

Wireless Facilities Siting

Scott Longhurst
President
Trillium Companies



Trillium Companies

Site Selection Process

- What determines the necessity for a site?
- Why are so many sites required?
- How are locations for wireless facilities selected?
- “The Ugly, the Better, and the Best”
- Closing Remarks

Why is a new site necessary?

- Site locations are determined by detailed radio frequency engineering and network analysis
- Marketing research and customer feedback also contribute to site selection
- Accomplishes at least one of following goals:
 - Expansion/Coverage
 - Increase Network Capacity
 - Improve Quality
 - Deployment of New technology

Why so many sites?

- Carriers limited to allotted spectrum/bandwidth
- Necessitates the re-use of frequencies
- New smart phones/devices are bandwidth intensive
- Without additional bandwidth, development of new sites facilitates increased network capacity

Bandwidth Comparison

Research
BusinessWeek

THE TRUTH ABOUT BANDWIDTH

Wireless operators are struggling to keep up with demand as more people use their phones to check Facebook and watch videos online. Here are estimates of how much bandwidth is used per person for various activities on different phones.

One megabyte is roughly equivalent to one digital book, 45 seconds of music, or 20 seconds of medium-quality video.



FEATURE PHONES

Phones such as the Motorola Razr are used primarily to make calls, and they consume little bandwidth even for Web activities because they have stripped-down Web browsers.

Voice Calls: 4 MB per hour
Web Browsing: 4 to 5 MB

100 MB



SMARTPHONES

Smartphones such as Research In Motion's popular BlackBerry are used for phone calls, e-mail, and light Web browsing.

Voice Calls: 4 MB per hour
Web Browsing: 4 to 5 MB

185 MB



SUPERPHONES

Advanced smartphones, including Apple's iPhone and Motorola's Droid, make it easy for people to surf the Web and watch online videos, leading to much higher bandwidth use.

Voice Calls: 4 MB per hour
Web Browsing: 40 MB
Net Radio: 60 MB
YouTube Videos: 200 MB

560 MB



TABLET COMPUTERS

Devices such as Apple's newly unveiled iPad are likely to send data use even higher. The iPad will chew up even more bandwidth than the iPhone because of its larger screen.

Web Browsing: 50 to 60 MB per hour
Net Radio: 60 MB
YouTube Videos: 300 to 400 MB

800 to 1,000 MB

MONTHLY TOTALS*

*Estimated. Data: Chetan Sharma Consulting

Site Selection Process

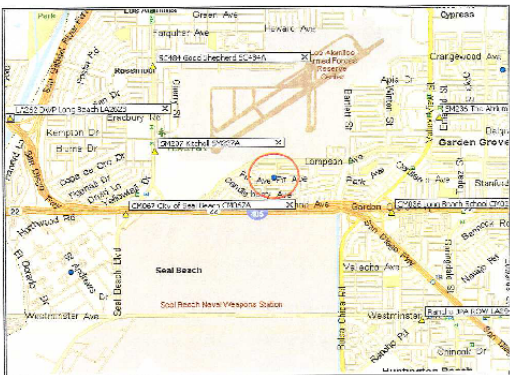
- RF Engineering Department requests approval for the development of a new site
- Once approved, RF issues a “Search Ring” indicating geographic boundaries where site is to be located
- Area is surveyed for suitable properties
- Property owners contacted
- Due diligence performed
- Potential candidates reviewed and primary property selected

Search Ring

T-Mobile - So. CA Search Ring Market: Los Angeles

Search Ring ID #: LA02941 Ring Name: LAC0941

Cross Streets / Reference point: LA02941



Latitude:	<u>33.7789</u> N	Rad. Center (ft):	<u>80</u>
Longitude:	<u>-118.053</u> W	Ground Elevation (ft):	<u>TBD</u>
Ring Type:	<u>Full</u>	Ring Diameter (miles):	<u>0.25</u>
ROI:	<u>\$3,575,257</u>		

Coverage Objective: This site is located near Los Alamitos near 22403 junction. Site is totally residential and near Army reserve base.

Potential Candidates: TBD

Comments:

RF Design Engineer: Jose Pena Release Date: 4/17/2009

RF Manager: Michael Gustafson

Sr. RF Manager: Lu's Gonzalez Date: 4/16/2009

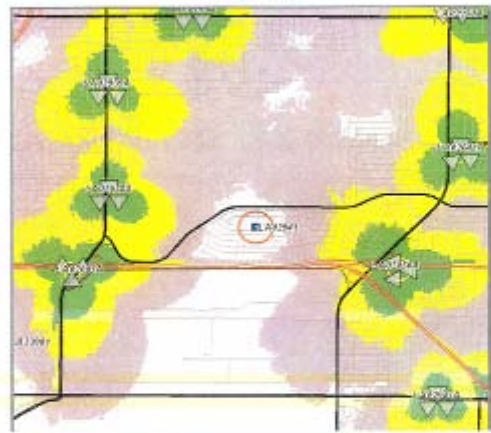
Lu's Gonzalez

LAOC SR Form - LA02941.xls 1

T-Mobile - So. CA Search Ring Market: Los Angeles

Search Ring ID #: LA02941 Ring Name: LAC0941

PCO Coverage Map



Latitude:	<u>33.7789</u> N	Rad. Center (ft):	<u>80</u>
Longitude:	<u>-118.053</u> W	Ground Elevation (ft):	<u>TBD</u>
Ring Type:	<u>Full</u>	Ring Diameter (miles):	<u>0.25</u>
ROI:	<u>\$3,575,257</u>		

Coverage Objective: This site is located near Los Alamitos near 22403 junction. Site is totally residential and near Army reserve base.

Potential Candidates: TBD

Comments:

LAOC SR Form - LA02941.xls 1

Property Analysis

- Potential candidates are reviewed and due diligence is performed to determine if the site is:
 - “Leaseable” – can a lease be negotiated?
 - “Zoneable” – can required permits be obtained?
 - “Buildable” - can the site be constructed?
 - RF Objectives – will the site provide the level of service required by the RF Engineer

The Ugly



The Better



The Best



Closing Remarks

- Need for new sites is driven by customer demand for improved quality and new services/content
- Infrastructure project – means of delivering services and content to end users
- Need to develop clear, consistent guidelines for development of wireless facilities for all stakeholders
- Carriers want to work with public agencies, elected officials and their customers, your constituents, on siting issues