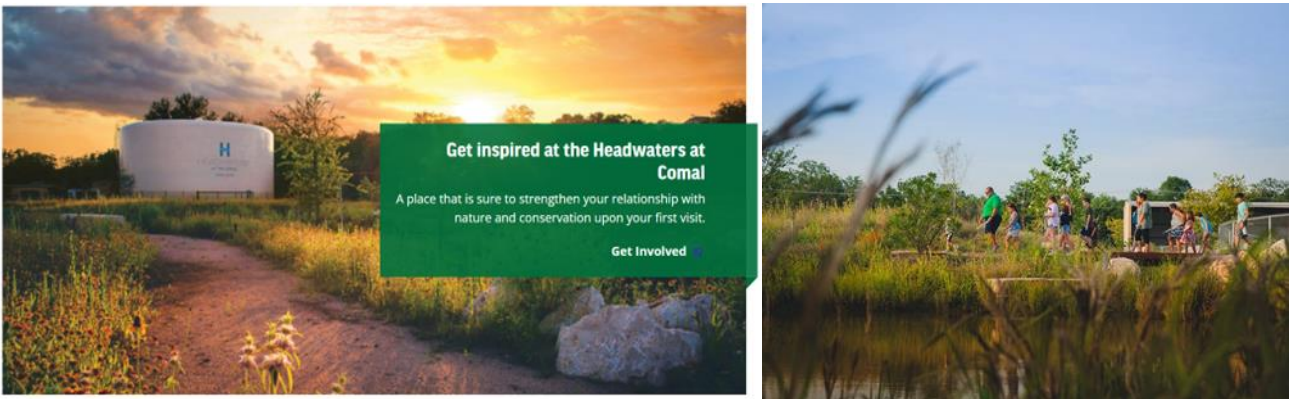


Figure 3-7 NBU Partners with Fisher Park Nature Education Center, Headwaters at the Comal, West Side Community Center, and New Braunfels Food Bank to Provide Education on Water Conservation to the Community

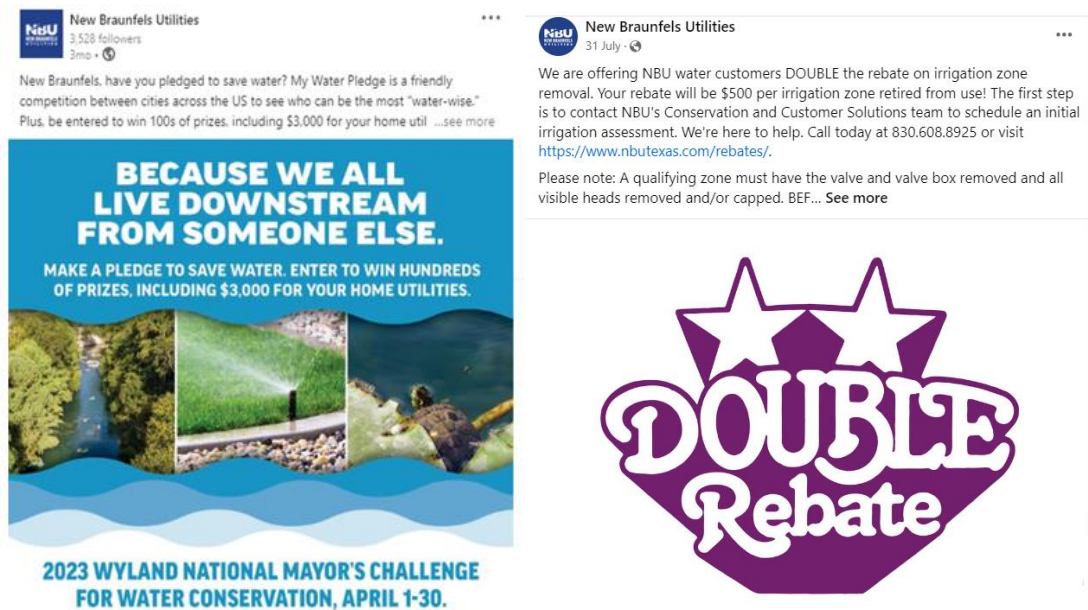


Figure 3-8 Example NBU Social Media Posts on Conservation

NBU has four specific outreach strategies that have been and will continue to be implemented, and NBU will be evaluating three new potential outreach strategies as part of a new Water Conservation Education and Outreach Plan that will be developed. These strategies are described in the following subsections.

