



Mountain View
Whisman
School District

CBRS Proposal





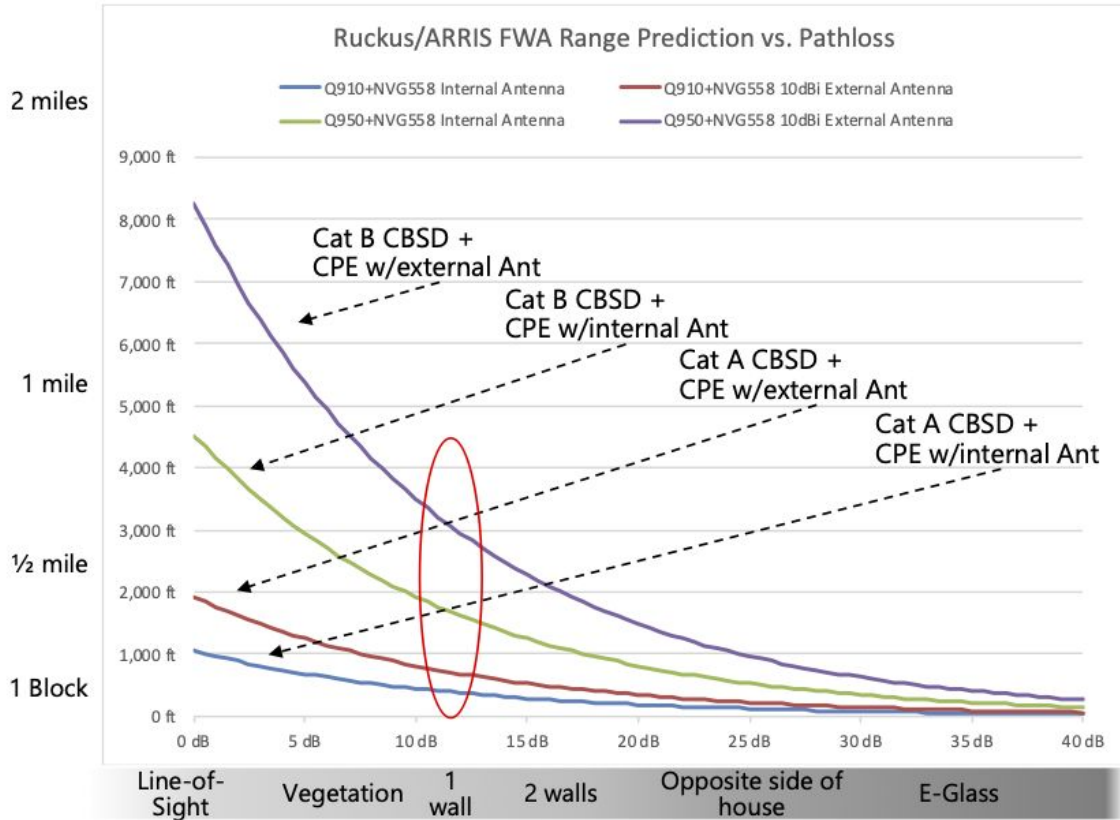
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What is CBRS?

Citizens Broadband Radio Service

- Utilizes 150Mhz wide band of the 3.5Ghz
- Allows for creation of private LTE networks
 - No need to acquire spectrum licenses
- Benefits over traditional wifi
 - Longer range
 - Reduced power usage
 - Operates outside of wifi spectrum

CBRS Delivers Significant Range



Factors impacting range:

- Obstructions – foliage, walls, ...
- Antenna height
- Number of channels
- Uplink power (user equipment)
- Desired performance

➔ Range is highly dependent on deployment environment!

Assumptions: 25Mbps DL/3 Mbps UL target rate using 2 CBRS channels (50/5 with 4 CBRS channels), empirical outdoor propagation model based on 3.5GHz field measurements, 3m base station height, 2dB fade margin. Actual coverage and range will vary according to actual RF conditions.

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What does a deployment look like?

Building Blocks of CBRS

COMMSCOPE®



Spectrum Access System

Spectrum Access System (SAS)

CommScope's SAS provides access to CBRS spectrum and protects incumbents and Priority Access License holders from interference. It can also provide insightful analytics to help plan CBRS deployments.



Evolved Packet Core (EPC)



SIMs



EPC and SIM Management Portal

Evolved Packet Core (EPC)

The EPC manages all LTE network connections and transmissions to optimize spectral efficiency, ensure tight security and enable seamless mobility. EPCs are defined and standardized via the 3GPP



AP Management Portal

RUCKUS CBRS LTE Access Points

RUCKUS CBRS Access Points, also known as eNodeBs or small cells, are the radio access network for CBRS. RUCKUS LTE APs deploy like Wi-Fi APs, and provide superior coverage and predictable performance.

