

# City of Mission Viejo

## Wireless Master Plan Study



Produced by:



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# City of Mission Viejo

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## Executive Summary

In 1992, the City of Mission Viejo approved the first wireless communications facility (“cell site”) within its jurisdictional limits to offer wireless cellular phone service for the predecessor of Cingular Wireless. Since then, over 70 cell sites for several wireless service providers have located their facilities in Mission Viejo.

Over the last few years three major factors have changed the wireless landscape:

- 1) More people are using cellular phones as their primary means to communicate;
- 2) People are expending more minutes on their cell phones as the price of minutes continues to come down; and
- 3) New services and capabilities, requiring greater bandwidth, are exhausting the capacity of current cell sites (wireless network infrastructure).

Inadequate cellular coverage and dropped calls (due to insufficient capacity) define poor quality of service, resulting in customers changing their wireless carrier from one service provider to another - know as “consumer churn”. Carriers, in an effort to compete for and retain customers, need to build more cell sites to keep up with consumer demand and improve their quality of service.

### GOALS

ATS Communications was hired by the City of Mission Viejo to accomplish four goals relating to the proliferation of antennas throughout the community:

- 1) Reduce the number of potential cell site locations through a coordinated co-location process;
- 2) Mitigate the visual impact of towers and antennas from the view of the community by adopting design standards that employ the best available “stealth” technologies.
- 3) Facilitate the development of efficient wireless networks by taking a proactive approach and implementing a wireless master plan; and

### PURPOSE

The primary purpose of the relationship between the City and ATS Communication is to help the City take a pro-active approach to handle the future development of cell sites throughout the City of Mission Viejo through the development and implementation of a wireless master plan.

### Methodology

ATS Communication's development of this Wireless Master Plan began with investigating the current wireless network coverage for each of the wireless service providers. By locating all the cell sites throughout Mission Viejo and using radio frequency engineering analysis tools - ATS was able to create a map of the existing carrier network infrastructure. From this analysis ATS was able to determine the most likely locations where additional cell sites need to be placed in order to provide robust, seamless wireless coverage throughout the City. As part of this process, ATS Communications researched City files for Planned Development Permits pertaining to cell site locations that were previously permitted. ATS reviewed what types of equipment installations were approved, along with the location, height, number, and direction of the antennas

Field verification for each site was performed by ATS to confirm City records and ensure the sites were constructed according to their conditions of approval. After completing the field verification, ATS Communications inputted the corresponding data into a comprehensive radio frequency software program.

This modeling program takes into account the unique topography of the City of Mission Viejo including hills, mountains, canyons, buildings and other types of physical terrain. In addition, ATS Communications considered ortho-imagery, market densities, census data, and arterials corridors, including major freeways and traffic counts data sets.

The resulting information enabled ATS Communications to produce radio frequency propagations and conduct an analysis using engineering and geographical information systems to model the coverage of each wireless service provider. The model also takes into account major commercial and residential projects in progress or planned for the future. Thus, the model allows ATS Communication to better understand the coverage and capacity capabilities in order to identify the current and future demand on each wireless service provider's network.

### FINDINGS

Taking into account the existing facilities (Appendix "C"), and City-owned properties ("Inventory of City Property" page 66), the radio frequency engineering analysis performed by ATS Communications identified eighteen potential locations throughout the City of Mission Viejo where various cellular service providers lack coverage that could be satisfied with a suitable City-owned property.

It should be noted that the entire list of City-owned properties was reviewed to identify possible candidates for meeting the needs of potential wireless service providers. Site location, topography, property size and other factors reduced the number of available properties down to a few locations that could meet the needs of the carriers, with current technology, in the near term.

In addition, changes in technology, the inability of the carriers to find suitable private property candidates, or other factors may result in the shifting of a network infrastructure design prediction. While traffic patterns and population statistics were taken into consideration, customer patterns, unavailable to our study, can have an affect on the overall network design, development and implementation as well.

The following chart shows the 18 locations in Mission Viejo in which City-owned properties meet the needs of various wireless service providers. Some locations have only one potential candidate while several identify two or more City properties identified for a possible cell site.

The entire inventory of City owned properties (see “Inventory of City Property” page 65) was evaluated. Since each carrier already has a number of locations in the City with most on private property, many City owned properties could not be considered as a possible candidate. More information on the following chart can be found pages 79 – 134 in “Wireless Infrastructure.”

	<b>Cingular</b>	<b>Metro PCS</b>	<b>Nextel</b>	<b>Sprint PCS</b>	<b>T-Mobile</b>	<b>Verizon Wireless</b>
MV-001 Animal Services Center			<b>X</b>			
MV-003 Marguerite Aquatics Center			<b>X</b>			
MV-005 Montanoso Recreation and Fitness Center	<b>X</b>					
MV-013 Abanico Open Space						<b>X</b>
MV-015 Barbadanes Park						<b>X</b>
MV-020 Coronado Park				<b>X</b>	<b>X</b>	
MV-024 Gilleran Park	<b>X</b>					
MV-028 Minaya Park	<b>X</b>					
MV-029 Napoli Park	<b>X</b>				<b>X</b>	
MV-031 Pacific Hills Park				<b>X</b>		
MV-040 Aurora Park				<b>X</b>		
MV-044 Christopher Park	<b>X</b>					
MV-046 Crucero Park				<b>X</b>	<b>X</b>	
MV-048 El Dorado Park			<b>X</b>			
MV-053 Melinda Park	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
MV-058 Preciados Park				<b>X</b>		
MV-060 Seville Park			<b>X</b>	<b>X</b>		
MV-062 Vista Del Lago Open Space	<b>X</b>					

During the Public Hearing portion of the Planning Commission and City Council meetings, several City park sites were identified as highly sensitive to the community. The parks mentioned were Coronado Park, Minaya Park, Napoli Park, Crucero Park, Seville Park and the Vista del Lago Open Space. These parks will not be marketed to wireless carriers.

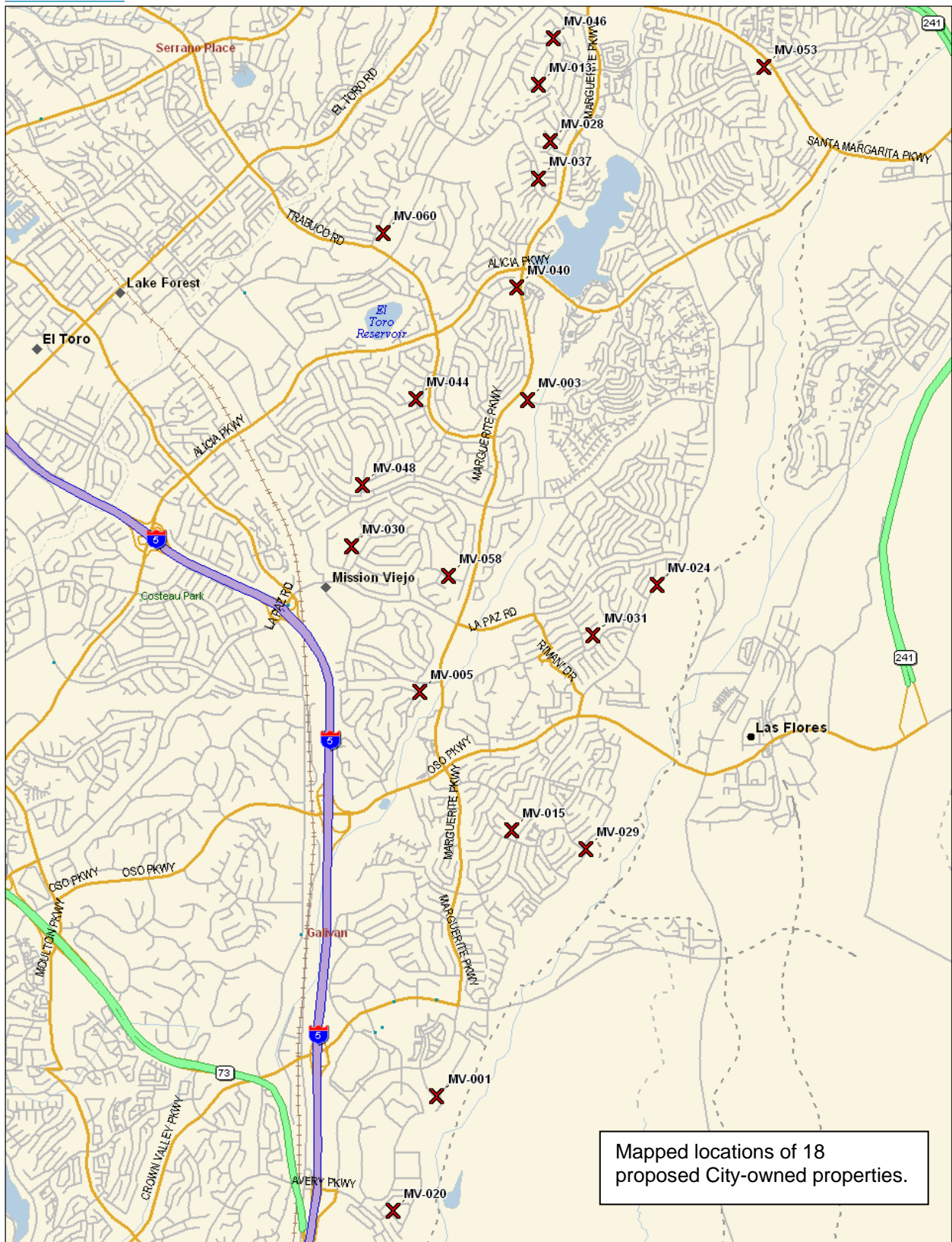
As part of the coverage analysis performed for the City of Mission Viejo, each wireless company has needs beyond those that can reasonably be satisfied by City-owned property. The following sites have been identified as future locations that wireless carriers may need to enhance their coverage and capacity in the City of Mission Viejo.

<b>Private Property Location</b>	<b>Wireless Communications Facility</b>
Marguerite & Delemos	Existing carriers at location
Marguerite & Olympiad	No carrier at location
Marguerite & Vista Del Lago	No carrier at location
Marguerite & Trabuco	No carrier at location
Marguerite & Oso Parkway	Existing carriers at location
Los Alisos & Mustang Run	No carrier at location
Los Alisos & Trabuco	Existing carriers at location
San Esteban & Lupe De Vega	No carrier at location
Los Alisos & Vista Del Lago	Existing carriers at location
Marguerite & Avery	Existing carriers at location

Primarily the intersection has been identified as each wireless carrier would allow their site acquisition representatives to evaluate several candidates within a quarter mile circle of the center of their coverage need. The actual service provided may depend on the willingness of some private property owners to allow a wireless communications facility on their property. Additional information regarding private property locations is available in Appendix "B" on page 138.

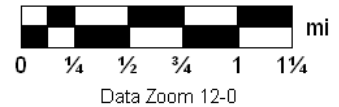
Based on a conservative estimate of sixty percent of the population in Mission Viejo using cell phones, there are 840 users per each location. When you further consider cell phone users in surrounding communities who drive through and visit Mission Viejo, there's even greater demand.

As more people use cell phones and all of their related services, more cell sites are going to be needed. Understanding where cell sites will need to be built and planning for the infrastructure will allow the City to take a proactive approach to dealing with this issue.



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## Introduction

Cellular & Personal Communications Systems (“PCS”), commonly referred to as “cell phones”, have become an integral part of our daily lives. As consumers become more dependent on these devices, the need for additional antennas or “cell sites”, to support the customers who use these services will grow as well. According to the Cellular Telecommunication Industry Association (“CTIA”), in June 1985 when they began their semi-annual survey of the industry the CTIA reported 203,600 domestic cellular subscribers. By June 2006, that number had grown to 219,420,457. The corresponding wireless infrastructure in place to service the over 200 million subscribers is estimated at approximately 200,000 cell sites.

## Wireless Networks and Cell Sites

The Federal government (FCC) has issued, through public auction, a limited number of licensed frequencies to wireless services providers (“Carriers”). As part of issuing these frequency licenses, the FCC mandates that the Carriers should provide seamless coverage throughout the licensed market area. In order for the Carriers to provide coverage to their customer base they need to reuse their frequencies. This is accomplished by allocating a set number of frequencies to each wireless carrier’s communications facilities or “cells”. Each cell site will utilize a different set of frequencies from all adjacent cell sites. This pattern is repeated through the market area, creating a wireless communications network - hence the name “cellular” communications.

Wireless communications networks develop over time. There are two underlying objectives that govern the placement of cell sites within any given geographical area. The first objective is to provide coverage and the second is to provide capacity. Together, these two objectives contribute to the overall Quality of Service a network provides to its customers.

The first and main objective is to provide coverage throughout the carrier’s licensed market area. This is accomplished by locating new cell sites in areas where existing coverage is not available or is unreliable. These locations can be at the periphery of market area where new population growth has occurred; or in newly licensed markets where the carrier has no existing network infrastructure; or within an existing network where technical issues, such as topographical constraints, cause service interruptions or gaps. These gaps are known as “holes”, which are the areas that cause “dropped calls”.

The other objective, network capacity, is also critical to the viability of a wireless network. Capacity is driven by demand and a cell site can only handle a finite

number of calls to meet this demand. More customers using the network place greater demands on the limited frequency capacity or bandwidth of an individual cell site. When a cell site's bandwidth is maximized it results in customer call blocking and dropped calls, thus poor quality of service. A carrier will attempt to minimize or eliminate issues of capacity by dividing a cell - effectively introducing a new cell site between existing cells to off-load customer call volume. According to Industry Profile #1 - SOMA Technology Committee report: "The number of subscribers per cell site still averages around 900, and despite technological improvements, the number has actually declined in recent years. This phenomenon is often misconstrued to be a result of subscriber minutes of use (MOU) continually exceeding the capacity improvements these technologies have produced. The increase in minutes of use per subscriber has greatly increased in the last several years. This phenomenon has been driven by the decrease in prices to the wireless consumer on a per minute basis."

## **Government Regulations**

The Telecommunications Act of 1996 (TCA) allows state and local governments to enact ordinances governing the placement of wireless telecommunications facilities [§TCA Section 332 (c)(7)]. However, local governments are increasingly becoming embroiled in law suites filed by the common carriers over the restrictiveness of local ordinances, violating section 253(a) of the TCA [§ 253(a)-(e)(1994 & Supp. II 1996)) (hereinafter "removing barriers")]. Recently, the courts have struck down restrictive ordinances or ordinances that are "so onerous" that they are in effect restricting the development of wireless networks – as in the following case: United States Court of Appeals for the 9<sup>th</sup> Circuit: 2990 SPRINT TELEPHONY PCS v. COUNTY OF SAN DIEGO.

Local governments regulate but cannot restrict the placement of wireless communications facilities from sites such as schools, residential zones, and public right-of-ways. Furthermore, according to the TCA § 332 (c)(7)(B) *Limitations (iv) - No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the commission's regulations concerning such emissions.*

## **Cell Site Selection**

Virtually all wireless carriers are constantly seeking to improve their quality of service by enhancing their wireless network infrastructure. The process begins with the Radio Frequency (RF) Engineers collecting data on the performance of their networks. RF Engineers are able to determine where their coverage problems areas are by reviewing the recorded number of dropped calls or missed calls over their network. The RF Engineering Team will visit the area of concern

to determine the best location for a new cell site from a technical perspective. The RF Engineer will then issue a “search ring”, which is a map of the general area where a new cell site needs to be located. Typically, the focal area is less than a ¼ mile in radius, but may be even smaller depending on environmental constraints, such as terrain.

The next step in the process is performed by a site acquisition specialist. The site acquisition specialist will use the RF Engineer’s search map to help identify the general location of suitable property candidates for developing a cell site. However, the set of criteria that is employed at this stage is often contrary to the criteria desired by the RF Engineer. The site acquisition criteria for a property in question must be “leasable”, “zonable”, “buildable”, but it still must be viable from an RF Engineering perspective.

Intuitively, the best locations for cell sites are on properties that have higher elevation than the surrounding area, allowing clear line-of-sight for the radio transmitted signal. Herein lies the crux of siting dilemma. In many instances, especially in established communities, the desired location (to provide the best radio coverage) is within a residential area, at a park, at a school, within a scenic view or at some other controversial location. Carriers typically will exhaust all attempts at locating a cell site on commercial property or on a non-residential use property to avoid or minimize zoning and land use issues. However, as network infrastructure continues to expand, viable options for cell sites become increasingly limited. This trend will force carriers to seek sites within residential area, on or adjacent to school properties, at parks and within the city’s public right-of-way.

Siting issues are compounded as the wireless service providers compete not only for customers but for suitable locations for new cell sites. The onus rests on local governments to manage and coordinate the proliferation of cell sites throughout their community. Local control and coordination is necessary because generally there is no benefit to each of the independent wireless services companies to work together. In fact, an industry effort to coordinate the co-location of network facilities would be contrary to the spirit of business competition and may give rise to concerns over collusion, monopoly and other regulatory issues.

With this backdrop in mind, developing a tool or a process that will help coordinate and manage the growth of cell sites to provide the future wireless network infrastructure is necessary and prudent for any well-planned community. Therefore, the creation of a Wireless Master Plan is meant to provide the means for facilitating the growth of wireless networks anticipated to meet the needs of both the wireless companies and their subscribers who live, work and visit the community.

### **Cell Site Selection Criteria**

Managing or coordinating the future development of cell sites in the city will necessarily require the adoption of particular cell site design standards. Every property has distinct characteristics that require a different approach to how a cell site should be developed. From the carrier's perspective the following basic cell site selection criteria are considered:

- Topography
- Coverage Area
- Tower Design or Type
- Antenna Height
- Antenna Array or Antenna Selection
- Antenna Orientation
- Cable Run (Distance from the Base Station Equipment to the Antennas)
- Surrounding Vegetation
- Proximity to Electrical Power and Telephone Services
- Access to the Public Right-of-Way
- Equipment and Tower Space Limitations
- Soils Composition
- Site Development Costs
- Rent

From the local government's perspective the following criteria are considered:

- Site Location
- Tower Design or Type
- Area Zoning (Residential, Open Space, Commercial, Industrial or Institutional)
- Screening and Integration
- View Impact
- Landscaping
- Access
- Co-location

These two sets of criteria represent objectives with conflicting goals. Wireless service providers seek to build a site that will maximize the cell site's coverage area at the minimum cost. These goals, from the carrier's perspective, correspond to building a tower high enough to overcome the topographical limitations and possible interference due to vegetation (trees), including space for a full array of antennas (typically twelve antennas divided into three arrays or "sectors" and a microwave dish. Furthermore, the carrier will seek locations that offer close proximity to power, telephone and street access, along with adequate space for their equipment shelter including space for a generator. The preceding criteria foster an image of a basic cell tower site that is not aesthetically attractive, and would not be welcome in any suburban setting.

Local jurisdictions, through their land use policies and zoning codes, have the ability to transform the basic cell tower site design to a site that is designed to minimize the visual intrusiveness usually associated with them. In general, however, local wireless planning codes often exacerbated the problem of cell site proliferation by restricting the most crucial elements involved with cell site development, namely location and height. These limitations correspond to a reduction in the efficiency of the site to maximize their intended coverage area.

In general, wireless services providers are willing to develop cell sites that are “stealth” in design in exchange for a defined and certain process. Anecdotal examples abound where a carrier has attempted to develop a needed site only to be denied because of public opposition. In some of these cases the carrier is forced to move to a less optimal location where gaps in coverage remain. In other more recent cases carriers have moved their sites to the public right-of-way, adjacent to the original candidate, where cities can be successfully challenged, as in the example where United States Court of Appeals for the 9<sup>th</sup> Circuit held that California Public Utilities Code §§ 7901 and 7901.1 preempted the City of La Cañada Flintridge from denying a permit for wireless service facilities based on aesthetics. *Sprint PCS Assets, L.L.C. v. City of La Cañada Flintridge*, No. 05-55014, 182 Fed. Appx. 688 (9th Cir. 2006) (mem.).

### **Goals**

The goals and objectives for the creation of a Wireless Master Plan for the City of Mission Viejo are to:

- 1) Reduce the number of potential cell site locations through a coordinated co-location process;
- 2) Mitigate the visual impact of towers and antennas from the view of the community by adopting design standards that employ the best available “stealth” technologies.
- 3) Facilitate the development of efficient wireless networks by taking a proactive approach and implementing a wireless master plan; and
- 4) Generate additional revenues for the City of Mission Viejo by offering and maximizing the use of public properties for the placement of wireless communications facilities. As part of this strategy and where appropriate, work with the carriers to obtain additional benefits for the community in the form of additional capital improvements.

While the goal of this study is to identify where new cell sites are likely to be needed for future wireless network infrastructure for each carrier, the focus will be on promoting City-owned properties as potential candidates. The Wireless Master Plan now includes private properties that might satisfy carrier needs. The locations are listed in Appendix “B” and identify the general intersection to avoid a “gold rush” on properties that would limit the ability of some companies to take

advantage of private property owners and to reduce the ability of wireless companies to negotiate leases and develop their networks efficiently. The City should recognize that wireless carriers are not precluded from satisfying their coverage needs through the siting of antennas on private property.

### **Methodology**

As part of this process, ATS Communications has identified the current locations for each of the major wireless carriers (Cingular, Sprint/Nextel, Verizon Wireless and T-Mobile) and their corresponding signal coverage to determine current network deployment. ATS Communications also evaluated population, traffic patterns and the physical terrain of the City of Mission Viejo to provide a current wireless network landscape for each of the major wireless companies.

In addition, the networks of new wireless companies (Metro PCS) will be evaluated to determine the best means to facilitate their introduction into the market. Based on the current wireless network infrastructure, expected growth in demand for the industry's services and the available locations to support this growth will be discussed.

ATS Communications can not determine what the exact near term development objectives of each wireless carrier will be; this report represents, an accurate depiction of what should be needed over a longer term. Determining the near term objectives of each wireless carrier is difficult because their annual capital budget doesn't always allow them to build out their complete network. Therefore, each carrier has their own criteria for prioritizing the enhancement of their wireless network. A build cycle may be six months or two years, it varies based on the size of the capital budget and logistics of what needs to be done.

The goal of this document is to identify each carrier's long term needs and, to the extent feasible, get City-owned properties into their future network design. Providing available locations that are easily deliverable allows each wireless company to better plan for future growth thereby greatly increasing the opportunity for City-owned property to be considered for new cellular sitings.

### **Strategy**

The Wireless Master Plan includes a current inventory of all cell site locations on both private and public properties throughout the community. An analysis of each carrier's locations is propagated to provide an analysis of their current network coverage along with a determination of where future sites may be needed.

City-owned and existing private properties with cell sites will be identified as possible future candidates as co-location for each of the wireless companies. Design recommendations, height requirements and other considerations are discussed for each of these locations. A specialized process will be established to help reduce the amount of time required by staff to handle these requests by creating the site specific design standards and development requirements that

will be acceptable to the City while meeting the needs of the wireless carriers in advance.

This process is expected to reduce much of the time expended by both the City and the wireless companies in their application process. Pre-approved locations on City property will create incentives for the wireless companies to enhance their network around available City locations thereby reducing the number of sites necessary for each carrier's network. Lastly, making each of the wireless companies aware of the available locations in the City will further assist in assuring these locations are utilized and co-location of antennas occurs because of efficiency and potential cost savings to the carriers.

### **Design Standards**

Design Standards for Wireless Communications Facilities (Cell Sites) are proposed in order for the City to take a proactive approach to how these structures will appear. While not all designs may be appropriate or desired, they are discussed in order to show they were considered.

#### General Types of Cell Sites

##### Antennas and Mounting Systems:

- Whip Antenna – A whip antenna is a thin metal/fiberglass pole which is used as a receiving and transmitting device. Typically, this antenna can be 18 inches to 10 feet in length and a half inch to 4 inches in diameter. These types of antennas are typically installed on Fire Department buildings, Police Department buildings and City Maintenance facilities
- Light Standard with Flush-mounted Antennas – A light standard with flush mounted antennas is generally seen at parks with ball field lighting. The antenna panels are usually mounted close to the pole, 10 to 15 feet under the lights. This design can be seen at several parks such as Beebe Park on Olympiad Road.
- Flag Pole – Much thicker in diameter than a typical flag pole in order to facilitate the antennas, a flag pole antenna system is essentially a slim line mono-pole with a flag attached. This design can be seen at the McDonalds at Trabuco Road and Alicia Parkway.
- Monopole – A monopole structure is used to describe the original design of wireless communications structures used for cell sites. It is typically a tall pole with a triangular structure on the top which holds the antennas. This design can be seen at the Moulton Niguel Water District site on Camino Capistrano.
- Slim line mono-pole – The slim line mono pole design is an 18 inch to 2 foot in diameter pole with the antennas mounted within or closely within the diameter of the pole. An example of this design can be seen at Shepard of the Hills Church on Muirlands Boulevard.
- Lattice Power Line Towers – This design of cell site takes advantage of the existing lattice tower transmission lines used by Southern

California Edison. Examples of this design can be seen along Olympiad Road between Melinda and Jeronimo.

- Water Tank – Designed to take advantage of another existing above ground structure, antennas can be placed directly on, or adjacent (on a pole), to a water tank. This design can be seen at the Moulton Niguel Water District property on Preciados Drive.
- Mono-pine – This design of structure takes a mono-pole design and includes a colored and textured pole with branches and pine needles. Pavion Park has an example of this type of structure.
- Mono-palm – A mono-palm design is another mono-pole design using palm fronds and the growth pod as a means to hide the antennas. While the City does not have an example of this design, a older example of this design exists on the east side of the 5 Freeway just south of the 55 Freeway in Tustin. Newer designs have greatly improved and look more realistic.
- Mono-broadleaf – The mono-broadleaf is the evolution of the mono-pine. Using the same mono-pole structure, the broadleaves instead of pine needles are used to hide the antennas. An example of this design can be seen outside the City at the intersection of Via Alondra and Rancho Santa Fe Road in the City of Carlsbad.
- Lollypops – A lollypop design is essentially a panel antenna held up on a thin pole. These designs used to be the standard employed on commercial rooftop installations. Their use is more appropriately employed in open space or canyon areas where they are placed on hilly terrain, below the ridgeline with antennas colored to blend with the surrounding environment. The antennas can be further camouflaged by surrounding them with faux or natural vegetation. An example of this design can be seen at the El Toro Water District facility on Via Pera, on the top of the True Value Hardware building at Oso Parkway and Marguerite Boulevard.
- Building Façade Mounted Antennas – Building façade mounted antennas are typically installed by flush-mounting the antenna to the building's façade and painting them to match the color and texture of the wall. In some cases the antennas are incorporated into or hidden by a design element of the structure. The office structure at 25910 Acero is one example of this type of design.
- “Stealth” Installations
  - Monuments
  - Faux Chimney
  - Rooftop parapet
  - Rooftop Screen Walls
  - Steeple
  - Clock Tower
  - Faux Rocks
  - Faux Water Tanks



The following Design Standards should be considered for adoption for all Cell Sites:

Antenna Mounting Systems:

- All whip antennas 18 inches or less should be allowed on any existing structure by right.
- Whip antennas five feet or less should be allowed on any commercial building, providing the antenna does not extend 10 feet above the roof-line (regardless of parapet height), the number of whip antennas does not exceed three, and the base of each whip antenna is set back from the edge of the roof a distance equal to its height – by right.
- Light Standards up to 40 feet in height with low profile / flush-mounted antennas should be allowed by right. Antennas should be painted to match the color of the structure. All cables should be concealed within the structure.
- Light Standards, up to 40 feet in height (total height), with the antenna(s) concealed within a radome at the top and with cables concealed inside the structure should be allowed by right. Antenna(s) should be painted to match the color of the structure.
- Ball Field Type Light Standards up to 75 feet in height with flush-mounted, low-profile mounting brackets or screened antennas. Antennas should be painted to match the color of the structure and cables should be concealed inside the structure.
- Flag Pole(s) with antennas and cables must be mounted inside the structure and the ray-dome (antenna covering) cannot exceed 18 inches in diameter. Pole must be able to fly a flag. A grouping of up to three Flag Poles should be allowed. Flag poles should be allowed up to 40 feet in height and allowed to be taller depending on the circumstance.
- Pole width for all structures should be the minimum necessary to meet engineering requirements and conceal the cabling inside. When possible, antennas by different carriers should be distributed on multiple light poles at parks so as to minimize the overall diameter of the pole.

- Monopoles – should not be allowed. Co-location on existing monopoles should require that the monopole be replaced with a mono-tree type structure.
- Slim line mono-pole – with antennas and cables must be mounted inside the structure and the ray-dome (antenna covering) cannot exceed 18 inches in diameter should be allowed. The coloring of the structure should be a light grey, olive green or light blue to better blend in with the back ground.
- Lattice Towers – No new lattice tower type structures should be allowed.
- Power Line Towers – collocation on existing power line towers should be allowed when feasible, providing the antennas are vertically mounted to the vertical structure when possible, using low-profile mounting brackets, and coaxial cables run inside the structure if possible. If the tower structure cannot accommodate interior cables then the cables should be painted to match the color of the tower structure. Where possible, the equipment shall be placed under the tower structure and screened if possible.
- Antennas mounted on existing water tanks that are flush-mounted with low-profile mounting brackets should be allowed when feasible. Antennas should be painted to match the color of the tank structure. Coaxial cables should be painted to match the color of the structure. Antennas mounted on the top of the water tank structure, if allowed, should be concealed behind screening that does not exceed six feet above the existing height of the water tank. Screening should surround the entire antenna structure and be painted to match the color of the water tank.
- Faux western style water tank structures should be allowed, subject to review, providing the structure is appropriate for the setting and the height of the structure does not exceed 38 feet to the eaves of the roof structure. Antennas must be completely concealed inside the structure. The structure should be painted to simulate weathered wood. An example of this design can be seen at the bottom of page 44.

- The following conditions should be incorporated into the specifications for the mono-pine:
  - Mono-pine structures should be designed for a minimum of two carriers.
  - The mono-pine should have 3.1 branches per foot for a full density coverage with limited spacing between the branches—70 percent of the branches should be 8-foot or longer.
  - Branch disbursement should be random so that longer branches and shorter branches are intermingled to give a natural appearance.
  - Branches should extend in length beyond all antennas by a minimum of 12 inches.
  - Branches should start at 15 feet above the ground.
  - There should be a minimum space of five feet between the top of the antenna and the top of the faux tree.
  - Branches should have an upward sweep similar to that of actual Canary Island Pines.
  - Branch foliage color should be olive green with some brown “needles” to match an actual Canary Island Pine. The foliage should be extruded (made from plastic) in the color instead of painted. A sample should be submitted to the City for approval prior to fabrication.
  - A sample of bark cladding with a custom color should be submitted to the City for approval prior to fabrication.
  - All antennas shall be covered with “pine needle antenna socks” that match the approved foliage color.
  - Antennas are to be mounted using “stand-off mounts” (horizontal, frame-type mounts are unacceptable). Support pipe mounts shall be concealed behind antennas and painted a darker shade or green (or black) with a “flat” paint finish to reduce reflection and visibility of the mounting.
  - Coaxial cables should access the structure through the base. Raised ice bridge or cable trays are unacceptable.
  
- The following conditions should be incorporated into the specifications for the mono-palm:
  - The mono-palm structure should be designed for a minimum of two carriers if possible.
  - The mono-palm structure should have a sufficient number of palm fronds to simulate a natural tree.
  - The antennas should be hidden in the growth pod and or the trunk of the mono-palm.
  - There should be a minimum space of seven feet between the top of the antenna and the top of the faux tree.

- Branch foliage color should be an olive green with varying color “fronds” to match an actual palm type of tree. A sample should be submitted to the City for approval prior to fabrication.
  - A sample of bark cladding with a custom color should be submitted to the City for approval prior to fabrication.
  - All coaxial cables should be concealed within the tower and should access the structure through the base. Raised ice bridge or cable trays are unacceptable.
- The following conditions should be incorporated into the specifications for the mono-broadleaf:
    - The mono-broadleaf structure should be designed for a minimum of two carriers.
    - The mono-broadleaf structure should have a sufficient branch count to conceal the presence of antennas.
    - Branch disbursement should be random so that longer branches and shorter branches are intermingled to give a natural appearance.
    - Branches should exceed all antennas by a minimum of 12 inches.
    - Branches should start at 15 feet above the ground.
    - There should be a minimum space of five feet between the top of the antenna and the top of the faux tree.
    - Branch foliage color should be olive green with varying color “leaves” to match an actual broadleaf type of tree. The foliage should be extruded in the color instead of painted. A sample should be submitted to the City for approval prior to fabrication.
    - A sample of bark cladding with a custom color should be submitted to the City for approval prior to fabrication.
    - All antennas shall be covered with “leafed antenna socks” that match the approved foliage color.
    - Antennas are to be mounted using “stand-off mounts” (horizontal, frame-type mounts are unacceptable). Support pipe mounts shall be concealed behind antennas and painted a darker shade or green (or black) with a “flat” paint finish to reduce reflection and visibility of the mounting.
    - All coaxial cables should be concealed within the tower and should access the structure through the base. Raised ice bridge or cable trays are unacceptable.
- The following conditions should be incorporated into the specifications for Lollypop type of antenna installations (single antenna mounted on a single pole usually in a set of three or four antennas):

- Lollypop type antenna installations should only be approved in instances where other types of “stealth” installations would be more intrusive by attracting more attention.
  - Lollypops should be installed below ridgelines to the best possible extent to reduce the profile of the antennas appearing above the top of a slope.
  - Cross braces between individual antenna poles add additional bulk to the installation and should be discouraged.
  - Antennas and their support poles should be painted with appropriate colors to match the surrounding environment.
  - In cases where irrigation is available, natural shrubs should be planted behind the lollypop antennas.
  - In cases where irrigation is not available or impractical, faux shrubs (subject to review by staff) should be installed to conceal the antenna arrays.
  - All coaxial cables should be run underground.
  - The height of the antennas from the base should not exceed 15 feet.
- The following conditions should be incorporated into the specifications for building façade mount antenna installations:
    - Patch (smaller, usually 12 inches in height) antennas and antennas less than 1.5 square feet in surface area mounted to the façade of a building shall be covered and painted to match the color and texture of the existing façade and shall be mounted flush to the building or mounted with low-profile brackets and skirted. The profile of the antennas shall not exceed 12”.
    - Antennas measuring greater than 1.5 square feet in surface area mounted to the façade of any commercial building should be fully screened using materials that match the color and texture of the existing façade.
    - The antenna screening systems must be architecturally integrated to the greatest possible extent.
    - Antenna screens must be fully enclosed to prevent birds from nesting in the screen structures.
    - Façade mounted antennas and the screening should not exceed 24” from the face of the existing building and should be designed to the minimum depth technically feasible.
    - All coaxial cables must be concealed inside the structures walls or within conduits, chases or concealment type devices that are integrated into the architecture of the building to the greatest possible extent. All exposed cable should be painted to match the underlying surface.

- The following conditions should be incorporated into the specifications for “Stealth” antenna installations:
  - Monuments:
    1. Monument antenna installations must be an appropriate design for the environmental setting.
    2. The height of a monument installation should be sufficient to allow for two carriers if technically feasible – 38 feet minimum.
    3. Examples of monument type of installations include:
      - a. Obelisk (can be seen on the 241 Toll Road)
      - b. Arch
      - c. Cross (can be seen at 5 Freeway in San Clemente)
      - d. Marquee Tower (a clock tower without the clock)
  - Faux Chimney:
    1. Wireless installations utilizing a faux chimney design should be allowed subject to the appropriateness of the application based on integration with the architecture of the existing building. The number, height, width and depth of a faux chimney should balance with the bulk and scale of the existing structure.
    2. Faux Chimneys should not exceed a height of 10 feet above the maximum roof height for buildings with level roofs.
    3. Faux Chimneys on buildings with peaked roofs shall not exceed the maximum roof height.
  - Rooftop Parapets - Antennas mounted inside parapet walls or parapet wall extensions should be allowed subject to the following:
    1. Antennas installed within an existing parapet must be screened such that the screening material matches the color and texture of the existing parapet.
    2. The height of any parapet extension shall not exceed five feet above the existing parapet.
    3. The design of the parapet extension shall be such that it is architecturally integrated with the design of the existing building.
    4. Parapet extensions shall be designed such that the antennas are screened on the back side as well.
  - Rooftop Screen Walls - The following conditions should be incorporated into the specifications for rooftop screen wall antenna installations:
    1. Rooftop screen walls shall not exceed a height of 10 feet above the maximum roof height for buildings with level roofs and subject to staff review.
    2. Rooftop screen walls shall be screened on all sides.

