



Non-Line-of-Sight Wireless Broadband

‘Changing the way the world Connects’

WaveRider®

WaveRider

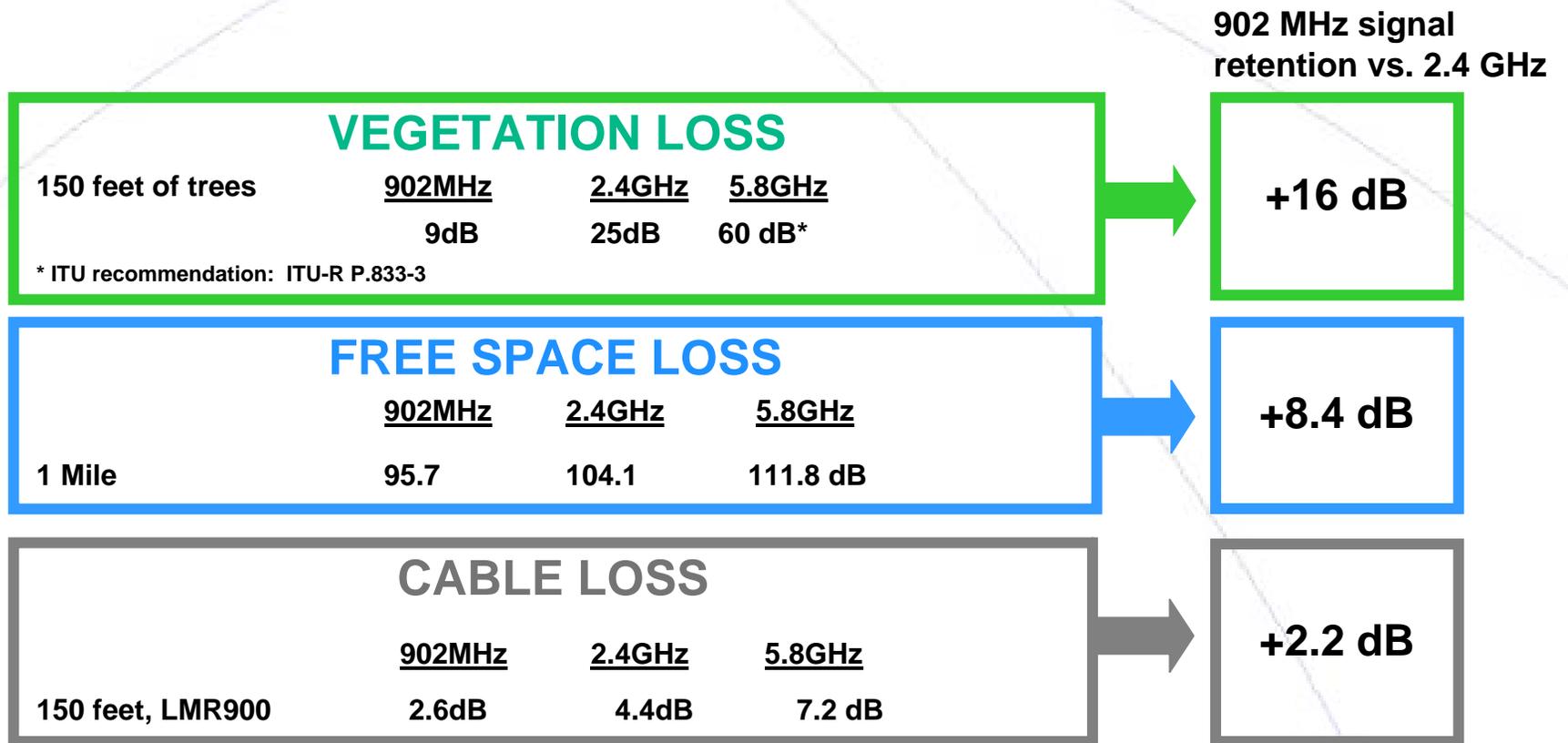
- First to launch true NON-LINE-OF-SIGHT wireless system for the license exempt 900 MHz spectrum (Spring 2000)
- Products have been deployed in more than 90% of U.S. states
- Customers include utility companies, telcos, municipal governments, large WISPs and start-up wireless providers
- More than 250 networks have been deployed worldwide

