# Final Data Poster: The San Marcos Industrial Water Loop

## 1. Research Question

**Primary Question:** How can San Marcos utilize open data from the EPA Clean Watersheds Needs Survey (CWNS) 2022 to implement a "Closed-Loop" Industrial Water System that protects the Edwards Aquifer while supporting rapid industrial growth?

**The Challenge:** San Marcos is currently under Stage 4 Drought restrictions, yet it is one of the fastest-growing industrial corridors in the nation. How do we provide millions of gallons for data centers and manufacturing without draining the city's drinking water?

## 2. Methodology

To solve this, we performed a multi-stage data analysis of the **EPA CWNS 2022 Dataset**:

1. **Data Extraction & Cleaning:**

• Processed `FLOW.csv` and `DISCHARGES.csv` using Python scripts to filter for Texas-based facilities.

• Cleaned facility IDs and combined flow types to isolate "Total Flow" vs "Reuse" percentages.

2. **State-Wide Analysis:**

• Calculated total water reuse volumes across Texas by joining discharge types with design flow capacities.

• Segmented reuse into four categories: Industrial, Irrigation, Potable, and Agricultural.

3. **Local Identification:**

• Triangulated San Marcos specific facility data using CWNS IDs `48008029001` and `48008029002`.

• Identified existing industrial "Significant Industrial Users" (SIUs) via the San Marcos Industrial Pretreatment Program (IPP).

4. **Case Study Validation:**

• Benchmarked the proposed San Marcos loop against the successful "40 Acre" Industrial WWTP (GCA) in Texas City.

## 3. Findings

• **The "Lost Asset":** San Marcos currently discharges **100%** of its treated wastewater (~17.8 MGD) back into surface waters. This water is currently a "lost asset" that does not contribute to drought

resilience.

• **The State Leader:** Texas leads in **Industrial Water Reuse**, which accounts for **143.04 MGD** (over 70% of all reuse in the state). This proves that industry is the most efficient target for large-scale recycling.

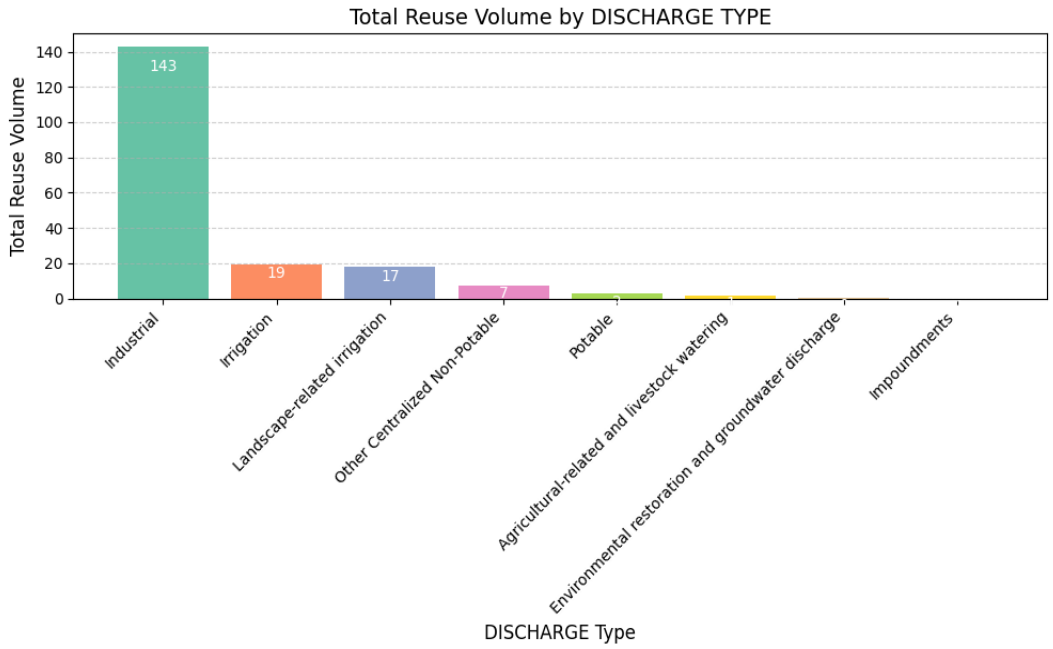
• **The Spatial Gap:** Geospatial analysis shows that major industrial candidates (Noveon, CFAN, and the new $1.5B Highlander Data Center) are clustered along the I-35 corridor, less than **5 miles** from the San Marcos WWTP, making a "Loop" pipeline physically viable.

## 4. Visualizations

The following data creation's drive our proposal's narrative:

### *A. Texas Water Reuse Breakdown*

This chart highlights the massive volume of Industrial Reuse compared to all other types, justifying our focus on factories and data centers.




### *B. The San Marcos Industrial Loop (Concept Map)*

A geospatial infographic showing the "Blue Line" pipeline route from the WWTP to the industrial corridor.


## 5. Results (Scaling the Loop)

By Implementing "The San Marcos Industrial Loop," the city can achieve the following:

• **Potable Water Savings:** Converting 50% of the city's current discharge to industrial reuse saves **~9 Million Gallons of Fresh Water EVERY DAY**.

• **The Impact:** This is enough to fill **14 Olympic-sized swimming pools** every 24 hours.

• **Economic Resilience:** The loop provides "drought-proof" water to anchor tenants like **Highlander Data Centers** and **Noveon Magnetics**, ensuring they never have to shut down during Stage 4 restrictions.

• **Sustainability:** Reduces the withdrawal pressure on the San Marcos River and the Edwards Aquifer, protecting local ecosystems while enabling economic expansion.