3. Rooftop screen walls shall be set back from the edge of the roof a minimum of three feet.
4. Rooftop screen walls shall be constructed to match or complement the color and texture of the building's façade or decorative features.
- Steeples - The following conditions should be incorporated into the specifications for steeple type antenna installations:
  1. Antennas mounted inside existing steeples should be allowed by-right providing the antennas are inside the steeple and are fully screened by materials that match the color and texture of the existing structure.
  2. Any modification to the outward appearance of the steeple should require the modification to be architecturally integrated with the overall design of the structure.
  3. New steeple construction on an existing structure should be consistent with the current architectural design up to 45 feet (regardless of the underlying height limit for the zone).
- Clock Towers - The following conditions should be incorporated into the specifications for clock tower antenna installations:
  1. Clock tower installations should be appropriate for the location.
  2. Clock tower installations should be designed for a minimum of two carriers.
  3. The height of a clock tower installation should be allowed up to 45 feet, subject to the surrounding environmental setting.
  4. The design of the clock tower installation should be consistent with the environmental setting.

Equipment Location & Screening systems:

- Equipment Vault – Below ground equipment vaults should be encouraged for all wireless installations at park facilities, and parking lots. Equipment vaults should be required for all right-of-way installations.
- Tenant Improvement – Should be encouraged for all wireless installations on existing buildings where sufficient space is available within the interior of the building. If sufficient space is not available within the existing building structure, equipment room additions should be allowed subject to standard building codes. The design of the equipment room addition shall be consistent with the architecture of the existing building and shall be effectively mitigated with the required landscape setbacks.

- Prefabricated Equipment Shelters – should be discouraged for most wireless installations applications. Prefabricated equipment shelters can be utilized in commercial areas where the shelter is not visible from any public view.
- Site Constructed Equipment Shelters – should be encouraged provided the equipment shelter is architecturally integrated into the surrounding environment. The height of the equipment shelter should not exceed a height that is consistent with the adjacent building. Air conditioning condensing units (A/C units) should be located on the ground adjacent to the structure or mounted in the roof. A/C units should be fully screened. A/C units should be selected that meet or exceed any applicable noise ordinance requirements. Landscape standards shall apply.
- Outdoor Telecommunications Equipment Cabinets – should be located within an equipment enclosure that has walls with sufficient height to completely conceal the equipment cabinets from any public view. Equipment enclosures should have lattice-type covering to prevent unauthorized access. All City screening and mitigation requirements will apply.
- Rooftop Equipment Platforms should be fully screened and, if possible, integrated with a rooftop antenna installation. The height of the equipment screening should not exceed a height of 10 feet above the maximum roof height for buildings with level roofs and subject to staff review.
- All types of equipment installations shall require all coaxial, telephone and electrical cables/wires to be concealed.

In evaluating the appropriate design for a particular property, the existing uses on the property, landscaping and optimal location of the facility should be taken into consideration. While some of the discussed design solutions may not be necessary at this time taking into account the current architectural and landscaping features of the City of Mission Viejo, they should be included in this study in the event a situation occurs in the future that might warrant their consideration.

As the Wireless Industry and the services they offer evolve, the equipment most likely will change as well. It is envisioned that the Wireless Master Plan will be updated periodically to incorporate the changing environment of the Wireless Industry and the progress made toward stealthing antennas and equipment.

Last, it should be noted that in preparing this analysis, the locations and designs are based on an evaluation of existing and proposed wireless communications facilities. Issues that may affect future sites include the approval of proposed sites and the ability of each wireless carrier to negotiate with private property owners for candidate sites on non City-owned properties, as well as the approval of these sites.



## **Wireless Network Analysis**

As part of the radio frequency engineering analysis performed throughout the City of Mission Viejo, the following list of potential sites were developed showing each City property that was identified as a possible candidate for the wireless carrier noted. This information was based on the analysis of existing sites and proposed new locations.

Additional information of the analysis can be found in Appendix "A" of this study. The analysis takes into consideration the heights of the antennas and existing terrain.

### ***Proposed City Locations for Future Antennas***

For the proposed city locations, ATS Communications observed sites in which the coverage looked weak or was completely gone and then located city property that made engineering sense. The City sites were all propagated at a height of 50 feet. Verizon Wireless and Nextel are both propagated at a frequency of 875MHz whereas other carriers are at 1960 MHz.

Listed below are the sites chosen for each carrier. There are 18 City-owned properties identified as part of this study. These selections by no means confirm the satisfaction of the carrier's coverage issues. These sites have been identified as the closest approximation to coverage gaps seen in the engineering analysis. Their location on the property and capacity issues may further validate or invalidate the site as a potential candidate. As part of this analysis, once the city has reviewed the proposed locations, they will be submitted to the wireless carriers for their consideration.

### **Identified for Cingular**

MV-053 Melinda Park  
MV-062 Vista Del Lago Open Space  
MV-028 Minaya Park  
MV-044 Christopher Park  
MV-005 Montanoso Recreation and Fitness Center  
MV-024 Gilleran Park  
MV-029 Napoli Park

### **Identified for Metro PCS**

There are no proposed sites for Metro PCS at this time as their network is currently being proposed. Based on what is approved or denied in the near term, this study will be updated to further determine their future network development.

**Identified for Nextel - 800mhz**

MV-060 Seville Park  
MV-003 Marguerite Aquatics Center  
MV-048 El Dorado Park  
MV-001 Animal Services Center  
MV-053 Melinda Park

**Identified for Sprint**

MV-046 Crucero Park  
MV-053 Melinda Park  
MV-060 Seville Park  
MV-040 Aurora Park  
MV-058 Preciados Park  
MV-031 Pacific Hills Park  
MV-020 Coronado Park

**Identified for T-Mobile**

MV-046 Crucero Park  
MV-029 Napoli Park  
MV-020 Coronado Park

**Identified for Verizon Wireless 850mHz**

MV-013 Abanico Open Space  
MV-053 Melinda Park  
MV-015 Barbadianes Park

**New Wireless Carriers**

As Southern California is the largest market for cell phone usage, it is reasonable to expect additional wireless carriers will at some point enter the market. In order to reduce their capital cost for network development and get their networks up quickly these companies will look to co-locate as much as possible. As information becomes available, these carriers will be provided a list of existing wireless communications facilities in order to facilitate further co-location.

**Identified City And Private Property Candidates**

	<b>Cingular</b>	<b>Metro PCS</b>	<b>Nextel</b>	<b>Sprint PCS</b>	<b>T-Mobile</b>	<b>Verizon Wireless</b>
MV-001 Animal Services Center			<b>X</b>			
MV-003 Marguerite Aquatics Center			<b>X</b>			
MV-005 Montanoso Recreation and Fitness Center	<b>X</b>					
MV-013 Abanico Open Space						<b>X</b>
MV-015 Barbadanes Park						<b>X</b>
MV-020 Coronado Park				<b>X</b>	<b>X</b>	
MV-024 Gilleran Park	<b>X</b>					
MV-028 Minaya Park	<b>X</b>					
MV-029 Napoli Park	<b>X</b>				<b>X</b>	
MV-031 Pacific Hills Park				<b>X</b>		
MV-040 Aurora Park				<b>X</b>		
MV-044 Christopher Park	<b>X</b>					
MV-046 Crucero Park				<b>X</b>	<b>X</b>	
MV-048 El Dorado Park			<b>X</b>			
MV-053 Melinda Park	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
MV-058 Preciados Park				<b>X</b>		
MV-060 Seville Park			<b>X</b>	<b>X</b>		
MV-062 Vista Del Lago Open Space	<b>X</b>					

While the list above identifies all of the possible City-owned properties that may facilitate a wireless communications facility, there are issues with some of the locations that require the wireless companies to consider other properties and primary candidates for their future builds. The following table provides alternative private property candidates that may offer comparable coverage or other solutions for reducing the number of City-owned properties under consideration.

<b>Identified City Property</b>	<b>Alternative location for wireless communications facility</b>
MV-001 Animal Services Center	Require Nextel to obtain coverage from Sprint
MV-003 Marguerite Aquatics Center	Require Nextel to obtain coverage from Sprint
MV-005 Montanoso Recreation and Fitness Center	Can locate at Marguerite and Estanciero
MV-013 Abanico Open Space	May be able to locate at Los Alisos and Mustang Run
MV-015 Barbadanes Park	Can co-locate at MNWD Delemos Water Tank
MV-020 Coronado Park	Can locate at Saddleback Community College
MV-024 Gilleran Park	Wireless communications facility proposed for this location
MV-028 Minaya Park	May be able to locate at Vista Del Lago and Marguerite
MV-029 Napoli Park	May be able to locate to water tank at Delemos
MV-031 Pacific Hills Park	Require Sprint to obtain coverage from Nextel
MV-040 Aurora Park	Require Sprint to obtain coverage from Nextel
MV-044 Christopher Park	Can locate at water tank property at San Esteban and Lupe De Vega
MV-046 Crucero Park	Can locate at a commercial center at Los Alisos and Mustang Run
MV-048 El Dorado Park	Require Nextel to obtain coverage from Sprint
MV-053 Melinda Park	Currently has wireless communications facility
MV-058 Preciados Park	Require Sprint to obtain coverage from Nextel
MV-060 Seville Park	Can locate at a commercial center at Los Alisos and Trabuco
MV-062 Vista Del Lago Open Space	Can locate at a commercial center at Los Alisos and Mustang Run

In addition, some City-owned properties identified as sensitive with the community can be satisfied with private properties in close proximity. While some of these alternatives may not offer adequate coverage to justify the change in location, additional solutions will be explored through new technology and practices. As well, Sprint and Nextel may be able to satisfy some of their coverage needs by expanding their existing facilities. This will depend on available space at their site for the equipment and willingness of the private property owner to reasonably modify the lease.

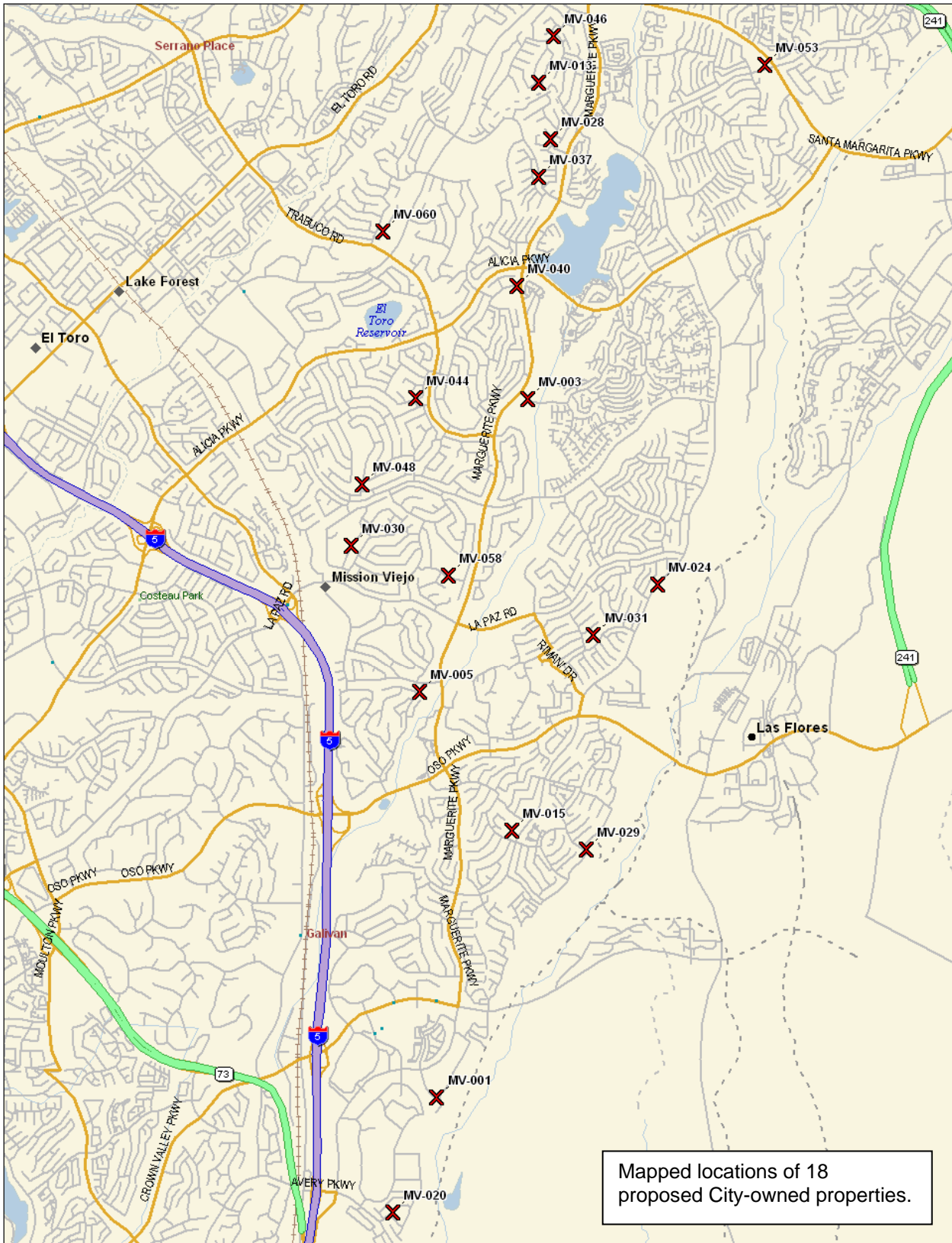
<b>Private Property Location</b>	<b>Wireless Communications Facility</b>
Marguerite & Delemos	Existing carriers at location
Marguerite & Olympiad	No carrier at location
Marguerite & Vista Del Lago	No carrier at location
Marguerite & Trabuco	No carrier at location
Marguerite & Oso Parkway	Existing carriers at location
Los Alisos & Mustang Run	No carrier at location
Los Alisos & Trabuco	Existing carriers at location
San Esteban & Lupe De Vega	No carrier at location
Los Alisos & Vista Del Lago	Existing carriers at location
Marguerite & Avery	Existing carriers at location

## Design Considerations

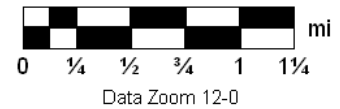
In evaluating the locations identified, potential designs were considered based on that architectural element's appropriateness with the particular property. The concept is to design a wireless communication facility that will most easily blend with its surroundings while still providing the necessary height and antenna configuration needed to offer service. The chart below identifies which type of design may be suited for the location shown with a numbering system from 1 (most appropriate) to 3 (could be appropriate).

	<b>Light standard</b>	<b>Flag pole</b>	<b>Slim Line</b>	<b>Power Line</b>	<b>Mono-tree</b>	<b>Stealth Façade</b>
MV-001 Animal Services Center	<b>3</b>		<b>2</b>			<b>1</b>
MV-003 Marguerite Aquatics Center	<b>3</b>		<b>2</b>			<b>1</b>
MV-005 Montanoso Recreation and Fitness Center	<b>2</b>					<b>1</b>
MV-013 Abanico Open Space			<b>1</b>		<b>2</b>	
MV-015 Barbadianes Park	<b>1</b>	<b>3</b>			<b>2</b>	
MV-020 Coronado Park	<b>1</b>	<b>3</b>			<b>2</b>	
MV-024 Gilleran Park	<b>1</b>	<b>3</b>	<b>2</b>			
MV-028 Minaya Park	<b>2</b>		<b>1</b>		<b>3</b>	
MV-029 Napoli Park	<b>2</b>		<b>1</b>		<b>3</b>	
MV-031 Pacific Hills Park	<b>2</b>		<b>1</b>		<b>3</b>	
MV-040 Aurora Park			<b>1</b>		<b>2</b>	
MV-044 Christopher Park			<b>1</b>		<b>2</b>	
MV-046 Crucero Park			<b>1</b>		<b>2</b>	
MV-048 El Dorado Park			<b>1</b>		<b>2</b>	
MV-053 Melinda Park			<b>1</b>		<b>2</b>	
MV-058 Preciados Park			<b>1</b>		<b>2</b>	
MV-060 Seville Park			<b>1</b>		<b>2</b>	
MV-062 Vista Del Lago Open Space			<b>1</b>		<b>2</b>	

The following map shows the locations of each property identified as part of this study.



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## Site Review

ATS Communications reviewed each of the City-owned locations proposed for wireless communications. The following pages show the sites along with a brief description as to the suitability of the site based on staff input and ATS Communications personnel evaluation.

Page	Site Name	Site ID	Latitude	Longitude	Address
29	Animal Services Center	MV-001	33.555445	-117.660359	28095 Hillcrest
30	Marguerite Aquatics Center	MV-003	33.616423	-117.650885	27474 Casta Del Sol
31	Montanoso Recreation and Fitness Center	MV-005	33.590806	-117.662203	25800 Montanoso Drive
32	Abanico Open Space	MV-013	33.643973	-117.649714	27587 Abanico
33	Barbadanes Park	MV-015	33.578703	-117.652533	26462 Barbadanes
34	Coronado Park	MV-020	33.545399	-117.665024	26652 Las Ondas Drive
35	Gilleran Park	MV-024	33.600206	-117.637218	24960 Felipe Road
36	Minaya Park	MV-028	33.639017	-117.648427	27552 Minaya
37	Napoli Park	MV-029	33.577029	-117.644726	27682 Napoli Way
38	Pacific Hills Park	MV-031	33.595813	-117.643981	28050 Fieldcrest
39	Aurora Park	MV-040	33.626236	-117.651949	23202 Via Guadix
40	Christopher Park	MV-044	33.616436	-117.66263	26801 Valpariso Drive
41	Crucero Park	MV-046	33.648076	-117.648125	27672 Crucero
42	El Dorado Park	MV-048	33.608979	-117.66822	24335 Carrillo Drive
43	Melinda Park	MV-053	33.645567	-117.626026	28951 Melinda Road
44	Preciados Park	MV-058	33.600958	-117.659147	27033 Preciados Drive
45	Seville Park	MV-060	33.630987	-117.666024	22832 Alturas Drive
46	Vista Del Lago Open Space	MV-062	33.639631	-117.659035	27062 Vista Del Lago

## Animal Services Center

### Aerial View

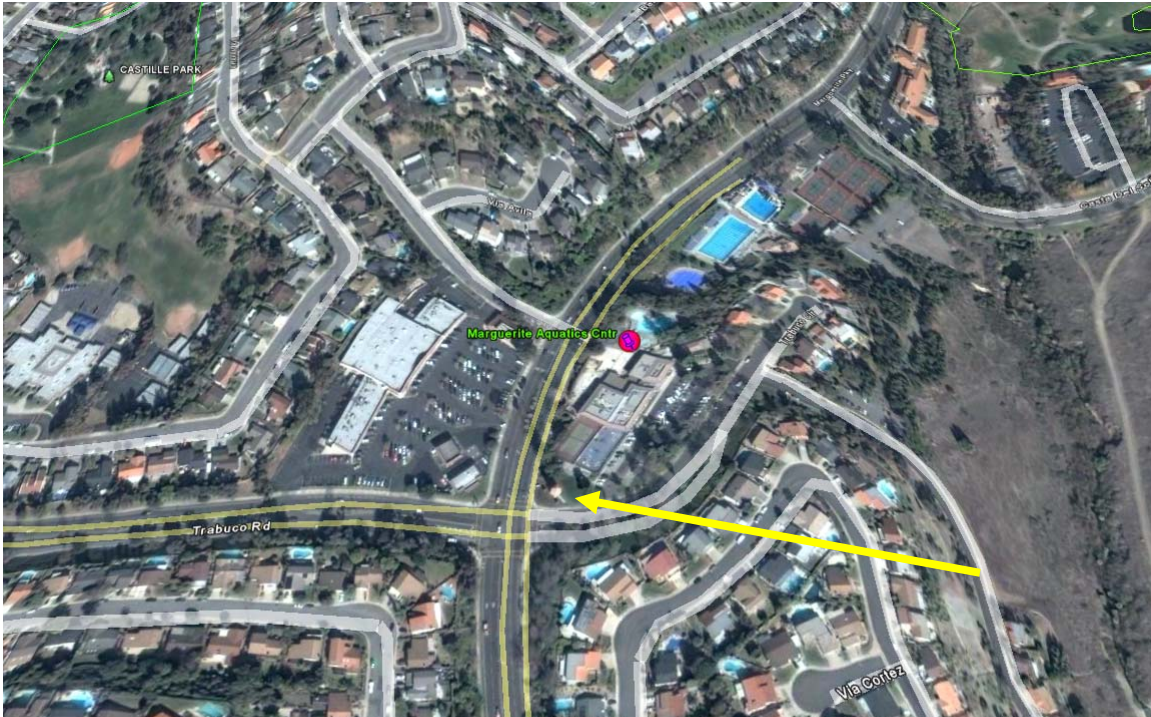


Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building or enclosure. Site poses limitations due to topography – main portions of the property sit below street level and surrounding bluffs to the east and north respectively. Possible structures to consider are: slim-line pole, light standard or flag poles at the facility entrance.



## Marguerite Complex (YMCA/Tennis Center/Aquatic Center)

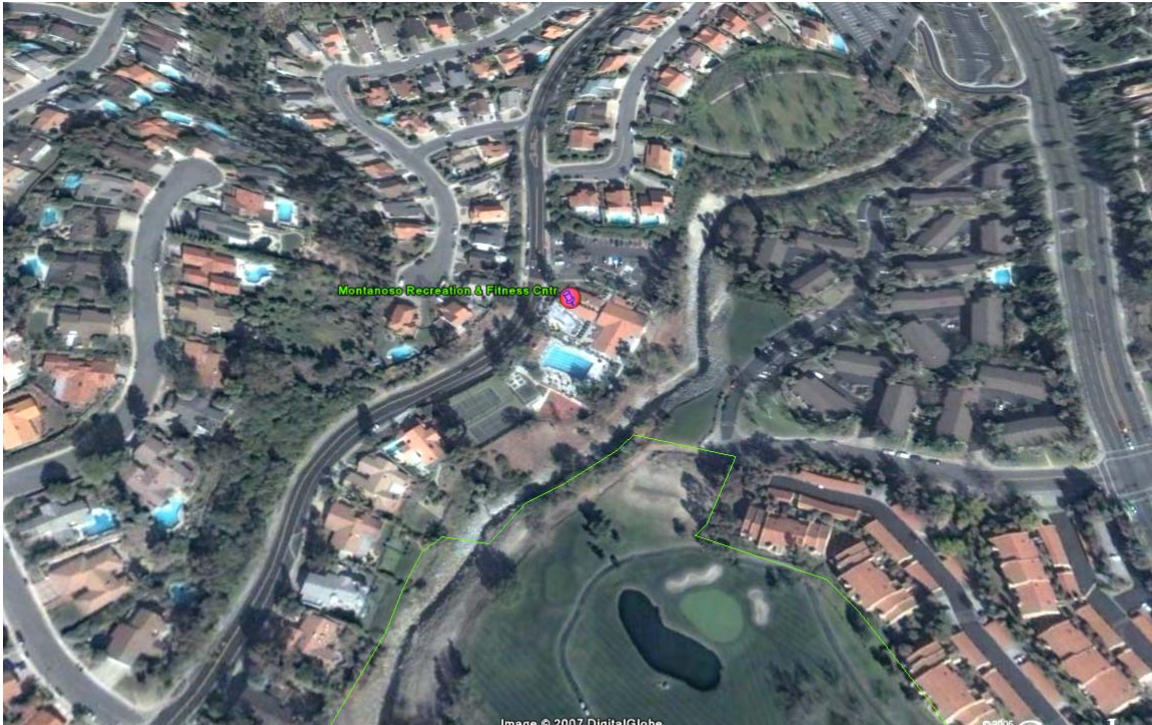
### Aerial View



Comments: Subject site is sufficiently large to accommodate an additional wireless communications provider. The existing structure may be limited in space for additional antennas, requiring an additional structure such as flag pole, light standard or a slim-line pole. The rooftop of the YMCA building would be a suitable location for a “stealth” antenna location. There appears to be sufficient ground space for an additional equipment building or enclosure.

## Montanoso Recreational Facility

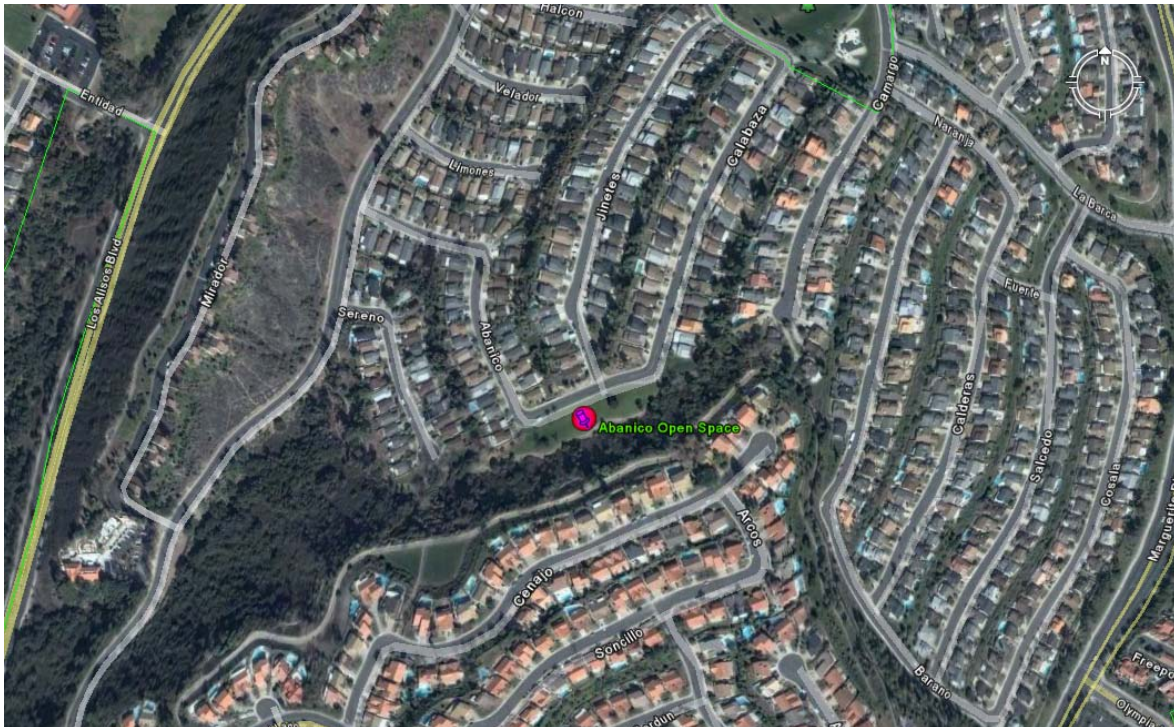
### Aerial View



Comments: Subject site appears to have sufficient space to accommodate a wireless installation. The existing building may lend itself to a “stealth” antenna solution through the installation of a cupola, faux chimney or monument-type structure integrated with the existing architecture. The telecommunications equipment can be located adjacent to the building or rear of the parking area.

## Abanico Open Space

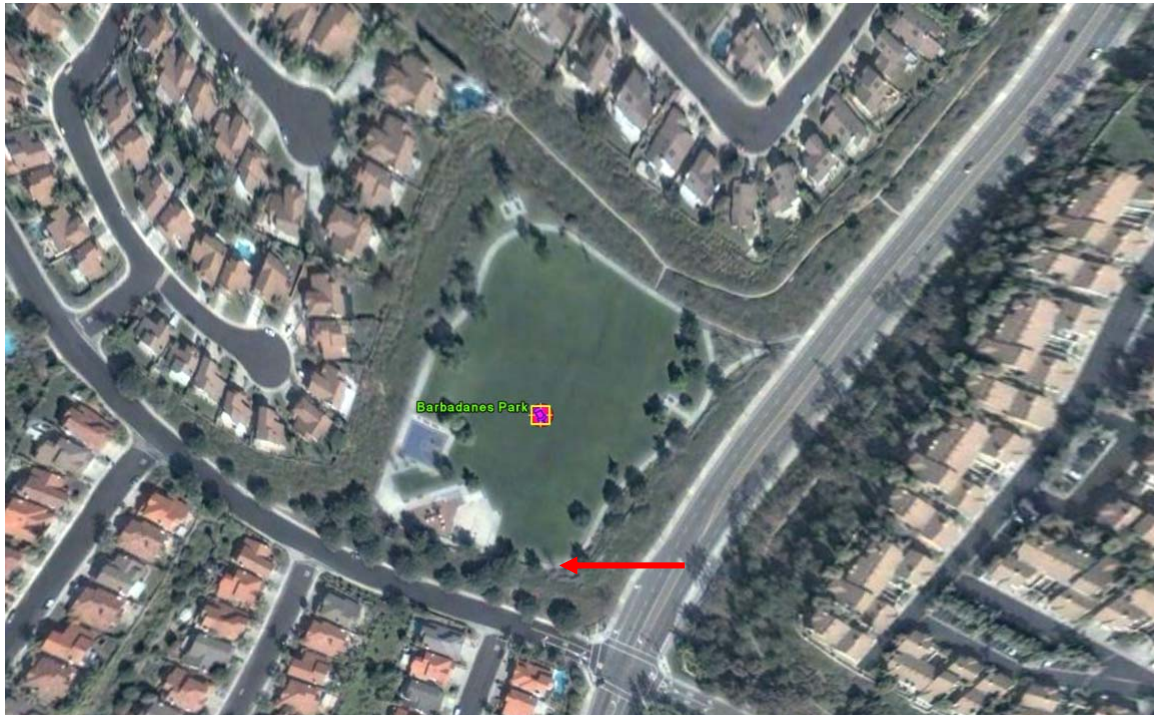
### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building or enclosure.

## Barbadanes Park

### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building or enclosure. The southwest corner of the park has a grouping of pines that can afford the integration of a slim line or mono-tree with the natural setting. Other structure options are light standards or flag poles. The accompanying equipment can be installed in a shelter, enclosure or vault. There may be some residential sensitivity to this location.

## Coronado Park

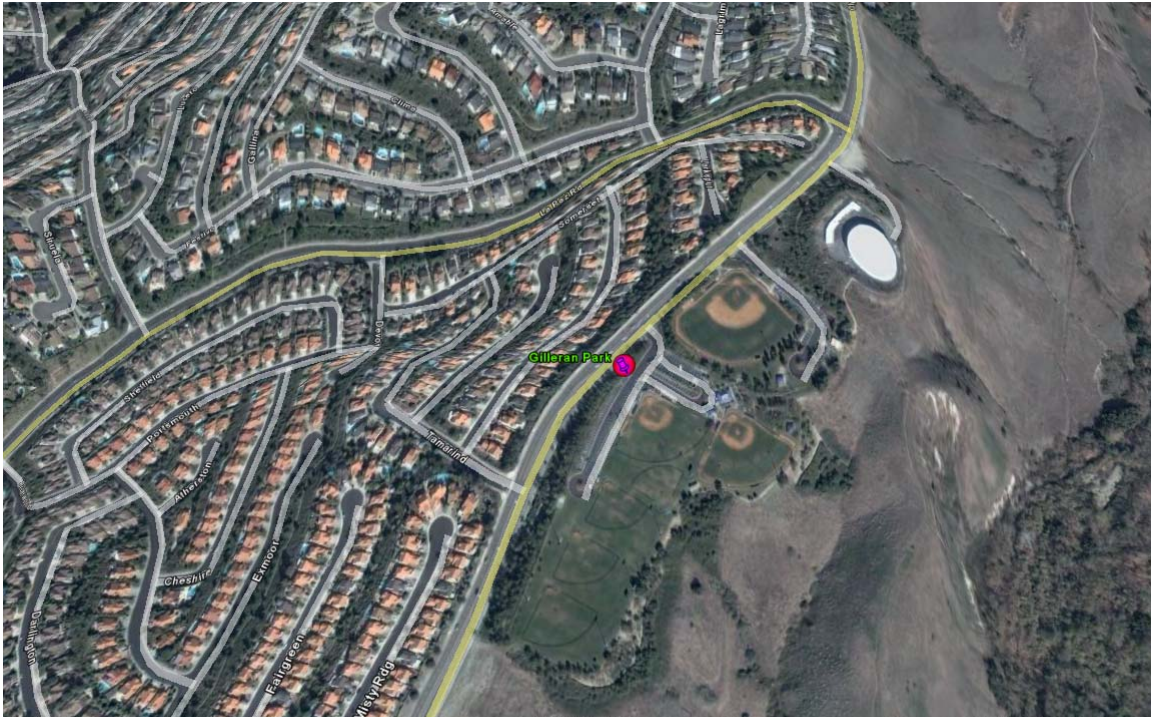
### Aerial View



Comments: Subject site is limited in size and natural features to adequately integrate a stealth mono-tree or slim-line structure with accompanying equipment buildings. Directly to the north and slightly higher elevation is the Saddleback College lower campus parking area, which presents better options for carrier site development consideration.

## Gilleran Park

### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment buildings or enclosures. Suitable options to consider are flush-mounted antennas on ball field light standards, flag poles or slim-line monopoles.



## Napoli Park

### Aerial View

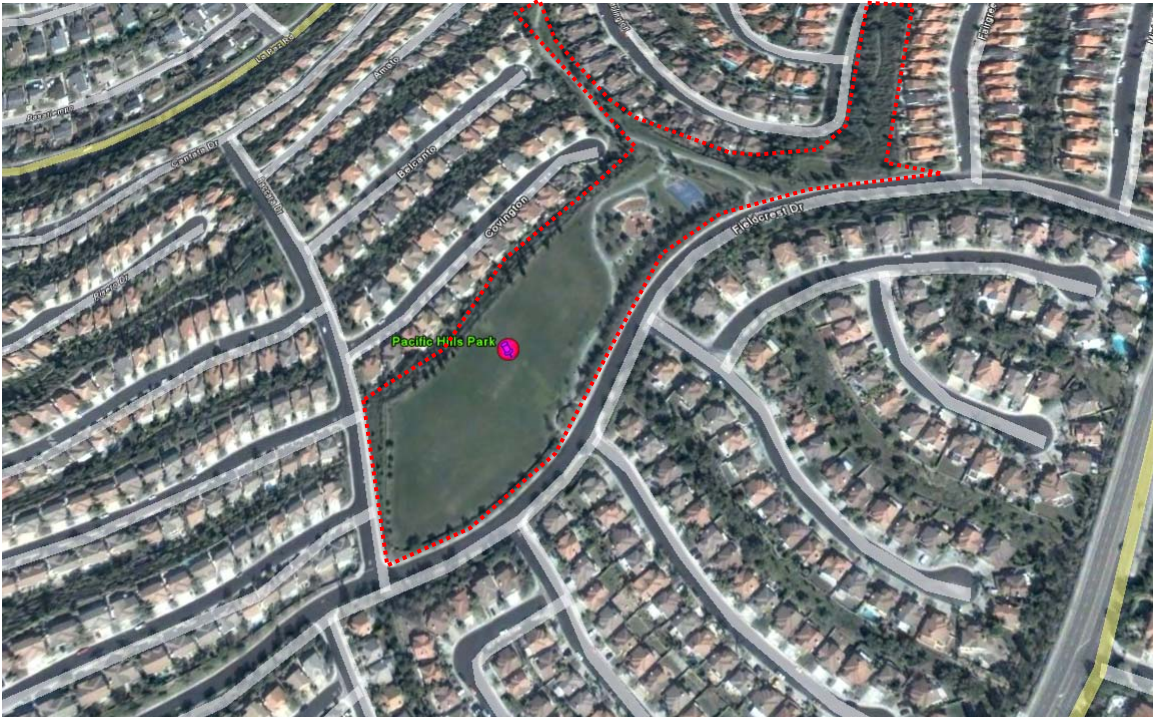


Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building, enclosure or vault. In addition, there is community sensitivity to this location. There exists private property to the north of this property that may offer a solution to placing a wireless communications facility at this site.



