

# MLGW Utility Support to xAI



MLGW Committee  
July 9, 2024

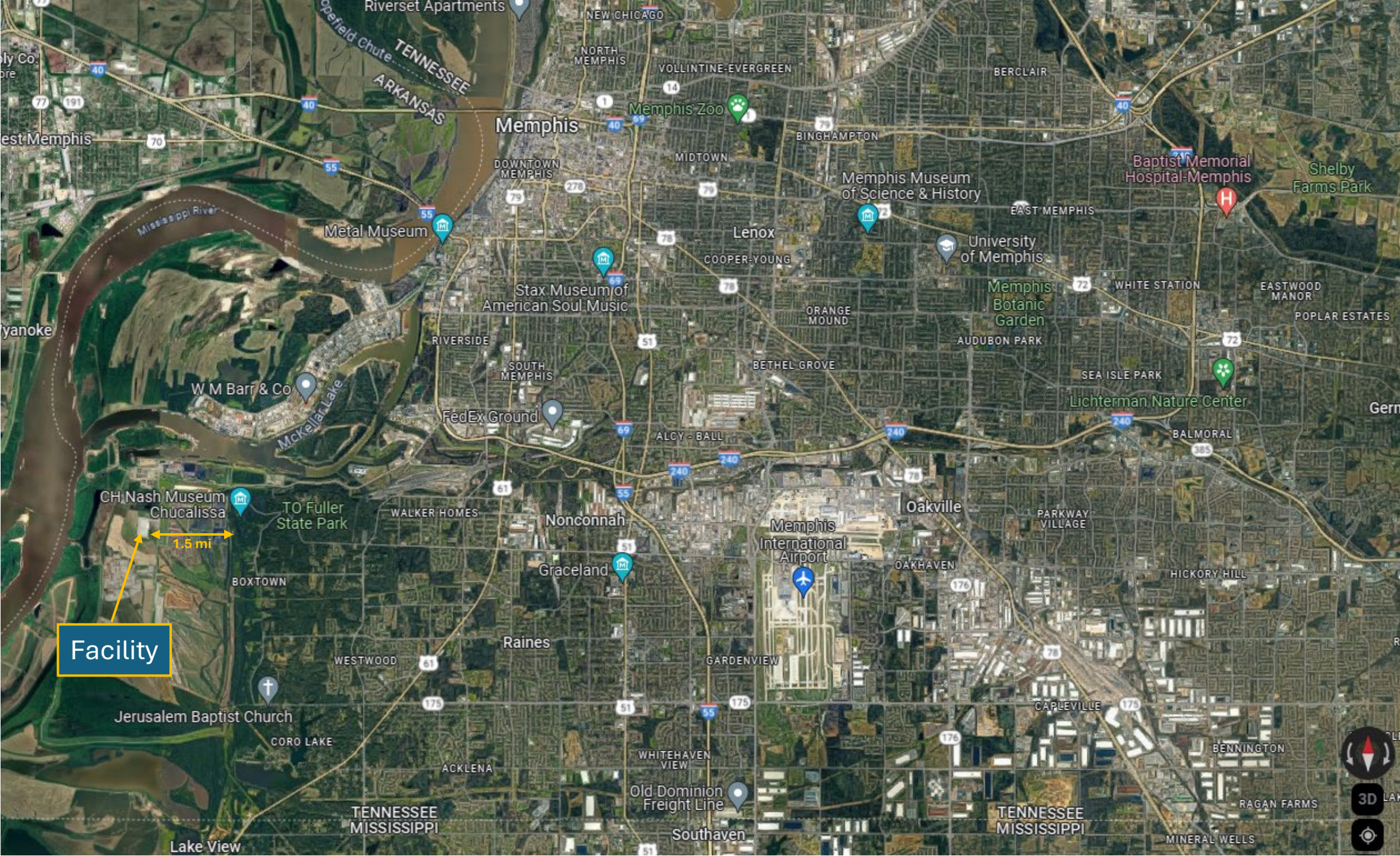
# xAI Utility Support

- xAI will occupy the former Electrolux manufacturing facility
  - The facility was constructed using a 2010, \$97 million State of TN grant, a \$3.1 million state training grant, and a 15-year local property tax abatement of 75%.
- Industrial Park has significant utility infrastructure to support industry
  - Other tenants include: TVA Allen Combined Cycle facility, US Army Corps of Engineers, City of Memphis Maxson Wastewater Treatment Plant, Nucor Steel, Praxair, CN Railroad Intermodal, Vulcan material company