NLOS Benefits

- Solves LOS issues
- Affordable solution for residential and small business users in the 'last mile'
- Equipment is less expensive to install
- NLOS networks can be deployed and expanded quickly and easily
- Networks can be configured to suit a range of environments/geographic conditions
- NLOS systems are robust in an ever changing environment – tree growth, new building etc.



900 MHz Advantages



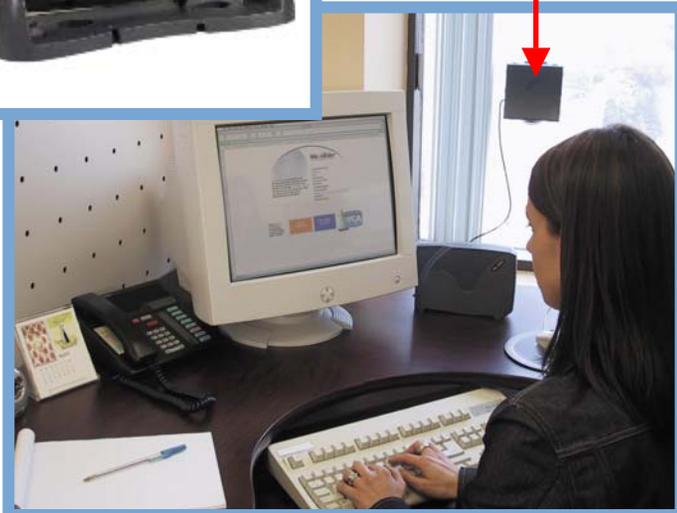
What WaveRider Has Learned

- The license-exempt 900 MHz spectrum is ideal for NLOS
- User-installable equipment is essential
- WISPs can generate revenues quickly
 - Successful business models include mix of business and residential subscribers
- Professional planning processes for:
 - Total saturation network
 - Overlay network to extend coverage and leverage existing real estate

User-installed equipment



Indoor Antenna



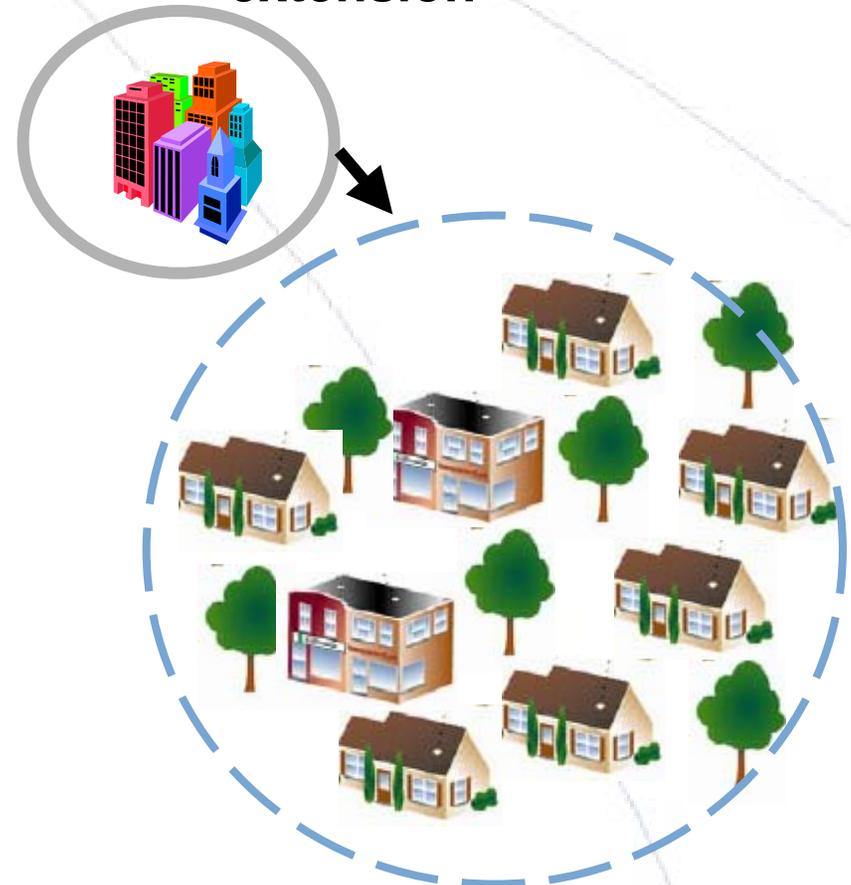
- User-install modem and indoor antenna
- Up to 90% self-install in some systems
- Eliminates the need for a truck roll
- Quick, easy installation process