## Pacific Hills Park

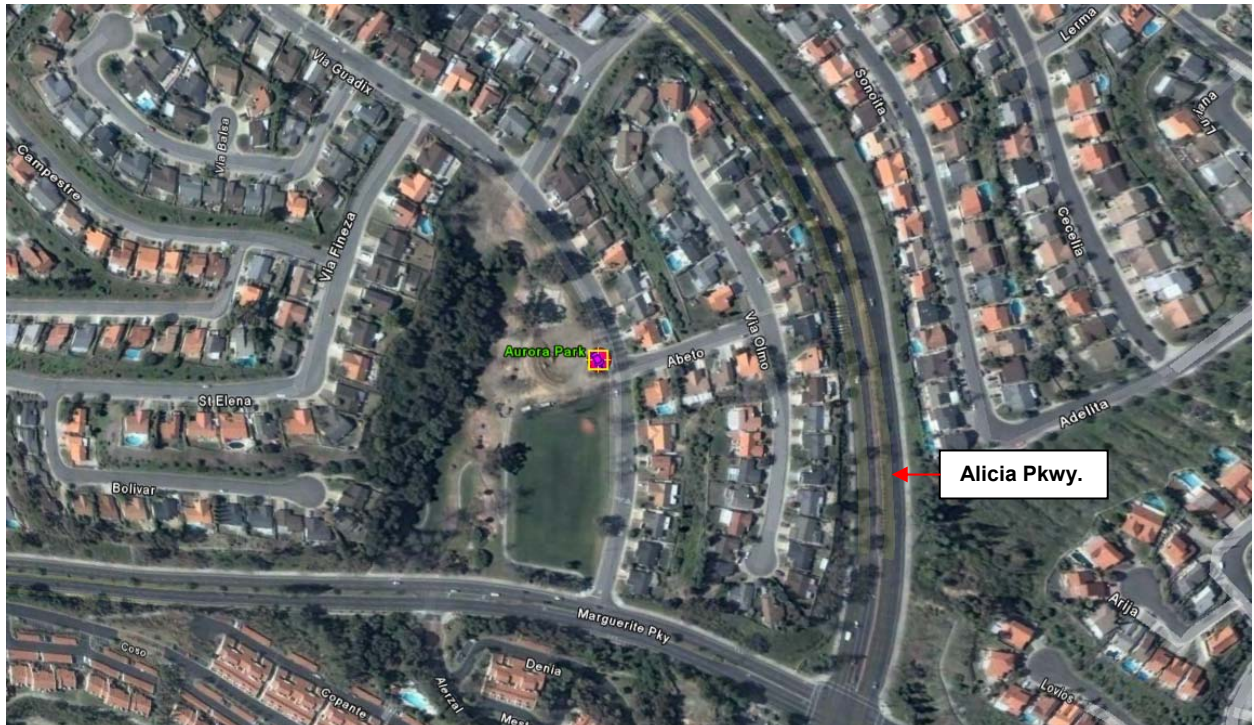
### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building, enclosure or vault. The installation of a slim line or mono-tree toward the western side of the site will require additional tree plantings to allow the structure to be sufficiently screened. Another structure to consider is a stealth light pole. There may be some residential sensitivity to this location.

## Aurora Park

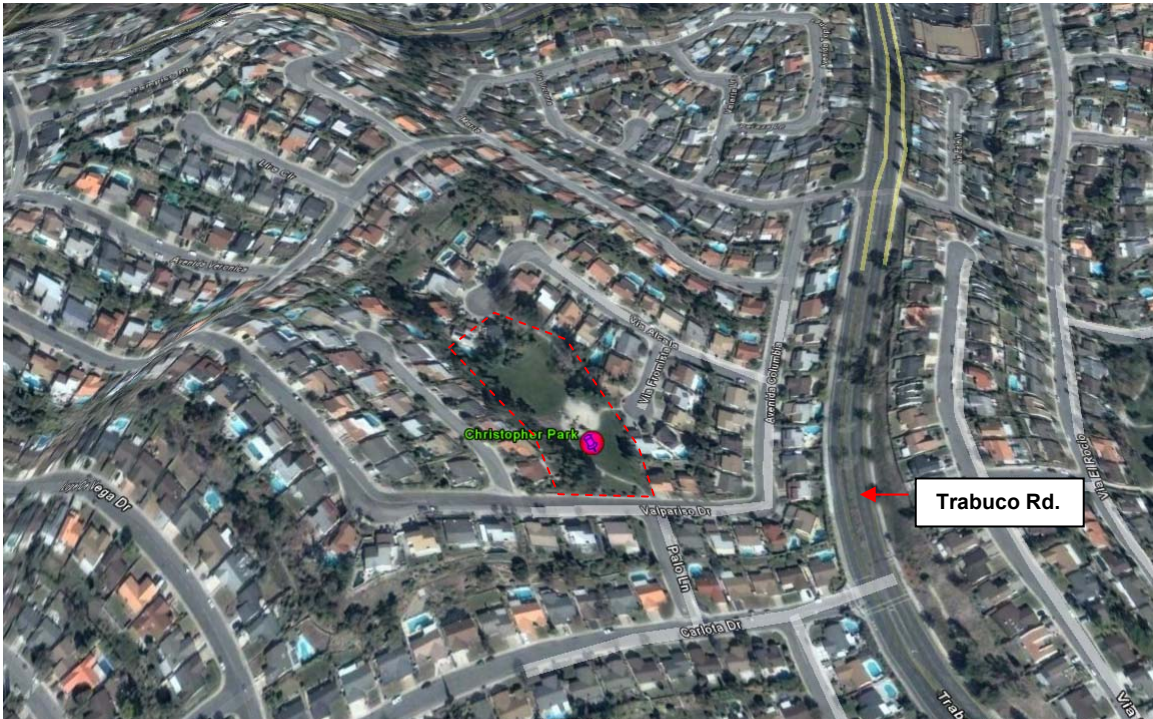
### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment buildings or enclosures. The southwest corner of the playing field presents one the best location to integrate a slim line or mono-tree type structure with the natural vegetation. Telecommunications equipment can be accommodated in a building, enclosure or vault.

## Christopher Park

### Aerial View



Comments: Subject site is limited in size and has topographical constraints to the north and west. This site could be available for a vault to accommodate antennas on street lamps adjacent to the entrance to the park's southern entrance. While the site could be residentially sensitive, there doesn't appear to be many options for providing coverage for this area.

## Crucero Park

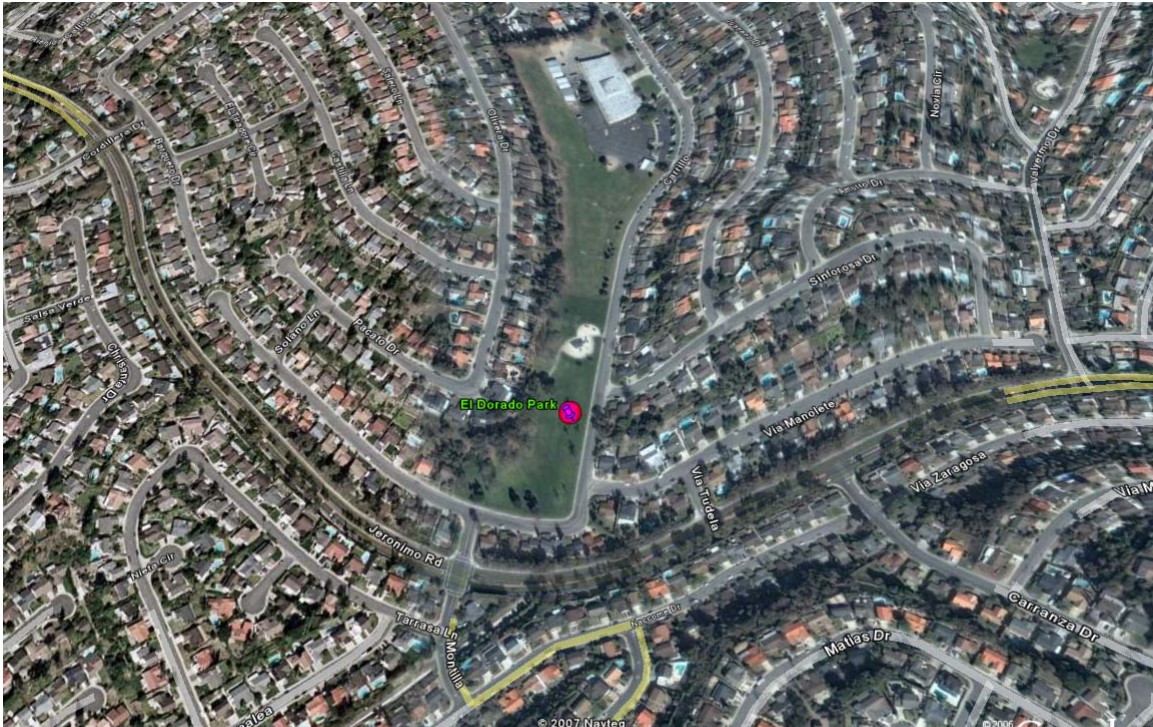
### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment buildings or enclosures. A slim line or mono-tree at the western side of the ball fields would integrate with the natural vegetation and accompanying telecommunications equipment could be vaulted or built as enclosures set into the hillside. Another antenna structure option includes a ball field light. While there is a commercial area to the north of the site that could facilitate wireless facilities, there appears to be terrain issues that may render the commercial area as a non-viable alternative.

## El Dorado Park

### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building or enclosure. There is a stand of mature trees on the western side of the park that would allow for the integration of a stealth mono-tree into the natural setting. Accompanying telecommunications equipment could be located inside an enclosure or in a below-ground vault. Other structures to consider are street lamps or slim-line poles. (This site is surrounded by residential properties with no commercial opportunities in the vicinity.)

## Melinda Park

### Aerial View



Comments: Subject site is sufficiently large to accommodate both tower type structure and accompanying telecommunications equipment buildings or enclosures. Site has an existing slim-line pole located at the southeast corner. Possible structures to consider are a mono-tree, or additional slim-line structures - with or without light attachments.

## Preciados Park

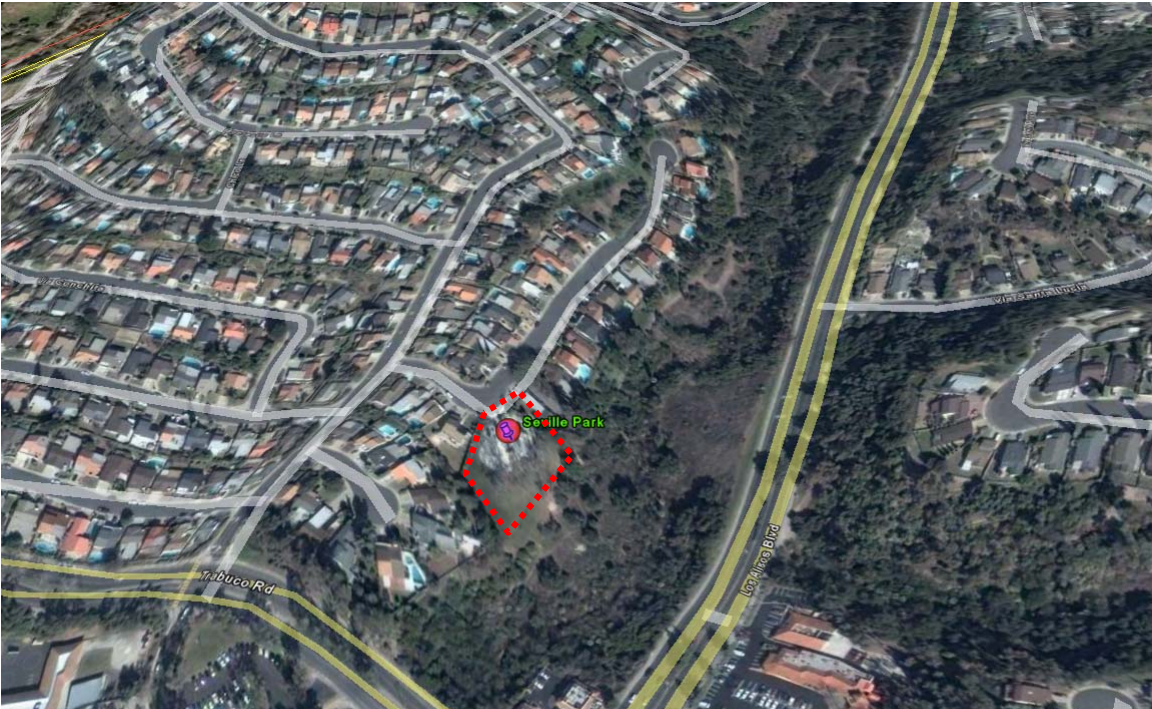
### Aerial View



Comments: Subject site is sufficiently large to accommodate both a tower type structure and accompanying telecommunications equipment building, enclosure or vault. This site has a line of dense trees along the eastern side that will provide screening and allow for a slim line or mono-tree type structure to integrate with the natural setting. Another structure to consider is a light standard.

## Seville Park

### Aerial View



Comments: This park may be too small to adequately facilitate a communications tower and its ancillary equipment. Due to the area that needs to be covered and its proximity to residential, placing some type of tower structure on this site may be controversial.





## Mono-Palm



The mono-palm is designed to conceal the antennas in the growth pod that exists below the palm fronds. Another set of antennas can be hidden as a slim line design just below the growth pod. The palm fronds will be mottled in color to look realistic and the bark will be textured and colored to look realistic.



**Mono-Tree**

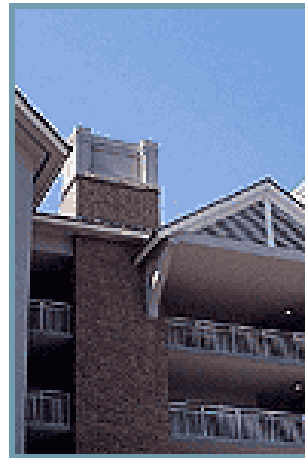


A mono-tree design can be either a thin-needle mono-pine facility or a broad-leaf type of tree. The branches shall continue above the antennas and extend beyond the location of the antennas. In addition, the antennas themselves should be sleeved in covering of the leaf or needle material. The leaves or needles should be mottled in color.

**Flag Pole**



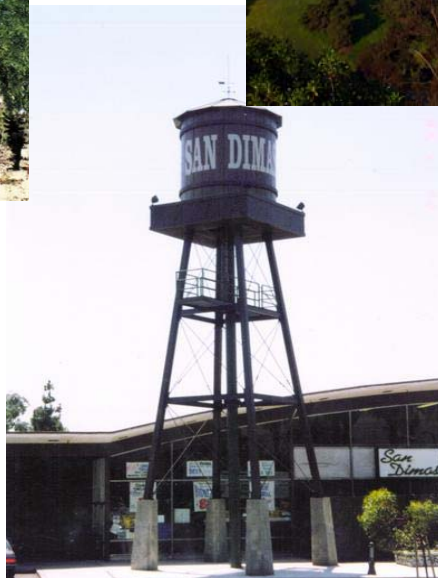
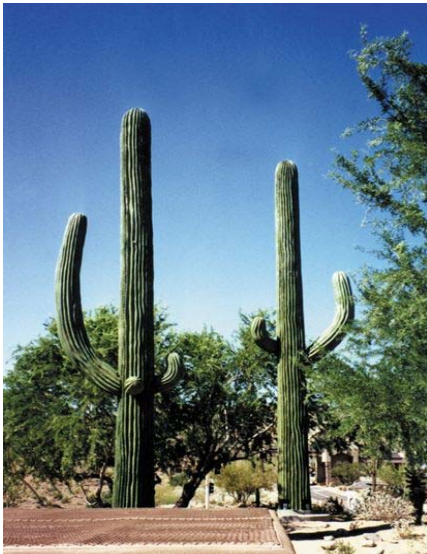
**Facade**



**Slim Line Pole**



**Other Designs**



Based on the architectural features of the property or surrounding area, wireless carriers have come up with a unique variety of designs to stealth their antennas.

**Light Pole**



## Equipment Designs



Adjacent to each wireless antenna facility, radio and other equipment necessary for the operation of the cell site needs to be facilitated. Stealthing this ground level equipment can include several methods of screening from public view, especially at city parks. This can also include building a structure that looks similar to other structures on the property, or incorporating the equipment room into a new snack bar or storage facility for the park.

### **Implementation**

As part of the development of the Wireless Master Plan for the City of Mission Viejo, marketing this study is integral to the success of the project. Just prior to the initiation of this study, there were six major wireless service providers offering cellular phone service in Southern California.

Over the last eighteen months alone, significant changes have occurred within the Wireless Industry:

- a. Cingular Wireless acquired AT&T Wireless
- b. Cingular sold a large portion of its network to T-Mobile
- c. Nextel received a new frequency spectrum and is required to relinquish their 800mHz in order to help solve the public safety interference issues.
- d. Nextel and Sprint PCS merged
- e. Metro PCS entered the Southern California market
- f. Cricket Wireless entered the San Diego market
- g. Mobile Modeo entered the Southern California market, and then quickly departs
- h. Television broadcast and mobile wallet capabilities began

As the Wireless Industry continues to evolve, so will the results of this study. ATS Communications has presented a list of City-owned properties to the wireless service providers for their consideration as potential candidates for their future builds. This study will be used as a marketing tool for the City to attract wireless carriers.

Within the Southern California market, which varies by company but typically includes the counties of Orange, Los Angeles, Ventura, Riverside, San Bernardino and sometimes Imperial, San Diego, Santa Barbara and Kern, there are hundreds of communities. Since Mission Viejo is only one community among many, it will be ATS Communication's responsibility to ensure the wireless carriers help implement this study.

Each of these wireless carriers uses site acquisition subcontractors to continue the development and enhancement of their networks. These companies come and go, and their personnel are very migratory. Therefore, a continuous marketing effort is needed to ensure this study is implemented and additional City-owned properties are considered.



## **Process**

Once the Wireless Master Plan is approved by the Planning Commission and City Council, the implementation begins. As part of the implementation, the process through the City is expected to be streamlined from what exists today.

Currently, the site acquisition representative with the wireless carrier goes out to the site and performs a number of activities in preparing their submittal to the City regarding the design and development of the project. Once this has been prepared and submitted to the City, it takes staff time and effort to prepare recommendations and modifications.

The concept of the Wireless Master Plan is to take a pro-active approach by using the information prepared and the approval process of the City to let the wireless companies know the location and design criteria of the City in order to remedy the current inefficient process. The following is generally the proposed process that can be expected as the Wireless Master Plan is implemented.

1. ATS Communications presents the potential cell site locations (both public and private) to each of the wireless carriers.
2. Carriers will determine if the locations are priority sites for their network development in the near term.
3. If sites are identified as priority sites, each carrier will issue a search ring to their respective site acquisition consultant
4. The site acquisition consultant will contact the City or ATS Communications directly to begin the site development process.
5. ATS Communications coordinates a field visit with the carrier's development team and appropriate City personnel.
6. Carrier develops and presents preliminary design drawings for staff and ATS review - pursuant to "best practices" and design standards outlined in the Wireless Master Plan.
7. Staff and ATS review design and forward comments back to the carrier.
8. Carrier incorporates changes to the design.
9. ATS negotiates the lease agreement for the cell site.
10. The draft of the lease agreement is reviewed by the City attorney.
11. The final lease agreement draft is presented to City Council, along with the site development drawings and related materials for consideration. The City Council may approve or request additional changes to the lease agreement, design drawings or both.
12. The Lease is executed by the City and the Carrier.
13. The Carrier applies for the building permit.
14. The building permit is issued and the lease rent commences.
15. ATS coordinates a pre-construction walk with the carrier's contractor and City personnel.
16. Site construction begins.

17. ATS and the City's building department monitor site construction.
18. Carrier calls for final inspection
19. ATS and City personnel review the construction site and identify all punch-list items for the carrier's contactor to correct.
20. Final inspection conducted – the site is released for the carrier to obtain permanent power hook-up.
21. ATS periodically reviews site for maintenance related issues.
22. ATS periodically reviews and updates the Wireless Master Plan.
  - a. Identify changes to each carrier's network infrastructure and coverage.
  - b. Identify any new wireless services providers entering into the Mission Viejo market and their potential impact.
  - c. Identify any changes within the industry relating to advances in technology that may impact the development of wireless networks within the City of Mission Viejo.
  - d. Identify any new developments in "stealth" technologies.
  - e. Identify any changes on regulatory issues.
  - f. Periodically report the status of the Wireless Master Plan to the City Council.

## **Background: The City of Mission Viejo**

### ***The City***

The first settlers of Mission Viejo moved into new Dean homes in 1966. Since then, the City of Mission Viejo has grown dramatically. Actually, the land was used before this time for cattle and sheep grazing as it was of little use to early inhabitants of Orange County for farming.

Nearly 100,000 people currently live in Mission Viejo with over 25,000 families residing in this community. Almost forty percent of the households in this community have children under the age of 18 at home. With an above average family income of \$90,000, this affluent community is a target market for the Wireless Industry and the direction it is heading.

The city rises to a highpoint of about 1,000 feet, with an average elevation of 450 feet. Within its 17.4 square miles, the city boasts rolling hills and spectacular views. While this creates a unique quality of living for the residents of Mission Viejo, it results in a logistical dilemma for wireless carriers trying to establish a cohesive wireless network within the community.

### ***Wireless Technology***

Wireless telecommunications generally describes those services known to the Federal Communications Commission (FCC) as Commercial Mobile Radio Services (CMRS). Currently, the majority of CMRS is encompassed within the radio telephony segment: Cellular Telephone Services (800 to 900 Mhz range), Personal Communications Services (PCS) (1800 to 1900 Mhz range), and Specialized Mobile Radio (SMR). By the end of 2003, 97% of U.S. residents had access to three or more providers of these services, and more than 160 million people subscribed to these services. Nationwide, over 54% of the population use CMRS services, while in Southern California, over 61% utilize CMRS services. During 2003, radio telephony generated over \$88 billion in revenue. As these facts make clear, CMRS, and especially radio telephony, are major factors in the daily lives of a large segment of the community.

Modern radio telephony got its start with analog Cellular Telephone Service. While cellular technology was originally developed by AT&T in 1958, it did not become commercially available until the FCC began licensing Cellular providers in 1982. Cellular licenses are allocated in two bands (A & B) within the 800 MHz area of the radio spectrum. Since 1991, two carriers have been licensed in each of the nation's 734 Cellular Market Areas. During the 1990s, most Cellular service was transitioned from analog to digital signal transmission, which greatly

improved reception for Cellular users, although Cellular operators must retain the availability of analog services until 2008.

In addition to Cellular Telephone Services, first generation services also include SMR, whose best known provider in Southern California is Nextel. The FCC began licensing SMR in both the 800 MHz and 900 MHz bands in 1979. Since that time, the FCC has also auctioned off spectrum for SMR services. To date, 19 MHz of exclusive spectrum and 7.5 MHz of shared spectrum has been allocated to SMR. SMR can provide for both one-on-one and simultaneous group communications through "dispatch mode" operations, as well as radio telephony through "interconnected mode" operations which connect the radios to the regular land-line telephone network. Because of various interference issues between SMR and public safety radio systems, the federal government is requiring SMR providers to relocate from the 800 MHz band to the 1900 MHz band.

The second generation of radio telephony service was introduced with the advent of Broadband PCS in 1995. PCS integrates the mobile telephony of Cellular with additional services, such as paging and text messaging. All PCS services are delivered through digital signals in the 1850-1990 MHz bands. Unlike Cellular, whose spectrum was allocated by the FCC through traditional regulatory licensing, Broadband PCS spectrum was allocated through auctions. The A and B blocks of the Broadband PCS spectrum, both of which are 30 MHz wide, were auctioned on the basis of 51 Major Trading Areas (MTA's). The remaining blocks, the 30 MHz C block, and the 10 MHz D, E and F blocks, were auctioned on the basis of 493 Basic Trading Areas (BTA's).

The third generation of radio telephony, commonly called "3G," has generally been implemented as an enhancement of Broadband PCS. 3G technology requires high speed digital transmission to support various multimedia applications, including email and internet access. The FCC is also planning to auction an additional 90 MHz of spectrum, in the 1710-1755 MHz and 2110-2155 MHz bands, specifically for advanced wireless services, such as 3G and 4G services.

In addition to radio telephony, CMRS includes two other elements - paging and Narrowband PCS. Licensees in these spectrum bands provide paging and both one-and two-way text messaging services. While these services may seem outdated, these companies are finding new niches in the market to fill where these services are still needed.

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## ***New Technologies***

Watching television commercials provides a glimpse into the changing landscape of wireless communications. Expecting that the largest segment of the population, seniors, will age into cell phones, most of the marketing dollars today are spent on the youth market between the ages of 12 and 24. New technologies and services enticing this crowd and adults alike include live television, video broadcasting, and interactive games.

Companies are promoting new cell phones to provide these services such as Helio and Amp'd Mobile. Helio's commercial stating "It's not a phone" is probably the most accurate as far as the direction these devices are going.

Many industry analysts expect that most devices such as PDA's, Ipods, cameras, video cameras, and even our wallets will be replaced by what we call our "cell phone." Unlike Europe, Asia and South America, the United States has been slow to embrace these new technologies and services, but there are a growing number of companies that are betting the American consumer is ready.

## ***Wireless Technology in the City***

In 1992, LA Cellular was the first wireless carrier to get approved for two antenna sites to begin providing analog cellular service in the City of Mission Viejo. The first site was at Saddleback Community College followed by Lakeside Plaza at Marguerite Parkway and Alicia Parkway.

The next year, Lakeside Plaza would be the site of the first co-located antennas with the introduction of Pactel Cellular to Mission Viejo. Pactel Cellular would be approved at Capo Valley High School in 1993 as well with Nextel receiving approval the following year at the same location.

By 1995, two more wireless carriers were approved in Mission Viejo, AirTouch Wireless and Pacific Bell Wireless. While LA Cellular added one more location to its network, PacBell received nine approvals for wireless sites throughout the City giving them a substantial network with more than 50% of the locations in the community.

Over the next couple of years, no new sites were approved. Then in 1999, 5 new sites were approved with another 33 locations during the following two years. These three years saw many of the new players in the industry that are still here today as many of the original wireless companies were acquired.

During the 14 years that wireless companies have been active in Mission Viejo, a number of mergers, name changes, and partnerships have occurred. The following table sorts out the various players:

<b>Current Wireless Company</b>	<b>Transactions</b>
Cingular Wireless (SBC)	Renamed from Pac Bell Wireless
	Purchased AT&T Wireless (who had purchased LA Cellular)
	Partnered with T-Mobile
	Sold a portion of its combined network to T-Mobile to dissolve partnership
	Purchased spectrum rights from NextWave Telecom
Nextel (Nextel)	Provide Boost Mobile prepaid services through joint venture with an Australian company
	Merged with Sprint PCS, though it appears Nextel may remain active as Sprint's business service
	Being required to relocate their spectrum to eliminate public safety radio system interference issues
Sprint PCS (Sprint)	Renamed from MCI
	Acquired Cox PCS service
	Merged with Nextel
	Partnered with Virgin Group LLC to form Virgin Mobile prepaid services
T-Mobile (Deutsche Telecom)	Partnered with Cingular
	Purchased a portion of Cingular's network and certain spectrum rights as partnership was dissolved.
	Partnered with Western Wireless
Verizon Wireless (Verizon)	Purchased Airtouch Cellular
	Acquired PacTel Cellular

Over the last 14 years, 69 cellular facilities have been approved and built to provide personal communications for residents and visitors throughout the City of Mission Viejo. The following list shows the dates the wireless communications facilities were approved:

<b>Wireless Facilities Located in Mission Viejo</b>					
	<b>Site Name</b>	<b>Year</b>	<b>City Ref #</b>	<b>Current Carrier</b>	<b>Original Carrier</b>
1	Saddleback Community College	1992	sp92-099p	Cingular	LA Cellular/AT&T Wireless
2	Lakeside Plaza	1992	sp92-114a	Cingular	LA Cellular/AT&T Wireless
3	Lakeside Plaza	1993	sp93-116a	Verizon Wireless	Pactel Cellular/Verizon
4	Capistrano Valley HS	1993	sp93-133p	Verizon Wireless	PacTel Cellular/Verizon
5	Capistrano Valley HS	1994	sp94-152p	Nextel	Nextel
6	MNWD Via Bahia	1995	sp95-206p	Nextel	Nextel
7	Lakeside Plaza	1995	sp95-216	T-Mobile	Pacific Bell/Cingular/T-Mobile
8	MNWD Via Bahia	1996	sp96-222	T-Mobile	Pacific Bell/Cingular/T-Mobile
9	Shepherd of the Hills	1996	sp96-223p	T-Mobile	Pacific Bell/Cingular/T-Mobile
10	MNWD Camino Capistrano	1996	sp96-224p	Cingular	LA Cellular/AT&T Wireless
11	True Value Hardware	1996	sp96-226p	T-Mobile	Pacific Bell/Cingular/T-Mobile
12	Acero Bldg East	1996	sp96-248	Cingular	Pacific Bell/Cingular/T-Mobile
13	Felipe Water Tank	1996	sp96-253p	T-Mobile	Pacific Bell/Cingular/T-Mobile
14	Pala Building	1996	sp96-255	T-Mobile	Pacific Bell/Cingular/T-Mobile
15	MV Church of Christ	1996	sp96-259	T-Mobile	Pacific Bell/Cingular/T-Mobile
16	Buck Building	1996	sp96-261	T-Mobile	Pacific Bell/Cingular/T-Mobile
17	MNWD Precidios	1996	sp96-266	T-Mobile	Pacific Bell/Cingular/T-Mobile
18	MV Presbyterian Church	1999	pdp1999-04	Verizon Wireless	AirTouch/Verizon
19	Felipe Water Tank	1999	pdp1999-05	Cingular	LA Cellular/AT&T Wireless
20	Buck Building	1999	pdp1999-06	Cingular	AT&T Wireless
21	MNWD Delemos	1999	pdp1999-14	Nextel	Nextel
22	MNWD Delemos	1999	pdp1999-17	T-Mobile	Pacific Bell/Cingular/T-Mobile
23	SCE @ Crown Valley	2000	pdp2000-19	T-Mobile	Pacific Bell/Cingular/T-Mobile
24	Pala Building	2000	pdp2000-22	Nextel	Nextel
25	MV Regional Medical Center	2000	pdp2000-23	Sprint PCS	Sprint PCS
26	Acero Bldg East	2000	pdp2000-26	Sprint PCS	Sprint PCS
27	Robinsons May Dept Store	2000	pdp2000-30	T-Mobile	Pacific Bell/Cingular/T-Mobile
28	La Alameda Building	2000	pdp2000-31	Nextel	Nextel

29	Mission Hills	2000	pdp2000-32	Nextel	Nextel
30	Chabad Jewish Center	2000	pdp2000-34	T-Mobile	Pacific Bell/Cingular/T-Mobile
31	SCE @ California Terrace	2000	pdp2000-35	Cingular	Pacific Bell/Cingular/T-Mobile
32	MV Church of Christ	2000	pdp2000-36	Sprint PCS	Sprint PCS
33	MNWD Camino Capistrano	2000	pdp2000-37	T-Mobile	Pacific Bell/Cingular/T-Mobile
34	Oso Viejo Park	2000	pdp2000-38	Verizon Wireless	Verizon
35	Oso Viejo Park	2000	pdp2000-40	Cingular	AT&T Wireless
36	MNWD Via Bahia	2000	pdp2000-44	Cingular	AT&T Wireless
37	Trabuco Hills Professional Center	2000	pdp2000-47	Verizon Wireless	Verizon
38	Acero Bldg North	2000	pdp2000-48	Cingular	AT&T Wireless
39	Ayres Suites	2000	pdp2000-49	T-Mobile	Cingular
40	Oso Viejo Park	2001	pdp2001-50	Nextel	Nextel
41	Plaza Drive	2001	pdp2001-51	Verizon Wireless	Verizon
42	Congregation Eilat	2001	pdp2001-56	Sprint PCS	Sprint PCS
43	Lakeside Plaza	2001	pdp2001-59	Cingular	Cingular
44	Trabuco MacDonalds	2001	pdp2001-60	T-Mobile	Cingular
45	Beebe Park	2001	pdp2001-61	Sprint PCS	Sprint PCS
46	YMCA Clock Tower	2001	pdp2001-62	Sprint PCS	Sprint PCS
47	SCE @ La Barca	2001	pdp2001-64	Cingular	AT&T Wireless
48	Pavion Park	2001	pdp2001-65	T-Mobile	Cingular
49	Buck Building	2001	pdp2001-67	Verizon Wireless	Verizon
50	SCE @ Flo Jo Park	2001	pdp2001-69	T-Mobile	Cingular
51	Beebe Park	2001	pdp2001-72	Verizon Wireless	Verizon
52	Vista Paint	2001	pdp2001-73	Sprint PCS	Sprint PCS
53	Beebe Park	2001	pdp2001-75	Nextel	Nextel
54	Fairfield Inn	2001	pdp2001-76	Nextel	Nextel
55	SCE @ Oso	2001	pdp2001-77	Sprint PCS	Sprint PCS
56	Kaleidoscope	2002	pdp2002-83	T-Mobile	Cingular
57	SCE @ Crown Valley	2002	pdp2002-87	Cingular	AT&T Wireless
58	SCE @ Beebe Park	2002	pdp2002-88	Cingular	AT&T Wireless
59	MV Church of Christ	2002	pdp2002-89	Cingular	AT&T Wireless
60	MV Christian Church	2002	pdp2002-91	T-Mobile	Cingular
61	Congregation Eilat	2002	pdp2002-94	T-Mobile	Cingular
62	Melinda Park	2003	pdp2003-105	T-Mobile	Cingular



63	SCE @ La Barca	2003	pdp2003-109	Nextel	Nextel
64	Trabuco Hills Professional Center	2004	pdp2004-124	Cingular	AT&T Wireless
65	El Toro Water District	2004	pdp2004-125	T-Mobile	Cingular
66	SCE @ Melinda	2004	pdp2004-128	Sprint PCS	Sprint PCS
67	Ayres Suites	2004	pdp2004-131	Verizon Wireless	Verizon
68	YMCA Clock Tower	2004	pdp2004-133	Cingular	AT&T Wireless
69	Ayres Suites	2005	pdp2005-138	Cingular	AT&T Wireless

T-Mobile is a relatively new player in the market having previously shared its network with Cingular. With the acquisition of AT&T Wireless, Cingular was required to divest itself of part of its wireless network, choosing to sell to T-Mobile its older, former Pacific Bell locations. As part of this transition, each carrier is in the process of moving their customers to their separate networks in order to give each company time to fill in coverage holes.

In addition, two new wireless companies have entered the Southern California market, Metro PCS (dba Royal Street Communications) and Modeo. While Metro PCS is competing head on with the other major wireless carriers, Modeo is a subsidiary of one of the major tower companies and is expected to use their infrastructure to develop their network.

As wireless communications companies continue to build their networks, with some disappearing along the way, the need for additional antenna sites will grow as the focus of network development shifts from signal coverage to service capacity. This growth is due to the increasing numbers of customers as people shift from land lines to cell phones, embrace all of the new third generation (3G) services, and grow more comfortable with their cell phones as they use greater amounts of minutes.