3.6.1 Continuous Consumption Alerts

NBU sends alerts via automated phone calls or text messages to customers if they have continuous water consumption for 48 hours indicating that a leak is occurring. These messages provide guidance to customers on locating and repairing leaks, and customers can contact NBU for assistance in fixing the leak. Since the inception of leak alerts in 2017, NBU estimates savings of 250 million gallons of water due to continuous consumption alerts.

NBU was awarded [the 2020 Texas Environmental Excellence Award for Water Conservation](#) for its customer leak awareness outreach campaign by the Texas Commission on Environmental Quality.

3.6.2 Utility Consumption Reports

Upon request through the [NBU Utility Consumption Report webpage](#), NBU also provides customers with a report (**Figure 3-9**) that charts indoor and irrigation water use and compares it to the neighborhood average. This educational tool tracks conservation progress and helps customers identify additional opportunities for water savings.

3.6.3 Top 30 Water User Report

This strategy was implemented a few years ago, but paused as it was labor intensive to generate this list of customers using the prior billing software system. Thus, following completion of the new data analytics software (**Section 3.1.1**), NBU will re-launch the Top 30 Water User Report. The new software will automatically generate a list of the 30 customers using the most water each month. NBU will then contact each customer to discuss strategies for reducing demand and usage.

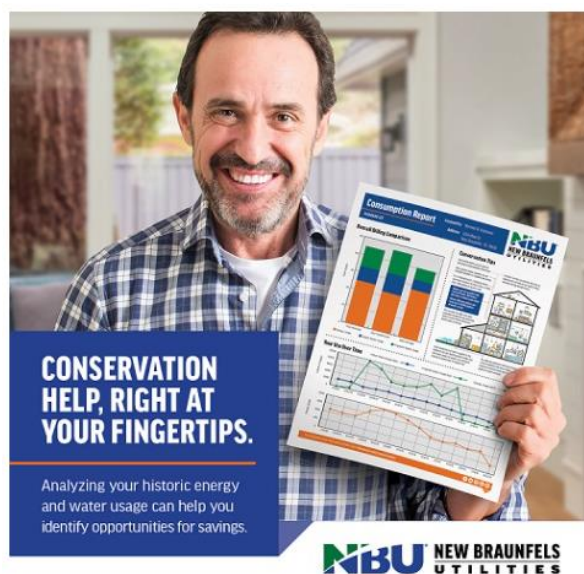


Figure 3-9 Utility Consumption Reports

3.6.4 Top 10 Water Violator Strategy

This strategy was also implemented a few years ago, but paused as it was labor intensive to generate this list of customers using the prior billing software system. Thus, following completion of the new data analytics software (**Section 3.1.1**), NBU will re-launch the Top 10 Water Violator Strategy. The new software will automatically generate a weekly list of the 10 customers with the greatest out of compliance usage (i.e., a leak or watering on the incorrect day). The top ten violators will be notified via courtesy letter or phone call.

3.6.5 💧 Water Conservation Education and Outreach Plan

Over the next couple of years, NBU will be reviewing the existing outreach and education program and developing a new Education and Outreach Plan that prioritizes the Landscape Transformation Program and aligns with the One Water New Braunfels Program. This evaluation will consider updates to messaging, outreach approaches and forums, and educational materials to align with current goals. To optimize use of resources, the Plan will also identify target audiences for tailored communication, including but not limited to, large water users, high water use areas, businesses, and low-income residents. Specific initiatives that will be prioritized include:

- Enhancing the water use assessment program (**Sections 3.4.3 and 3.5**) with new materials and resources to increase customer participation
- Enhancing the water-wise landscape rebate program (**Section 3.4.4**) with new educational materials to increase customer participation
- Developing an internal training program to increase the literacy of NBU and City staff on the existing and new water conservation programs and the role each department plays in supporting conservation