# BLUF: Utility Support

- Water:
  - Facility will use water from existing 20" water main.
  - No capital cost to MLGW. Will pay prevailing commercial rate for consumption
- Gas:
  - Facility will use gas from existing 16" Gas Main. Developer paid for 8" tap to facility.
  - No capital cost to MLGW. Will pay prevailing commercial rate for consumption
- Electric:
  - Facility will use existing 8MW of electric power currently available.
  - MLGW will increase availability to 50MW at an MLGW capital cost of \$760,000
  - Developer will pay for construction of 150MW substation.
    - MLGW will provide a "margin allowance" on monthly bill to recoup cost of construction of the substation (approximately \$24M total).
    - Will pay prevailing commercial rate for electric consumption





Facility

1.5 mi

CH Nash Museum Chucalissa

TO Fuller State Park

Memphis

Memphis Zoo

Memphis Museum of Science & History

University of Memphis

Memphis Botanic Garden

Baptist Memorial Hospital-Memphis

Shelby Farms Park

Stax Museum of American Soul Music

Lenox

W M Barr & Co

FedEx Ground

Memphis International Airport

Oakville

Lichterman Nature Center

Nonconah

Graceland

Raines

Old Dominion Freight Line

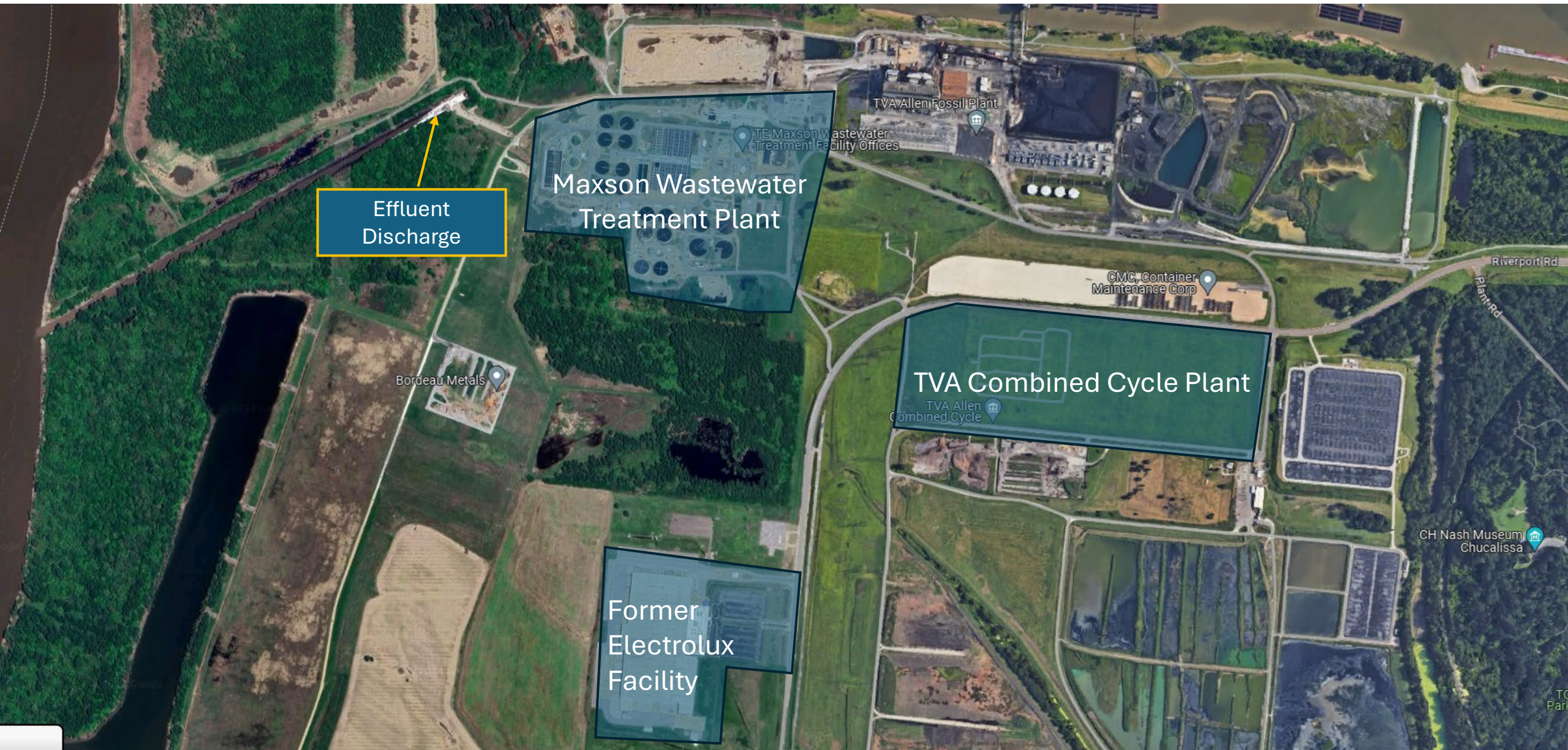
Southaven