### ***Evolution of Wireless Technologies***

The underlying technology of cell phones has been in existence since the development of the radio. While television shows like “Get Smart” and “Star Trek” introduced us to the idea of cell phones, they were first developed in the mid-seventies by Motorola.

The current technology of cell phones is beginning to provide users with access to television broadcasts and sending live streaming video. The future of wireless technologies promises to bring us closer to an ubiquitous wireless environment that offers even greater access to high-speed data services for a wide variety of devices all over the globe. The emergence of the 802.16 (WiMAX) standard adds

a new opportunity to provide high-speed data access to a new wave of Internet users. The successor to 802.11a/g aimed at consumer applications require very high throughput, like HDTV and streaming video, 802.11n will see a four fold increase in bandwidth to support increasing demands of high volume data networks over the next few years.

These technologies will continue to evolve and cross pollinate with both licensed and unlicensed bands including PCS and VoIP networks that carry voice. That said, there is a common opinion throughout academia, industry and business that the current wireless technology fulfills neither current nor future demands," according to those behind the Wireless Gigabit with Advanced Multimedia (WIGWAM) project. WIGWAM is seen as an early vision of the next generation to 802.11n looking for Gbps speeds, the interactive speed and bandwidth necessary for the next generation of wireless services envisioned.

Over the next few years, the landscape of wireless technology, new devices and the bandwidth necessary to meet the demands of the consumer will be dynamic. As wireless technology evolves, the infrastructure to support those needs will grow as well in order to keep pace. There is no evolution of technology if the infrastructure necessary to support it doesn't exist.

### **Major Carrier Network Coverage**

Currently there are several major wireless personal communications companies providing wireless cellular service in the City of Mission Viejo: Cingular, Sprint PCS (with Nextel), T-Mobile and Verizon Wireless. An additional carrier, Metro PCS, is in the process of submitting applications for locations in the City. Metro PCS is developing their initial network throughout Southern California. They expect to begin marketing their products by mid 2006 with cell phone availability beginning in November for Holiday shopping.

In addition, Cricket, a smaller niche carrier out of San Diego, is aggressively building out their network. It is expected that they could continue their development north of San Diego in the near future. Other smaller service companies have licenses to come into this market so the possibility exists that these companies could be joined by others in the near term.

<b>Wireless Facilities Throughout Mission Viejo</b>			
<b>Current Carrier</b>	<b>Year</b>	<b>Site Name</b>	<b>Original Evolution</b>
Cingular	1992	Saddleback Community College	LA Cellular
Cingular	1992	Lakeside Plaza	LA Cellular
Cingular	1996	MNWD Camino Capistrano	LA Cellular
Cingular	1999	Felipe Water Tank	LA Cellular
Cingular	1999	Buck Building	AT&T Wireless
Cingular	2000	Oso Viejo Park	AT&T Wireless
Cingular	2000	MNWD Via Bahia	AT&T Wireless

Cingular	2000	Acero Bldg North	AT&T Wireless
Cingular	2001	Lakeside Plaza	Cingular
Cingular	2001	Trabuco MacDonalds	Cingular
Cingular	2001	SCE @ La Barca	AT&T Wireless
Cingular	2001	Pavion Park	Cingular
Cingular	2001	SCE @ Flo Jo Park	Cingular
Cingular	2002	Kaleidoscope	Cingular
Cingular	2002	Chabad Jewish Center	AT&T Wireless
Cingular	2002	SCE @ Crown Valley	AT&T Wireless
Cingular	2002	SCE @ Beebe Park	AT&T Wireless
Cingular	2002	MV Church of Christ	AT&T Wireless
Cingular	2002	MV Christian Church	Cingular
Cingular	2002	Congregation Eilat	Cingular
Cingular	2003	Melinda Park	Cingular
Cingular	2004	Trabuco Hills Professional Center	AT&T Wireless
Cingular	2004	El Toro Water District	Cingular
Cingular	2004	YMCA Clock Tower	AT&T Wireless
Cingular	2005	Ayres Suites	AT&T Wireless
Nextel	1994	CVHS	Nextel
Nextel	1995	MNWD Via Bahia	Nextel
Nextel	1999	MNWD Delemos	Nextel
Nextel	2000	Pala Building	Nextel
Nextel	2000	La Alameda Building	Nextel
Nextel	2000	Mission Hills	Nextel
Nextel	2001	Oso Viejo Park	Nextel
Nextel	2001	Beebe Park	Nextel
Nextel	2001	Fairfield Inn	Nextel
Nextel	2003	SCE @ La Barca	Nextel
Sprint PCS	2000	MV Regional Medical Center	Sprint PCS
Sprint PCS	2000	Acero Bldg East	Sprint PCS
Sprint PCS	2000	MV Church of Christ	Sprint PCS
Sprint PCS	2001	Congregation Eilat	Sprint PCS
Sprint PCS	2001	Beebe Park	Sprint PCS
Sprint PCS	2001	YMCA Clock Tower	Sprint PCS
Sprint PCS	2001	Vista Paint	Sprint PCS
Sprint PCS	2001	SCE @ Oso	Sprint PCS
Sprint PCS	2004	SCE @ Melinda	Sprint PCS
T-Mobile	1995	Lakeside Plaza	Pacific Bell Wireless
T-Mobile	1996	MNWD Via Bahia	Pacific Bell Wireless
T-Mobile	1996	Shepherd of the Hills	Pacific Bell Wireless
T-Mobile	1996	True Value Hardware	Pacific Bell Wireless
T-Mobile	1996	Acero Bldg East	Pacific Bell Wireless
T-Mobile	1996	Felipe Water Tank	Pacific Bell Wireless
T-Mobile	1996	Pala Building	Pacific Bell Wireless
T-Mobile	1996	MV Church of Christ	Pacific Bell Wireless
T-Mobile	1996	Buck Building	Pacific Bell Wireless
T-Mobile	1996	MNWD Preciados	Pacific Bell Wireless
T-Mobile	1999	MNWD Delemos	Pacific Bell Wireless

T-Mobile	2000	Ayres Suites	Cingular
T-Mobile	2000	SCE @ Crown Valley	Pacific Bell Wireless
T-Mobile	2000	Robinsons May Dept Store	Pacific Bell Wireless
T-Mobile	2000	Chabad Jewish Center	Pacific Bell Wireless
T-Mobile	2000	SCE @ 241 Toll Road	Pacific Bell Wireless
T-Mobile	2000	MNWD Camino Capistrano	Pacific Bell Wireless
Verizon Wireless	1993	Lakeside Plaza	Pactel Cellular
Verizon Wireless	1993	CVHS	Pactel Cellular
Verizon Wireless	1999	MV Presbyterian Church	AirTouch Wireless
Verizon Wireless	2000	Oso Viejo Park	Verizon Wireless
Verizon Wireless	2000	Trabuco Hills Professional Center	Verizon Wireless
Verizon Wireless	2001	Plaza Drive	Verizon Wireless
Verizon Wireless	2001	Buck Building	Verizon Wireless
Verizon Wireless	2001	Beebe Park	Verizon Wireless
Verizon Wireless	2004	Ayres Suites	Verizon Wireless

Industry analysts predict that over the next few years, more cellular facilities will need to be built to keep up with consumer demand. These analysts expect anywhere from double to triple the number of cell sites will be necessary to provide the bandwidth needed for these services.

While commercials for cell phones show all of the new services available, they truly are no longer used solely for voice communications. This sophisticated walky-talky, takes pictures, plays movies and music, keeps your calendar, pays your bills and allows you to video conference.

## Inventory of City Property

### City-Owned Property

The following is a comprehensive list of all of the properties owned by the City of Mission Viejo. Some parcels were removed from consideration if they obviously could not be considered a viable site for the placement of structure to support a wireless antenna. All properties were evaluated and considered as possible locations for the near term needs of the wireless carriers coverage. Those properties which fell roughly within a quarter mile of a coverage or capacity need by identified were then included in the list of 18 proposed properties. Therefore, properties that could facilitate a wireless communications facility may be left out as coverage is provided by other properties.

The sites have been divided into four groups based on several factors that currently exist at these locations. Group “A” consists of properties with existing wireless communications facilities that have the capacity to handle additional wireless communications facilities. Group “B” includes properties that have existing wireless communications facilities that are either at or close to capacity for handling additional wireless communications facilities. Group “C” addresses properties that currently do not have any wireless communications facilities but are capable of facilitating a wireless communications facility. Some of these locations may have applications in process from wireless companies. Group “D” identifies properties that may not reasonably facilitate a wireless communications facility.

Factors considered in determining which group a property was assigned includes ground height and other topographical features, reasonable access to utilities, size of the property and its ability for a wireless communications facility to reasonably blend into the current location, general proximity to other non-city owned properties that may provide better coverage, and other reasons.

The latitude and longitude for each location was determined along with the ground height (AMSL which stands for above mean sea level) of the site.

Group	Site Name	Site ID	Latitude	Longitude	AMSL	Address
A	Heritage House	MV-010	33.645567	-117.626026	997'	28951 Melinda Road
A	Norman P. Murray Community Center	MV-011	33.598812	-117.65026	594'	24932 Veterans Way
A	Thomas R. Potocki Conference Center	MV-012	33.597853	-117.648778	594'	27301 La Paz Road
A	Alicia Park	MV-014	33.619911	-117.674955	578'	23650 Via Linda
A	Gilleran Park	MV-024	33.600206	-117.637218	792'	24960 Felipe Road
A	Pinecrest Park	MV-032	33.651945	-117.637998	797'	21310 Pinecrest
A	World Cup Soccer Fields	MV-038	33.597853	-117.648778	594'	27301 La Paz Road
A	Florence Joyner Olympiad Park	MV-049	33.631788	-117.635596	795'	22760 Olympiad Road

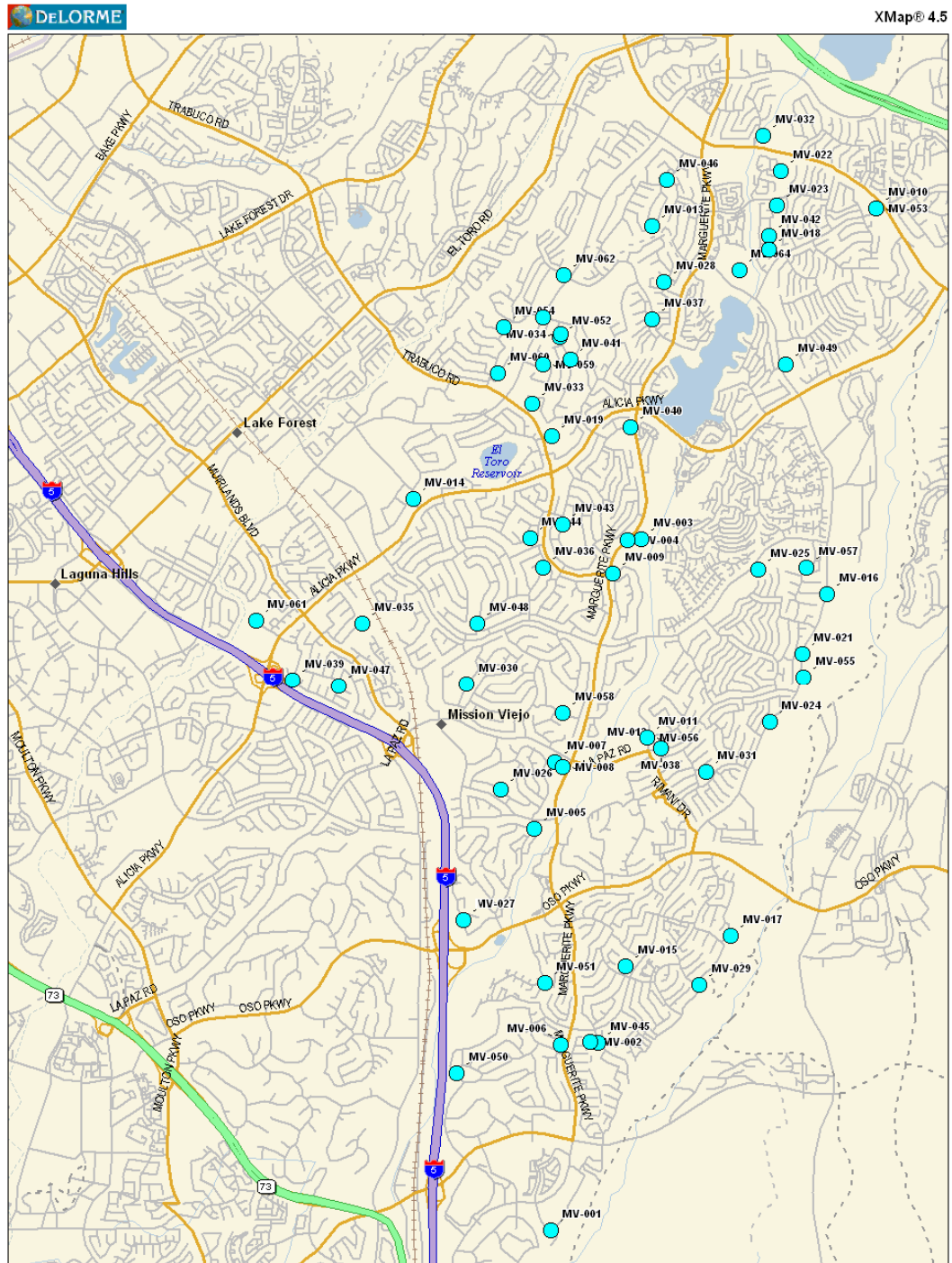
Inventory of City Property

A	Melinda Park	MV-053	33.645567	-117.626026	997'	28951 Melinda Road
A	Pavion Park	MV-057	33.613883	-117.633374	767'	24051 Pavion
B	Marguerite Recreation Center	MV-009	33.613336	-117.653895	597'	27341 Trabuco Circle
B	Beebe Park	MV-016	33.611511	-117.63123	800'	24190 Olympiad Road
B	Oso Viejo Community Park	MV-056	33.598812	-117.65026	594'	24932 Veterans Way
C	Animal Services Center	MV-001	33.555445	-117.660359	401'	28095 Hillcrest
C	Felipe Tennis Center	MV-002	33.571974	-117.656283	508'	27161 Nogal
C	Marguerite Aquatics Center	MV-003	33.616423	-117.650885	596'	27474 Casta Del Sol
C	Marguerite Tennis Center	MV-004	33.616341	-117.652296	597'	23840 Marguerite Parkway
C	Montanoso Recreation and Fitness Center	MV-005	33.590806	-117.662203	403'	25800 Montanoso Drive
C	Sierra Recreation and Fitness Center	MV-006	33.571774	-117.659351	592'	26887 Recodo Lane
C	City Hall	MV-007	33.59667	-117.65994	543'	200 Civic Center
C	Library	MV-008	33.59621	-117.65918	546'	100 Civic Center
C	Abanico Open Space	MV-013	33.643973	-117.649714	804'	27587 Abanico
C	Coronado Park	MV-020	33.545399	-117.665024	387'	26652 Las Ondas Drive
C	La Mancha Park	MV-051	33.577246	-117.660977	566'	26482 Country Club Drive
C	Seville Park	MV-060	33.630987	-117.666024	597'	22832 Alturas Drive
C	Youth Athletic Park	MV-064	33.640099	-117.64043	794'	22056 Olympiad Road
D	Barbadanes Park	MV-015	33.578703	-117.652533	596'	26462 Barbadanes
D	Sergeant Matt Davis Park	MV-017	33.581354	-117.64139	586'	26210 Camino Largo
D	Castlewood Park	MV-018	33.64189	-117.637391	796'	22126 Castlewood
D	Colinas/Escorial Open Space	MV-019	33.625465	-117.660305	787'	23361 Trabuco Road
D	Curtis Park	MV-021	33.606297	-117.633795	796'	24460 Olympiad Road
D	Eastbrook Park	MV-022	33.648837	-117.636068	798'	21530 Eastbrook
D	Flamenco Open Space	MV-023	33.645819	-117.636496	837'	28097 La Barca
D	Jeronimo Greenbelt Open Space	MV-025	33.613692	-117.638504	682'	28072 Jeronimo Road
D	Linda Vista Park	MV-026	33.594252	-117.66573	495'	26601 Pepita Drive
D	Madrid Fore Park	MV-027	33.582769	-117.669634	397'	26182 Via Oceano

Inventory of City Property

D	Minaya Park	MV-028	33.639017	-117.648427	802'	27552 Minaya
D	Napoli Park	MV-029	33.577029	-117.644726	503'	27682 Napoli Way
D	M. M. O'Neill Park	MV-030	33.603596	-117.669365	433'	24771 San Doval Lane
D	Pacific Hills Park	MV-031	33.595813	-117.643981	630'	28050 Fieldcrest
D	San Gabriel Open Space	MV-033	33.628325	-117.66234	722'	22996 Via San Gabriel
D	Santa Maria Open Space	MV-034	33.634506	-117.659377	754'	22602 Via Santa Maria
D	Bart Spendlove Park	MV-035	33.608959	-117.680376	397'	25801 Delta Avenue
D	Valyermo Park	MV-036	33.613864	-117.661273	597'	24091 Valyermo Drive
D	Vista Del Lago Park	MV-037	33.635797	-117.649663	799'	27642 Vista Del Lago
D	Aegean Hills Park	MV-039	33.603893	-117.687737	397'	25362 Maximus Street
D	Aurora Park	MV-040	33.626236	-117.651949	714'	23202 Via Guadix
D	Barcelona Park	MV-041	33.632187	-117.65835	773'	22800 Via Santa Maria
D	Birchwood Park	MV-042	33.643141	-117.63737	797'	21992 Birchwood
D	Castille Park	MV-043	33.617725	-117.659178	597'	27032 Via Oviedo
D	Christopher Park	MV-044	33.616436	-117.66263	597'	26801 Valpariso Drive
D	Cordova Park	MV-045	33.571943	-117.655426	492'	26931 El Retiro
D	Crucero Park	MV-046	33.648076	-117.648125	797'	27672 Crucero
D	Doria Park	MV-047	33.603429	-117.682838	397'	24692 Doria Avenue
D	El Dorado Park	MV-048	33.608979	-117.66822	540'	24335 Carrillo Drive
D	Granada Park	MV-050	33.569204	-117.670344	394'	27122 Via Grande
D	Loyola Park Open Space	MV-052	33.634177	-117.659477	745'	22621 Via Santa Maria
D	Mojave Open Space	MV-054	33.63505	-117.665401	630'	22561 Mojave Lane
D	Olympiad Road Open Space	MV-055	33.604179	-117.633751	795'	24474 Olympiad Road
D	Preciados Park	MV-058	33.600958	-117.659147	571'	27033 Preciados Drive
D	Santa Lucia Open Space	MV-059	33.631772	-117.661222	668'	26850 Via Santa Lucia
D	Sycamore Park	MV-061	33.609169	-117.691563	395'	25101 Charlinda Drive
D	Vista Del Lago Open Space	MV-062	33.639631	-117.659035	780'	27062 Vista Del Lago
D	Wilderness Glen	MV-063	33.635972	-117.66125	721'	22500 Los Alisos Blvd.

Map of City Properties



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### **City Property Evaluation & Marketing**

In evaluating City-owned property, all of the parcels were geo-coded and ground heights determined. This information is the minimum profile necessary for the initial marketing of the properties to the wireless carriers. Offered as potential candidates for future builds, the wireless carriers can place these sites in their database of available properties as they enhance their wireless network.

In evaluating and marketing the City's properties to the wireless carriers, several factors will be taken into consideration by these companies. First is the relationship of the ground height with the surrounding area in which the carriers need coverage. In a community like Mission Viejo with its hilly topography, more sites are needed to achieve full coverage due to the gaps created by the landscape.

Determining suitable allowable height availability will be necessary to market city property as part of this study. Typically, maintaining the tree heights or roof top heights should be acceptable to the carriers, though too close a proximity to trees results in the signal being absorbed by foliage.

While this study attempts to evaluate various coverage and coverage objectives of each of the carriers, a wireless network is an expanding and contracting entity that is affected by numerous factors including weather, temperature, vegetation, and structures. The marketing of city properties goes hand in hand with the detailed evaluation of the current wireless landscape of each carrier.

Two factors affecting this will be each carrier's capacity issues and changing technologies and the services being offered. As each carrier competes with the other, the primary reason a customer leaves one provider for another is dropped calls. While the study will identify each carrier's coverage holes, capacity is another reason for carriers needing additional sites. Add to this that new services take up greater bandwidth thereby reducing the number of callers who can be serviced by a cell site.

Therefore, all of the city's properties are offered to the carriers to not only capture their coverage needs, but their capacity needs as well. In addition, not all parcels may be suitable for a wireless carrier's antenna needs; there are other opportunities available for the City to generate revenue from these parcels as well. Those opportunities include space for equipment if an adjacent private property offers a better height advantage for the antenna, carrier switching facilities and other types of carrier needs.

## **Legislative Issues**

### ***Federal and International***

Through three principal acts, Congress has provided for a comprehensive federal regulatory scheme over wireless telecommunications, thereby occupying the field and preempting state and local regulation. The first act was the Communications Act of 1934. This Act created the Federal Communications Commission (FCC), with regulatory responsibility for interstate communications, both wired and wireless. Second, the Omnibus Budget Reconciliation Act of 1993 eliminated the ability of states to regulate the entry and rates of wireless providers.

Finally, the Telecommunications Act of 1996 was a major overhaul of the 1934 Act, with a focus on creating a competitive telecommunications market through eliminating barriers to entry and "public utility model" monopolies, which were the principal features of the telecommunications industry under the 1934 Act. The one major exception to federal preemption under the 1996 Act is local zoning authority, which the act specifically reserves for state and local governments.

Under the 1934 and 1996 Acts, the FCC exercises regulatory authority over wireless communications providers, including spectrum allocation (through either traditional public interest allocations or auctions), carrier licensing, and the design, manufacture and operations of equipment. In addition, the FCC has adopted comprehensive radio frequency exposure regulations to protect the public from dangerous levels of radio frequency emissions.

Aside from the 1934 and 1996 Acts, wireless telecommunications providers may fall under a number of additional federal regulations. Wireless facilities must comply with Federal Aviation Administration regulations with regards to height and proximity to airport facilities in order to avoid being hazards to air navigation.

Projects in certain federal priority areas, including federal property, wilderness areas, wildlife preserves, endangered species habitat, historical sites, Indian religious sites, flood plains, and wetlands, may require an Environmental Assessment under the National Environmental Protection Act.

Wireless facilities that contain backup battery and generator systems may also be subject to federal regulations under the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, and the Emergency Planning and Community Right-to-Know Act.

### **State and Regional**

Because of federal preemption, the State has a very limited role in wireless telecommunications regulatory issues beyond the normal labor, tax and similar acts applicable to all business enterprises in the state. The zoning exception, however, does provide an opening for State regulation.

Because the State has generally delegated land use authority to local government, State regulation is generally limited to those special cases where the State retains zoning authority, such as the Coastal Zone, where the Coastal Commission exercises regulatory authority, and hospital sites, where the Office of Statewide Health and Planning Development exercises authority. In addition, wireless facilities must meet the requirements of the California Environmental Quality Act (CEQA).

### **Local**

Because of the exception for zoning regulation under the 1996 Act, local governments have the most direct impact on where wireless facilities are located and how they look through control of the placement, construction, and modification of wireless facilities. This authority, however, is not unlimited. Local governments may not "unreasonably discriminate among providers of functionally equivalent services," enact regulations that prohibit or effectively prohibit wireless facilities, or take radio frequency emissions into account so long as the facility complies with the FCC's radio frequency emission regulations.

In addition, local governments are required to act on a request for permission to place a wireless facility in a timely manner, and if a request is rejected, it must be done in writing and must be supported by substantial evidence in the written record. Applicants who are denied authorization for facility placement are entitled to file an action in court challenging the denial, and are entitled to an expedited hearing by the court. If a denial is based on radio frequency emission, the applicant may appeal that denial to the FCC rather than the courts.

### **Radio Frequency Emissions**

Emissions from wireless sites may not be directly regulated by the City of Mission Viejo. The Telecommunications Act of 1996, 704 Section B states that State or Local Governments may not regulate wireless facilities on the basis of environmental effects of radio frequency emissions if the applicant demonstrates compliance with FCC regulations.

Nevertheless, it is important to understand the guidelines under which such sites are regulated. The government has based the Maximum Permissible Exposure (MPE) levels on National ANSI, IEEE and international standards. These health and radio emission standards were put in place by the FCC. The guidelines created for measuring and analyzing RF Emissions is the FCC's Office of Engineering and Technology (OET) 65. They create a periodic bulletin called "Evaluating Compliance with FCC guidelines for Human Exposure to Radiofrequency Electromagnetic Fields."

This bulletin is used to guide Engineers and other qualified persons in making a determination about whether a specific site meets the emission requirements set forth in the document. Because typical cellular tower transmissions are at a relatively low power level the issue of emissions as outlined by the FCC is rarely an issue. The distance from a transmitting antenna to the nearest structure is usually more than enough to fall well below the MPE threshold.

Another excellent document for reference produced by the FCC is entitled A local Governments Official's Guide to RF Emission Antenna Safety: Rules, Procedures and Practical Guidance is available on the FCC's RF safety web page at [www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety).

### ***City Communications Leases***

ATS Communications reviewed 14 leases entered into between the City of Mission Viejo and various carriers. Six of the original parties in the lease with the City have changed over time, some more than once. The average initial lease rate was \$1,500 though there is one early lease at \$1,000 per month for ground space.

While most leases are 20 to 25 years in duration, there is one lease for only 7.5 years with Sprint at the YMCA Clock Tower facility. The following chart evaluates some of the terms in the agreements between the wireless carriers and the City of Mission Viejo.

Legislative Issues

Site Address	City ref #	Original Contracted Carrier	Current Carrier	Lease Area (sf)	Initial Monthly Rent	Additional Fees	Term	Lease Rent Commencement Terms	Termination Penalty	Escalation Percent	Date Executed	Insurance	City Antennas	Collocation Revenue
28951 Melinda Rd.	pdp2003-105	Cingular (Pacific Bell Wireless)	T-Mobile	200	\$ 1,500	\$6,400 landscape & signage	10 yr./5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	10/7/2003	\$10 million	City or County emergency communications equipment	Collocation agreement needed
27341 Trabuco Circle	pdp2004-133	Cingular	Cingular	225	\$ 2,300	\$1,500 Option fee	5yr./4 5 yr. renewal	First day of the month following start of construction	3 months rent	3%	11/8/2005	\$10 million	City or County emergency communications equipment	Collocation agreement needed
27341 Trabuco Circle	pdp2001-62	Sprint PCS	Sprint PCS	482	\$ 1,500	NA	7.5 yrs.	Start of construction or 3 months following full execution of contract	12 months rent	3%	8/20/2002	\$10 million	City or County emergency communications equipment	Tower rent to Sprint and ground rent to City
27301 La Paz Rd.	pdp2000-38	Verizon Wireless	Verizon Wireless	384	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 6 months following full execution of contract	12 months rent	CPI	5/1/2001	\$2.5 million	No language	No language
27301 La Paz Rd.	pdp2000-40	AT&T	Cingular	200	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	12/21/2002	\$5 million	City or County emergency communications equipment	Collocation agreement needed
27301 La Paz Rd.	pdp2001-50	Nextel	Nextel	240	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	3/19/2002	\$10 million	City or County emergency communications equipment	Collocation agreement needed
24190 Olympiad Rd.	pdp2001-72	Verizon Wireless	Verizon Wireless	270	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	9/3/2002	\$5 million	City or County emergency communications equipment	Collocation agreement needed
24190 Olympiad Rd.	pdp2001-61	Sprint PCS	Sprint PCS	400	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	9/3/2002	\$10 million	City or County emergency communications equipment	Collocation agreement needed
24190 Olympiad Rd.	pdp2001-75	Nextel	Nextel	355	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	8/20/2002	\$10 million	City or County emergency communications equipment	Collocation agreement needed
24051 Pavion Rd.	pdp2001-65	Cingular (Pacific Bell Wireless)	T-Mobile	625	\$ 1,500	NA	10 yr./2 5 yr. renewal	Start of construction or 3 months following full execution of contract	12 months rent	3%	3/19/2002	\$10 million	No language	Collocation agreement needed

Legislative Issues

Los Alisos Blvd.	SP 98-307p	Cox PCS	Sprint PCS	180	\$ 1,000	NA	5 yr./3 5 yr. renewal	Start of construction or 6 months following full execution of contract	Lesser of 6 months or balance of annual rent	CPI	9/21/1998	\$1 million	Tower belongs to SCE	N/A
SCE Tower/Joyner Park	pdp2001-69	Cingular	T-Mobile	280	\$ 1,500	NA	5 yr./3 5 yr. renewal	First day of month following letter stating intention to start construction or 12 months following full execution of contract	None	CPI	2/4/2002	\$10 million	Tower belongs to SCE	N/A
SCE Tower	pdp2002-88	AT&T	Cingular	128	\$ 1,500	NA	5 yr./3 5 yr. renewal	First day of month following letter stating intention to start construction or 12 months following full execution of contract	None	CPI	11/5/2002	\$10 million	Tower belongs to SCE	N/A
SCE Tower	pdp2004-128	Nextel	Nextel	375	\$ 1,500	NA	5 yr./3 5 yr. renewal	First day of month following letter stating intention to start construction or 12 months following full execution of contract	None	CPI	1/19/2004	\$10 million	Tower belongs to SCE	N/A

## Initial WiFi

ATS Communications has input data for all of the City-owned property locations throughout the community. Other pertinent information has been included for determining the coverage available from those City-owned properties that have existing above ground structures suitable for WiFi antennas or are being proposed for wireless facilities.

The following is a list of City-owned properties that can be considered for the City's initial base WiFi coverage.

Site Name	Site ID	Address
Animal Services Center	MV-001	28095 Hillcrest
Felipe Tennis Center	MV-002	27161 Nogal
Marguerite Aquatics Center	MV-003	27474 Casta Del Sol
Marguerite Tennis Center	MV-004	23840 Marguerite Parkway
Montanoso Recreation and Fitness Center	MV-005	25800 Montanoso Drive
Sierra Recreation and Fitness Center	MV-006	26887 Recodo Lane
City Hall	MV-007	200 Civic Center
Library	MV-008	100 Civic Center
Marguerite Recreation Center	MV-009	27341 Trabuco Circle
Heritage House	MV-010	28951 Melinda Road
Norman P. Murray Community Center	MV-011	24932 Veterans Way
Thomas R. Potocki Conference Center	MV-012	27301 La Paz Road
Abanico Open Space	MV-013	27587 Abanico
Alicia Park	MV-014	23650 Via Linda
Barbadanes Park	MV-015	26462 Barbadanes
Beebe Park	MV-016	24190 Olympiad Road
Coronado Park	MV-020	26652 Las Ondas Drive
Gilleran Park	MV-024	24960 Felipe Road
Minaya Park	MV-028	27552 Minaya
Napoli Park	MV-029	27682 Napoli Way
Pacific Hills Park	MV-031	28050 Fieldcrest
World Cup Soccer Fields	MV-038	27301 La Paz Road
Aurora Park	MV-040	23202 Via Guadix
Christopher Park	MV-044	26801 Valpariso Drive

Crucero Park	MV-046	27672 Crucero
El Dorado Park	MV-048	24335 Carrillo Drive
Florence Joyner Olympiad Park	MV-049	22760 Olympiad Road
Melinda Park	MV-053	28951 Melinda Road
Oso Viejo Community Park	MV-056	24932 Veterans Way
Pavion Park	MV-057	24051 Pavion
Preciados Park	MV-058	27033 Preciados Drive
Seville Park	MV-060	22832 Alturas Drive
Vista Del Lago Open Space	MV-062	27062 Vista Del Lago
Youth Athletic Park	MV-064	22056 Olympiad Road

While there are a number of City-owned properties that can be considered for the initial base WiFi coverage for the City, there are some issues that need to be addressed. First, some of the existing leases with City-owned properties have language that allows for the tenant to charge a collocation fee. Future leases with wireless carriers need to include language that allows the City to place WiFi antennas on the structure at no cost to the City.

Once the City has considered the Wireless Master Plan and determined which properties are suitable for wireless facilities and what type of structure is appropriate, ATS Communications will provide a WiFi coverage map. In addition, ATS Communications will make available for the company chosen by the City to facilitate WiFi to provide any underlying data necessary for their radio frequency coverage needs.



## Wireless Infrastructure

### Introduction

This land cover data set was produced as part of a cooperative project between the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA) to produce a consistent, land cover data layer for the conterminous U.S. based on 30-meter LandSat Thematic Mapper (TM) data. National Land Cover Data (NLCD) was developed from TM data acquired by the Multi-Resolution Land Characterization (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies that produce or use land cover data. Partners include the USGS (National Mapping, Biological Resources, and Water Resources Divisions), USEPA, the U.S. Forest Service, and the National Oceanic and Atmospheric Administration.

#### California - SOUTH

The California-South NLCD set was produced as part of a project area encompassing portions of Federal Region 9, including the states of California, Nevada, and Arizona. This data set was produced under the direction of the MRLC Regional Land Cover Characterization Project of the USGS EROS Data Center (EDC), Sioux Falls, SD. Questions about the data set can be directed to the MRLC Regional Team at (605) 594-6114.

Population density studies and traffic count analysis were conducted in order to confirm where the clustering of wireless sites is most likely to occur. With increased population density and higher traffic counts, site density will increase in number and tend to be lower in height than in less densely populated areas and those with lower traffic counts.

Traffic counts on Interstate 5 can exceed 200,000 cars per day. Upon closer examination of population densities in areas of interest we find that densities can vary from street to street in the downtown districts surrounding areas around Interstate 5.



**Network Coverage for Major Wireless Carriers**

In preparing the radio frequency analysis for each carrier in the City of Mission Viejo, several tools and techniques were employed. Plans for each cell site were reviewed and copied at City Hall, then reviewed again at the office. Field surveys were performed for each location, with equipment rooms checked when possible.

Through this analysis, 69 active, on-air cell sites were identified located at 43 distinct spots throughout the City. While there are applications in process with the City by most of the carriers and in various stages, this analysis only pertains to those sites currently in use and an additional analysis showing sites proposed.

