



NORTH TEXAS MUNICIPAL WATER DISTRICT
LONG-RANGE
WATER SUPPLY PLAN
AN OVERVIEW

DECEMBER 2024



**NORTH
TEXAS
MUNICIPAL
WATER
DISTRICT**

WWW.NTMWD.COM

NTMWD: SERVING THE HEART OF A GROWING REGION

The North Texas Municipal Water District provides treated water to more than 2.3 million people in 70+ communities in one of the fastest-growing parts of the U.S.

Regional growth is expected to continue, driven by factors that include:

- Job opportunities
- High quality of life in the region
- Policies friendly to business, technology and innovation
- Multiple universities and research hubs
- Access to transportation for moving goods

WHAT DOES THAT MEAN?

The District must plan to meet water needs that will be likely if the population more than doubles, as projected, to 4.5 million by 2080.

The District remains committed to conservation as the most cost-effective and environmentally responsible way to extend our water supplies. Our successful conservation program, embraced by our Member Cities and Customers, can continue saving our most precious resource but we'll also need new sources.

OUR CURRENT SUPPLY

- Lavon Lake
- Bois d'Arc Lake
- Lake Texoma
- Lake Tawakoni
- Jim Chapman Lake
- Water Reuse, including East Fork Reuse Project

WATER TREATMENT PLANTS THAT PRODUCE POTABLE WATER

Wylie (I-IV), Leonard, Bonham, Tawakoni

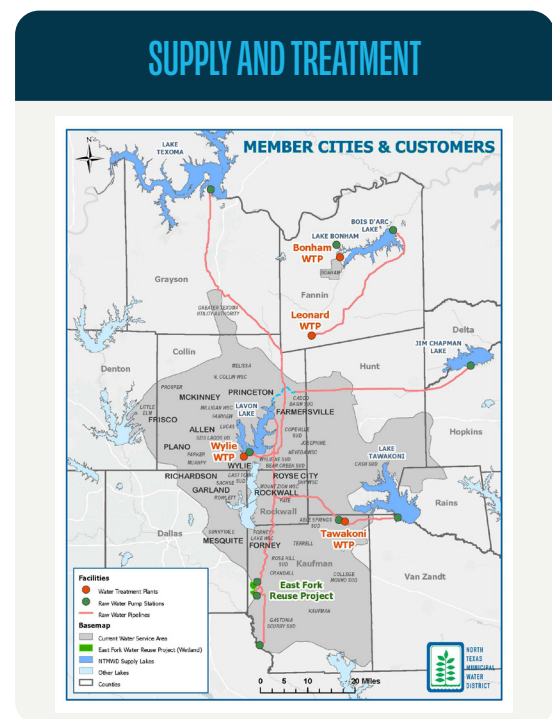
HOW CAN THIS LONG-RANGE WATER SUPPLY PLAN HELP ADDRESS OUR NEEDS?

The plan examines projections for population growth and water demands, evaluates existing sources and the potential impacts on them from climate variability, looks at a range of water management strategies, and makes recommendations for ways to develop supply to keep pace with growth.



2024
RELIABLE SUPPLIES OF
400+ MILLION
GALLONS PER DAY (MGD)

2080
PROJECTED NEED OF
800+ MILLION
GALLONS PER DAY (MGD)



KEY QUESTIONS AND ANSWERS

Q: HOW ARE WATER NEEDS EXPECTED TO CHANGE IN NTMWD'S SERVICE AREA?

A: Since 2000, NTMWD's successful conservation program has substantially reduced the demand for water in our service area. This mirrors the trend in the North Texas region, which has seen a 30 percent reduction in per capita water use from 2006 to 2020. However, efficient water use alone won't meet our growing needs.

Even with aggressive conservation, rapid population growth means an increasing demand for water in the region. The numbers tell this story:

- **400+ million gallons per day:** Current availability in 2025 for 2.3 million people
- **800+ million gallons per day:** Projected need in 2080 for a population of 4.5 million

(During a dry year, abnormally dry weather/drought leads to water shortages.)

Q: HOW WILL NTMWD MEET ITS WATER SERVICE OBLIGATIONS?