Professional Planning – Define the Scope

Total saturation network

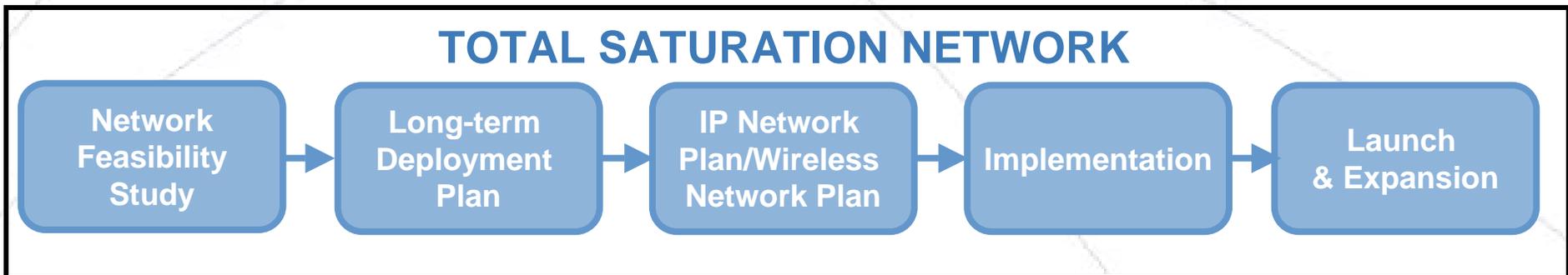


Network overlay/
extension



Planning Process

TOTAL SATURATION NETWORK



OVERLAY NETWORK



The NLOS Planning Process



Network feasibility study

- Plan the network – number of access points required to serve customer base and geographic area
- Identify barriers – noise, geographic, distance limitations, tower capabilities, zoning
- Select sites
- Produce frequency reuse plan consistent with technology and capacity requirements

The NLOS Planning Process



Long-term deployment plan

- Estimate breadth of future deployments
- Plan initial network so that it can be easily expanded to accommodate future growth