3.6.6 💧 Engage Local Officials and Community Stakeholders

NBU will enlist feedback and input from key stakeholder groups and community members on water conservation strategies. Priority discussion topics for this group will include the New Commercial Business Landscape Ordinance as well as providing feedback on new outreach and education materials developed. NBU will also be engaging with local officials, including City Council, to provide education and updates on implementation of the conservation plan as well as guidance on ways local officials can support and elevate the conservation plan.

3.6.7 💧 Establish Water Conservation Partnerships with Local Trade Organizations

Local trade organizations and professionals, such as landscapers, plumbers, and irrigators, serve a critical role in making recommendations to customers on landscaping and building improvements. Thus, NBU is planning to establish new partnerships with local trade organizations to provide education on water conservation approaches, the importance of helping customers implement conservation strategies, and the current NBU water conservation programs. On a case-by-case basis, partnerships may also include providing hands-on support for implementing business changes to better support implementation of conservation initiatives (e.g., advice on changes recommended to materials provided to customers or additional in-the-field training for local businesses).

4 Five-Year Water Conservation Implementation Plan

NBU has identified a portfolio of existing, expanded, and new conservation programs for implementation during calendar years 2024 through 2028 (**Section 3**). These strategies were selected through a multi-phased screening process to prioritize applicability, diversification, and effectiveness and were evaluated considering resource requirements, potential water savings, and other utility priorities. Strategies include new incentive programs, enhanced education and outreach, and new/updated ordinances and address both indoor and outdoor water use. However, as analysis of historical water use data (**Section 2**) demonstrated that irrigation water use accounts for over half of total water use, NBU will be prioritizing allocation of additional resources over the next five years to strategies reducing irrigation water consumption. Long-term, these strategies will reduce water demand per user, which will ultimately protect water resources and promote long term water supply sustainability for NBU customers. The following sections summarize the action plan for implementing both the existing and new/expanded conservation strategies over the next five years.

- **Implementation Plan (Section 4.1)** summarizes the timeline for implementing the new and expanded water conservation strategies as well as the budgets required, expected savings, and roles and responsibilities.
- **Water Conservation Program Metrics (Section Error! Reference source not found.)** presents metrics that will be used to track implementation progress and ensure conservation programs are effective.
- **Per Capita Demand Goals (Section 4.2)** summarizes targets for the next 5 and 10 years.
- **Approval and Distribution of the Conservation Plan (Section 4.3)** documents approval of this plan and lists the recipients of the final conservation plan.
- **Adaptive Implementation (Section 4.4)** outlines the process for regular evaluation of progress and updates to the implementation plan.

4.1 Implementation Plan

Over the next five years, NBU will continue implementation of all existing conservation programs, expand existing programs that prioritize reduction of water use for landscape irrigation, and add new programs. Conservation programs will engage both residential and commercial customers. The proposed implementation timeline, budget, savings, and roles and responsibilities for the new and expanded strategies (**Table 4-1**) are summarized below.

Table 4-1 List of New and Expanded Water Conservation Strategies

New Conservation Strategies	Expanded Conservation Strategies
• Conservation Data Analytics and Visualization • Irrigation System Inspection Program • New Development Ordinance Revisions • Water Conservation Education and Outreach Plan • Engage Local Officials and Community Stakeholders • Establish Water Conservation Partnerships with Local Trade Organizations	• Advanced Metering Infrastructure • Increased Investment in Asset Management • Drought Management Plan and Enforcement • Home and Commercial Irrigation Assessments with Rebates • Water-Wise Landscape Rebates

Timeline: Figure 4-1 represents key milestones that are planned to be achieved each year. The first year will focus on updating the Drought Management Plan, completing the Water Aging Infrastructure Plan, and developing a new Water Conservation Outreach and Education Plan. During 2024, NBU will also complete implementation of the new data analytics software and develop the new landscape transformation conservation strategies. In 2025, NBU plans to launch the new Landscape Transformation program, including expanded and customizable rebate programs. Then, in 2026, new outreach and education strategies will be launched to engage the community in these new conservation strategies and to engage stakeholders in development of the new commercial customer landscape ordinance, which is planned to be presented to the NBU Board and City Council for approval in 2028.