TENNESSEE MISSISSIPPI

MINERAL WELLS







Effluent Discharge

Maxson Wastewater Treatment Plant

TVA Combined Cycle Plant

Former Electrolux Facility

TVA Allen Fossil Plant

TE Maxson Wastewater Treatment Facility Offices

CMC Container Maintenance Corp

TVA Allen Combined Cycle

Bordeau Metals

CH Nash Museum Chucalissa

Riverport Rd

Plant Rd

TO Park



Future (2025)  
Electric  
Substation  
150 MW capacity

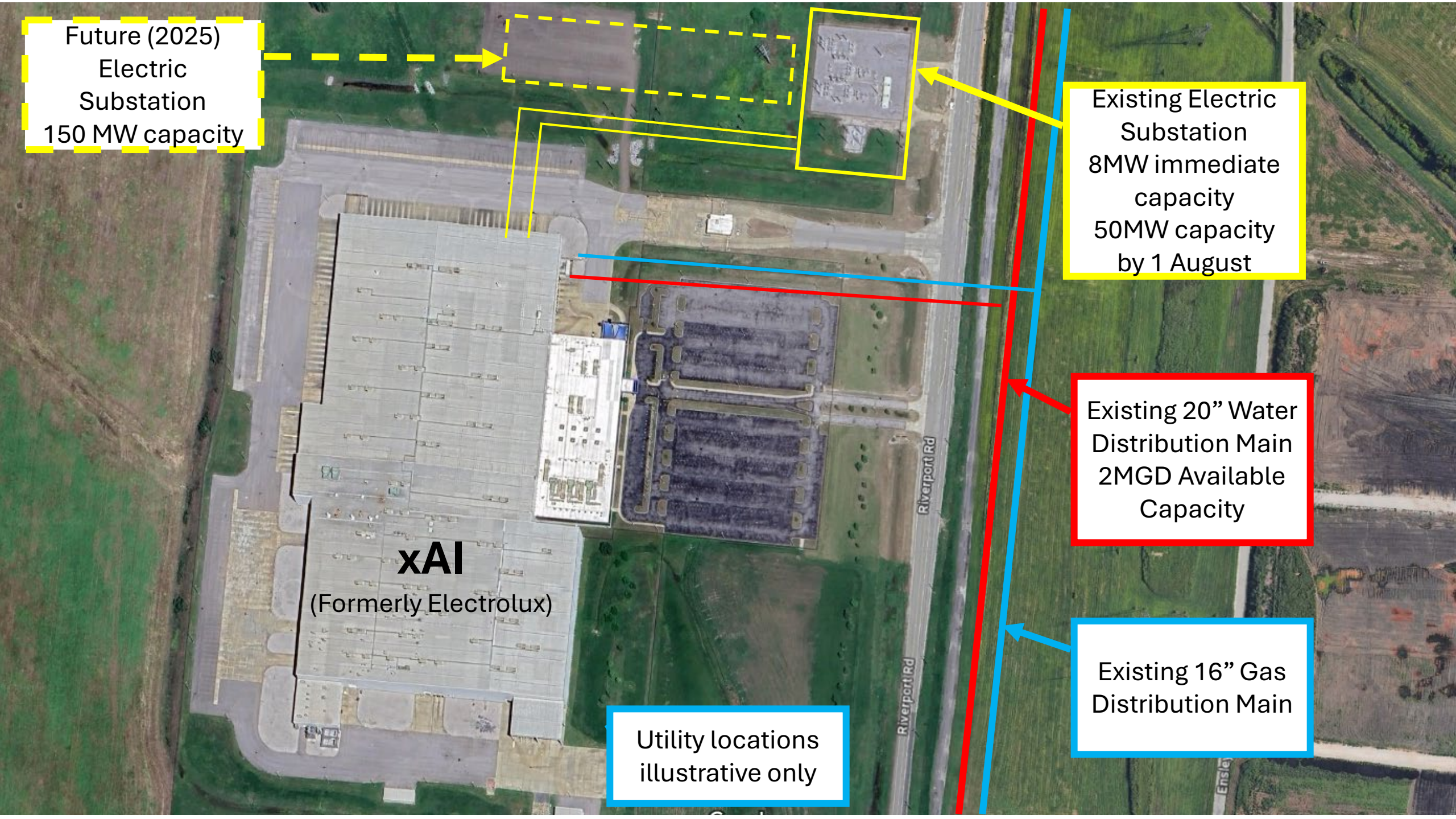
Existing Electric  
Substation  
8MW immediate  
capacity  
50MW capacity  
by 1 August

Existing 20" Water  
Distribution Main  
2MGD Available  
Capacity

Existing 16" Gas  
Distribution Main

**xAI**  
(Formerly Electrolux)

Utility locations  
illustrative only



# MLGW Actions

- Economic development discussion with Chamber and property owner early March
- Utility availability discussion with xAI mid-March
- Contracts for gas, water and initial electric service coordinated April-June.
- Still pending is TVA Board approval of 150MW request
  - Loads above 100MW require board approval
  - Participation in Demand Response program a practical requirement for approval

# Concerns that have been expressed

- Additional stress on the electric grid
- Additional, high-volume use of aquifer water



# Electric Grid Stress

- On very hot summer days or during an extreme winter storm, homeowners and businesses use more energy than usual to heat or cool their buildings, risking their utility's ability to supply enough energy for everyone, and putting stress on the grid.
- It is during these peak periods when the demand for energy exceeds a utility's energy supply, which may cause severe electricity disruptions
- The TVA Bulk Electric System has experienced this type of stress twice: Dec 2022 (rolling blackouts), Jan 2024 (voluntary conservation request). *MLGW Demand was approximately 2000MW during each event.*
- MLGW winter/summer normal peak demands are ~2000MW/3000MW. This project will add approximately 150MW to those peaks. **MLGW all time peak 3533MW 8/15/07**

# How can utilities respond?

- They can turn on specialized power plants, known as **peaker plants**, that are only called on occasionally when the grid approaches maximum capacity. “Combustion Turbines” and “Aeroderivative Turbines” are examples.
- They can call for **voluntary conservation**. As stress on the grid rises, the utility can ask customers to voluntarily conserve. This can be effective if everyone does their part.
- TVA has peaker units in their electric generation fleet