A: Our strategy encompasses four main approaches:

- Staying committed to conservation and helping our customers understand its vital role
- Identifying, acquiring and developing new water supply resources
- Taking sensible, affordable actions that can bolster supplies in the short term
- Using long-range planning to target what we should do now to prepare for the future

Q: WHAT DOES PLANNING FOR THE FUTURE INVOLVE?

A: Long-range planning includes steps required today to be ready for tomorrow. While data can help develop projections, we also have to plan for the unexpected. Projections include a 10% allowance to factor in uncertainty. Our scenarios also consider lower- and higher-than-projected growth.

Other factors to consider:

Existing supplies fall short: We might have less water than expected if supplies are reduced by lengthy droughts or unexpected impacts of climate variability.

Major projects face hurdles: It can take decades to

develop a major new supply, which requires planning, land acquisition, permitting, design and construction of multiple components. For instance, planning for Bois d'Arc Lake started in 2003, but it took until 2023 to start providing water, because of the lengthy permitting process required for most major new water supplies.

Growth adds slightly to reuse supplies: NTMWD has the largest water reuse program in Texas, but just as with conservation, it can't provide enough to keep up with growth.

Q: WHAT DO THE OPTIONS LOOK LIKE?

A: The Long-Range Water Supply Plan evaluated 25 potential water management strategies, looking at considerations such as the amount of additional water provided, cost, reliability, environmental impact and the practicalities of implementing them. There often are tradeoffs: For instance, alternatives that would add the most to the supply also would take the longest to develop, and they're costly. There is also uncertainty in developing various sources of supply, so multiple options must be pursued to achieve the new water supplies needed.

Q: WHAT WILL CHANGES MEAN FOR CUSTOMERS?

A: With NTMWD's commitment to good stewardship of our natural resources, conservation will continue to play a key role in extending our water supply and saving taxpayer funds.

Our leadership will look to add to our supply in the 2030s through short-term options that make the most fiscal and practical sense. For longer-term strategies, we'll need to start now to pursue new water sources that will be reliable and cost-effective.

New supplies are expensive because of the permitting, infrastructure and other elements required, so water rates will have to increase. We'll continue to keep our customers informed through our website: www.ntmwd.com.

Supplying water since 1956, NTMWD has developed an award-winning conservation program, the largest water reuse program in Texas and resources to provide more than 400 million gallons a day of safe water. Looking toward 2080, NTMWD will continue to build on this success and live out its vision: **Regional service through unity: providing for our region's needs today and tomorrow.**



CONSERVATION AS A FOUNDATION

NTMWD shows our commitment to good stewardship of our natural resources through leadership in water conservation, which we intend to aggressively continue. NTMWD has won 20 conservation awards across 20 years. Our extensive investment and collaborative efforts have extended our water supply and saved billions of dollars by avoiding or delaying capital expenditures.

Here's proof that we're clearing a high bar with our conservation success: To approve the permit to build Bois d'Arc Lake, the Texas Commission on Environmental Quality required NTMWD to show that we were achieving the highest practicable levels of conservation – It's a standard we met.

NTMWD updated our Water Conservation Plan in the spring of 2024, and we continue working with our regional partners and Member Cities and customers to encourage conservation and fund resources.

These initiatives have helped significantly reduce the per-person demands within our service area. Even though conservation alone won't be enough to meet the rapidly growing needs of our region, continuing to reduce our per-person water use should help us keep our projected overall need in 2080 at 260 million gallons per day lower than it would be without conservation.



HOW WATER PLANNING WORKS

The Long-Range Water Supply Plan includes projections of population and demand for NTMWD, analysis of expected water supply from existing sources, projections of the need for additional water supplies, and analysis of water management strategies that might provide additional supplies to meet the expected needs.

NTMWD is planning for supplies 10% greater than projected demands to allow for uncertainty. This is prudent, smart planning based on available knowledge.

There are several reasons for any water provider to build supplies in excess of projected demands. For instance, in recent years, the District has faced demands that have grown faster than projected, while supplies from existing sources have sometimes been less than expected, some sources have become unavailable, and projects have taken a long time to develop. Dry periods, also called droughts, are particularly challenging because they

increase demand (more lawn watering) and decrease supplies (low water levels in rivers and streams). Factoring in uncertainty adds extra supply security in the face of these issues.

