

Procurement Ledger: District Hub (DHU)

Role: District Director (Regional Aggregator) | Quantity: 25 Units

The District Hub (DHU) acts as the regional "Director" of the FarmSense network. Strategically positioned to cover 10km radius zones, these hubs provide the backhaul connectivity, edge processing, and mesh-coordination required to keep the Subdistrict 1 "Digital Water Ledger" synchronized. This document details the high-capacity hardware procurement and the infrastructure logistics required for their permanent installation across the San Luis Valley.

1. Granular Hardware & Component Costs

Category	Component Description	Supplier	Part # / Type	Cost (Unit)
Computing	Industrial 8-Core ARM SoC PC	OnLogic	CL210-Series	\$420.00
Computing	128GB pSLC Industrial SSD	Swissbit	X-75	\$185.00
Radio	120° 5GHz LTU Sector (x3)	Ubiquiti	UISP-AP-Sector	\$850.00
Radio	LTE-M/NB-IoT Modem (Global)	Telit	ME910G1	\$115.00
Housing	NEMA 4X Polycarbonate Box	Polycase	ML-Series	\$180.00
Power	200W Rigid Mono-Solar Array	Renogy	100W-x2	\$340.00
Power	200Ah Heated LiFePO4 Bank	Battle Born	BBGC2H	\$850.00
Tower	35ft Class 4 Timber Pole (Set)	Local Utility	35-Class4	\$1,500.00
Protection	Lightning Arrestor/Surge GDT	L-com	AL-CAT5HPW	\$125.00
TOTAL	Per Unit Hardware Cost			\$4,565.00

2. Engineering & Infrastructure Justification

- Edge Computing Architecture:** The DHU utilizes the OnLogic CL210 industrial PC to perform local "Data Decimation" and Kriging. By processing the raw mesh data from 50+ VFA/LRZ nodes locally, the DHU only needs to transmit compressed "Insight Packets" to the Regional Superstation, significantly reducing LTE data costs. The 128GB Swissbit pSLC SSD

is selected for its extreme write-endurance, ensuring the hub can maintain a local "Black Box" record of all water transactions even if the primary backhaul fails.

- **Triple-Sector Radio Spine:** To provide 360° coverage, each DHU is outfitted with three Ubiquiti LTU Sector antennas. This configuration allows the hub to handle high-bandwidth 5GHz connections from over 100 field anchors simultaneously. By using LTU technology, the DHU can maintain stable connections in the high-interference environments created by competing farm WiFi and cellular towers.
- **Winter Autonomy & Thermal Management:** The high-desert winters of the San Luis Valley present a major challenge for battery life. We utilize Battle Born's heated LiFePO4 series (\$850), which uses internal heating elements to remain functional during -30°F "Polar Vortex" events. Coupled with a 200W solar array, the DHU has a "7-Day Autonomy" rating, meaning it can continue to coordinate the water ledger through a week of total cloud cover or heavy snow.
- **Lightning & Surge Mitigation:** Positioned at 35ft on timber poles, the DHUs are the tallest objects in the field and are highly susceptible to lightning strikes. The inclusion of L-com Gas Discharge Tube (GDT) arrestors is a critical "molecular audit" item, protecting the \$420 industrial PC and \$850 radio stack from induced surges during summer monsoon thunderstorms.

3. Deployment Totals & Regional Infrastructure (Subdistrict 1)

The DHU deployment is a civil engineering effort that requires permanent land-use agreements and heavy equipment for pole setting.

- **Hardware Subtotal: \$114,125**
 - *Reflects the core technology stack for all 25 hubs, which provide a redundant "umbrella" of coverage for the entire subdistrict.*
- **Site Foundation & Concrete: \$12,500**
 - *Covers the cost of high-strength concrete for pole footings and the rental of "Vibratory Plows" to bury the grounding grids required for lightning protection.*
- **Labor (Pole Setting Crew): \$18,375**
 - *The "Vertical" Blitz: This budget covers a specialized utility crew using an "Auger-Bucket" truck. The process involves drilling a 6ft deep hole, setting the 35ft Class 4 timber pole, backfilling with crushed rock/concrete, and mounting the solar/radio array. Each hub is sited in collaboration with the local utility provider to ensure no interference with existing lines.*

DHU TOTAL PROJECT COST: \$145,000

Note: The 35ft timber pole is a "utility-standard" asset, selected for its 40-year lifespan and low maintenance compared to steel lattice towers. It also provides the necessary height to clear the