# How can utilities respond?

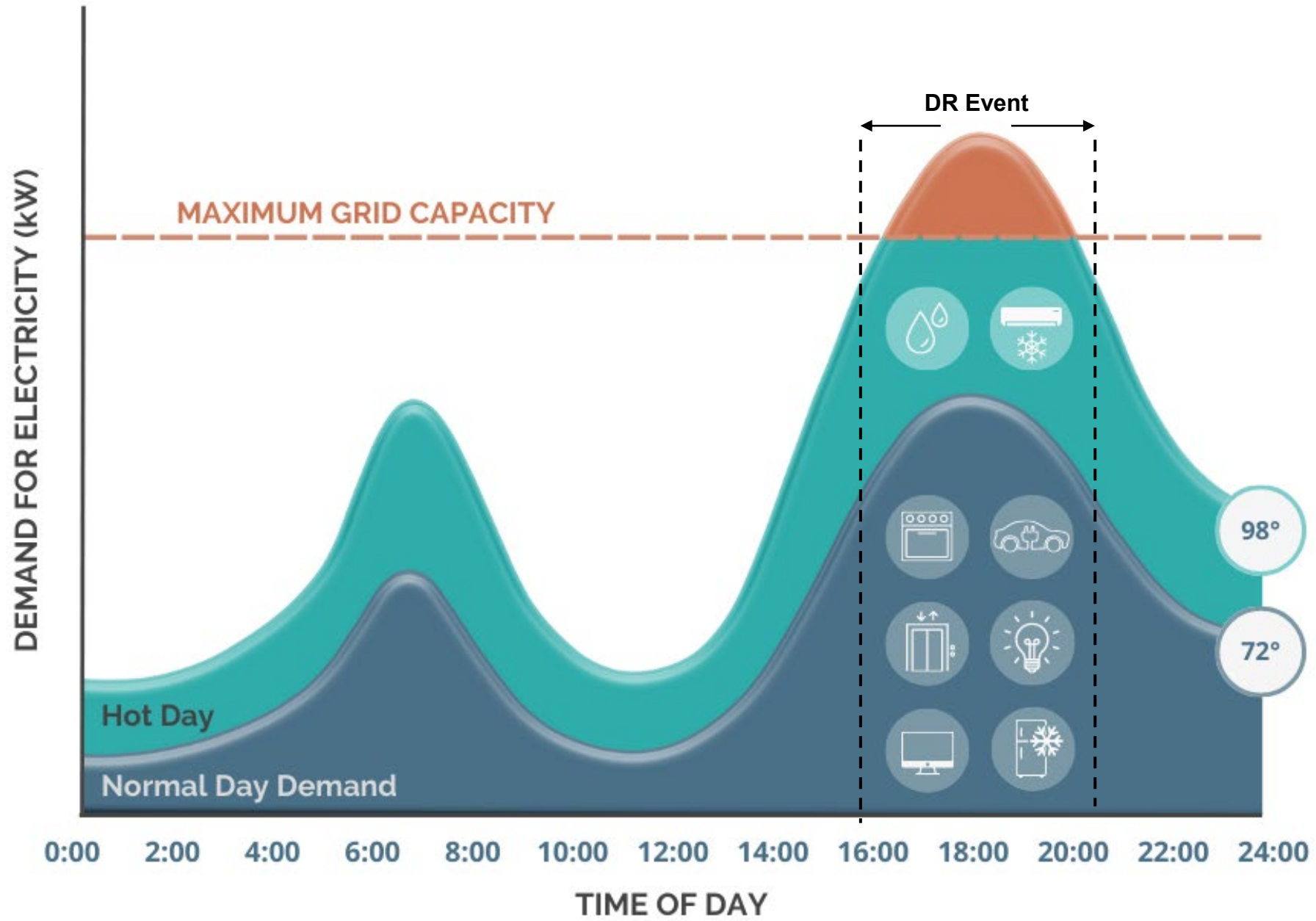
- They can activate a “**virtual power plant**”, also known as a Distributed Energy Resource plan. This is a collection of energy storage systems connected to the grid like batteries or Evs
- MLGW Grid Modernization will allow us to have this capability