<b>Mission Viejo Cell Sites by Location</b>					
<b>Site</b>	<b>City ref #</b>	<b>Site Name</b>	<b>Address</b>	<b>Year</b>	<b>Carrier</b>
1	pdp2001-56	Congregation Eilat	22081 Hidalgo	2001	Sprint
	pdp2002-94	Congregation Eilat	22081 Hidalgo	2002	T-Mobile
	pdp2005-140	Congregation Eilat	22081 Hidalgo	2005	Cingular
2	pdp2001-69	SCE @ Flo Jo Park	22760 Olympiad (Flo Jo)	2001	T-Mobile
3	sp96-261	Buck Building	22951 Los Alisos Blvd.	1996	T-Mobile
	pdp1999-06	Buck Building	22951 Los Alisos Blvd.	1999	Cingular
	pdp2001-67	Buck Building	22951 Los Alisos Blvd.	2001	Verizon Wireless
4	sp92-114a	Lakeside Plaza	23120 Alicia Pkwy	1992	Cingular
	sp93-116a	Lakeside Plaza	23120 Alicia Pkwy	1993	Verizon Wireless
	sp95-216	Lakeside Plaza	23120 Alicia Pkwy	1995	T-Mobile
5	sp95-206p	MNWD Via Bahia	23391 Via Bahia	1995	Nextel
	sp96-222	MNWD Via Bahia	23391 Via Bahia	1996	T-Mobile

	pdp2000-44	MNWD Via Bahia	23391 Via Bahia	2000	Cingular
6	pdp2000-31	La Alameda Building	26300 La Alameda	2000	Nextel
7	sp93-133p	Capistrano Valley HS	23601 Via Escolar	1993	Verizon Wireless
	sp94-152p	Capistrano Valley HS	23601 Via Escolar	1994	Nextel
8	pdp2000-34	Chabad Jewish Center	24041 Marguerite Pkwy	2000	T-Mobile
9	pdp2001-65	Pavion Park	24051 Pavion (Pavion Park)	2001	T-Mobile
10	pdp2001-73	Vista Paint	24164 Alicia Pkwy (Vista Paint)	2001	Sprint
11	pdp2001-61	Beebe Park	24190 Olympiad (Bebe Park)	2001	Sprint
	pdp2001-72	Beebe Park	24190 Olympiad (Bebe Park)	2001	Verizon Wireless
	pdp2001-75	Beebe Park	24190 Olympiad (Bebe Park)	2001	Nextel
12	sp96-253p	Felipe Water Tank	24988 Felipe Rd	1996	T-Mobile
	pdp1999-05	Felipe Water Tank	24988 Felipe Rd	1999	Cingular
13	sp96-255	Pala Building	25909 Pala	1996	T-Mobile
	pdp2000-22	Pala Building	25909 Pala	2000	Nextel
14	pdp2000-48	Acero Bldg North	25910 Acero	2000	Cingular
15	sp96-248	Acero Bldg East	25950 Acero	1996	Cingular
	pdp2000-26	Acero Bldg East	25950 Acero	2000	Sprint
16	sp96-223p	Shepherd of the Hills	26001 Muirlands	1996	T-Mobile

17	sp96-226p	True Value Hardware	26006 Marguerite Pkwy	1996	T-Mobile
18	pdp1999-04	MV Presbyterian Church	26051 Marguerite Pkwy	1999	Verizon Wireless
19	pdp2004-125	El Toro Water District	26081 Via Pera	2004	T-Mobile
20	pdp2001-76	Fairfield Inn	26328 Oso Pkwy	2001	Nextel
21	pdp2000-19	SCE @ Crown Valley	Crown Valley 1/2 mi so. Of Marguerite	2000	T-Mobile
	pdp2002-87	SCE @ Crown Valley	265231/2 Crown Valley Pkwy	2002	Cingular
22	sp96-259	MV Church of Christ	26558 Marguerite Pkwy	1996	T-Mobile
	pdp2000-36	MV Church of Christ	26558 Marguerite Pkwy	2000	Sprint
	pdp2002-89	MV Church of Christ	26558 Marguerite Pkwy	2002	Cingular
23	pdp2001-51	Plaza Drive	26691 Plaza Drive	2001	Verizon Wireless
24	sp96-224p	MNWD Camino Capistrano	26742 Camino Capistrano	1996	Cingular
	pdp2000-37	MNWD Camino Capistrano	26742 Camino Capistrano	2000	T-Mobile
25	sp96-266	MNWD Precidios	26852 Preciados	1996	T-Mobile
26	pdp2001-60	Trabuco MacDonalds	26902 Trabuco Rd.	2001	T-Mobile
27	pdp2002-91	MV Christian Church	27192 Jeronimo Rd	2002	T-Mobile
28	pdp2001-62	YMCA Clock Tower	27341 Trabuco Circle	2001	Sprint
	pdp2004-133	YMCA Clock Tower	27341 Trabuco Circle	2004	Cingular

29	pdp2000-23	MV Regional Medical Center	27700 Medical Cntr Rd	2000	Sprint
30	pdp2000-47	Trabuco Hills Professional Center	27725 Santa Margarita Pkwy	2000	Verizon Wireless
	pdp2004-124	Trabuco Hills Professional Center	27725 Santa Margarita Pkwy	2004	Cingular
31	pdp2002-83	Kaleidoscope	27741 Crown Valley Pkwy (Edwards)	2002	T-Mobile
32	sp92-099p	Saddleback Community College	28000 Marguerite Pkwy	1992	Cingular
33	pdp2000-49	Ayres Suites	28941 Los Alisos	2000	T-Mobile
	pdp2004-131	Ayres Suites	28941 Los Alisos	2004	Verizon Wireless
	pdp2005-138	Ayres Suites	28941 Los Alisos	2005	Cingular
34	pdp2003-105	Melinda Park	28951 Melinda (Melinda Park)	2003	T-Mobile
35	pdp2000-30	Robinsons May Dept Store	300 The Shops @ MV	2000	T-Mobile
36	pdp2002-88	SCE @ Beebe Park	Beebe Park area, Jeronimo/Olympiad	2002	Cingular
37	pdp2000-32	Mission Hills	El Toro Rd W of 241 in MV	2000	Nextel
38	pdp1999-14	MNWD Delemos	27169 Delemos	1999	Nextel
	pdp1999-17	MNWD Delemos	27169 Delemos	1999	T-Mobile
39	pdp2000-35	SCE @ California Court	Los Alisos and California Court	2000	Cingular
40	pdp2000-38	Oso Viejo Park	27301 La Paz Road (Oso Prk)	2000	Verizon Wireless
	pdp2000-40	Oso Viejo Park	27301 La Paz	2000	Cingular
	pdp2001-50	Oso Viejo Park	27301 La Paz Rd. (Potocki)	2001	Nextel

41	pdp2001-77	SCE @ Oso	SCE tower S of Oso W of the 5	2001	Sprint
42	pdp2004-128	SCE @ Melinda	SE corner of Olympiad & Melinda	2004	Sprint
43	pdp2001-64	SCE @ La Barca	Southwest corner of La Barca & Ontur	2001	Cingular
	pdp2003-109	SCE @ La Barca	Southwest corner of La Barca & Ontur	2003	Nextel

Of these 69 cell sites, T-Mobile has the most facilities with 23 located throughout the community and three additional sites proposed. Cingular Wireless has the second most cell sites with 18 locations and two more proposed. Nextel has 10 sites throughout the City with an additional 9 sites for Sprint PCS. We can anticipate where advantageous they will combine their coverage.

Verizon Wireless has 9 wireless facilities throughout the city and has two more locations in process. While Metrocom had three locations in the City, they have gone out of business and their sites are abandoned. A new wireless carrier, Metro PCS, proposing sites in the City under the name of Royal Street Communications, has 13 sites in process.

The following is the breakdown of the current sites by carrier:

<b>Wireless Facilities Throughout Mission Viejo</b>				
<b>Current Carrier</b>	<b>Year</b>	<b>Site Name</b>	<b>City Ref #</b>	<b>Original Carrier</b>
Cingular	1992	Saddleback Community College	sp92-099p	LA Cellular/AT&T
Cingular	1992	Lakeside Plaza	sp92-114a	LA Cellular/AT&T
Cingular	1996	MNWD Camino Capistrano	sp96-224p	LA Cellular/AT&T
Cingular	1996	Acero Bldg East	sp96-248	Pacific Bell/Cingular/T-Mobile
Cingular	1999	Felipe Water Tank	pdp1999-05	LA Cellular/AT&T
Cingular	1999	Buck Building	pdp1999-06	AT&T
Cingular	2000	SCE @ California Court	pdp2000-35	Pacific Bell/Cingular/T-Mobile
Cingular	2000	Oso Viejo Park	pdp2000-40	AT&T
Cingular	2000	MNWD Via Bahia	pdp2000-44	AT&T

Cingular	2000	Acero Bldg North	pdp2000-48	AT&T
Cingular	2001	Lakeside Plaza	pdp2001-59	Cingular
Cingular	2001	SCE @ La Barca	pdp2001-64	AT&T
Cingular	2002	SCE @ Crown Valley	pdp2002-87	AT&T
Cingular	2002	SCE @ Beebe Park	pdp2002-88	AT&T
Cingular	2002	MV Church of Christ	pdp2002-89	AT&T
Cingular	2004	Trabuco Hills Professional Center	pdp2004-124	AT&T
Cingular	2004	YMCA Clock Tower	pdp2004-133	AT&T
Cingular	2005	Ayres Suites	pdp2005-138	AT&T
Cingular	2005	Congregation Eilat	pdp2005-140	Cingular
Nextel	1994	CVHS	sp94-152p	Nextel
Nextel	1995	MNWD Via Bahia	sp95-206p	Nextel
Nextel	1999	MNWD Delemos	pdp1999-14	Nextel
Nextel	2000	Pala Building	pdp2000-22	Nextel
Nextel	2000	La Alameda Building	pdp2000-31	Nextel
Nextel	2000	Mission Hills	pdp2000-32	Nextel
Nextel	2001	Oso Viejo Park	pdp2001-50	Nextel
Nextel	2001	Beebe Park	pdp2001-75	Nextel
Nextel	2001	Fairfield Inn	pdp2001-76	Nextel
Nextel	2003	SCE @ La Barca	pdp2003-109	Nextel
Sprint	2000	MV Regional Medical Center	pdp2000-23	Sprint
Sprint	2000	Acero Bldg East	pdp2000-26	Sprint
Sprint	2000	MV Church of Christ	pdp2000-36	Sprint
Sprint	2001	Congregation Eilat	pdp2001-56	Sprint

Sprint	2001	Beebe Park	pdp2001-61	Sprint
Sprint	2001	YMCA Clock Tower	pdp2001-62	Sprint
Sprint	2001	Vista Paint	pdp2001-73	Sprint
Sprint	2001	SCE @ Oso	pdp2001-77	Sprint
Sprint	2004	SCE @ Melinda	pdp2004-128	Sprint
T-Mobile	1995	Lakeside Plaza	sp95-216	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	MNWD Via Bahia	sp96-222	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	Shepherd of the Hills	sp96-223p	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	True Value Hardware	sp96-226p	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	Felipe Water Tank	sp96-253p	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	Pala Building	sp96-255	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	MV Church of Christ	sp96-259	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	Buck Building	sp96-261	Pacific Bell/Cingular/T-Mobile
T-Mobile	1996	MNWD Precidios	sp96-266	Pacific Bell/Cingular/T-Mobile
T-Mobile	1999	MNWD Delemos	pdp1999-17	Pacific Bell/Cingular/T-Mobile
T-Mobile	2000	SCE @ Crown Valley	pdp2000-19	Pacific Bell/Cingular/T-Mobile
T-Mobile	2000	Robinsons May Dept Store	pdp2000-30	Pacific Bell/Cingular/T-Mobile
T-Mobile	2000	Chabad Jewish Center	pdp2000-34	Pacific Bell/Cingular/T-Mobile
T-Mobile	2000	MNWD Camino Capistrano	pdp2000-37	Pacific Bell/Cingular/T-Mobile
T-Mobile	2000	Ayres Suites	pdp2000-49	Cingular
T-Mobile	2001	Trabuco MacDonalds	pdp2001-60	Cingular
T-Mobile	2001	Pavion Park	pdp2001-65	Cingular



T-Mobile	2001	SCE @ Flo Jo Park	pdp2001-69	Cingular
T-Mobile	2002	Kaleidoscope	pdp2002-83	Cingular
T-Mobile	2002	MV Christian Church	pdp2002-91	Cingular
T-Mobile	2002	Congregation Eilat	pdp2002-94	Cingular
T-Mobile	2003	Melinda Park	pdp2003-105	Cingular
T-Mobile	2004	El Toro Water District	pdp2004-125	Cingular
Verizon Wireless	1993	Lakeside Plaza	sp93-116a	Pactel Cellular/Verizon
Verizon Wireless	1993	CVHS	sp93-133p	PacTel Cellular/Verizon
Verizon Wireless	1999	MV Presbyterian Church	pdp1999-04	AirTouch/Verizon
Verizon Wireless	2000	Oso Viejo Park	pdp2000-38	Verizon
Verizon Wireless	2000	Trabuco Hills Professional Center	pdp2000-47	Verizon
Verizon Wireless	2001	Plaza Drive	pdp2001-51	Verizon
Verizon Wireless	2001	Buck Building	pdp2001-67	Verizon
Verizon Wireless	2001	Beebe Park	pdp2001-72	Verizon
Verizon Wireless	2004	Ayres Suites	pdp2004-131	Verizon

These facilities were predominantly located on high points throughout the community with ground heights ranging from just over 300 feet to nearly 1,000 feet. While most antenna heights ranged from 30 feet to 60 feet, there is a location with antennas as low as eight feet and above 300 feet.

Ten different styles of antenna structures were observed with roof mount being the most common. Over the last few years, most of the builds have been screened and the structures housing their equipment concealed from view. These design styles include clock tower, mono-pole, mono-pine, screened and unscreened roof mount, SCE tower, light pole, flag pole and water tank.

All of this data was provided to our radio frequency engineering team for their analysis. The data was entered into radio frequency engineering software analysis tools for study. Taking into consideration the ground terrain, building

heights, carrier frequencies, antenna heights, and other factors, the coverage for each carrier was identified.

**Breakout of Plots per carrier and frequency**

Carrier Name	Freq	Band1	On Air	Band2	On Air	Band3	On Air
Sprint / Nextel	800MHz	ESMR	Yes				
Nextel / Sprint	1900MHz	A	Yes				
Cingular	850MHz	Cell A	Yes				
Cingular	1900MHz	B	Yes	C2	Yes	D	Yes
Verizon	850MHz	Cell B	Yes				
Verizon	1900MHz	C1	No	E	No		
T Mobile	1900MHz	B2	Yes	F	Yes		
Metro PCS	1900MHz	C3	No				

The above table indicates which frequency ranges the carriers are using in the Southern California market.

## Cingular

As the largest provider of cellular service in the United States, Cingular serves more than 54 million subscribers across the country. With revenues in excess of \$32 billion annually, Cingular is a joint venture of AT&T Inc. (60% ownership) and BellSouth (40% ownership).

Cingular has over one third of the cell sites located in the city and they are still actively pursuing more locations. The following analysis shows the existing coverage based on their current sites and their future planned builds. As their agreement with T-Mobile to share wireless facilities comes to an end, expect that they will actively pursue additional sites to meet demand and maintain their leadership position.

Currently, Cingular has 18 active wireless communications facilities throughout the City of Mission Viejo. They also have three sites in process. The following table provides Cingular's list of sites:

Cingular Wireless Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Congregation Eilat	Mono-pole	33.64248	-117.655	796'	40'
Buck Building	Roof Mount	33.63	-117.7	597'	29'
Lakeside Plaza	Wall Mount	33.627	-117.7	647'	35'
MNWD Via Bahia	Water Tank	33.624	-117.7	714'	25'
Felipe Water Tank	Water Tank	33.604	-117.6	703'	32'
Acero Bldg North	Roof Mount	33.616	-117.7	504'	59'6"
Acero Bldg East	Roof Mount	33.611	-117.7	504'	61'
SCE @ Crown Valley	SCE Tower	33.564	-117.7	485'	ant 32', mww dsh 45'
MV Church of Christ	Roof Mount	33.574	-117.7	545'	35'
MNWD Camino Capistrano	Monopole	33.575	-117.7	394'	50'
YMCA Clock Tower	Clock Tower	33.613	-117.7	597'	35'
Trabuco Hills Professional Center	Roof Mount	33.655	-117.6	797'	35'
Saddleback Community College	Monopole	33.55	-117.7	397'	60'

Ayres Suites	Roof Top	33.655	-117.6	984'	43'
SCE @ Beebe Park	SCE Tower	33.613	-117.6	903'	32'
SCE @ California Court	SCE Tower	33.657	-117.6	931'	60'
Oso Viejo Park	Light Standards	33.598	-117.7	565'	64' & 74' resp
SCE @ La Barca	SCE Tower	33.646	-117.6	834'	21'
<b>Currently Proposed Sites for Cingular</b>					
SCE @ Flo Jo Park	SCE Tower	33.633	-117.6	802'	50'
True Value Hardware	Roof Mount	33.585	-117.7	398'	40'
Mt. of Olives Church	Roof Mount (church steeple)	33.601554	-117.673	397'	40'

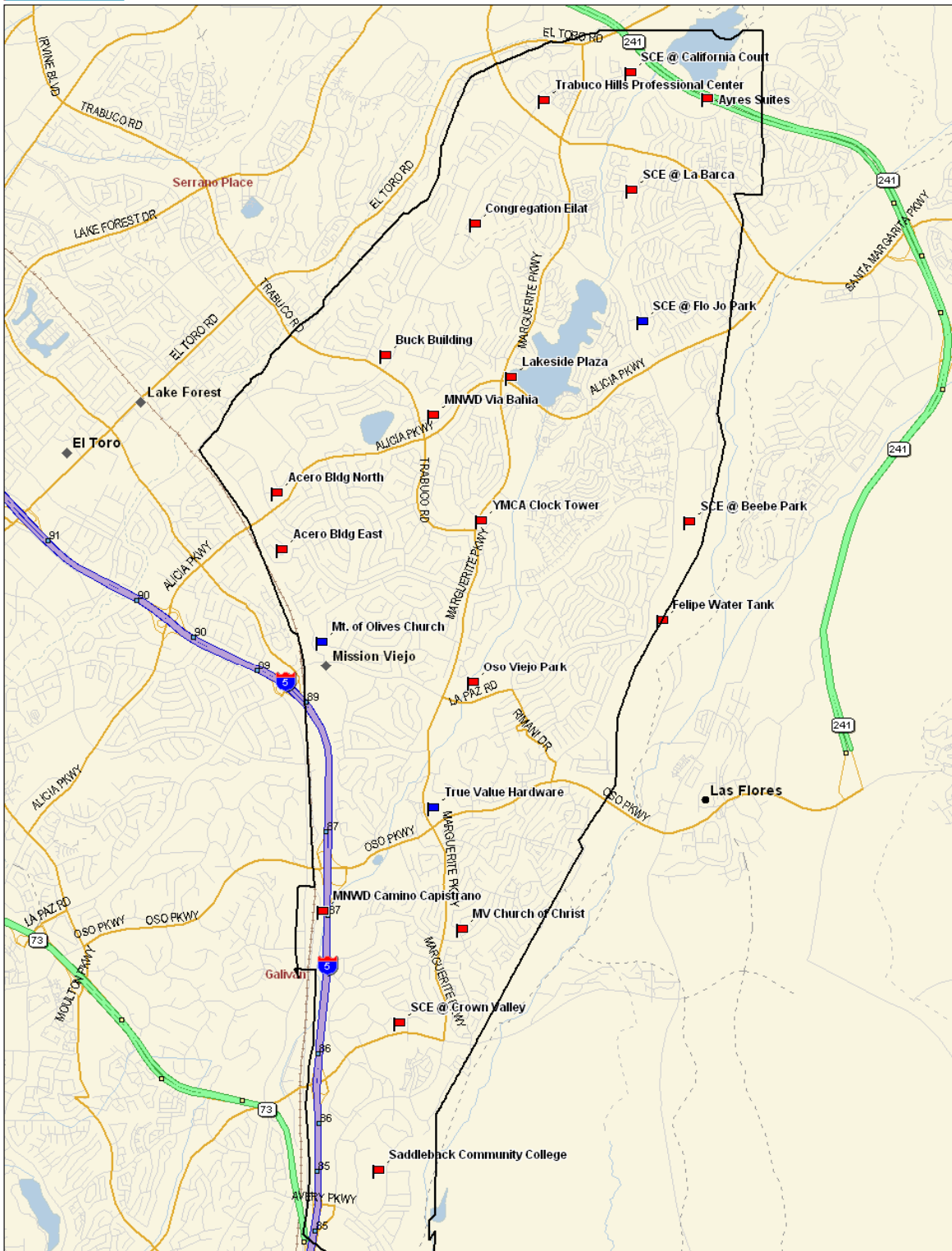
The following sites have been identified as City-owned properties that could satisfy future needs for Cingular Wireless. The sites mostly consist of City park locations.

**Identified for Cingular**

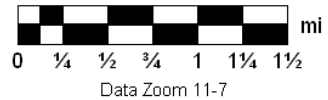
- MV-005 Montanoso Recreation and Fitness Center
- MV-024 Gilleran Park
- MV-028 Minaya Park
- MV-029 Napoli Park
- MV-044 Christopher Park
- MV-053 Melinda Park
- MV-062 Vista Del Lago Open Space

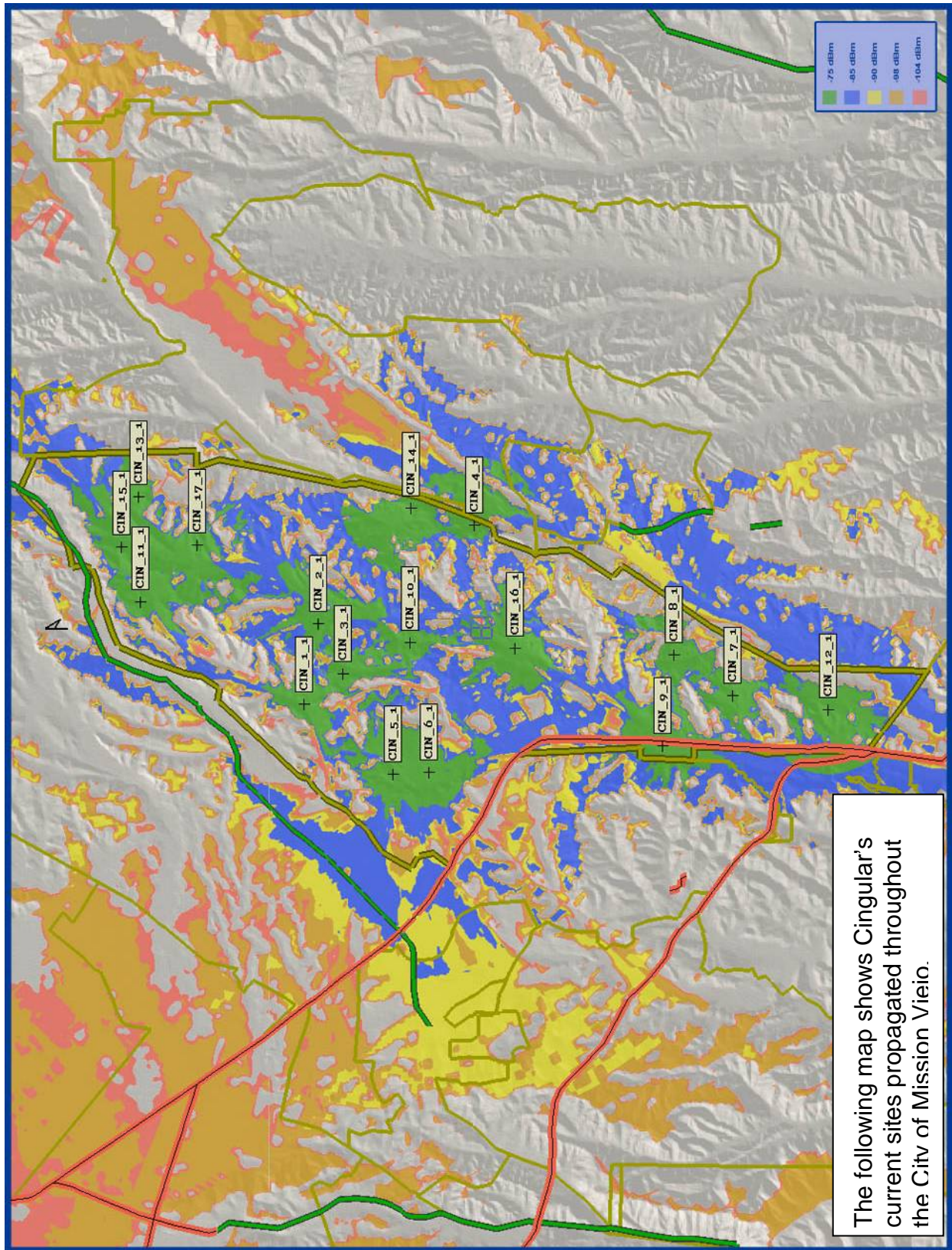


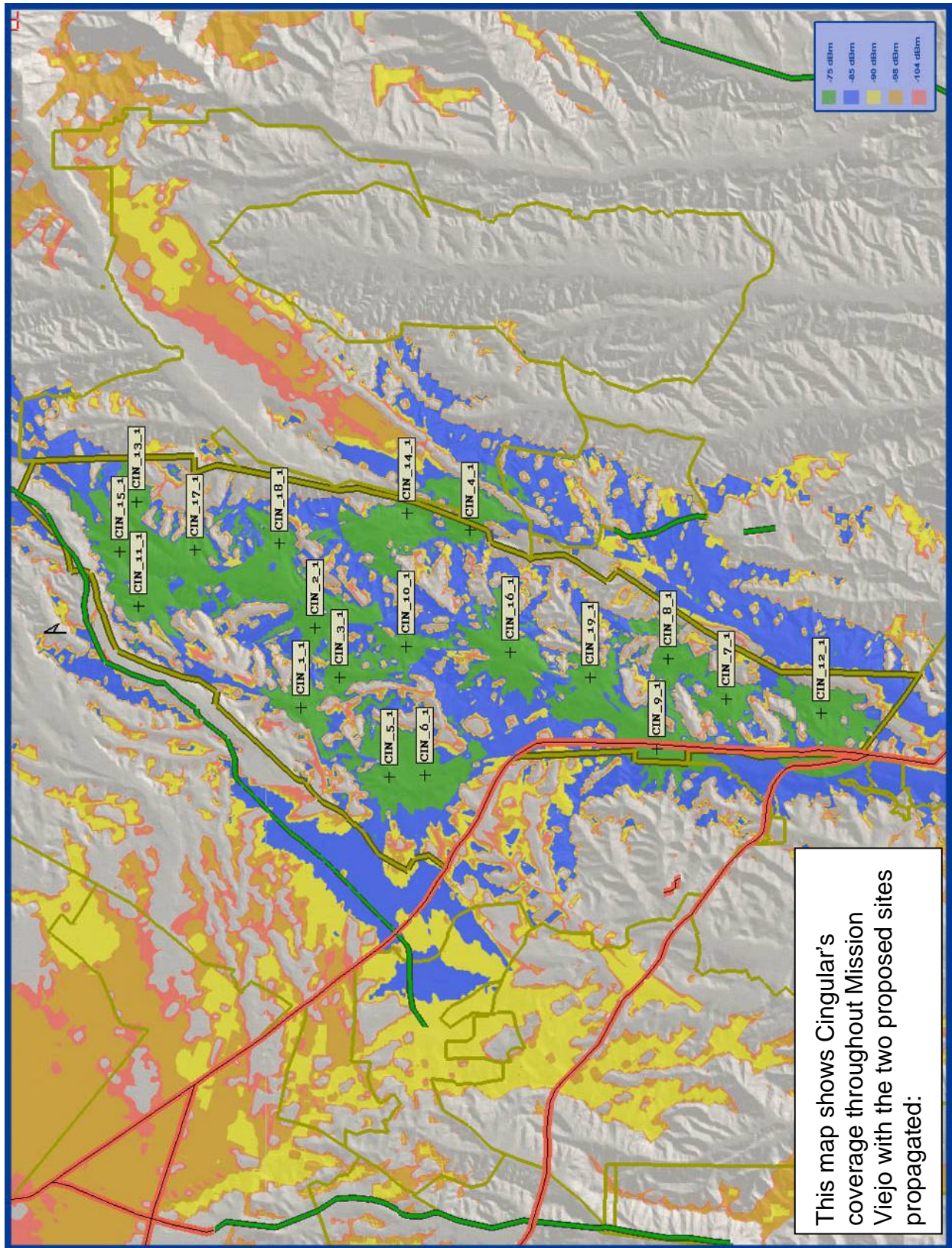
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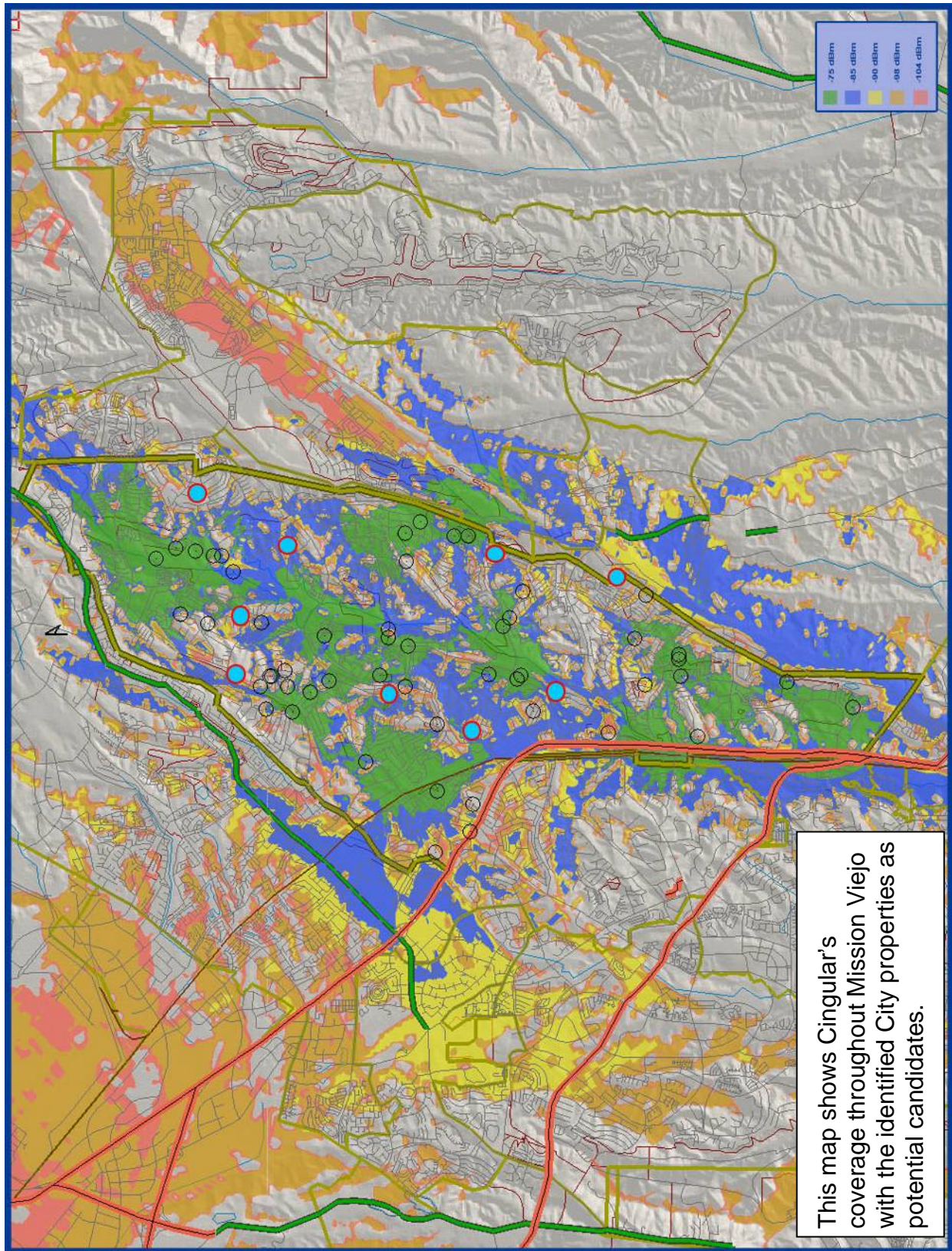


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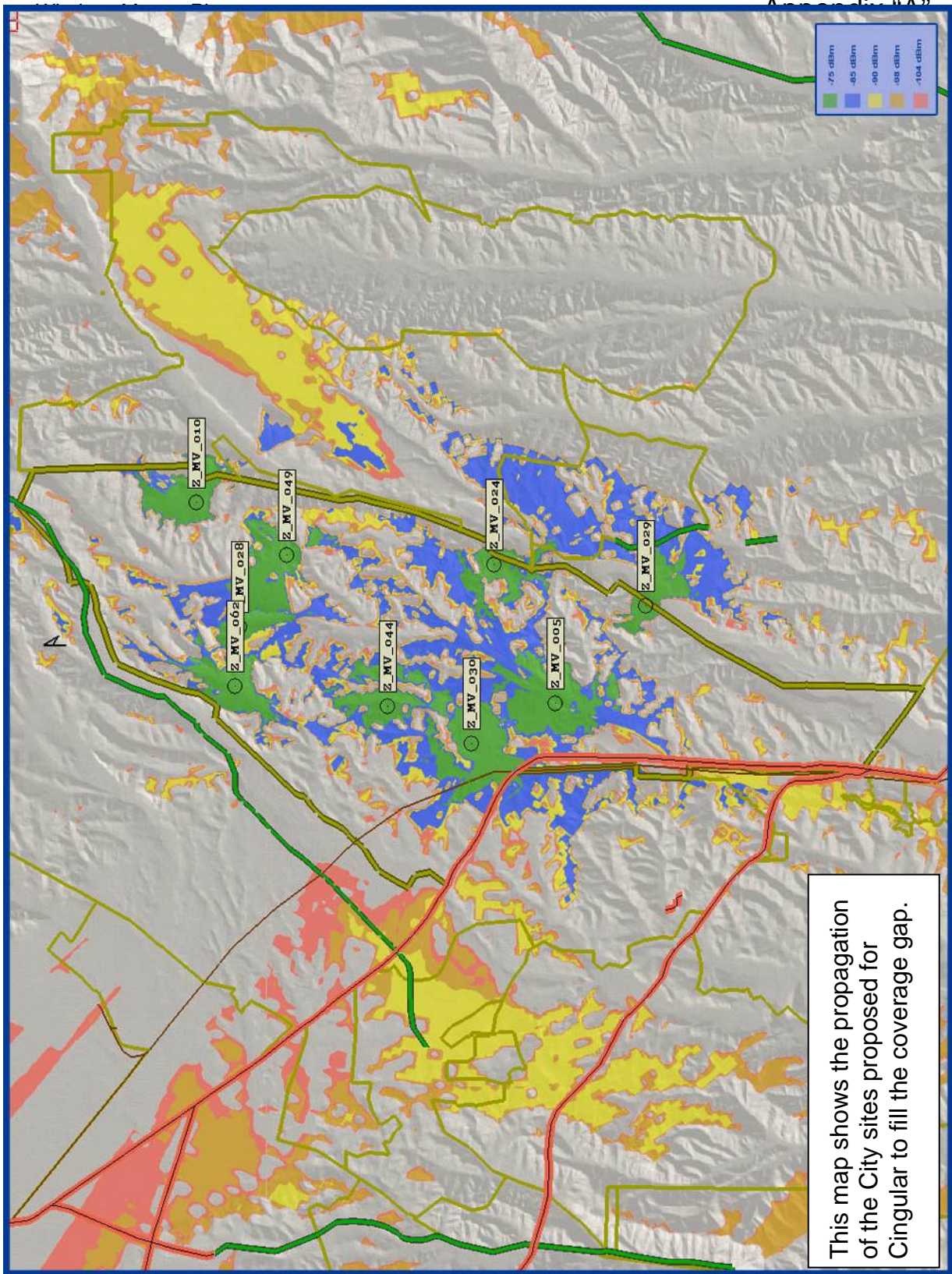