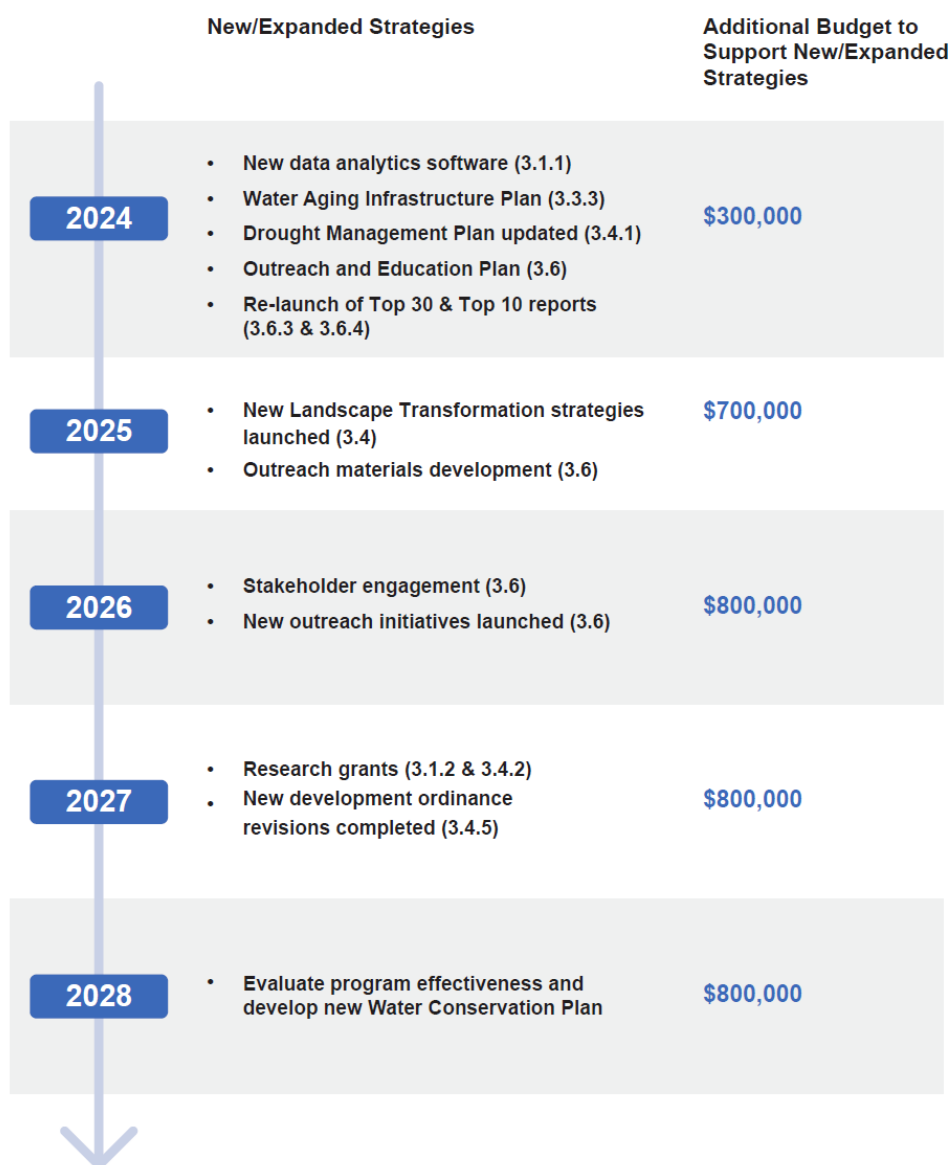


Figure 4-1 Implementation Timeline and Budget for New and Expanded Water Conservation Strategies (in addition to continuing to implement and fund the existing water conservation strategies)