# How can utilities respond?

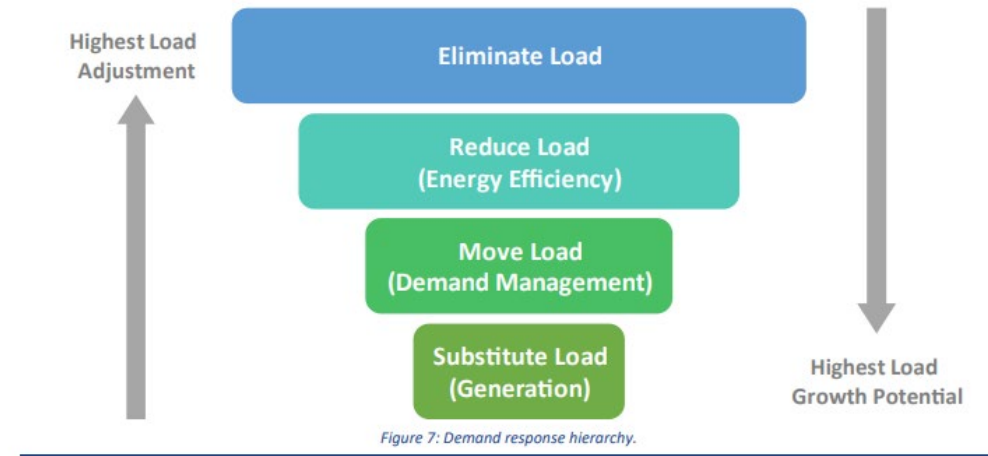
- They can implement **demand response** programs.
- **Demand Response** (DR) programs are contractual agreements with large customers to reduce their electricity consumption temporarily during high-demand periods to maintain reliability of the grid.
- Typical events are only between 2-4 hours long and occur only a few times per year, so disruption to businesses is very minimal
- TVA/MLGW coordinates Demand Response agreements with large customers





