

Total Cost Estimation for LoRaWAN Mesh Network System with BLE Scanners and Alert System

The following is a **detailed cost breakdown**, covering **hardware, installation, labor, testing, and alert system setup**.

1. Hardware Costs (Per Node)

Each **LoRaWAN node** consists of a Raspberry Pi with a LoRa module and BLE scanner.

Component	Unit Cost (AUD)	Quantity per Node	Total Cost (AUD)
Raspberry Pi 4 Model B (4GB)	\$95.95	1	\$95.95
LoRaWAN HAT (RAK811/SX1302)	\$130.00	1	\$130.00
BLE USB Adapter	\$15.00	1	\$15.00
32GB MicroSD Card	\$12.00	1	\$12.00
Power Supply (Official Pi PSU)	\$19.00	1	\$19.00
Waterproof Enclosure	\$20.00	1	\$20.00
Antenna (LoRa 5dBi)	\$25.00	1	\$25.00
Miscellaneous (Cables, Mounting, Cooling)	\$20.00	1	\$20.00
Total Per Node			\$336.95

Number of Nodes Required:

- To cover **1 km²**, assuming each node covers **250m radius**, at least **16 nodes** are required.

Total Nodes	Cost Per Node	Total Hardware Cost
16	\$336.95	\$5,391.20

2. Central Node (LoRaWAN Gateway)

Component	Unit Cost (AUD)	Quantity	Total Cost (AUD)
Raspberry Pi 4 Model B (4GB)	\$95.95	1	\$95.95
High-Performance LoRaWAN Gateway (RAK7246)	\$250.00	1	\$250.00
4G LTE Modem for Remote Connectivity	\$150.00	1	\$150.00
High-Gain LoRaWAN Antenna (8dBi)	\$70.00	1	\$70.00
Power Supply	\$19.00	1	\$19.00
Waterproof Enclosure	\$30.00	1	\$30.00
Total Central Node Cost			\$614.95

3. Installation & Labor Costs

Assembly & Configuration (for 16 Nodes + 1 Gateway)

Task	Hours Per Node	Rate Per Hour (AUD)	Total Cost (AUD)
Hardware Assembly (Enclosure, Antenna, PSU)	0.5	\$50.00	\$400.00
Software Installation (OS, BLE Scanner, LoRaWAN)	1.5	\$50.00	\$1,200.00
Field Deployment (Mounting, Positioning, Testing)	2.0	\$75.00	\$2,400.00
Network Testing & Optimization	2.0	\$75.00	\$2,400.00
Total Installation & Labor			\$6,400.00

4. Alert System Implementation

The **alert system** needs to send notifications (SMS, Email, Push Alerts) when a target BLE MAC address is detected. The central node will use **AWS IoT, Firebase, or Twilio** to broadcast alerts.

Cloud Server Setup & Hosting

Service	Cost (AUD)
AWS IoT Core / Firebase Server Hosting (1 Year)	\$250.00
Twilio SMS API Subscription (Monthly)	\$20.00 x 12 = \$240.00
Web Dashboard Development	\$800.00
Total Alert System Cost	\$1,290.00

5. Total Cost Summary

Category	Total Cost (AUD)
LoRaWAN Node Hardware (16 Nodes)	\$5,391.20
Central Node Gateway	\$614.95
Installation & Labor	\$6,400.00
Alert System Setup & Cloud Hosting	\$1,290.00
Grand Total	\$13,696.15

6. Optional Add-Ons

Item	Cost (AUD)
Solar Power (for Off-Grid Deployment)	\$150 per node x 16 = \$2,400.00
Redundant Backup Gateway	\$614.95

Item	Cost (AUD)
SIM Card for Remote Connectivity	\$10/month

Final Thoughts

The **total estimated cost** for the full system, including **hardware, installation, and an alert system**, is approximately **\$13,696.15 AUD**.