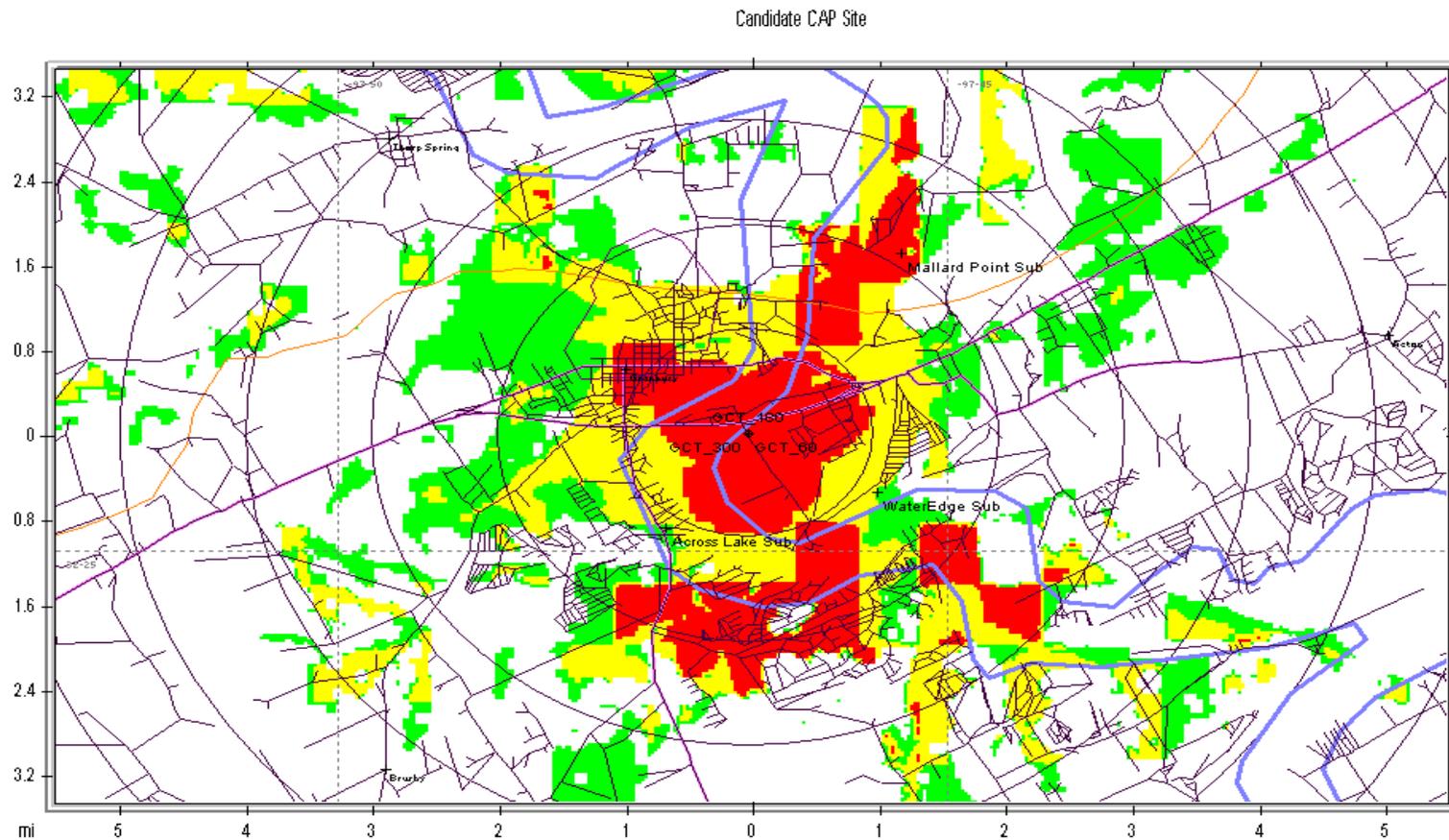
The NLOS Planning Process



IP Network Plan / Wireless Network Plan

- IP Network Plan: design, topology, IP network plan
- Wireless Network Plan: antenna heights, models, frequency planning, RF propagation; mobile utility test
- Site acquisition