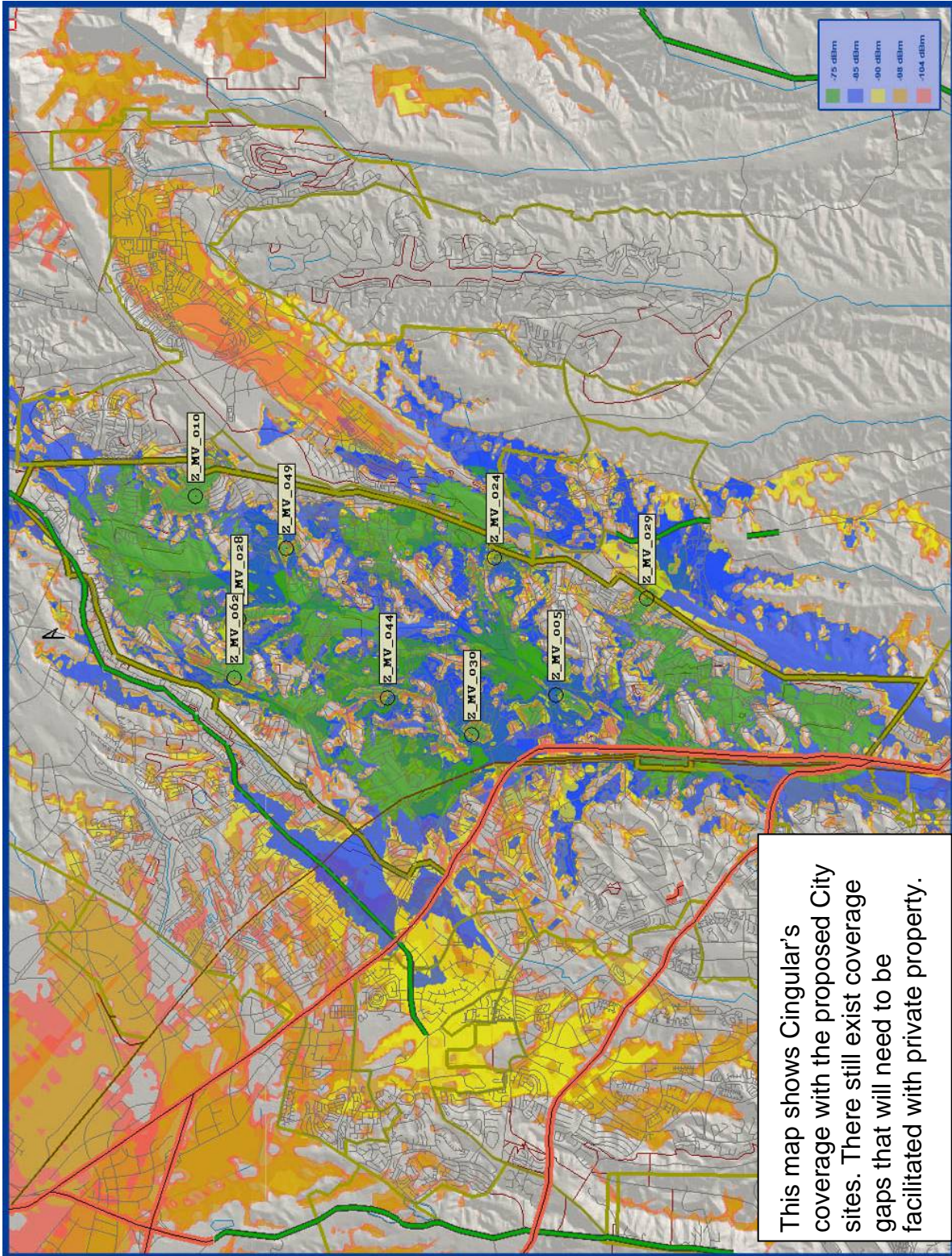


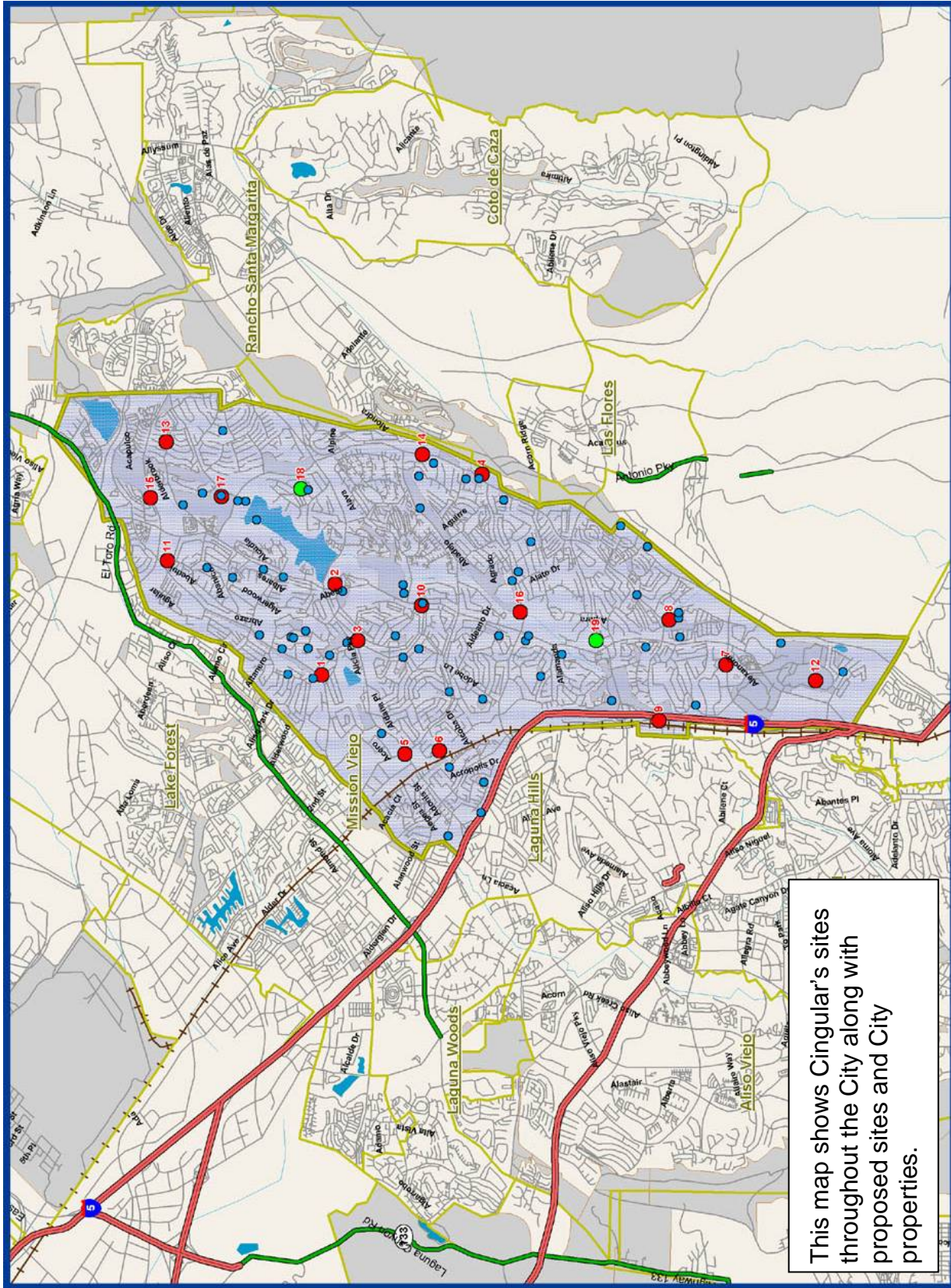












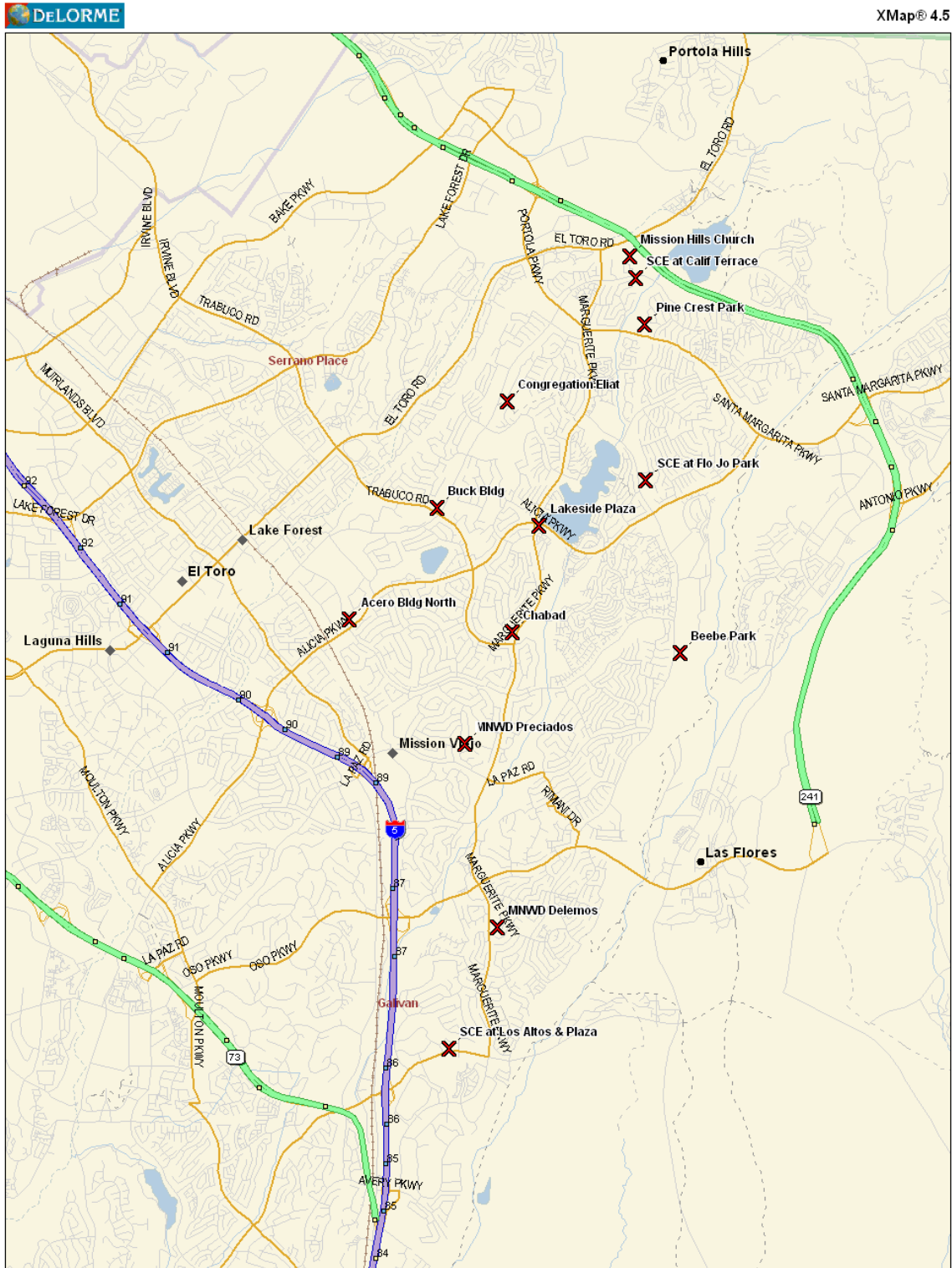
**Metro PCS**

Offering the same phones as their competitors with a cheaper monthly fee, Metro PCS has entered the Southern California market as they have in Northern California, Dallas and Detroit. Entering a new market with entrenched competitors seems to work for Metro PCS who uses the existing infrastructure of cell sites to lower their capital costs and build their network quickly.

Headquartered in Dallas, Texas, Metro PCS offers an all digital network based on third generation technology and infrastructure. As can be seen from the "Breakout of Plots per carrier and frequency," this carrier will be transmitting only in the 1900 Mhz frequency range when they come on line with their network later this year.

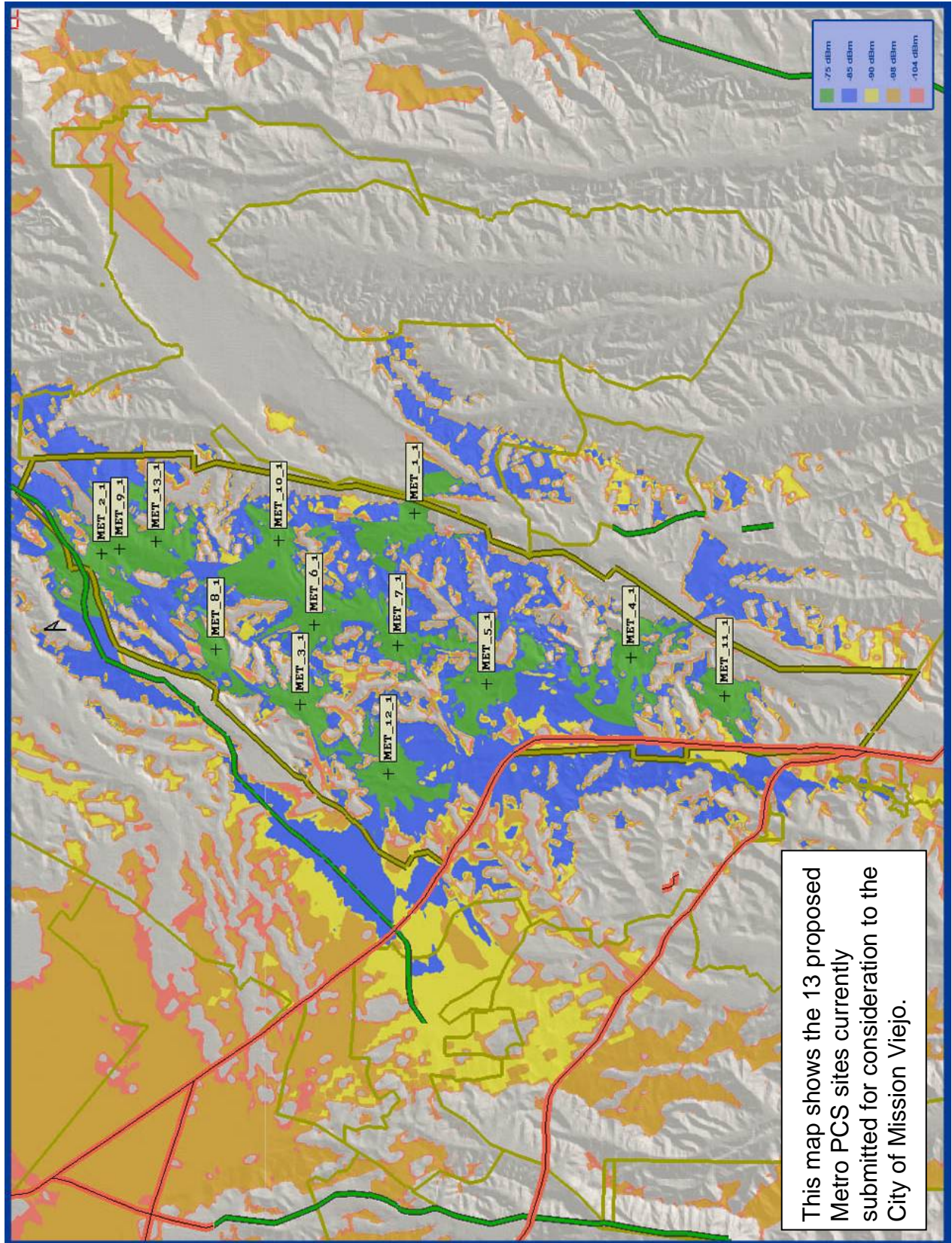
The following analysis is based on the proposed 13 sites presented by the carrier at this time. This analysis is meant to show their coverage if all sites are approved, may or may not be the case at the City's discretion.

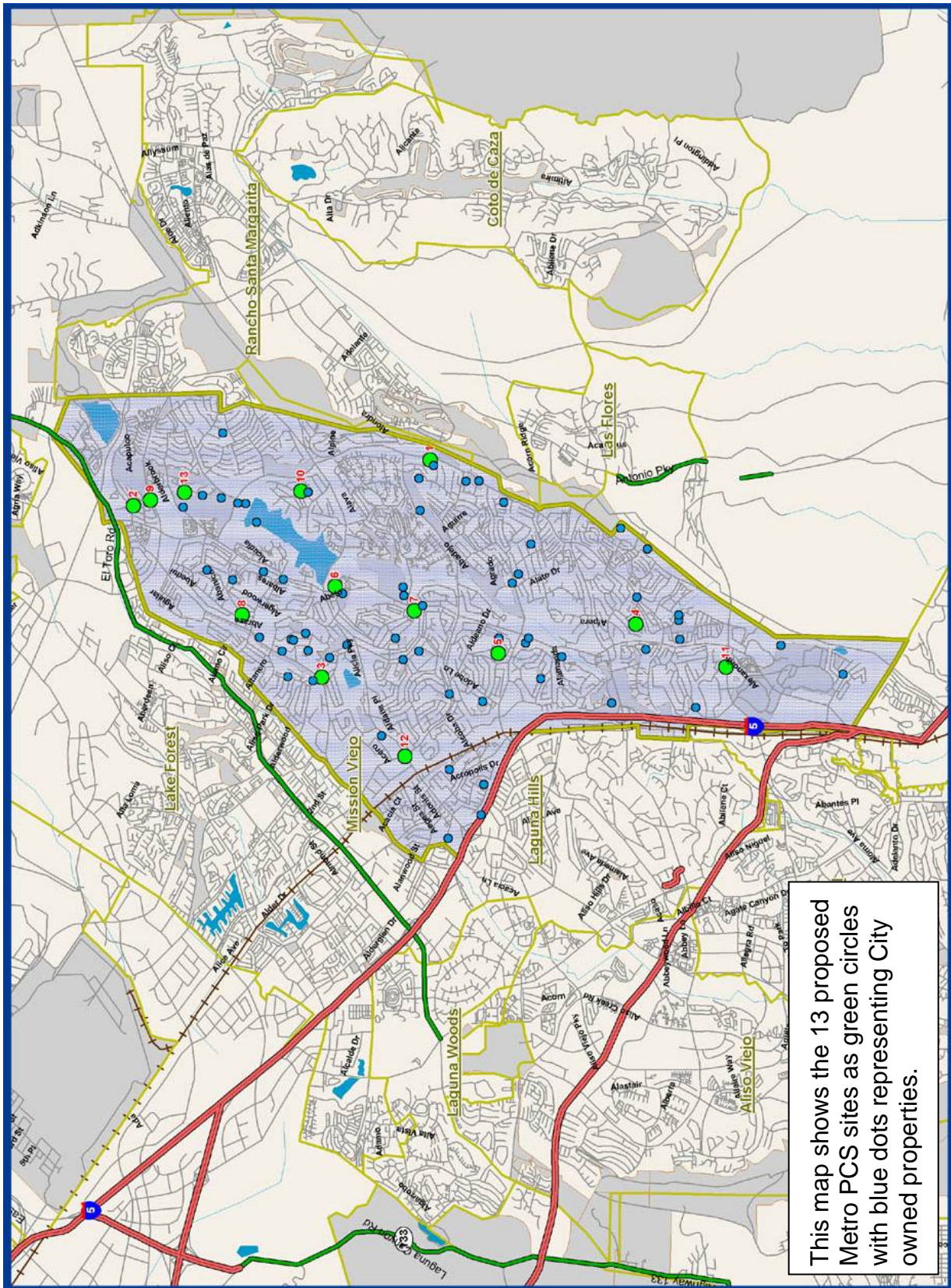
Metro PCS Proposed Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Beebe Park	Light Standard	33.61213	-117.63	836'	63'
Mission Hills Church	Monopine	33.66	-117.638	993'	60'
Buck Bldg	Roof Mount	33.62961	-117.665	597'	29'
MNWD Delemos	Water Tank	33.5789	-117.657	597'	32'
MNWD Preciados	Water Tank	33.60109	-117.662	597'	25'
Lakeside Plaza	Wall Mount	33.62746	-117.651	647'	35'
Chabad	Roof Mount	33.61467	-117.655	597'	30'
Congregation Eilat	Mono-pole	33.64248	-117.655	796'	33'
SCE at Calif Terrace	SCE Tower	33.65728	-117.637	931'	50'
SCE at Flo Jo Park	SCE Tower	33.63295	-117.635	802'	50'
SCE at Los Altos & Plaza	SCE Tower	33.56433	-117.664	485'	50'
Acero Bldg North	Roof Mount	33.61616	-117.678	504'	59'6"
Pine Crest Park	SCE Tower	33.65177	-117.636	809'	45'

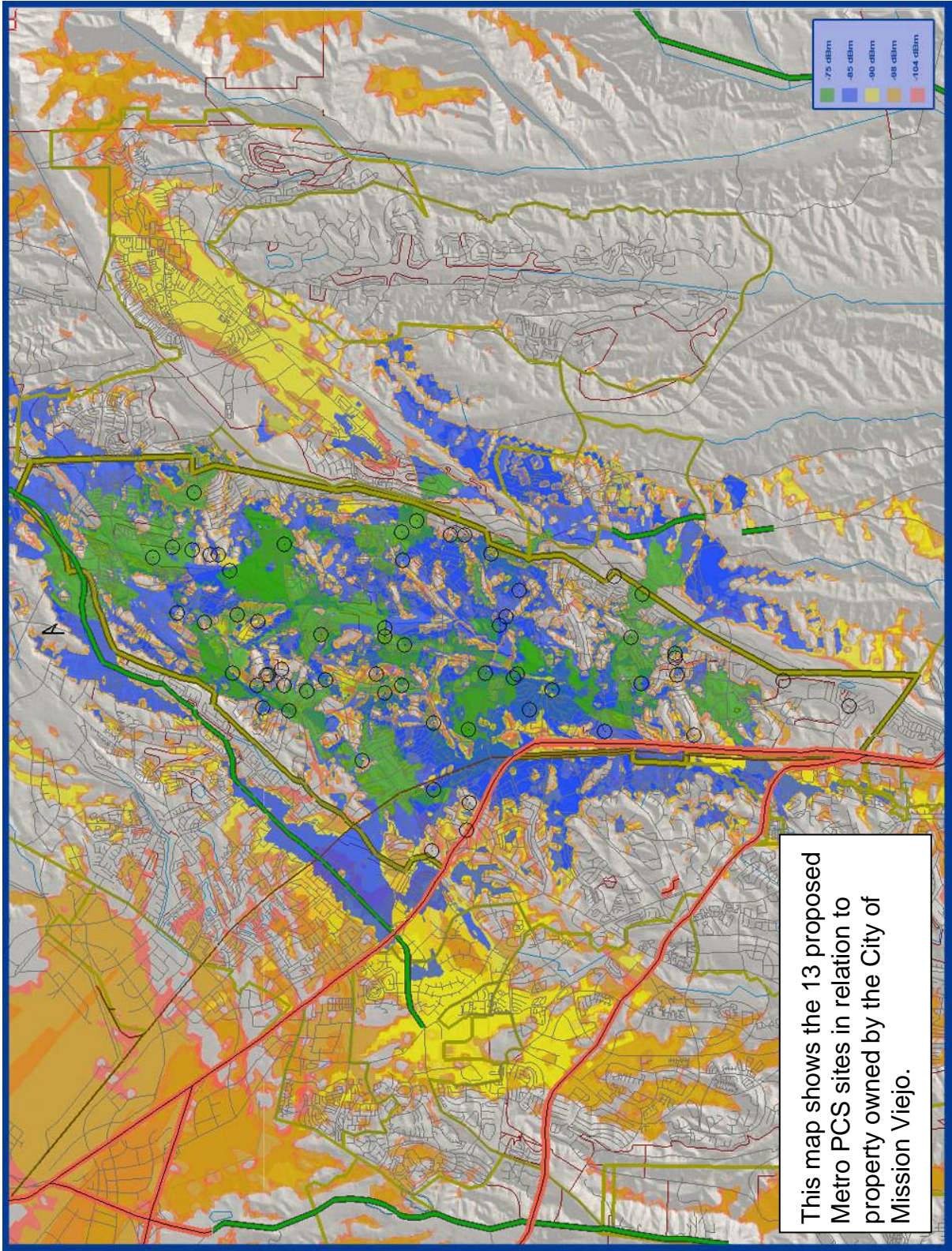


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**Nextel**

Unlike the Cingular/AT&T merger, Sprint and Nextel both remain separate entities. Though it is not clear whether Nextel will brand itself as the business focus of the merged companies or target some other segment of the market, they have combined their build plans for efficiency.

While we have shown each build plan separately, it is more than likely that the part of their network enhancement will be through collocating on each others sites. They will also combine their acquisition of new sites through the Sprint name as part of their Synergy network enhancement plan which is underway.

The following table is a list of Nextel's wireless communications facilities in the City of Mission Viejo:

Nextel Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
MNWD Via Bahia	Monopole	33.62377	-117.66	714'	25'
La Alameda Building	Roof Mount	33.56363	-117.671	397'	50'
Capistrano Valley HS	Monopole	33.54365	-117.672	381'	70'
Beebe Park	Light Standard	33.61104	-117.631	836'	50'
Pala Building	Roof Top	33.61948	-117.679	529'	40'
Fairfield Inn	Roof Top	33.57897	-117.67	394'	50'
Mission Hills	Monopine	33.66	-117.638	993'	60'
MNWD Delemos	Water Tank	33.5789	-117.657	597'	32'
Oso Viejo Park	Light Standard	33.59711	-117.655	565'	70'
SCE @ La Barca	SCE Tower	33.64579	-117.637	834'	47'

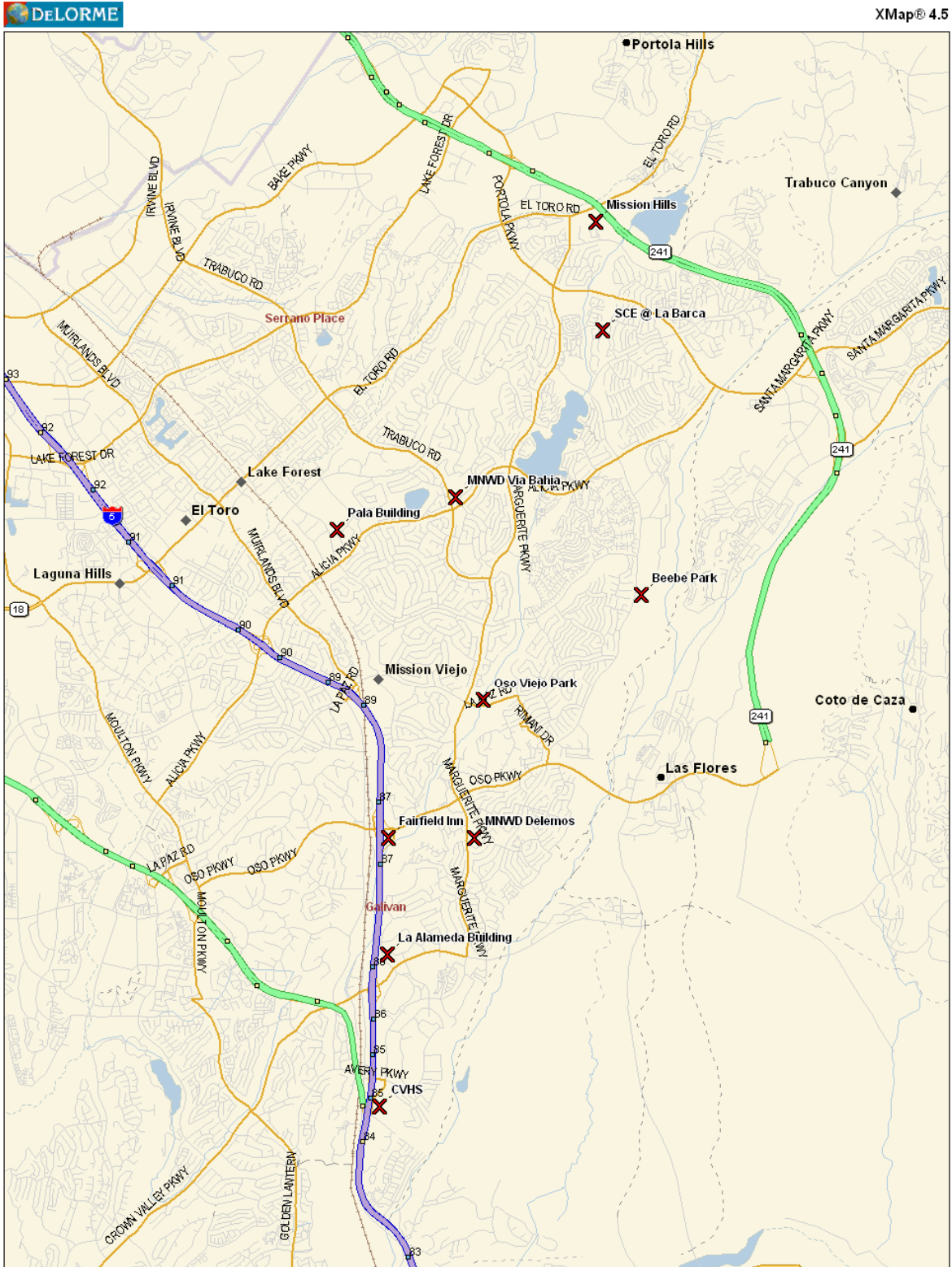
In reviewing the current network for Nextel in Mission Viejo, they are not actively seeking any sites. We anticipate over the next few years that they will need to augment their network with the following list of sites, though these sites could change due to Sprint's network needs.

In addition, Nextel has been granted by the FCC a new range of frequencies in the cellular range (1900 MHz). This is due in part to help eliminate the interference problems with emergency services networks. While it will take several years to transition to this new frequency range, it will have an affect on their capital expenditure and choice of future sites.

**Identified for Nextel - 800mhz**

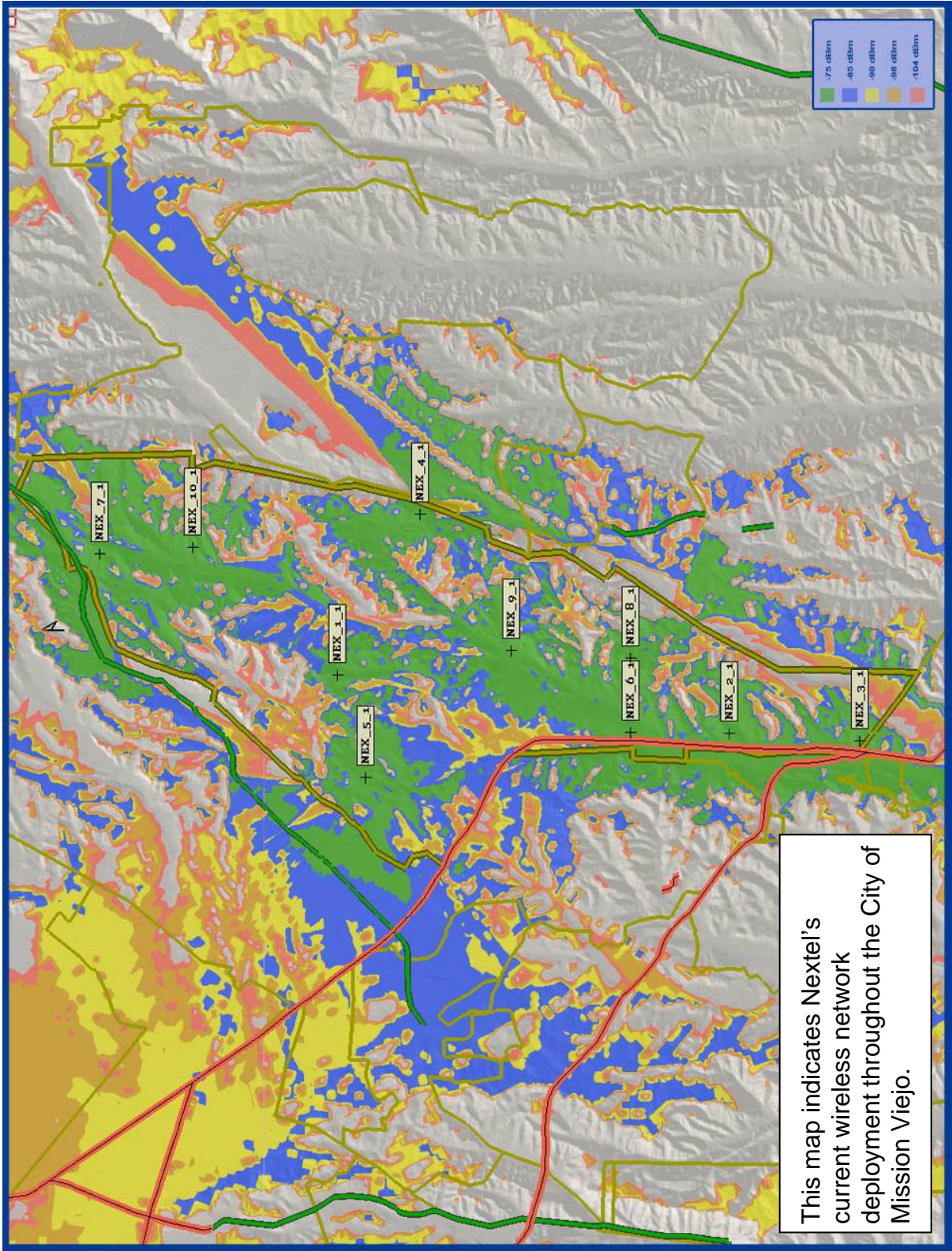
MV-060 Seville Park  
MV-003 Marguerite Aquatics Center  
MV-048 El Dorado Park  
MV-001 Animal Services Center  
MV-053 Melinda Park

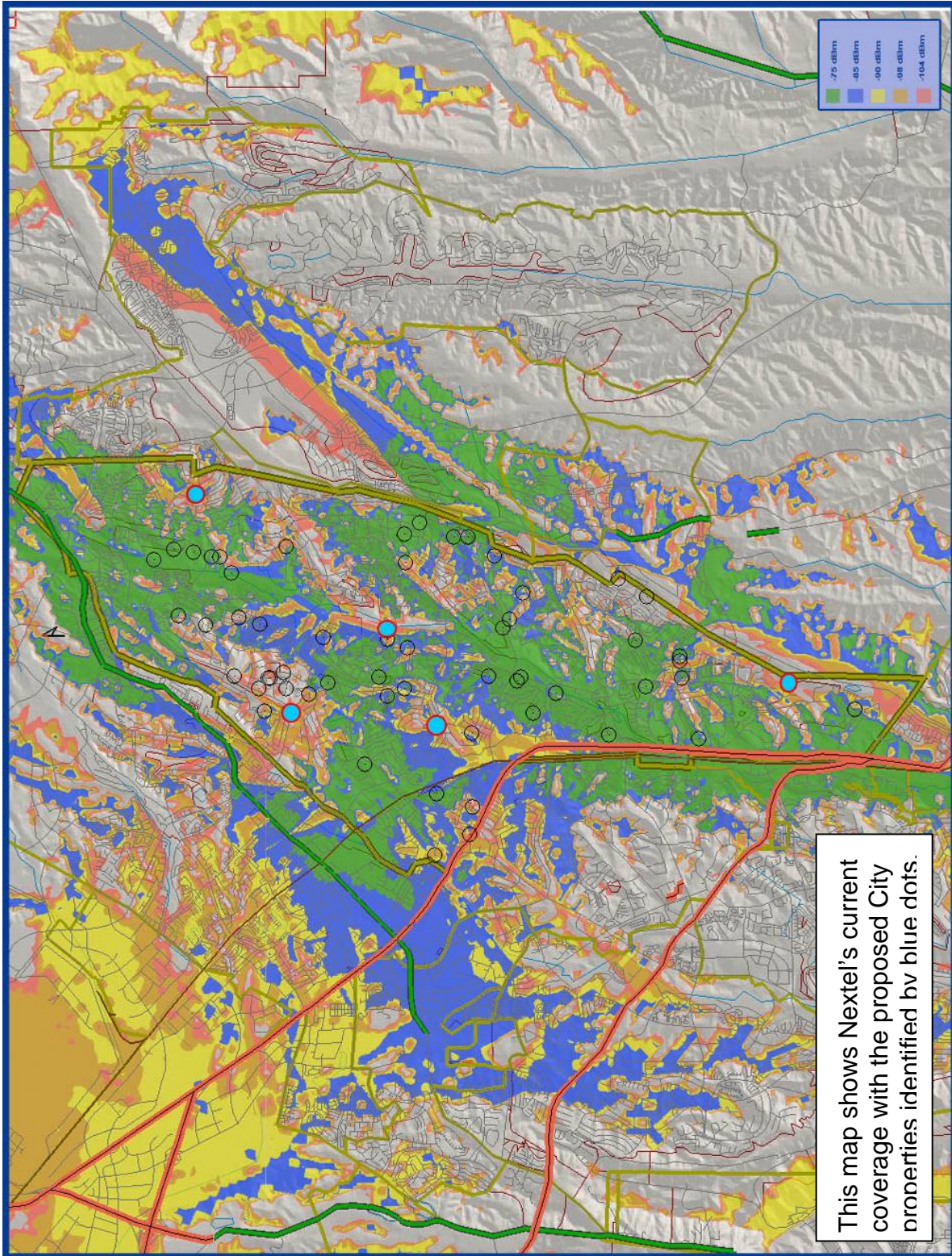
While Sprint and Nextel are shown with proposed sites at Melinda and Seville Park, it is anticipated that only Sprint would develop the sites. As part of this study, we would carefully monitor the proposals submitted by this carrier to determine if both types of facilities would be proposed to ensure the City was properly compensated for the site.