COMMSCOPE®



CBRS Devices

To connect over CBRS, devices must be band 48 (3.5 GHz) capable. There are CBRS-capable devices available for almost any application.

CBRS Specialists

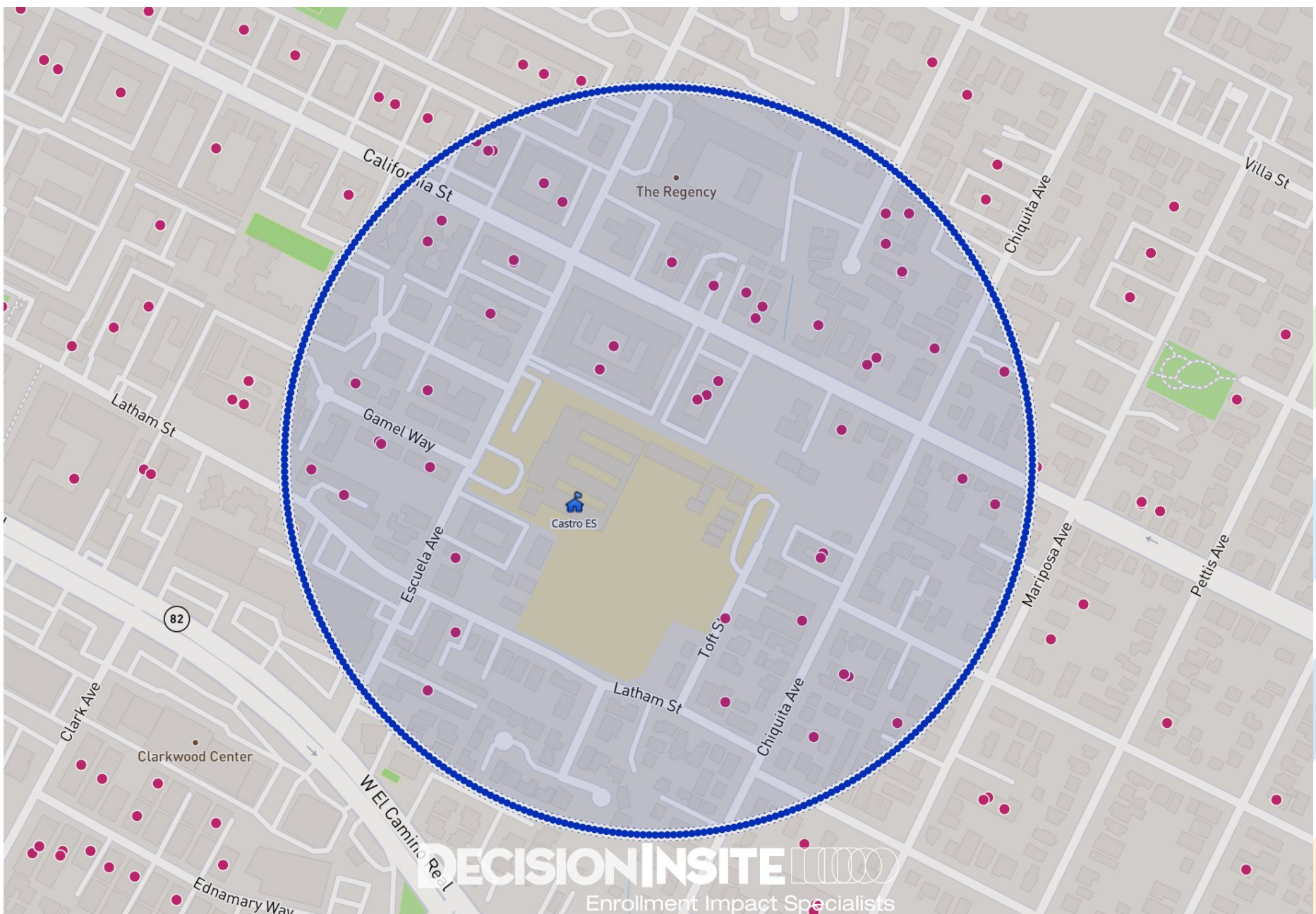
Select partners with CBRS training, certifications and full solution capability