# xAI and Demand Response

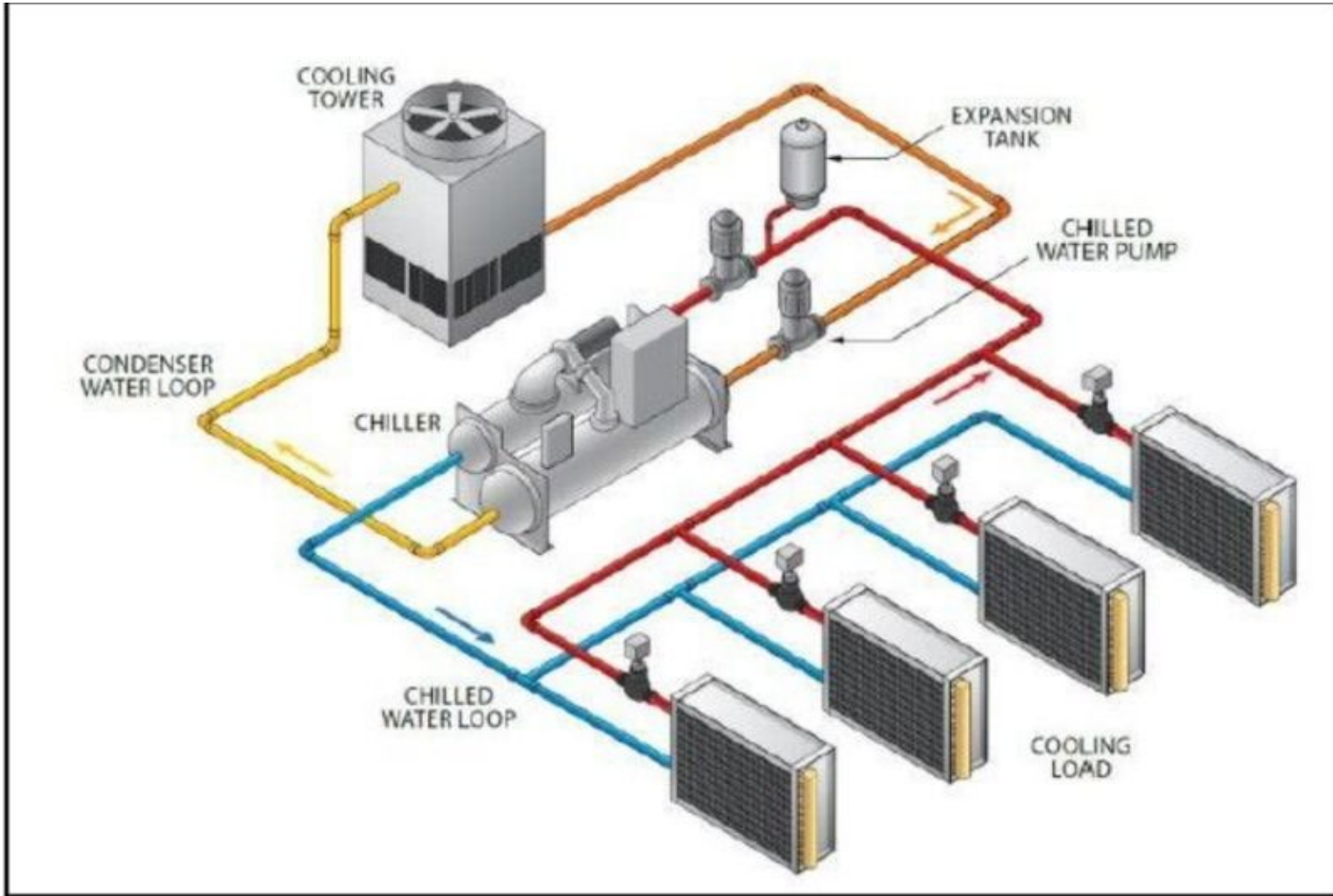
- TVA offers a range of notification windows: 5 min, 30 min, 60min, 4hr, 12hr
- And an annual interruption total from 24 hrs to 96 hrs
- Companies receive a larger discount for enrolling in a program with shorter notification and larger annual capacity





# How will xAI use water?

- xAI will use two water systems:
  - a recirculating chilled water system to cool the computers. This is a closed loop system that does not consume much water. This recirculating water will heat up as it draws and carries heat away from the computers. This water is cooled by using a water-cooled chiller and evaporative cooling tower.
  - An evaporative cooling tower system that harnesses the cooling properties of evaporating water to remove heat from the recirculating cool water. It is the evaporative cooling process that consumes large quantities of water



Chilled water cooling system

Evaporative cooling tower



Images are representative

# MLGW, xAI, and Water

- As other entities have done in the past, xAI could have made application to the Shelby County Water Board for a permit to install wells and use unmetered water for their plant
- During the initial meeting, MLGW conveyed, and xAI agreed, that using metered water from MLGW was the right first step.
- xAI quickly agreed that exploring other options for cooling water was in the best interest of the company and the community.
- MLGW delivers an average of 150 MGD to customers, this would add ~1 MGD to that demand. **MLGW all time peak 342 MGD 8/29/00**