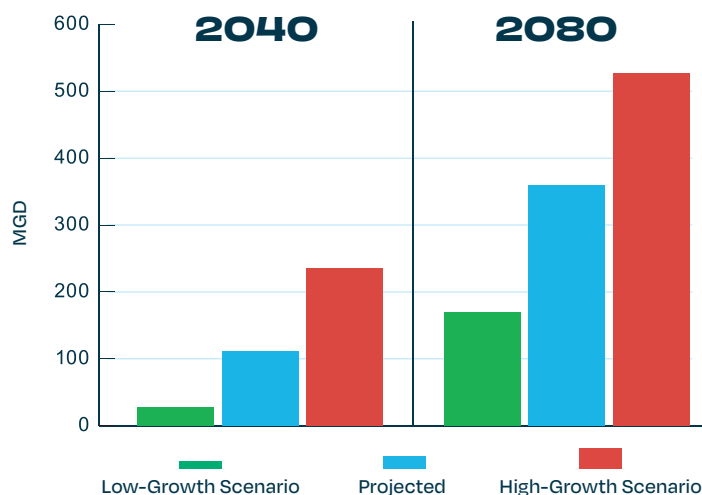
The plan examines projections along with lower-than-expected and higher-than-expected growth. A number of other factors are considered. Among the most important considerations for major projects are that they take time and can be complex.

A major new supply requires planning, land acquisition, permitting, design and construction of multiple components. Planning for Bois d'Arc Lake (above) started in 2003, but the system did not begin delivering water until spring 2023.

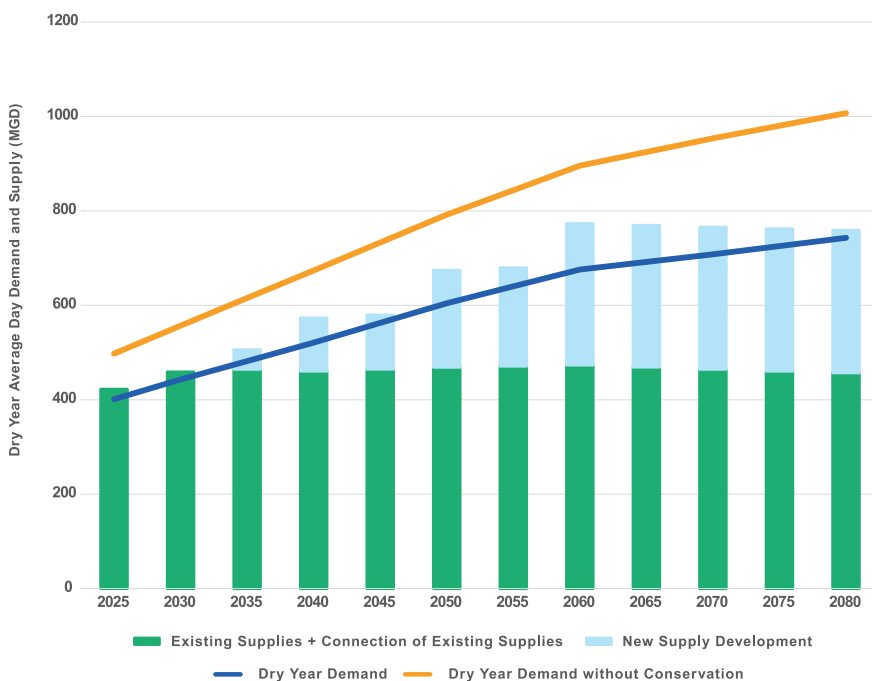
ESTIMATING OUR NEEDS

NTMWD is already pursuing additional projects to provide full access to our current water sources. We will need to start adding even more to our supplies starting in the 2030s to keep pace with the projected rapid population growth in our service area.