Five- and Ten-Year Water Savings⁵: While estimated water savings were calculated for only seven of the twenty strategies, implementation is estimated to result in a minimum of 850 million gallons of water savings over the next five years (170 million gallons per year, on average). Of strategies that were measured, the greatest measurable water savings are expected to come from continuing continuous consumption alerts and satellite leak detection. Further, over the next 10 years, savings may total more than 2,200 million gallons (averaging more than 220 million gallons per year). The increased savings realized over time are due to the compounding advantage of long-term changes such as through the ordinance and permanent landscape conversions; the affects will increase even further past ten years. Although the new conservation strategies proposed are not anticipated to result in an immediate increase in measurable water savings, they will contribute to long-term water consumption reduction and long-term cost savings, including:

- **Delayed New Water Supply Costs:** For example, if the new development ordinance revisions are approved by 2025, the number of customers impacted each year will increase such that by 2063, when NBU is projected to need another new water supply, a savings of over 200 million gallons per year is anticipated for commercial customers alone. In 2063, this would correlate with a demand reduction of 2 gallons per capita (person) per day without requiring any change by residents at home. Similar revisions to the residential ordinances for new developments will increase these savings greatly. By reducing demand, we delay the need for developing a new water supply, which could cost hundreds of millions of dollars.
- **Lower Water Use Costs:** Over this five-year implementation period, the average cost per volume of water saved for the new and expanded conservation programs is estimated to be lower than the cost NBU has calculated for NBU's newest water supply, the Gonzalez-Carrizo Water Supply Project, which is coming online in 2024.

The conservation strategies identified vary in cost and expected outcomes. Incentive / rebate programs encourage community buy-in, increase education, and reward conservation efforts. However, water savings are limited by a relatively small number of participants and these programs require greater investment to fund rebates. On the other hand, usage ordinances result in greater water savings since all relevant customers must participate, with only minor costs for staff time for enforcement.

- **Avoided Costs:** These conservation strategies will also assist NBU and the community by increasing the avoided costs that would have otherwise been incurred, had conservation strategies not been implemented. Avoided costs can include reduced water treatment and wastewater treatment costs, reductions in water losses through distribution, and reduced staff hours.

Five-Year Budget: A modest budget of \$3.4 Million over the next five years (in addition to continuation of budgets allocated for existing conservation programs) is required to implement the recommended new initiatives effectively. The budget supports hiring new employees to support additional conservation work (e.g., additional inspections and assessments), hiring external engineering consultants and legal support, rebates to incentivize customers, and community outreach and education. None of the conservation programs selected have large

⁵ Savings and cost estimates are based on a set of assumptions that will be verified during program implementation.

traditional capital cost expenditures due to the goal of focusing on low-cost strategies for the next five years. However, annual investment in staff and incentives for customers will be needed to make these programs successful. Several utilities have moved to capitalizing rebate costs and NBU will research and investigate the opportunity to do so for these costs. Additionally, staff will research grant programs to identify potential funding available in support of these new strategies.

Roles and Responsibilities: NBU's Conservation and Customer Solutions team will oversee implementation of the water conservation implementation plan. However, effective implementation will require participation by multiple departments across NBU and coordination with the City of New Braunfels. The lead department responsible for implementation of each conservation program is shown in **Table 4-2**.