Davis  
30 MGD  
Capacity

CH Nash Museum  
Chucalissa

WALKER HOMES

Raines

ACKLENA

FedEx Ground

Nonconnah

Graceland

Memphis  
International  
Airport

Oakville

OAKHAVEN

Old Dominion  
Freight Line

Southaven

Lake View

TENNESSEE

TENNESSEE  
MISSISSIPPI

TENNESSEE  
MISSISSIPPI

W M Barr & Co

McKellar Lake

TO Fuller  
State Park

BOXTOWN

WESTWOOD

Dalstrom Park

Jerusalem Ba

ACKLENA

WHITEHAVEN  
VIEW

GARDENVIEW

ALCY - BALL

BETHEL GROVE

SOUTH  
MEMPHIS

LONGVIEW  
HEIGHTS

RIVERSIDE

AUDUBON PARK

51

69

240

240

240

78

61

55

51

76

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175

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175

175

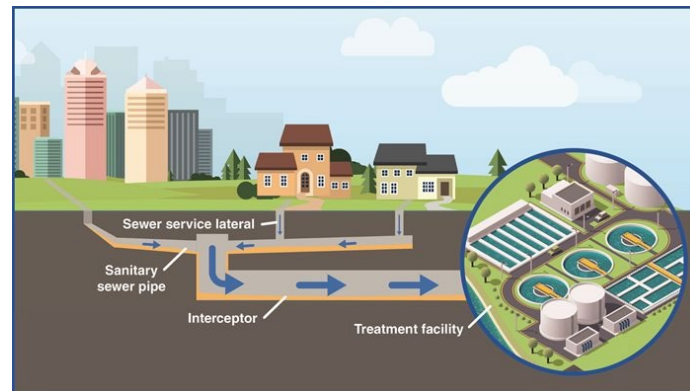
15

51



# Wastewater

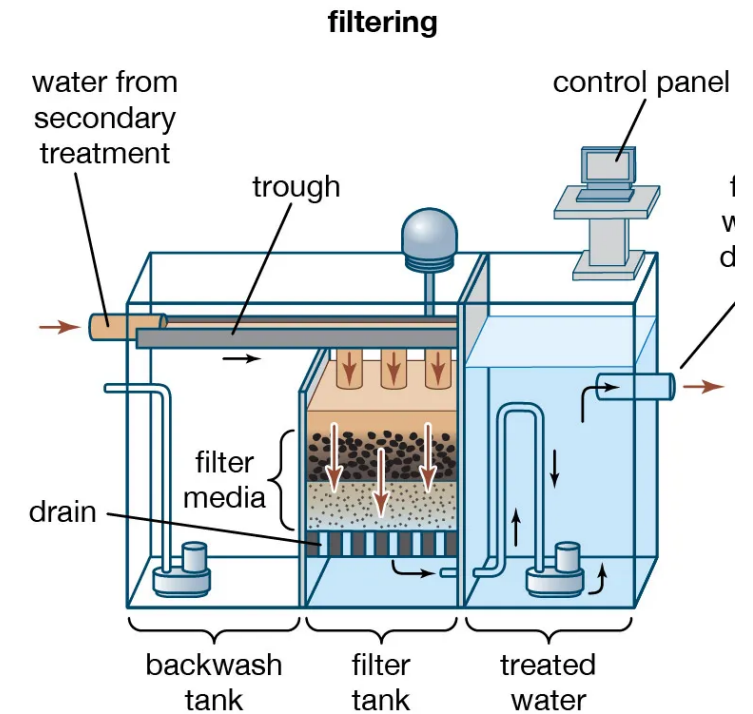
- Municipal wastewater is treated to remove biologics before being released to back to source water. In Memphis, effluent is discharged to the Mississippi River. This is also known as “graywater”.
- Graywater can be used as a water source for evaporative cooling systems in industrial plants. However, if not properly treated, graywater can introduce impurities that can cause problems with system operation.
- This is the case with effluent from the CoM Wastewater plant – it contains too many impurities to be used without additional treatment.



# Graywater (Tertiary) treatment facility

- Advanced wastewater treatment that consists of eliminating non-biodegradable pollutants.
- This results in better and more consistent quality of water suitable for use in industrial processes, like cooling.

**Tertiary treatment of wastewater**





# Graywater, TVA, CoM, and xAI

- Process underway to determine most appropriate style treatment plant
  - Different styles have different costs, but also have variability the quality of end product.
- Planning assumption: plant sized to produce 10 MGD of useable water. Sufficient to serve typical demands from TVA, CoM, xAI and future customers.
- Within 30 days: we will have analysis of options and probable costs from engineering firm
  - xAI and TVA/MLGW/CoM have parallel design and engineering efforts underway

# Questions