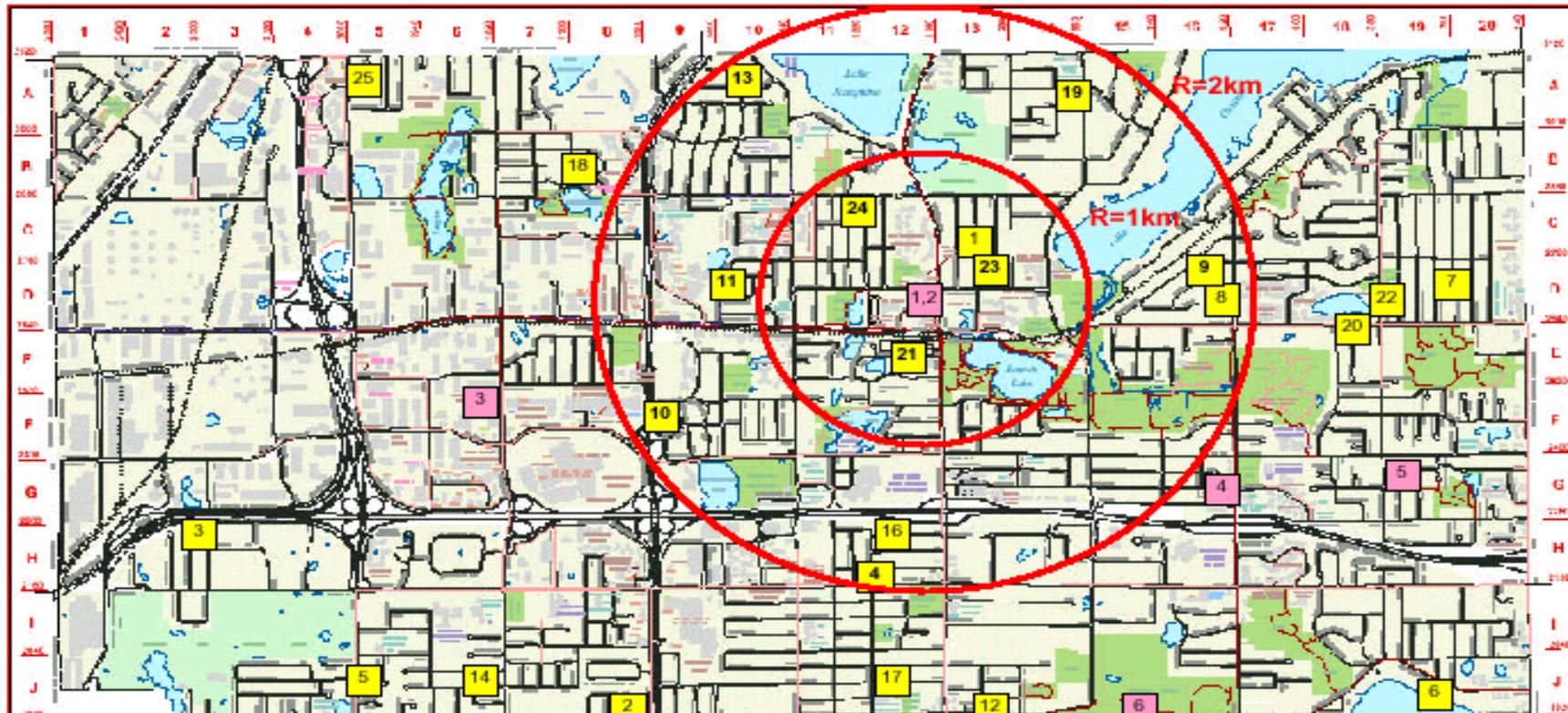
Propagation Prediction



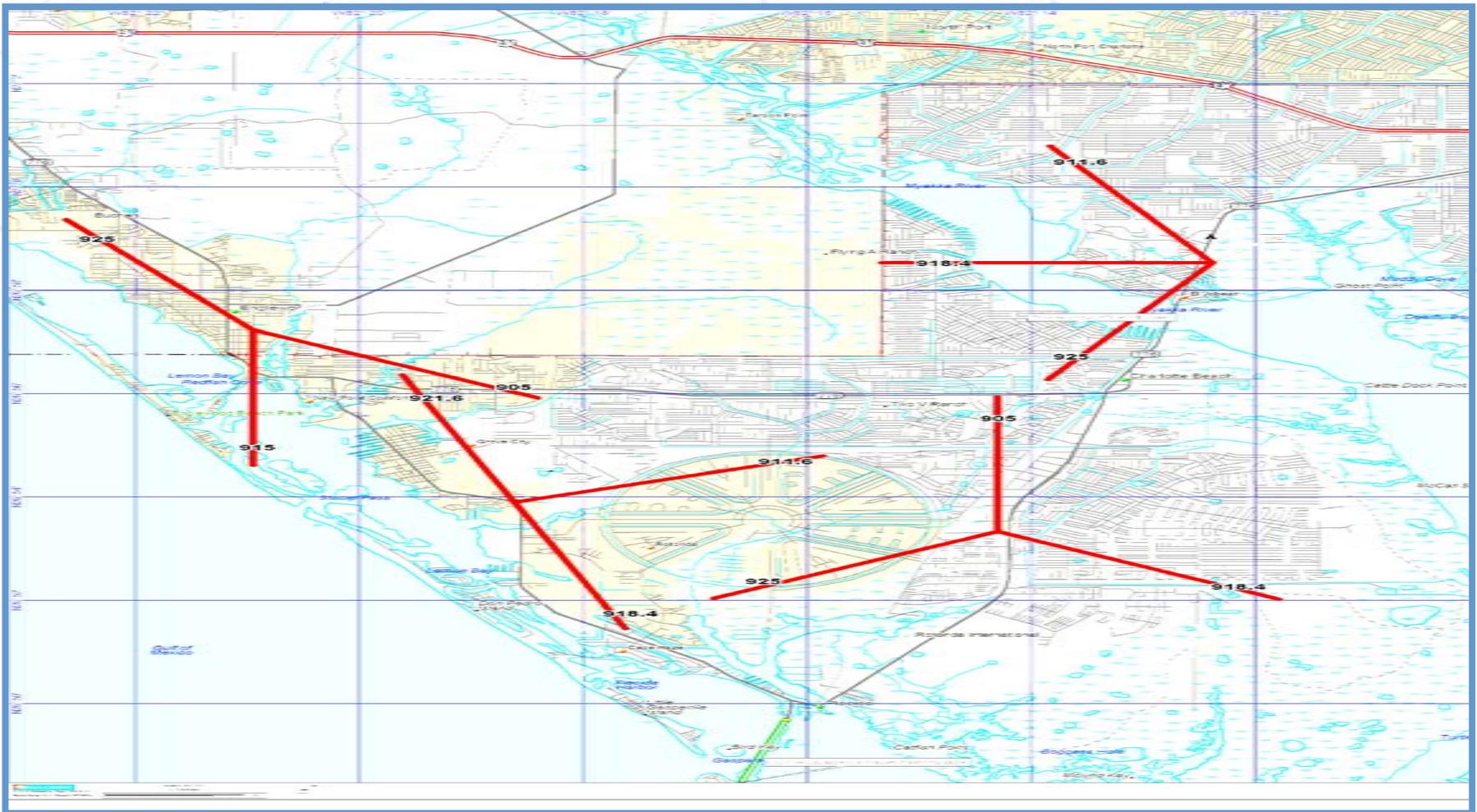
Wc

<RED-Indoor, YEL-Outdoor NLOS, GRN-Outdoor LOS> - Figure 1

Planning Your Network: Coverage



Detailed Site Survey



The Planning Process



Implementation

- Base station deployment: installation, configuration, antenna and coax installation, optimization of site to meet coverage area
- Backhaul equipment and antenna installation & testing
- Commissioning: baseline; drive test; map coverage area
- **TRAINING**

Drive Test

- Indoor install
- Outdoor install
- Marginal coverage

The Planning Process



Launch & Expansion

- Connect initial subscribers
- Market your services
- Generate revenues
- Increase your customer base
- Generate more revenues!