ADDITIONAL NEEDS (with 10% for uncertainty)



SUPPLIES EXISTING OR BEING DEVELOPED, ALONG WITH EXPECTED DEMAND TRENDS



REGIONAL WATER PROJECTS UNDERWAY TO INCREASE SUPPLY OR ACCESS TO SUPPLIES

LEONARD WATER TREATMENT PLANT PHASE II

Expand treatment capacity from

70 MGD TO 140 MGD

to access additional Bois d'Arc Lake supplies

WYLIE WATER TREATMENT PLANT IV EXPANSION

Increase treatment capacity by

70 MGD ↑

(final expansion to Wylie plant) to add to supply

BOIS D'ARC LAKE RAW WATER PUMP STATION NO. 2

Increase pumping capacity to

142 MGD ↑

to provide more water for treating and adding to the drinking supply

LAVON LAKE RAW WATER PUMP STATION NO. 4

Create new, deeper intake at Lavon Lake to increase access to deeper storage during drought conditions

SISTER GROVE REGIONAL WATER RESOURCE RECOVERY FACILITY

Implement new wastewater treatment plant for northern portion of service area to add to the reuse reserves



EXAMINING OPTIONS TO KEEP WATER FLOWING

The plan shows the results of an evaluation of **25 potential water management strategies** to develop additional water supplies for NTMWD. For each possible option, the evaluation examined:

- Potential amount of supply
- Capital cost and unit cost (cost per 1,000 gallons) to provide treated water
- Six other categories, including water quality, reliability and environmental impacts

The strategies that could be implemented by 2040 include:

- Fresh groundwater supplies from sites in east and northeast Texas
- Additional reuse water using various configurations and technologies for treatment
- Drawing more from Lake Lavon at deeper intake levels
- Connecting to existing reservoirs
- Desalination of Lake Texoma supplies (to reduce high salinity from Red River basin deposits)

The longer-term strategies that could be implemented after 2040 include:

- Aquifer Storage and Recovery, which would require more study to determine viability
- Using more from Lake Texoma, which would require blending with additional new sources
- Purchasing/transferring water from Toledo Bend Reservoir on the Texas/Louisiana border
- Reallocating storage in Lake Wright Patman from flood control to municipal use
- Potential new lakes: Columbia, Marvin Nichols, George Parkhouse North and South

EVALUATION EXAMPLE: SHORT-TERM STRATEGY

H. ADDITIONAL TEXOMA WITH DESALINATION

Action (What?)

Strategy Description	This strategy would utilize NTMWD's existing Lake Texoma water right through desalination
Strategy Type	Existing Surface Water
Water Right or Purchase	Water Right
Partners	None
NTMWD Supply Quantity	26 MGD
Years of Supply (Based on 8 MGD/year of demand growth)	3 years
Infrastructure	43 miles of 60-inch pipeline, 83 MGD conventional treatment plant expansion, 50 MGD reverse osmosis treatment plant, 23 miles of 30-inch discharge pipeline

Strategy Evaluation Scores

Quantity	3
Quality	6
Capital Cost	7
Unit Cost	2
Certainty	9
Reliability	8
Environmental Impacts	7
Legal/Regulatory Requirements	7
Time to Implement	9

Scores 1-10 with 10 being the most favorable score.

Driver(s) for this project

- New Water Supply
- Capacity

Purpose (Why?)

Provides additional reliable water supplies through desalination of Lake Texoma water for which NTMWD already has an existing water right.

Special Considerations

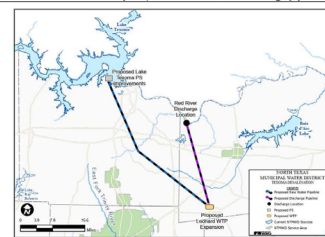
The proposed project would utilize an existing water right without the need for a new fresh water source to blend with. Operating costs for desalination are more expensive than conventional treatment and some water is lost during the treatment process. However, this strategy could be initiated at any time as NTMWD largely controls this strategy's timeframe. NTMWD already holds a TPDES permit to discharge brine from the proposed plant.

Timing (When?)

The estimated time to implement is between 5-10 years. This includes time for design and construction of facilities, and any additional time that may be needed for pipeline routing and treatability studies.

Cost (How Much?)

