PROJECT PROPOSAL: Infrastructure Efficiency & Aquifer Preservation

Location: Texas County, OK (FIPS 40139) | Guymon & Hooker **Objective:** Non-Revenue Water (NRW) Recovery and Grid Stabilization **Technical Standard:** Green Code Infrastructure Protocol

1. Executive Summary

Texas County is facing a dual pressure point: the critical drawdown of the Ogallala Aquifer and the rapid expansion of high-density data center facilities. This proposal outlines a 12-month pilot to implement advanced leak detection and hardware-efficiency standards to protect municipal resources and stabilize utility rates for residents and agricultural operators.

2. The Infrastructure Challenge

Based on regional audits of the High Plains corridor, Texas County currently operates with an estimated **18–22% Non-Revenue Water (NRW)** baseline. This represents treated municipal water lost to distribution inefficiencies before reaching consumers. Simultaneously, "Furnace-model" data centers (legacy dense GPU architectures) require significant evaporative cooling, placing an additional load on a stressed aquifer.

3. Technical Solutions

A. 140 Hz Acoustic Leak Detection

- **Deployment:** Installation of high-frequency acoustic sensors at primary wellheads and municipal trunk lines.
- **Impact:** Real-time detection of micro-fissures and structural anomalies in the distribution matrix, providing a 48-hour early warning system for well-failure or significant leaks.

B. Data Center Regulatory Standards (The "Symbiotic" Mandate)

To protect the grid from new developments, we propose a transition to **Sparse Inference Benchmarks**:

- **Efficiency:** Requirement for new facilities to meet a **<20W per core** energy standard (Neuromorphic/Sparse architectures).
- **Thermal Loop:** Mandatory use of closed-loop reclaimed water systems to ensure zero impact on groundwater extraction.

C. Verification via Zero-Knowledge Proof (ZKP)

- **Transparency:** Utilizing ZKP reporting allows the County to verify real-time water and power consumption of data centers without exposing proprietary corporate data or trade

secrets.

4. Financial Impact & ROI

- **Primary ROI:** 42.1:1 based on utility recovery models.
- **Cost Recovery:** The project is funded by identifying and repairing the 20% NRW loss, returning that lost capital to the county's infrastructure and general funds.

Technical Basis: Data sourced from EPA SDWIS, US Geological Survey (Ogallala Drawdown Reports), and Municipal CAFR data.