Table 4-2 Water Conservation Program Responsible Teams and Proposed Metrics

Water Conservation Program	Responsible NBU Team(s)	Metrics
Overall Program Management	Conservation and Customer Solutions	- Tracking of total per capita demand (Appendix A) - Tracking of residential per capita demand (Appendix A) - Tracking of average use per account per customer type
Conservation Data Management	Conservation and Customer Solutions, Resource Strategy, Water Operations, and Data Strategy	- New internal data management system and dashboard live (% complete) - Continue implementation of AMI for all new customers (% customers)
Rate Structure	Finance	- Use of an inclining block rate structure for single family customers (y/n) - Effectiveness of inclining block rate structure - Incorporation of peak and off-peak rates to encourage conservation among commercial and multi-family rate structures (y/n) - Inclusion of a strategy for maintaining revenue stability while incentivizing conservation and efficiency (y/n)
Non-Revenue Water Program	Water Operations, Engineering, and Production	- Tracking of number of leaks detected (y/n) - Tracking of estimated water savings (y/n) - Tracking of unit annual water losses (y/n) - Number of breaks per mile of pipe - Infrastructure Leakage Index
Landscape Water Transformation Program	Conservation and Customer Solutions	- Decreasing trend in average irrigation water use per customer for customers with separate irrigation meters - Number of water-wise landscape rebates approved per year - Number of irrigation assessment rebates approved per year - Area of turf removed (sf) - Percent of conservation team positions filled (%) - Enforcement program for each component of the updated Drought Management Plan (% of components) - Percent of identified violators receiving a warning (%)

New Braunfels Utilities
Water Conservation Plan

Water Conservation Program	Responsible NBU Team(s)	Metrics
		• Approval of the New Development Ordinance revisions (y/n)
Indoor Water Use	Conservation and Customer Solutions	• Number of indoor rebates approved per year • Tracking of estimated water savings (y/n)
Education and Outreach Campaign	Conservation and Customers Solution and Communications Team	• Implementation of outreach plan activities (% complete) • Tracking of number of customers reached per year (y/n) • Tracking of estimated water savings based on engagement with top water users and top violators (y/n)

4.2 Water Conservation Program Metrics

Water conservation program metrics assist in tracking and maintaining records of implementation progress, evaluating program effectiveness, allocating time and resources, and identifying areas for further investment and further improvement in programs. Metrics may be quantifiable (e.g., the number of water-wise landscape projects) or qualitative (e.g., percent complete of a new initiative). Regardless of type, metrics selected should align with implementation priorities, be attainable, and provide actionable triggers for increased investment or resource allocation. While this plan provides an initial slate of metrics to evaluate implementation progress and conservation effectiveness over the next five years (**Table 4-2**), staff will continue amending and improving these after plan adoption.

4.3 Approval and Distribution of the Water Conservation Plan

Implementation of an effective and sustainable water conservation plan requires commitment and engagement from the community. Thus, after NBU's Conservation and Customer Solutions team has drafted the water conservation plan, with input from the NBU Executive Leadership team and NBU departments engaged in implementation of the plan, the plan is presented to the NBU Board of Directors for review and approval. Upon approval by the NBU Board of Directors, the water conservation plan is then presented to the New Braunfels City Council for review and approval. Approval by both of these bodies ensures community buy-in to the proposed conservation strategies and that support and sufficient funding are allocated to ensure the success of the conservation implementation plan. This Water Conservation Plan was approved by the City Council on **[insert date after approval]** (**Appendix F**).

Upon approval by City Council, this Water Conservation Plan was delivered to the South-Central Texas Regional Water Planning Group (Region L) and submitted to the Texas Water Development Board and Texas Commission on Environmental Quality. Additionally, the plan was made available to the public on [NBU's Water Conservation Webpage](#).

4.4 Adaptive Implementation

NBU has an ongoing commitment to long-term water conservation that extends existing water supplies and delays the need to purchase additional supplies. NBU's Conservation and Customer Solutions team will review program metrics annually to evaluate program progress and effectiveness, and reallocate resources, as needed, in alignment with the conservation plan goals and priorities. Thus, the long-term success of the conservation program is highly dependent on the configuration and implementation of the new conservation data analytics software to allow for effective decision making.

During the last year of this implementation plan, NBU will prepare a similar roadmap for future implementation activities. Although capital and operational budgets for the current five years were already accounted for at the time of drafting this conservation plan, NBU plans to increase investment in conservation programs to support future water conservation plans. Thus, the success of this plan (and future plans) in delaying the need for additional water supplies will depend on the commitment of NBU and City leadership to increase investment in

New Braunfels Utilities
Water Conservation Plan

conservation, further grow an internal conservation culture, and ensure that communication internally and externally aligns with this commitment.