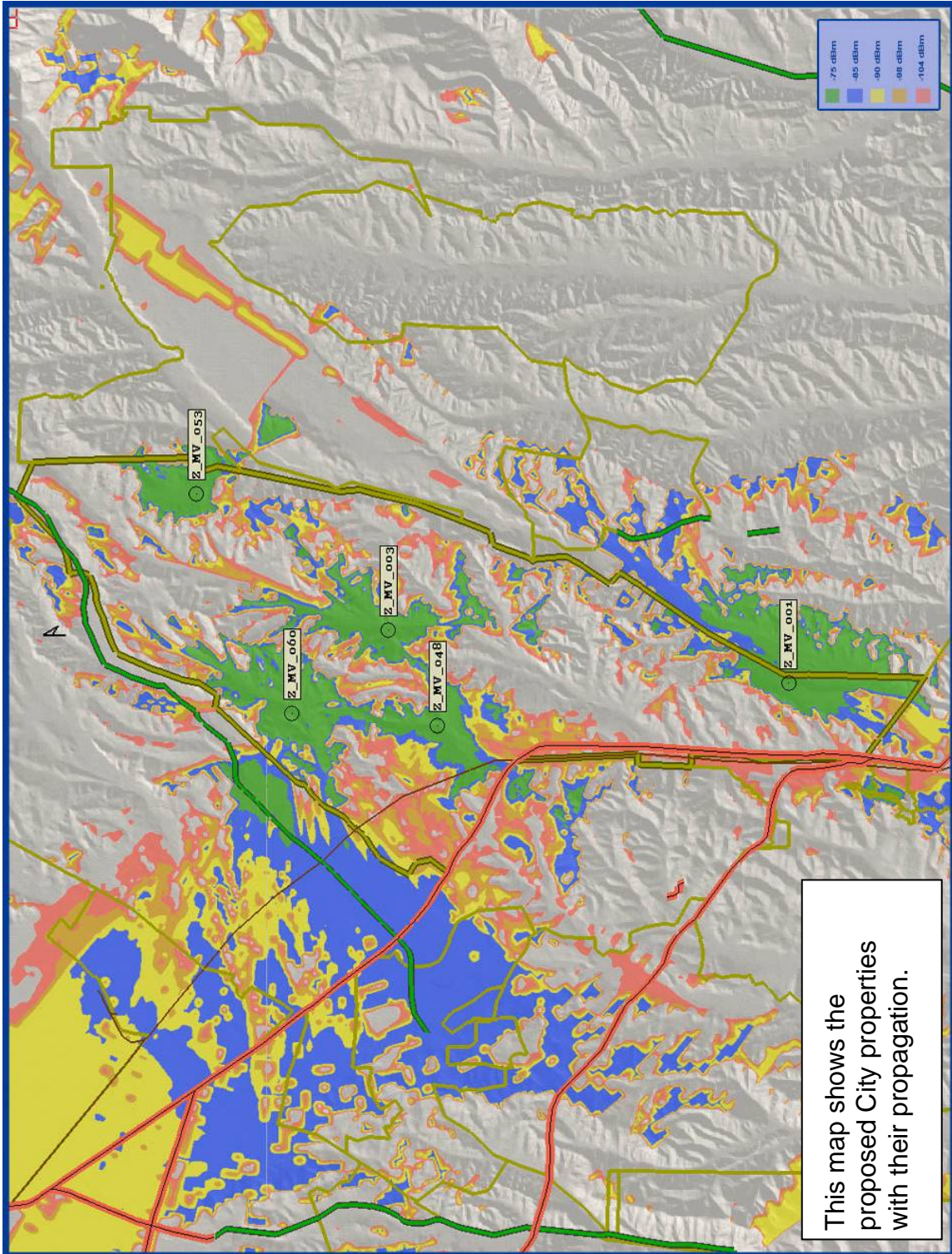


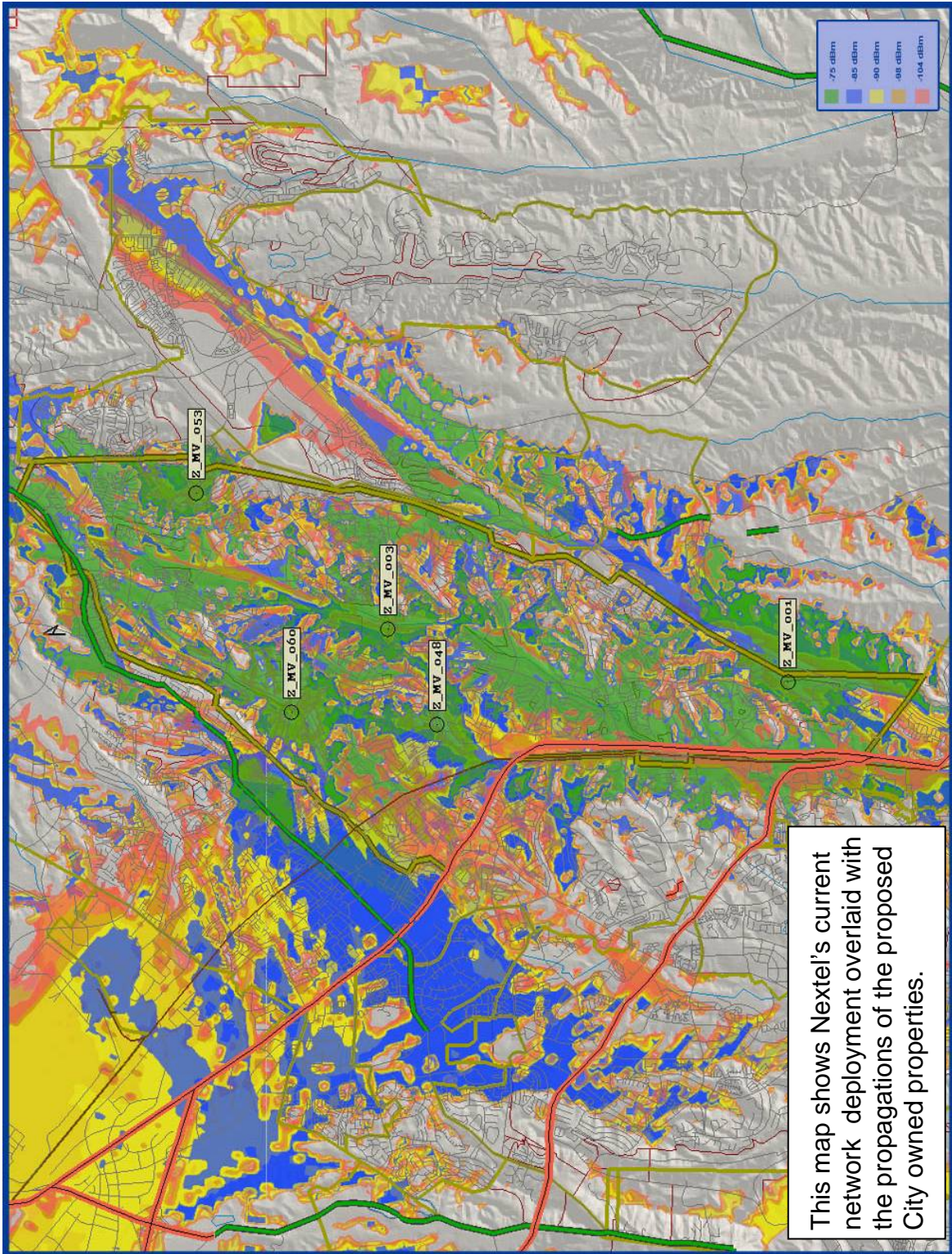
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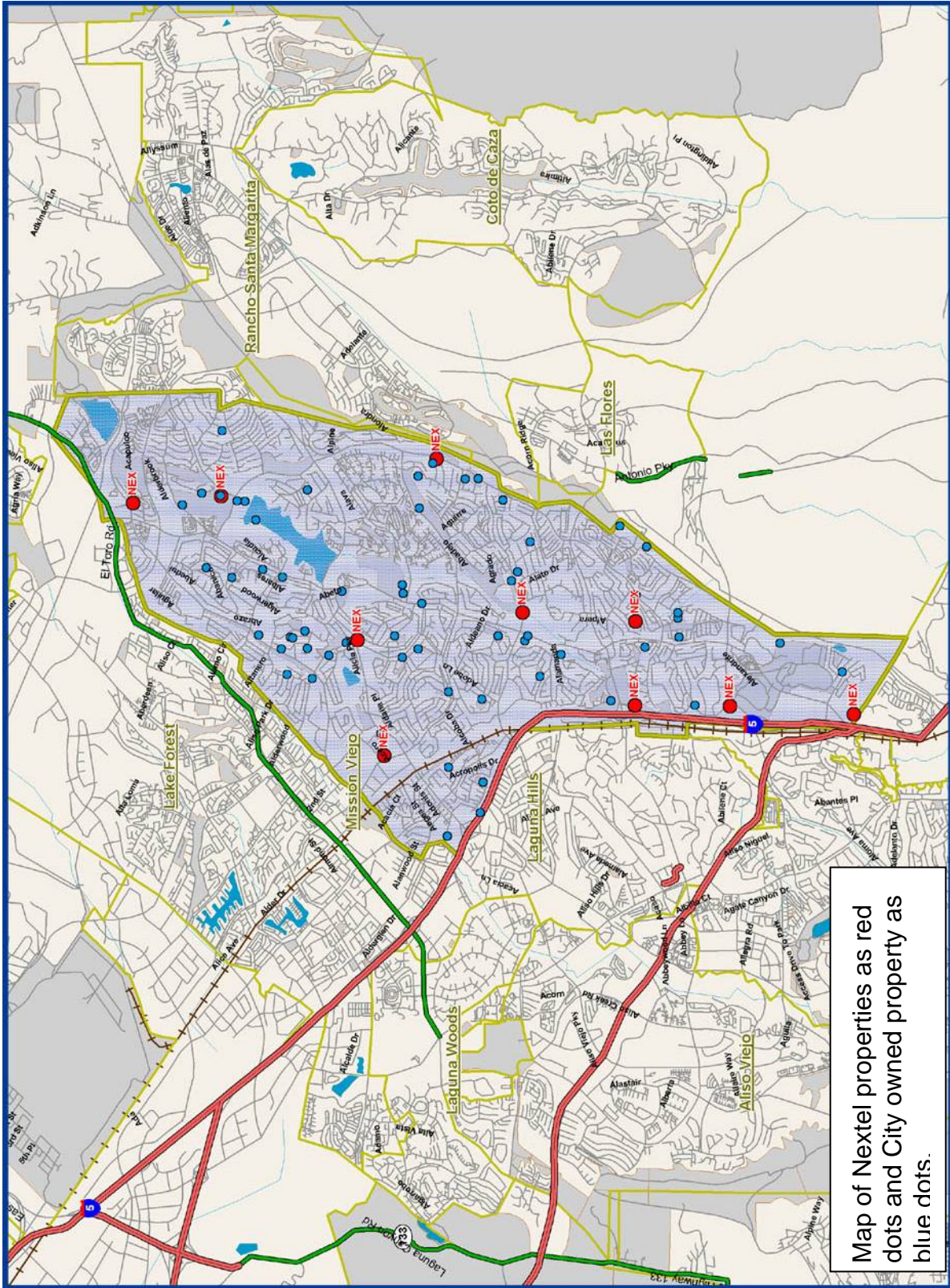














### Sprint PCS

Sprint PCS recently announced its plans to develop and deploy the first fourth generation (4G) nationwide mobile network. As an affluent community in the nation's number one mobile market, Sprint PCS will be looking to enhance their network throughout Mission Viejo.

Where possible, they will most likely use clauses in their and Nextel's agreements to enhance their networks within the bounds of those facilities. Even so, the higher frequency ranges necessary to facilitate 4G technology is going to require additional sites. The following analysis shows the Sprint PCS network, without the benefit of Nextel's network.

Sprint Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Congregation Eilat	Mono-pole	33.64248	-117.655	796'	33'
Vista Paint	Mono-pine	33.60992	-117.685	399'	40'
Beebe Park	Light Standard	33.61213	-117.63	836'	63'
Acero Bldg East	Roof Mount	33.61065	-117.678	504'	60'
MV Church of Christ	Monopine	33.5735	-117.657	545'	45'
YMCA Clock Tower	Clock Tower	33.61349	-117.654	597'	50'
MV Regional Medical Center	Roof Mount	33.56083	-117.666	303'	81'9"
SCE @ Oso	SCE Tower	33.57648	-117.674	394'	45' & 65'
SCE @ Melinda	SCE Tower	33.63797	-117.637	812'	68'

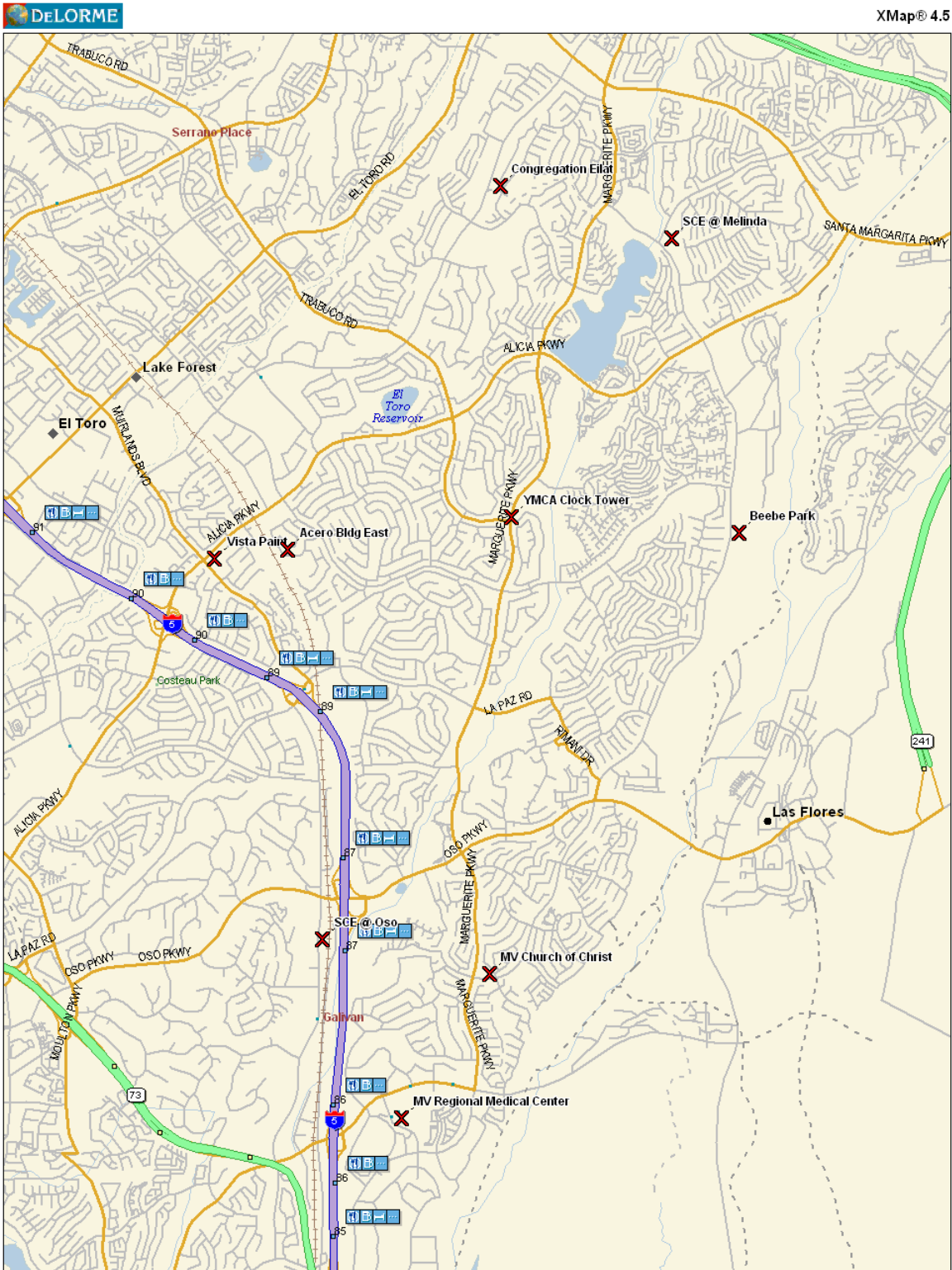
Seven locations were identified as potential candidates for Sprint's build over the next few years. We anticipate that with the Nextel change of frequencies and Sprint's aggressive marketing of live sports video, their demand for sites could be even greater than shown here.

Should customer acceptance of live video and television become a reality, Sprint is seen as the first mover in this service and will need additional sites support this service. This demand could easily double the number of sites Sprint needs.

**Identified for Sprint**

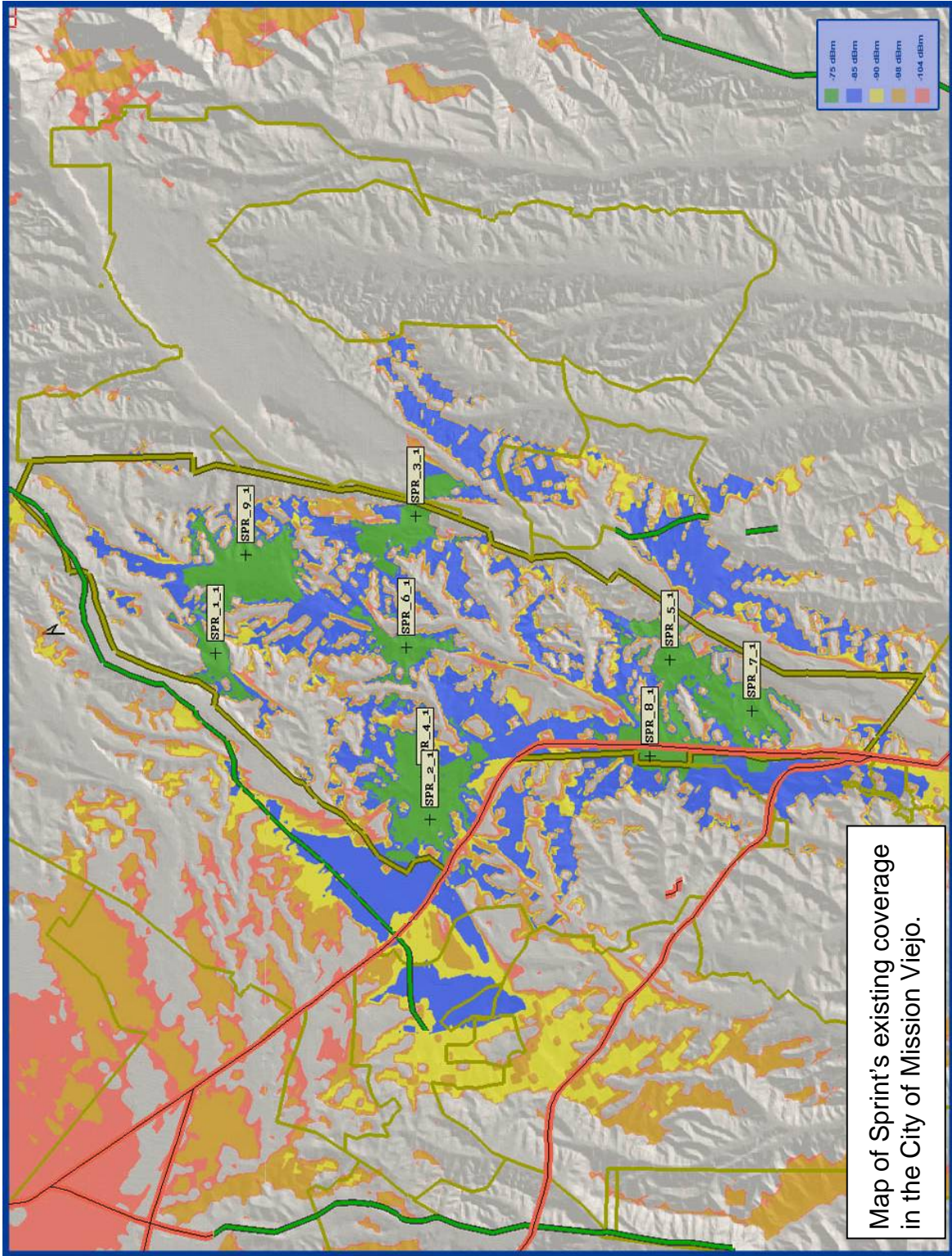
MV-046 Crucero Park  
MV-010 Heritage House  
MV-060 Seville Park  
MV-040 Aurora Park  
MV-058 Preciados Park  
MV-031 Pacific Hills Park  
MV-020 Coronado Park

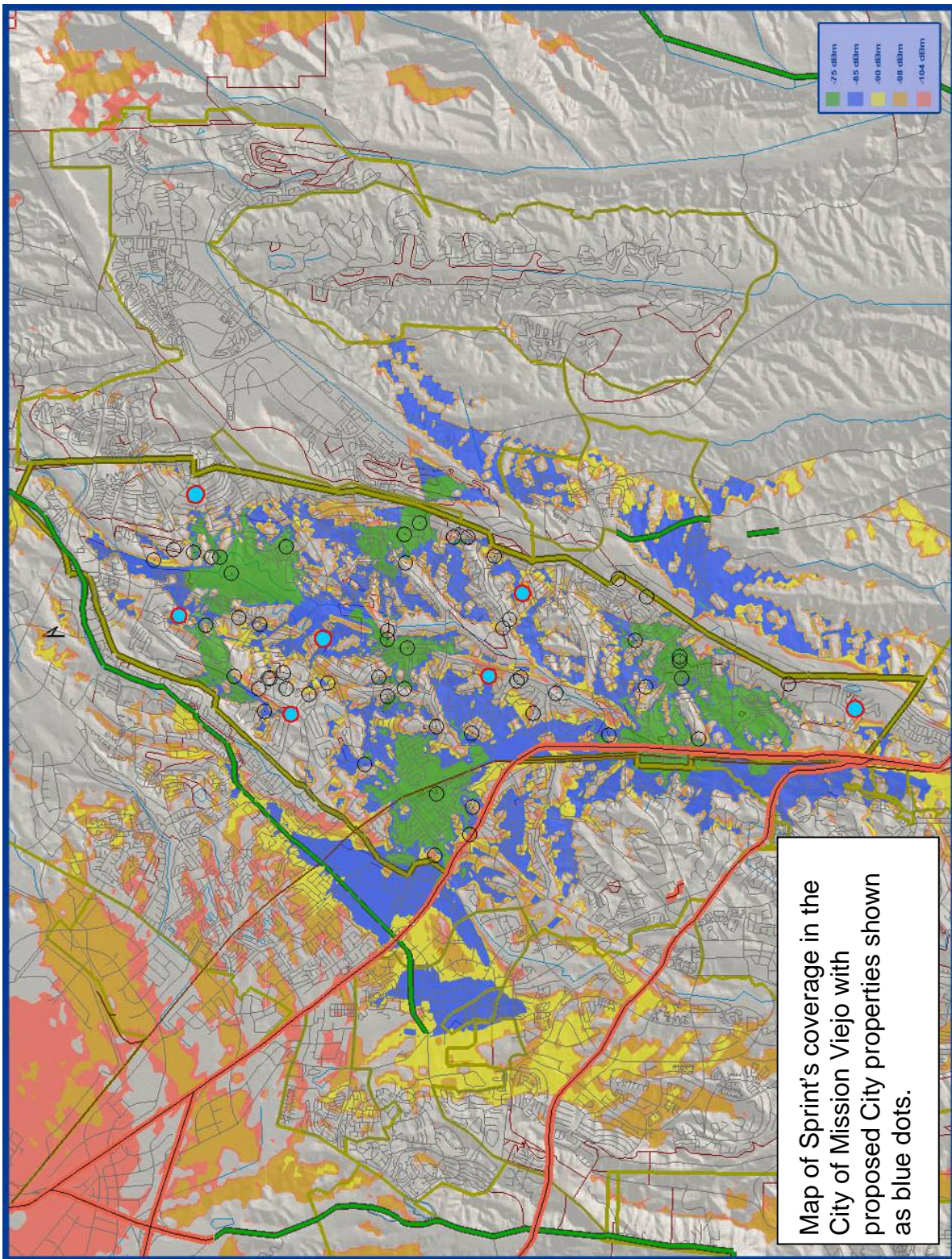
While Sprint and Nextel are shown with proposed sites at Melinda and Seville Park, it is anticipated that only Sprint would develop the sites. As part of this study, we would carefully monitor the proposals submitted by this carrier to determine if both types of facilities would be proposed to ensure the City was properly compensated for the site.

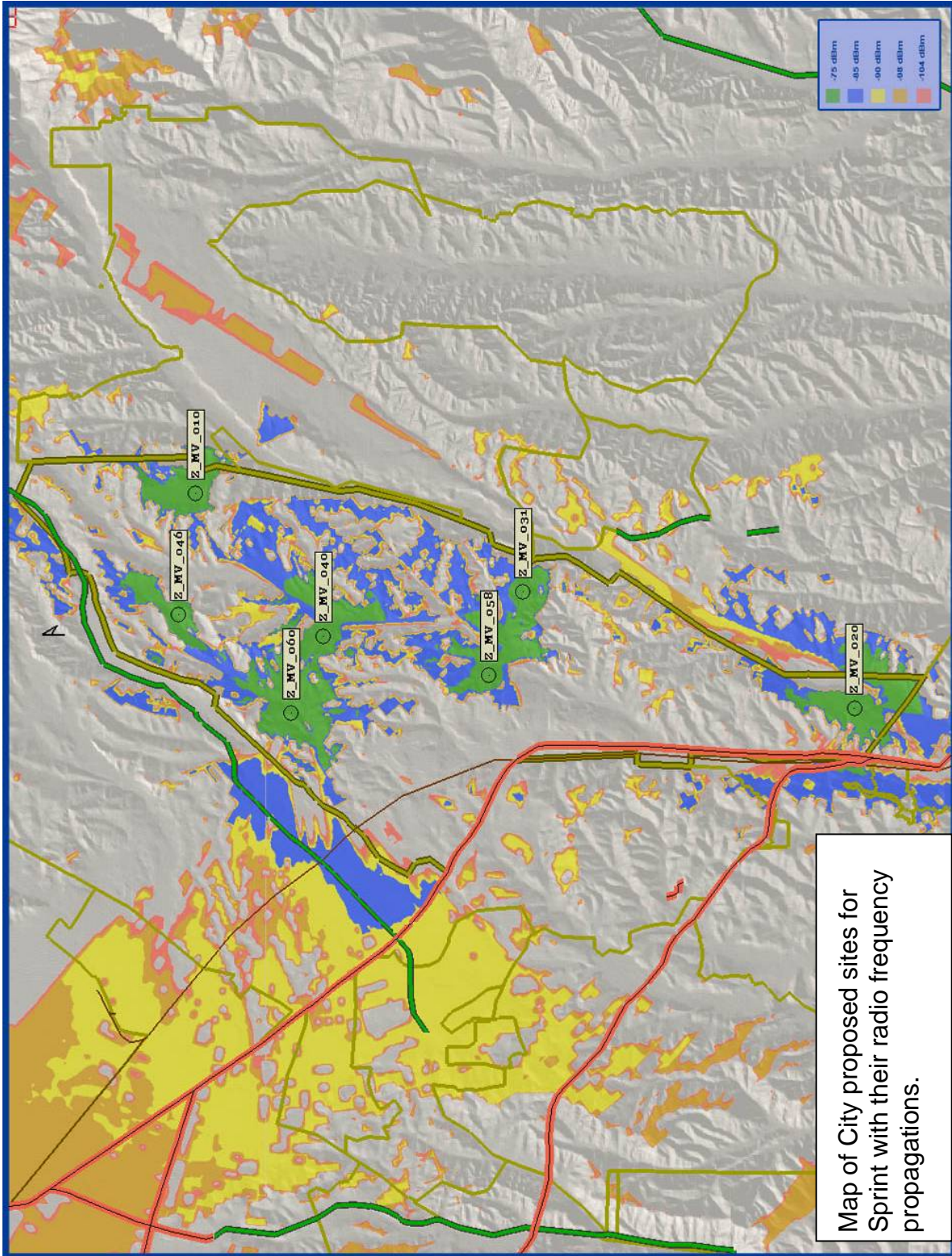


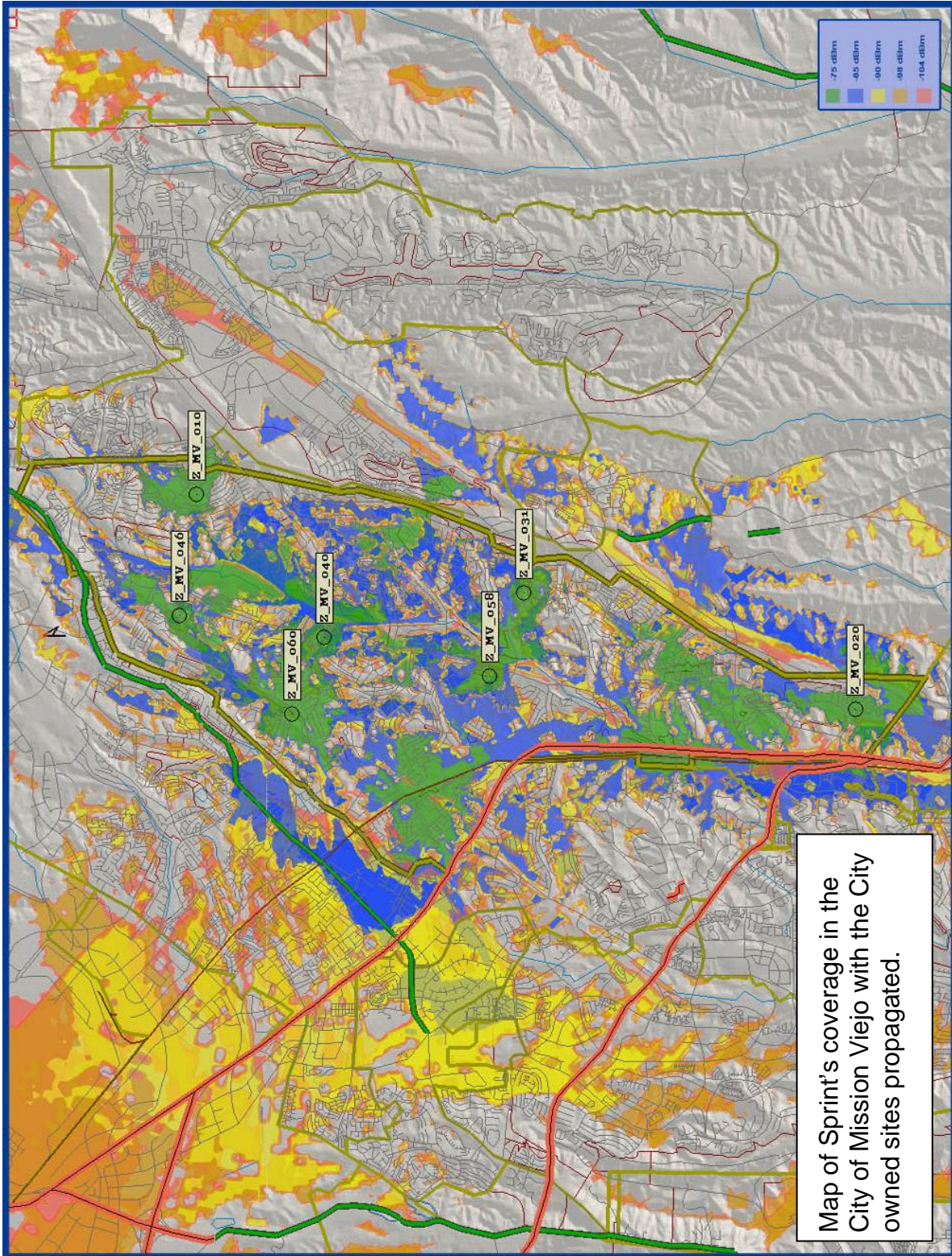
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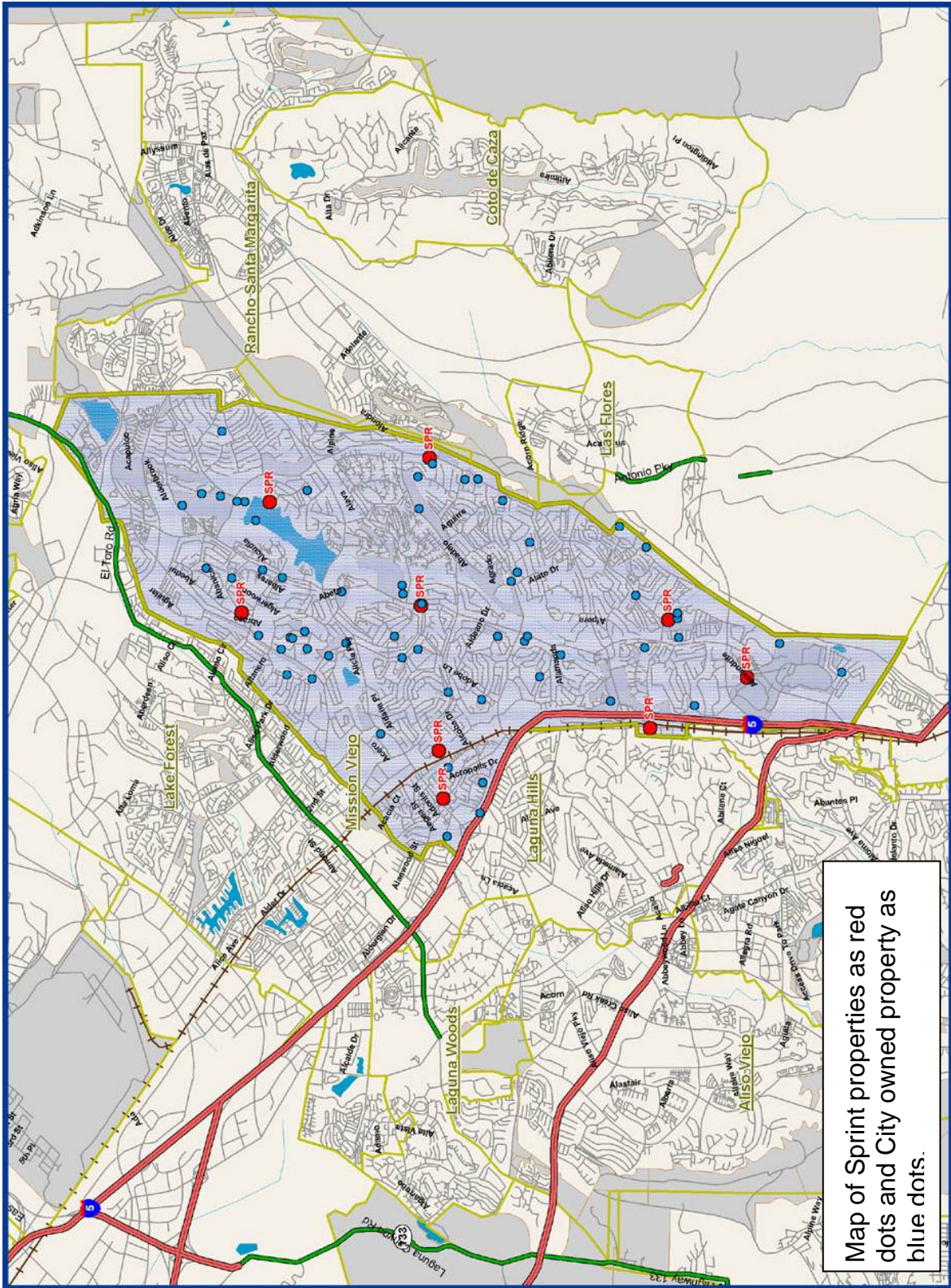














### T-Mobile

T-Mobile is a subsidiary of Deutsche Telekom AG, a German company. They entered the Southern California market in 2003 sharing their network with Cingular. As part of Cingular's acquisition of AT&T Wireless, Cingular sold a portion of their network, the older sites acquired from their acquisition of Pacific Bell.