Benefits of NLOS Network Planning

- Ensures ALL users within planned coverage area will receive service (vs. LOS systems)
- Enables operators to determine the number of subscribers they can reach
- Determines service levels that can be offered for each subscriber *before* deployment
- Optimizes the network for your business – target customers are covered



Successful NLOS Deployments

Adams Telephone Co-Operative



**Adams Networks Inc.
NetVelocity™
4 cities in Illinois &
Missouri**

- Deployed WaveRider's 900 MHz system to power its NetVelocity wireless broadband service
- Adams expects to expand its broadband wireless network to more communities in 2004

WaveRider®

Business services:

- 3 grades of service
- 24/7 customer & technical support
- Installation fee charged up front or quarterly

Residential services:

- 3 grades of services
- Market to gamers & high-bandwidth users
- Installation fee charged up front (waived for a 3-year commitment)

Cross Telephone Company



**Cross Wireless
DATZ Broadband Service
10 cities in Oklahoma
Population: >100,000**

- Deployed WaveRider's 900 MHz system to power its Datz wireless broadband service
- The Datz program will bring wireless broadband to ten cities in Oklahoma by the end of 2003

WaveRider®

Business bundles/services:

- Supports web servers, e-mail servers, VPN connections
- Offers web and e-mail hosting services

Residential bundles/services:

- Bundled Internet and cellular services
- Varied service levels from e-mail to gamers

Lemonweir Valley Telephone Company & Oakdale Electric Cooperative



**Oakdale Electric
Cooperative**



Wireless broadband initiative serving communities in Wisconsin

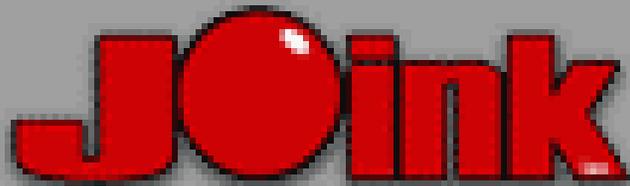
“Broadband connectivity has become an essential service for both businesses and residents in Mauston. The goal of our wireless network initiative was to make broadband both affordable and accessible to the entire community.”

- *Bruce Ardelt, General Manager, Oakdale Electric Cooperative.*

- Chose WaveRider’s wireless products for its non-line-of-sight capabilities and scalability
- Expect to expand the wireless service to hundreds of users in Mauston
- Plans to add a second network in a nearby community this year

WaveRider®

JOINK



Joink, Inc.
Indiana and Illinois

- **Residential service:**
 - \$99.95 activation fee
 - From \$29.95 to \$59.95 /month
- **Business Service**
 - \$99.95 setup fee
 - \$199.95/month

- Delivers wireless broadband to 21 communities using WaveRider's NLOS systems
- Launched wireless broadband service in 2002
- Bundles wireless broadband with e-mail and web hosting services
- Holds the record for the highest-capacity WaveRider base station

WaveRider®

Infobahn Outfitters



Infobahn Outfitters
Macomb, IL
Pop: 18,000

- **Residential service:**
 - \$199.95 activation fee
 - \$49.95/month + tax
- **Business Service**
 - \$495 setup fee
 - \$65.00/month + tax

- ISP serving 9 communities in Illinois
- Launched wireless broadband service in Nov. 2002
- First company to bring broadband access to region
- Doubled its expected capacity

City of Buffalo

Buffalo

CITY OF BUFFALO, MINNESOTA

City of Buffalo, MN

Population: 10,000

Highlights:

- More than 850 subscribers
- **96%** user-installed CPE with interior antennas (exceeded goal of 90%)

- No affordable wired access to broadband services available
- Local businesses and residents needed broadband access
- The City of Buffalo launched its own high-speed wireless Internet service using WaveRider's NLOS equipment; managed with a team of 2 people!
- NLOS required because of dense foliage

WaveRider®

NLOS: Planning and Profits

- WaveRider's NLOS LMS4000 has proven its performance in a wide variety of applications
- NLOS deployment process is simple, yet unique
- Once the network is deployed marketing and customer installations are easier
- With professional planning, operators can generate revenues and become profitable quickly with NLOS systems

Contact WaveRider

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