# CTRL – AQUATRACK

## Team Introduction

**Team Name:** CTRL  
**Expansion:** Catalysts for Technology, Resilience, and Life  
**Project Name:** AQUATRACK – Adaptive QUAntum-inspired Water Tracking and Conservation Kit  
**Tagline:** *Real-time water intelligence for communities that can’t afford to waste a drop.*

## Team Members & Roles

* Dhriti – Full-stack developer (core functionality + APIs)
* Shruti– Frontend developer (React/Next.js + visualization), Backend developer (Firebase/Supabase + auth)
* Pranavasree – UI/UX designer (design polish + accessibility)

## Problem Statement

* 1.7 billion people use unsafe drinking water (WHO)
* Water wastage through leaks and overuse is rarely detected in real-time
* Communities lack affordable tools to monitor and conserve water

## Proposed Solution

* A real-time monitoring dashboard for water usage and quality
* Simulated IoT sensors streaming data to Firebase/Supabase
* Alerts for anomalies (e.g. leaks/contamination)
* Weather and location APIs provide context
* Mock blockchain ledger for transparency

## Expected Impact & Benefits

* Reduce water waste with early leak detection
* Empower communities with transparent data
* Support farmers and rural households with actionable insights
* Scalable across geographies (rural, urban, global)

## Resource Requirements

* Developer laptops + internet access
* Firebase/Supabase setup
* APIs: OpenWeatherMap, Mapbox/Google Maps
* Open-source libraries: Next.js, Recharts/Chart.js

## Alignment with Theme

**Shaping new frontiers – Data, Intelligence, and Quantum**  
- **Data:** Real-time water usage & quality streams  
- **Intelligence:** Smart alerts, threshold-based anomaly detection  
- **Quantum-inspired:** Resource optimization for sustainability  
- **Social Impact:** Equitable access to clean water & conservation tools

## User Need Validation

* Water insecurity affects billions globally
* Farmers and low-income communities need affordable monitoring
* Existing solutions are too expensive or limited to smart cities/homes
* AQUATRACK fills the gap with open, community-first tech

## Competitors & Differentiation

* Competitors: Smart city water meters, industrial IoT water systems
* Closest Product: Smart home leak detectors (Phyn, Moen)
* Differentiation: Open-source, affordable, API-integrated, socially impactful

## Technologies Used

* **Frontend:** Next.js (React + TypeScript)
* **Backend/DB:** Firebase/Supabase
* **Visualization:** Recharts / Chart.js
* **APIs:** OpenWeatherMap + Mapbox
* **Blockchain (mocked):** Immutable water logs
* **Other:** CSS animations, WCAG compliance, Google Analytics

## Architecture

**Conceptual Flow:** Sensors → Database → Dashboard → Alerts  
**Logical:** - Data Layer: Firebase/Supabase - API Layer: Weather + Maps - Frontend: React/Next.js + Recharts - Auth: Firebase Auth  
**Components:** - Login & Onboarding - Real-time Dashboard - Alerts & Thresholds - Blockchain Logger (mocked)

## The Last Word

* CTRL’s AQUATRACK tackles water insecurity head-on
* Built with modern, open-source, scalable tech
* Balanced for hackathon demo: polished visuals + clear impact
* Intuitive user flow → wow judges in under 3 minutes
* *We don’t just track water. We empower communities to protect it.*