Example - Castro/Mistral

2 -3 Ruckus Q910 Access Points

2 EPC routers

CBRS band 48 client USB modems



DECISIONINSITE 
Enrollment Impact Specialists



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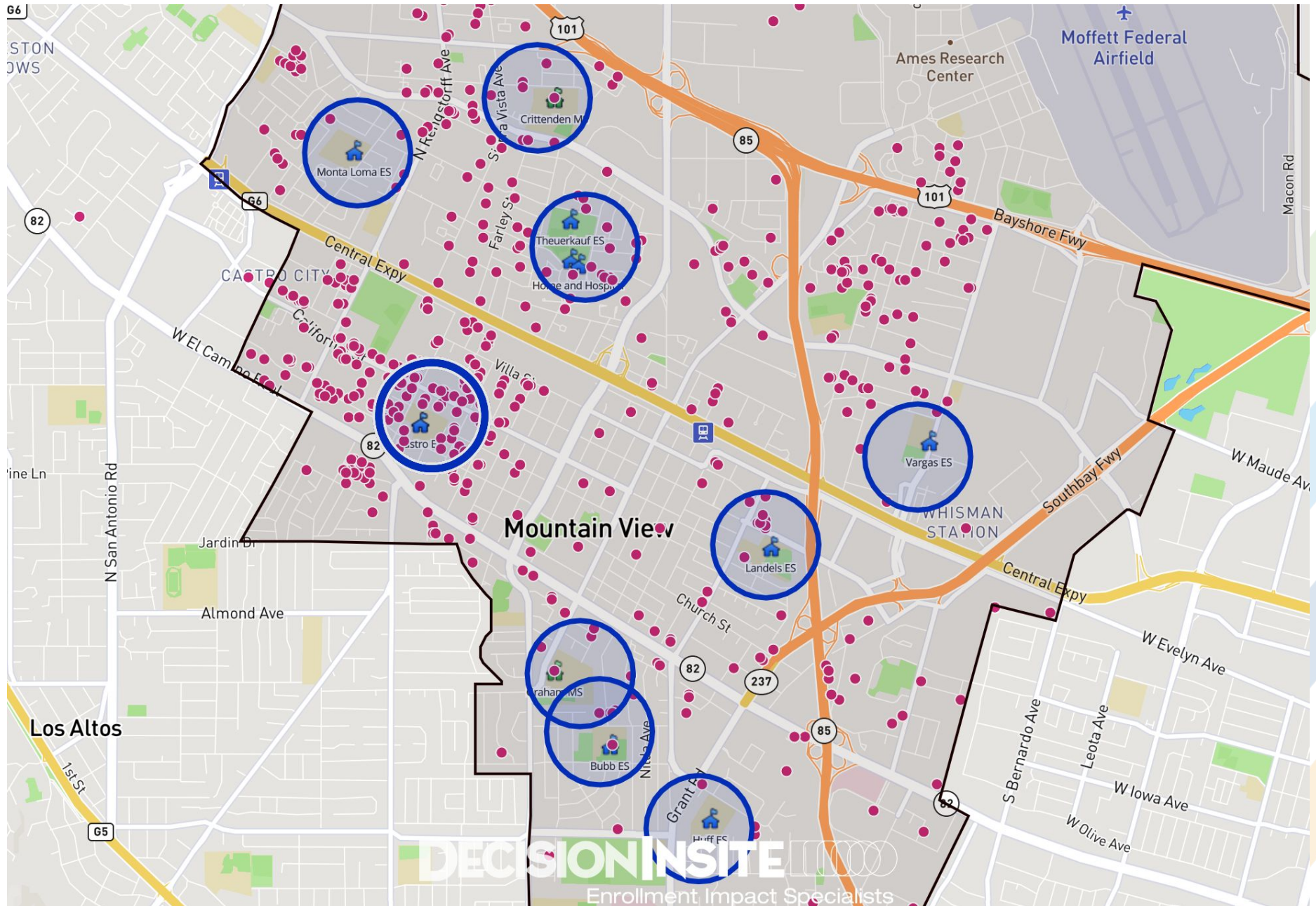
District-wide deployment