Capital (2021 \$)	Unit Cost w/ Debt Service (2021 \$)	Unit Cost w/o Debt Service (2021 \$)
\$1 billion	\$11.71	\$5.03



EVALUATING BEST WATER MANAGEMENT STRATEGIES

In the expected scenario, NTMWD will need to develop another new source of supply in the 2030s and about 360 MGD of additional average annual supply by 2080. The Long-Range Water Supply Plan used a multi-level screening process to select and evaluate multiple water management strategies.

The 25 most viable options for evaluation were identified using information from previous analyses and engineering judgment. Some strategies that weren't included in this plan might become more attractive in the future and be worth reconsideration.

The evaluation showed that there are often tradeoffs between criteria. Strategies that rank high in certainty tend to come with higher capital and unit costs. Strategies that provide significant volumes of new supplies tend to require longer lead times for development and must be pursued many years in advance of a need.

The plan includes a one-page summary of key information for each water management strategy evaluated. The scoring scale ranges from 1 to 10 in each category, with 10 being the most favorable.

EVALUATION EXAMPLE: LONG-TERM STRATEGY

G. ADDITIONAL LAVON (DEEPER INTAKE WITH NEW RWPS NO. 4)

Action (What?)

Strategy Description	New raw water pump station with access to deeper levels in Lavon Lake
Strategy Type	Existing Surface Water
Water Right or Purchase	Water Right
Partners	None
NTMWD Supply Quantity	12 MGD
Years of Supply (Based on 0.5 MGD/year of demand growth)	1-1.5 years
Infrastructure	350 MGD pump station, connection to all four Wylie WTPs

Strategy Evaluation Scores

Quantity	1
Quality	6
Capital Cost	9
Unit Cost	8
Certainty	7
Reliability	8
Environmental Impacts	8
Legal/Regulatory Requirements	5
Time to Implement	8.5

Scored 1-10 with 10 being the most favorable score.

Driver(s) for this project

- New Water Supply
- Capacity
- Redundancy

Purpose (Why?)

In addition to increased reliable supply of Lavon Lake, RWPS No. 4 would provide several other benefits to the NTMWD system. RWPS No. 4 adds resiliency and redundancy in the NTMWD system by providing access when Lavon Lake is low to many other sources that currently flow through the lake to the Wylie WTP. The project also includes connection to all four Wylie WTPs, providing redundancy for raw water distribution within the Wylie complex in the event of problems at one of the other raw water pump stations. A 350 MGD pump station would also provide a near term emergency lifeline supply (winter demands or implementation of drought stage 3, no outdoor watering) at lower lake levels.

Special Considerations

The proposed RWPS No. 4 could replace aging RWPS No. 1 and/or No. 2 which have a total capacity of 285 MGD, or these stations could be maintained for additional resiliency. For the purposes of this strategy cost evaluation, we assumed that RWPS No. 4 would replace RWPS No. 1 and 2. Since Lavon Lake is owned by the U.S. Army Corps of Engineers (USACE), significant coordination and 408 permitting would be needed.

Timing (When?)

This project is estimated to take 7-15 years to implement.

Cost (How Much?)

Capital (2021 \$)	Unit Cost w/ Debt Service (2021 \$/1,000 gals)	Unit Cost w/o Debt Service (2021 \$/1,000 gals)
\$340 million total cost \$285 million with credit for rehab of RWPSs No. 1 and 2	\$5.22 (with credit for rehab of RWPSs No. 1 and 2)	\$0.97 (with credit for rehab of RWPSs No. 1 and 2)

88

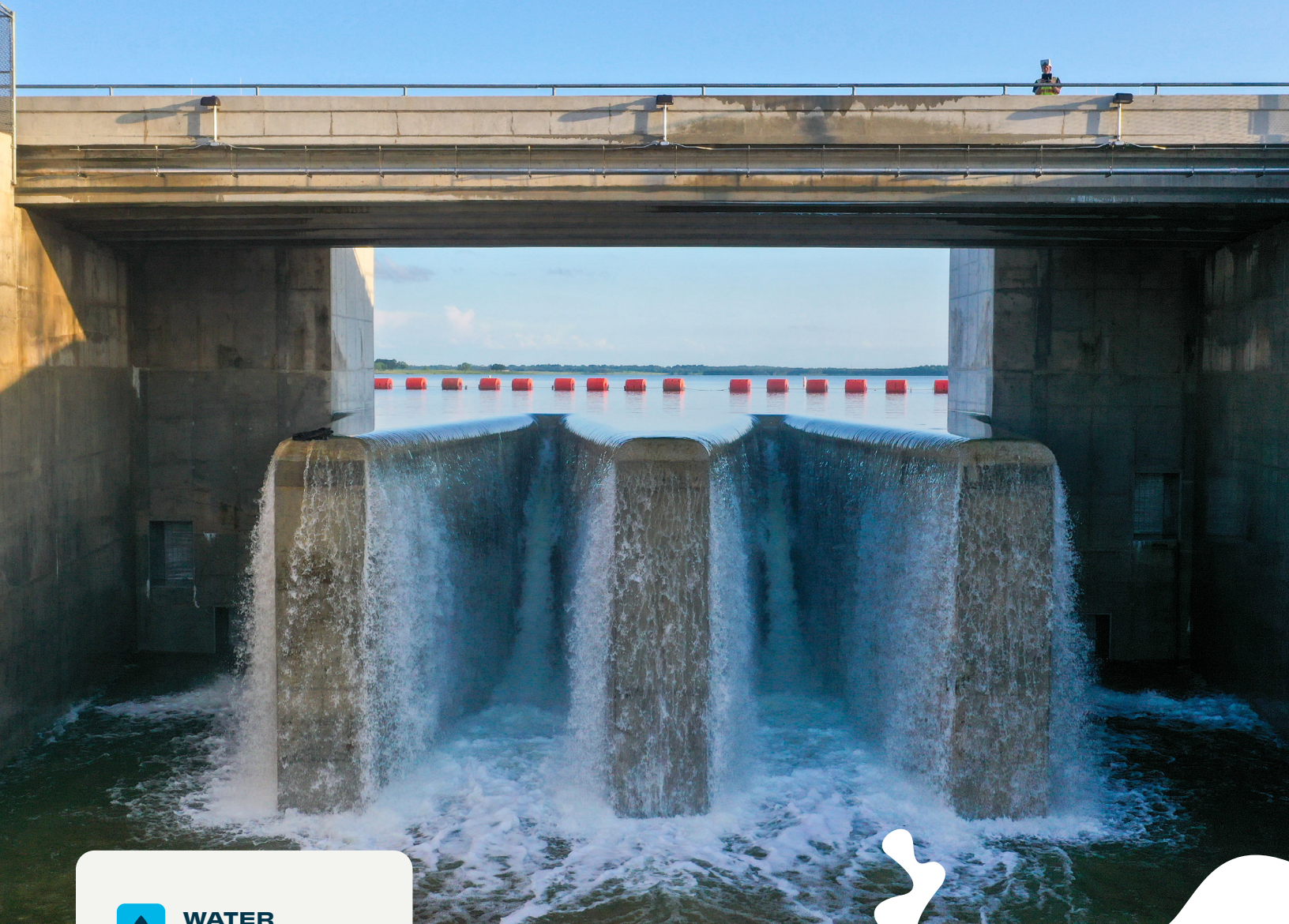


RECOMMENDATIONS

It generally takes a long time to develop major new water supplies, and there is significant uncertainty in the process. Much of the time required for development, along with the uncertainty, can be attributed to the lengthy permitting process, especially for potential new reservoirs.

THE PLAN RECOMMENDS THAT NTMWD PURSUE MULTIPLE STRATEGIES CONCURRENTLY:

TIMEFRAME	ACTION
Near-term	Vigorously pursue strategies to meet the needs projected beginning in the 2030s decade.
Longer-term	Continue simultaneously pursuing multiple strategies to prepare for expected needs over the next few decades.
Continuous	Monitor the population and demand, supply from existing sources and potential water supply options, and adapt the plan to meet changing needs.
Every five years	Update the plan to capture changed conditions.
Ongoing	Keep all options open and examine new water supply alternatives if they become available.



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