Deploying at all sites

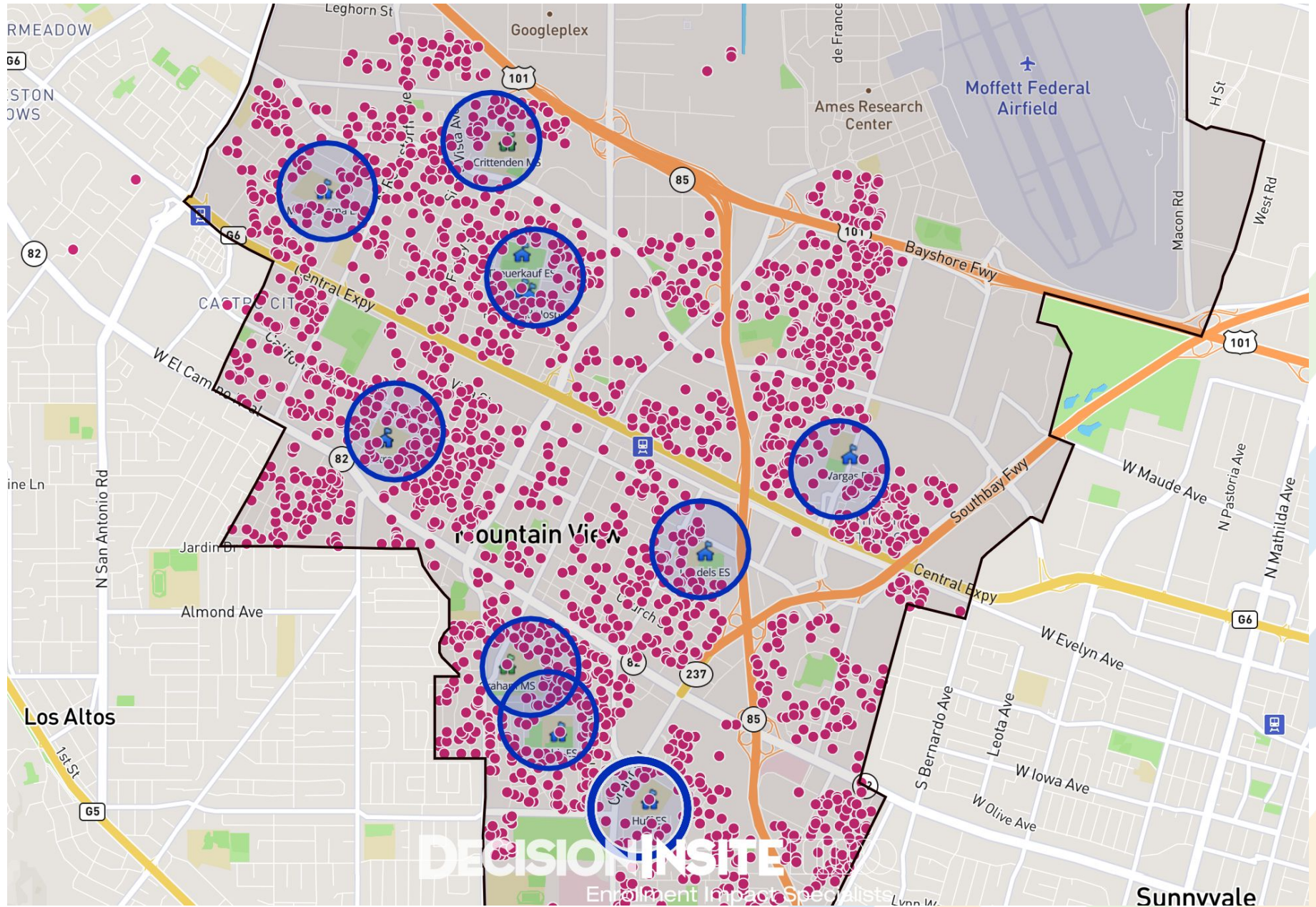
- Every site with at least one AP
 - CA/MI and DO/TH/ST with 2-3
- 300 client USB modems
- Installation costs



Coverage of SED students



Coverage of all students



Sample USD Private LTE Proposal



Input Numbers Below	
14	
300	
0	
3	

of Ruckus Q910 Infrastructure APs
 # of Multi-Tech USB Client Premises Devices (connects directly to laptop)
 # of Multi-Tech OnGo gateways (connects via ethernet to laptop or home wifi router)
 How many years of CPE Sim support?

Private LTE Costs with 3 years of support and licensing

Total Cost HW/SW/Licensing	\$	198,372.00
Total Cost CPI services physical installation	\$	75,600.00
Grand Total	\$	273,972.00
Total Recurring Fees (included in Total Cost)	\$	19,186.00

Recurring Fees = 3 year AP support, and 3 years of sim support

Competitive Pricing vs. T-Mobile Education Promotion MiFi and Meraki Citywide WiFi

Estimated MiFi costs for 3 years of support and licensing

Total Cost HW/SW/Licensing (No cost)	\$	-
Total Cost (Based on T-Mobile education pricing of \$20 unlimited per line)	\$	216,000.00
Grand Total	\$	216,000.00

All Fees are recurring

Estimated WiFi costs for 410 Access Points (Estimated AP count for 2 square miles of City Wide WiFi Coverage)

Total Cost Onsite Survey	\$	988,389.00
Wireless LAN Deployment	\$	121,005.00
Cabling and Physical Installation	\$	549,400.00
Access Points and Licensing for 3 years (120 APs)	\$	856,490.00
Grand Total	\$	2,515,284.00
Total Recurring Fees (included in Total Cost)	\$	83,230.00

Recurring fees are based on 3 years of AP cloud management



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Next Steps

Next Steps

- Work with vendor to create more accurate coverage maps
- Validate viability of unused fiber for city and Whisman
- Category B equipment available in the Spring