Transitioning their customers from Cingular's sites, T-Mobile has an aggressive build plan underway to enhance their network. Last year's build plan called for 700 sites in the Southern California market. Their radio frequency engineers indicate that their build plan for the following three years is 1,700 sites each year.

The following is the analysis of their existing sites, but not taking into account their shared infrastructure with Cingular. As Cingular and T-Mobile's customers are separated from the combined coverage, they will find new holes in their service that didn't exist before.

T-Mobile Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Congregation Eilat	Mono-pine	33.64248	-117.655	796'	50'
SCE @ Flo Jo Park	SCE Tower	33.63295	-117.635	802'	50'
Buck Building	Roof Mount	33.62961	-117.665	597'	29'
Lakeside Plaza	Roof Mount	33.62746	-117.651	647'	35'
MNWD Via Bahia	Monopole	33.62377	-117.66	714'	52'
Chabad Jewish Center	Roof Mount	33.61467	-117.655	597'	30'
Pavion Park	Monopine	33.61556	-117.635	759'	65'
Felipe Water Tank	Water Tank	33.60375	-117.633	703'	38'
Pala Building	Roof Mount	33.61948	-117.679	529'	40'
Shepherd of the Hills	Monopole	33.60048	-117.675	397'	40'
True Value Hardware	Roof Mount	33.5853	-117.66	398'	40'
El Toro Water District	Stub Mount	33.62972	-117.676	563'	8'
SCE @ Crown Valley	SCE Tower	33.56433	-117.664	485'	50'
MV Church of Christ	Monopine	33.5735	-117.657	545'	37'

MNWD Camino Capistrano	Flag Pole	33.57603	-117.673	394'	55'
MNWD Precidios	Water Tank	33.60109	-117.662	597'	25'
Trabuco MacDonalds	Flag Pole	33.6216	-117.661	625'	45'
MV Christian Church	Roof Mount	33.60987	-117.685	398'	42'
Kaleidoscope	Roof Mount	33.56133	-117.671	394'	65'
Ayres Suites	Roof Mount	33.6547	-117.628	984'	30'
Melinda Park	Monopole	33.64575	-117.625	997'	45'
Robinsons May Dept Store	Roof Mount	33.55978	-117.668	405'	45'
MNWD Delemos	Water Tank	33.5789	-117.657	597'	33.6'

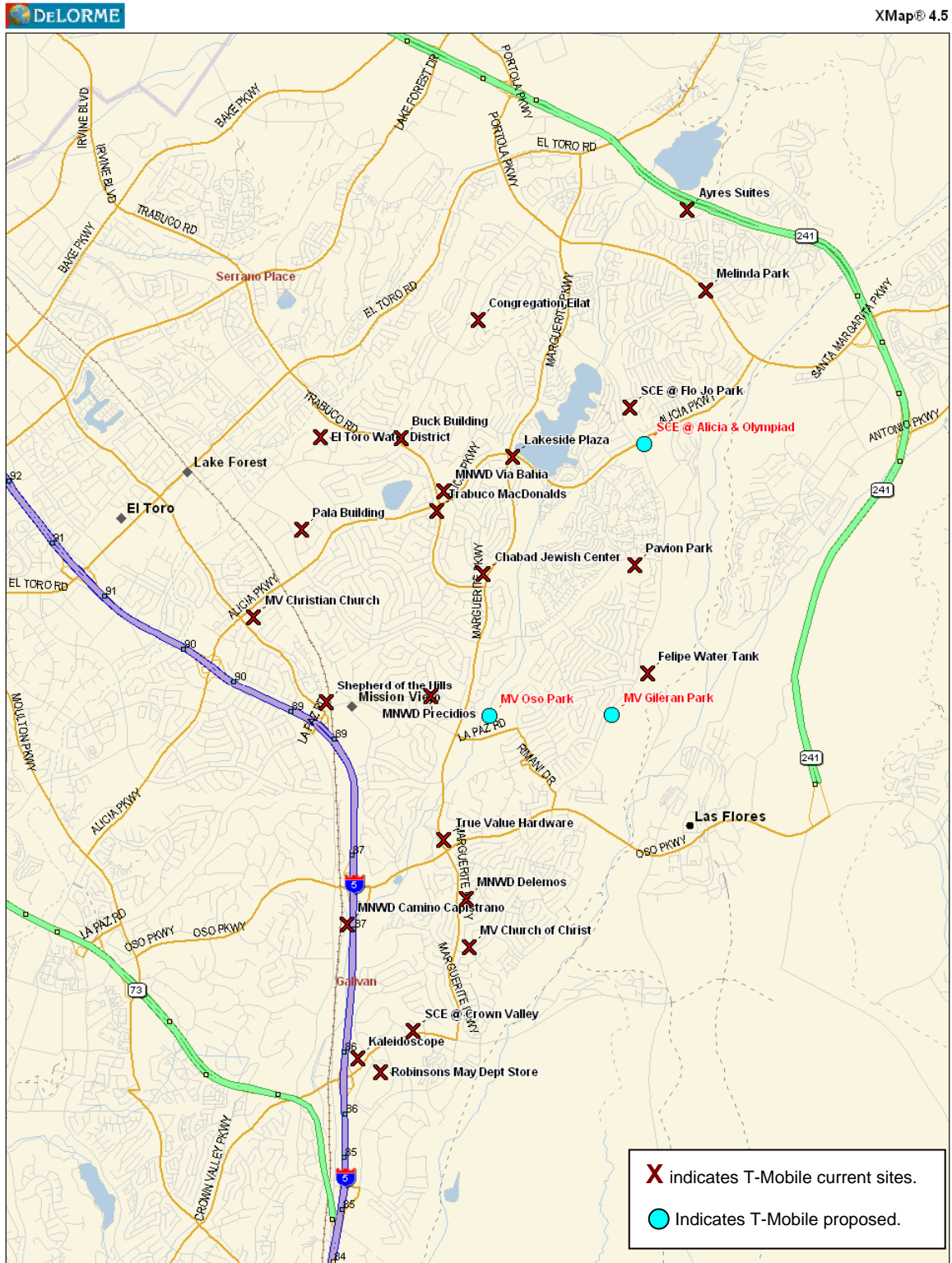
While T-Mobile has the most sites in Mission Viejo with 23 wireless communications facilities, they are currently pursuing 3 additional sites. The following is a list of those sites:

T-Mobile Proposed Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
MV Gileran Park	Light Standard	33.59909	-117.638	762'	60'
MV Oso Viejo Park	Light Standard	33.59898	-117.654	579'	60'
SCE @ Alicia & Olympiad	SCE Substation	33.6289	-117.633	854'	60'

Because of T-Mobile's aggressive build and number of sites, their number of coverage sites needed over the next few years is less. Though based on customer demand and new types of services, they could likely require additional sites to support their network.

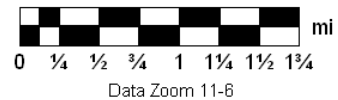
**Identified for T-Mobile**

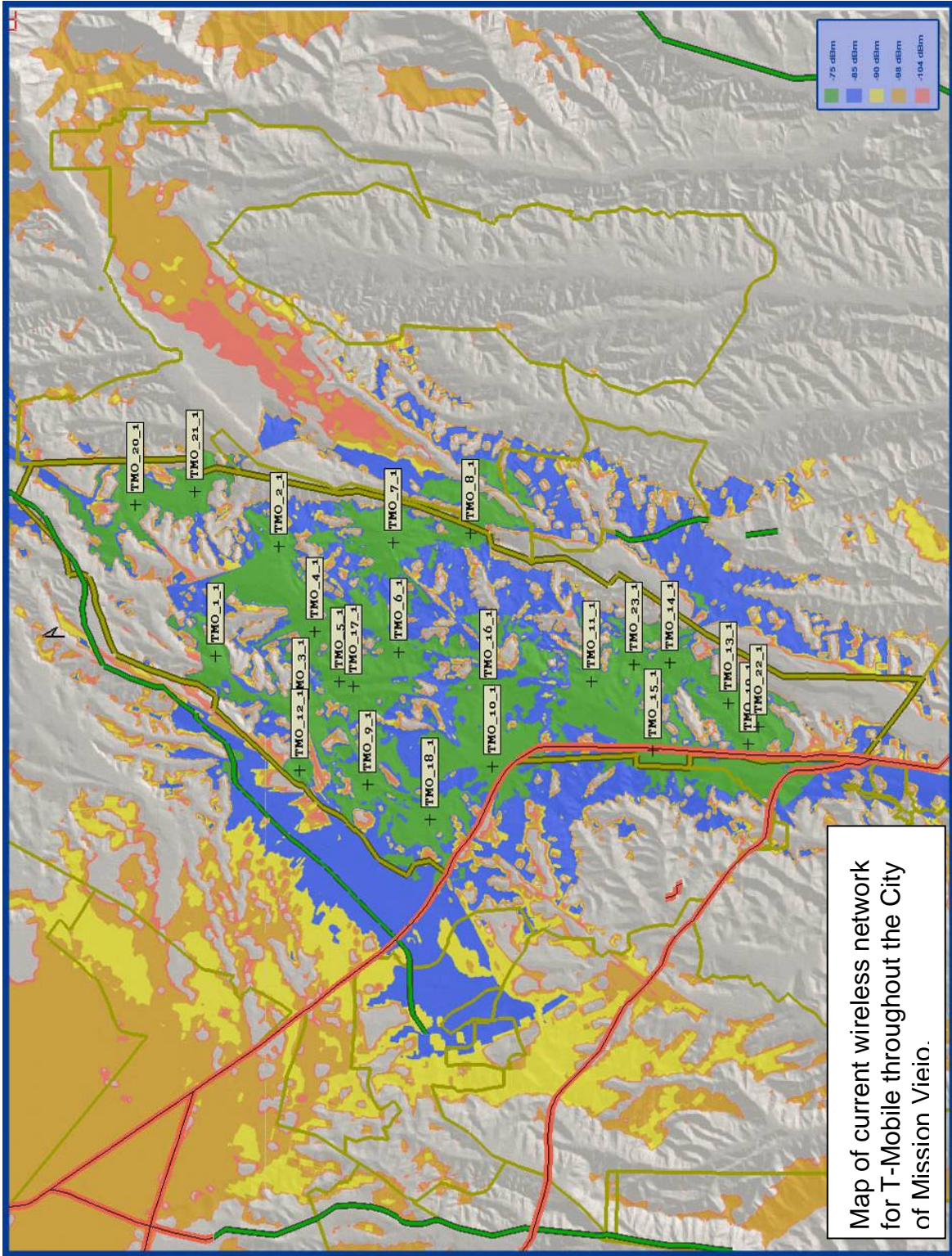
- MV-046 Crucero Park
- MV-029 Napoli Park
- MV-020 Coronado Park

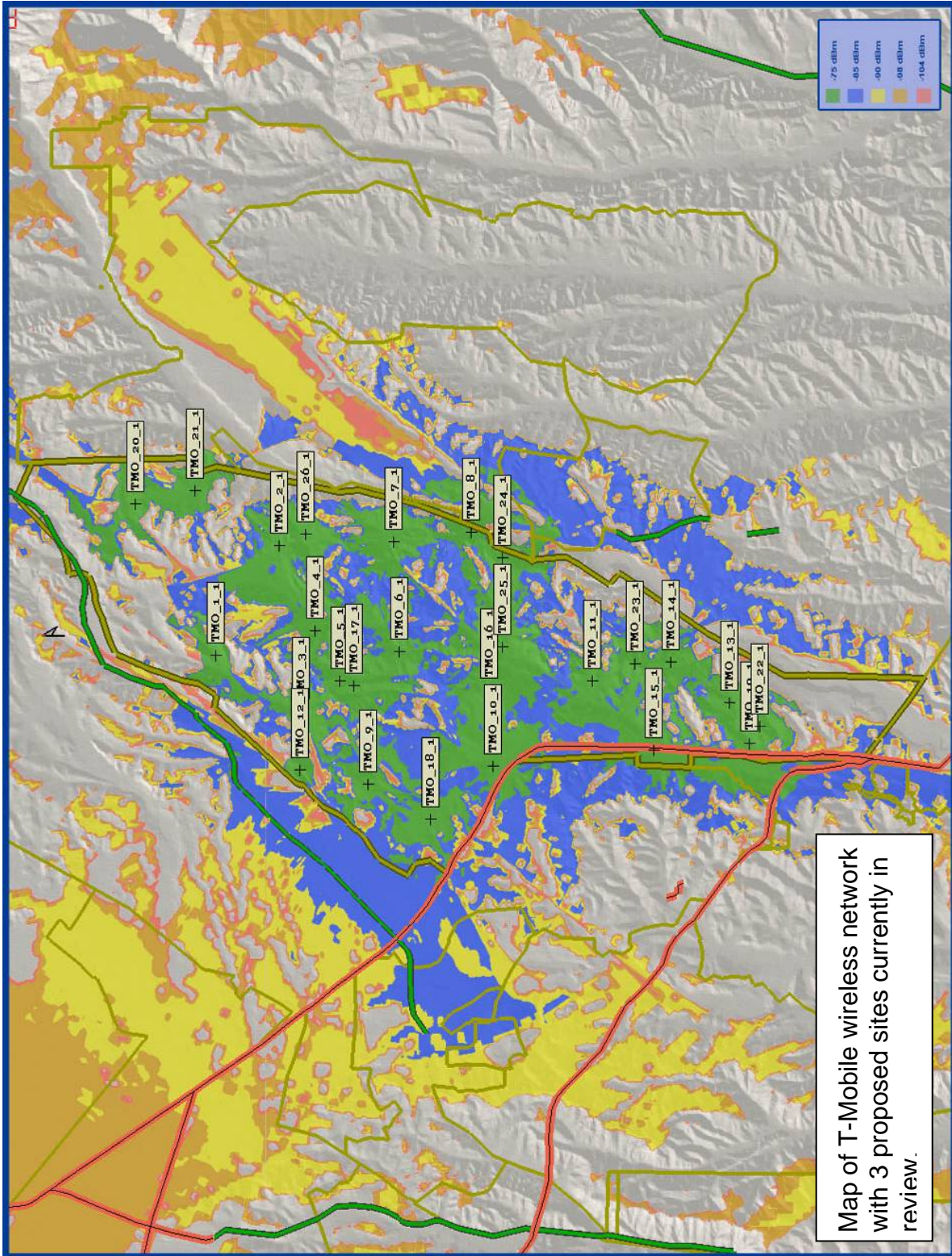


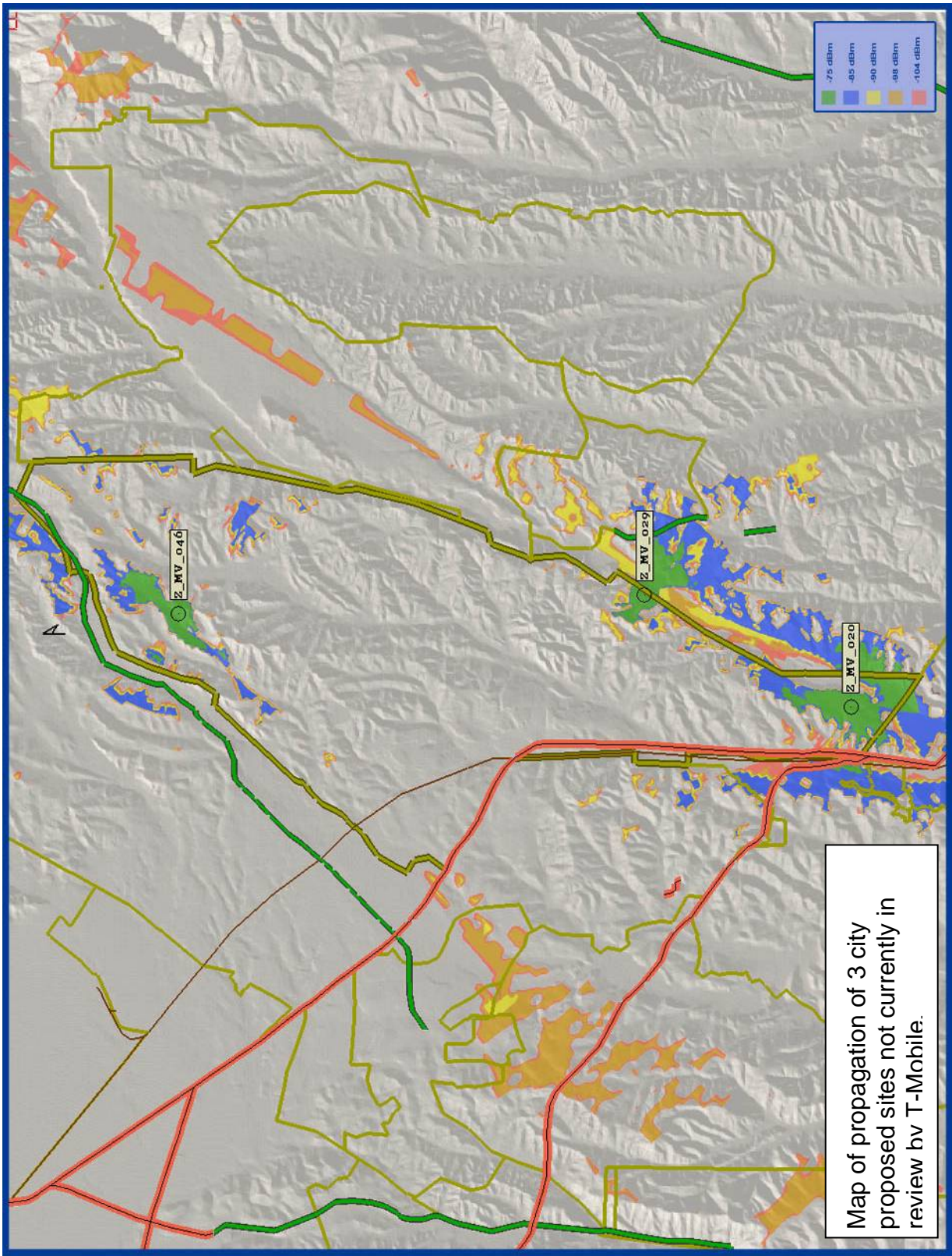
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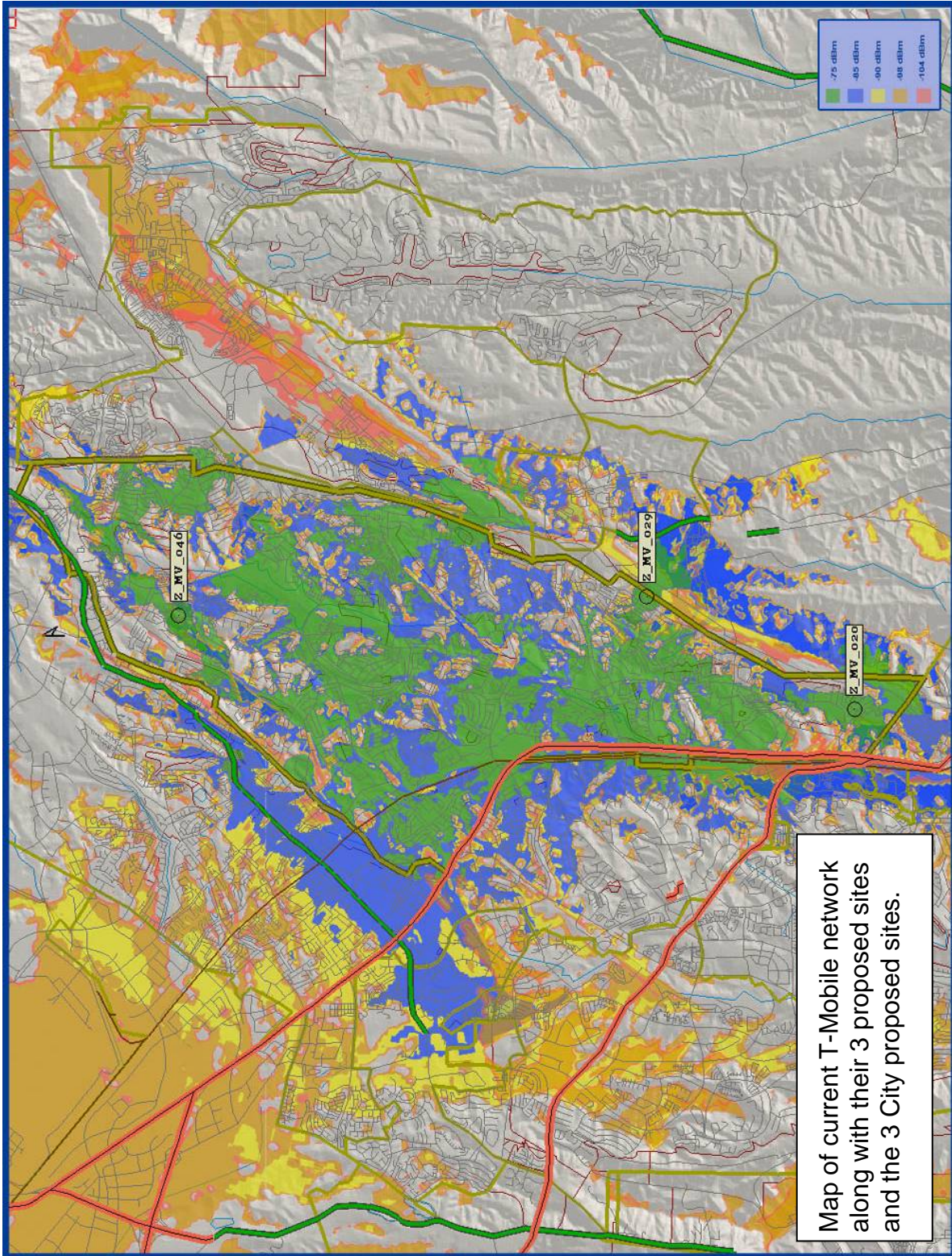
MN (12.8° E)

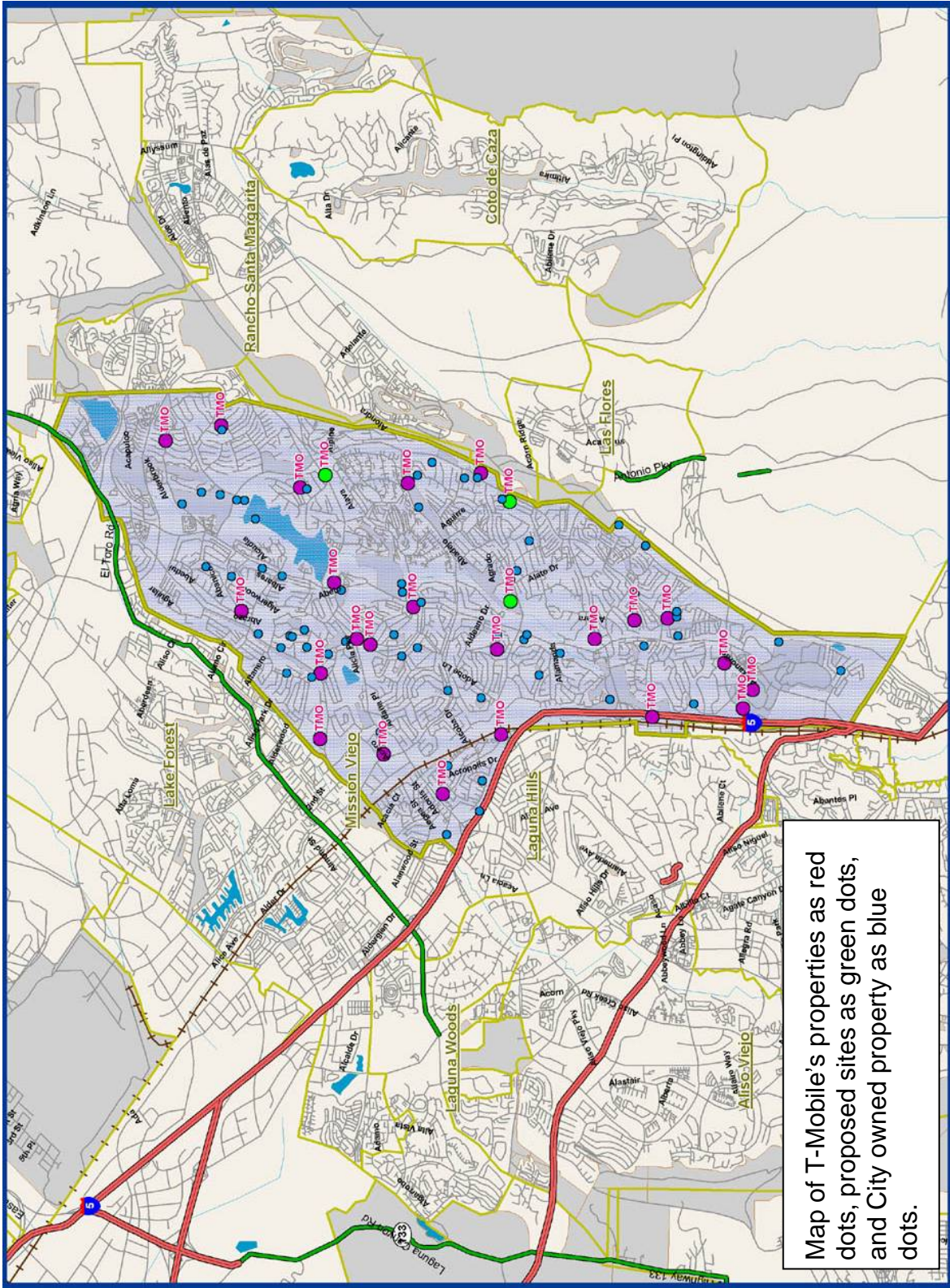














**Verizon Wireless**

Headquartered in Basking Ridge, New Jersey, Verizon Wireless is a joint venture of Verizon Communications and Vodafone. With 54 million customers across the country, Verizon Wireless is a close second to Cingular in subscribers. In this market, Verizon is transitioning over from the cellular network (800 to 900 Mhz) to PCS network (1800 to 1900 Mhz) in order to prepare for the next generation of products and services.

This year's build plan for Verizon Wireless is well below that of their competitors. For Verizon Wireless to maintain its customer base with new competitors entering the market expect their build plan to increase dramatically over the next couple of years. The following is a list of their current sites in the City of Mission Viejo.

Verizon Wireless Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Buck Building	Roof Mount	33.62961	-117.665	597'	27'6"
Lakeside Plaza	Wall Mount	33.62746	-117.651	647'	35'
Capistrano Valley HS	Monopole	33.54365	-117.672	381'	100'
Beebe Park	Light Standard	33.61213	-117.63	836'	60'
MV Presbyterian Church	Mono-pine	33.5845	-117.661	397'	45'
Plaza Drive	Roof Mount	33.56555	-117.665	445'	60'
Trabuco Hills Professional Center	Roof Mount	33.65481	-117.647	797'	35'
Ayres Suites	Roof Mount	33.6547	-117.628	984'	30'
Oso Viejo Park	Light Standard	33.59898	-117.654	579'	58'

Currently, the following two sites are in process for Verizon Wireless in the City of Mission Viejo. These sites have been included in this study.

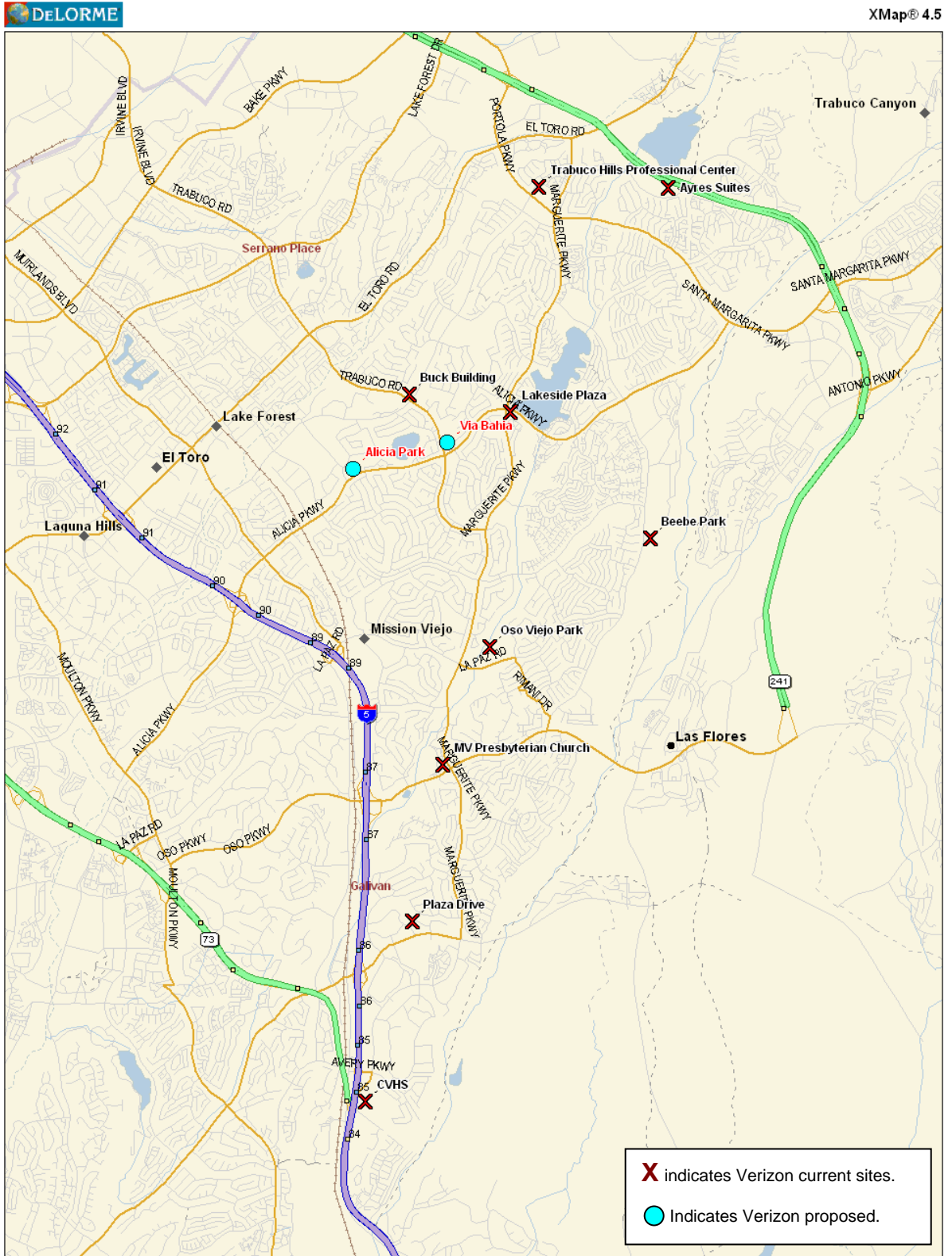
Verizon Wireless Proposed Locations in Mission Viejo					
Site Name	Type of build	Lat	Long	AMSL	Antenna RAD height
Alicia Park	Light Standard	33.62054	-117.674	586'	60'
MNWD Via Bahia	Water Tank	33.62377	-117.66	714'	35'

In performing the radio frequency analysis, the following sites were identified as City owned properties that would satisfy future needs for Verizon Wireless. While Verizon Wireless is operating in the cellular, 850MHz frequency range, this range offers the ability to reach further than the higher PCS, 1900 MHz frequency range.

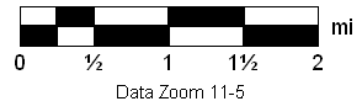
For Verizon Wireless to compete with other wireless carriers for the new services they will have to move to the higher frequency range. The higher frequency range allows for greater bandwidth of data necessary for services such as streaming video and games.

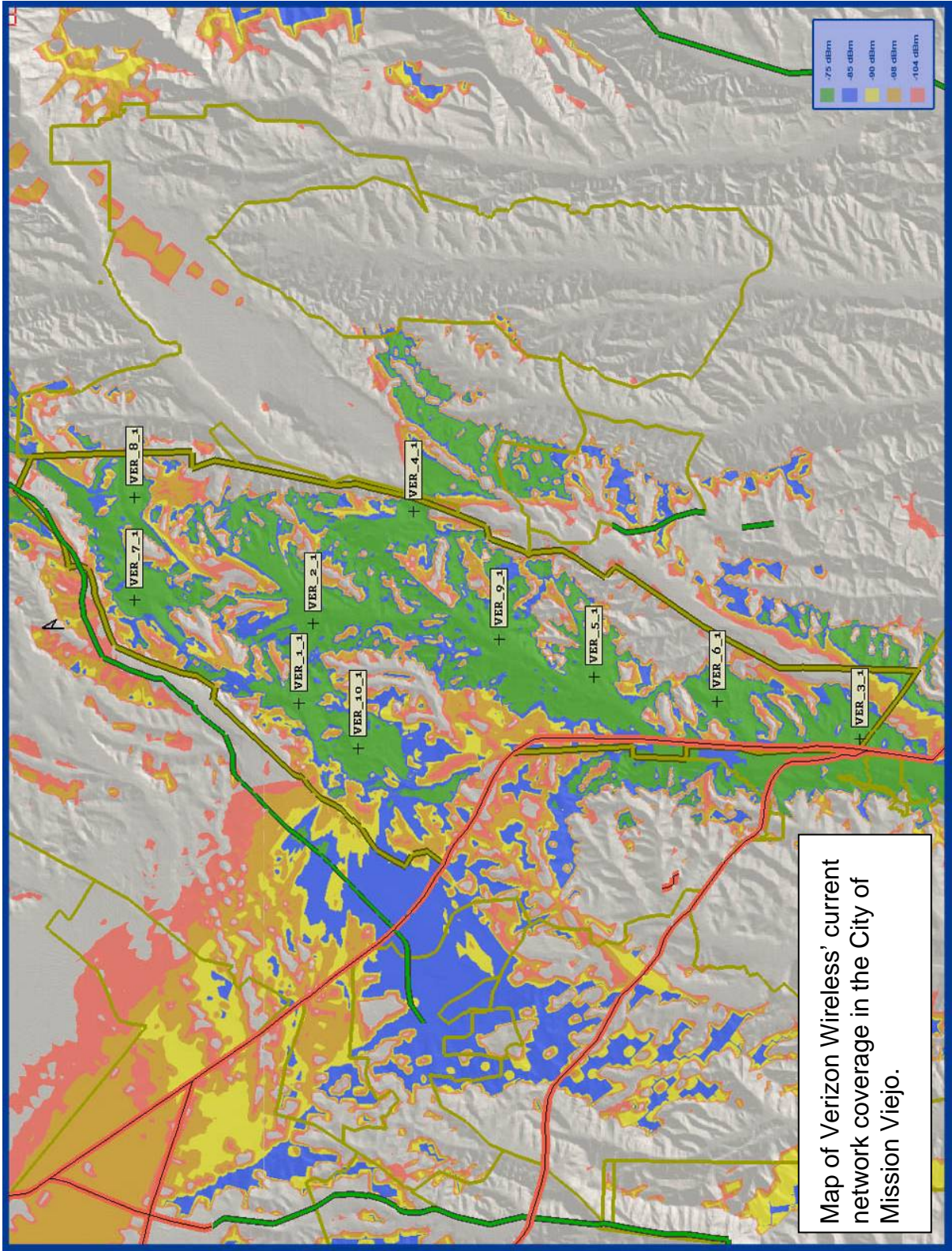
**Identified for Verizon Wireless 850mHz**

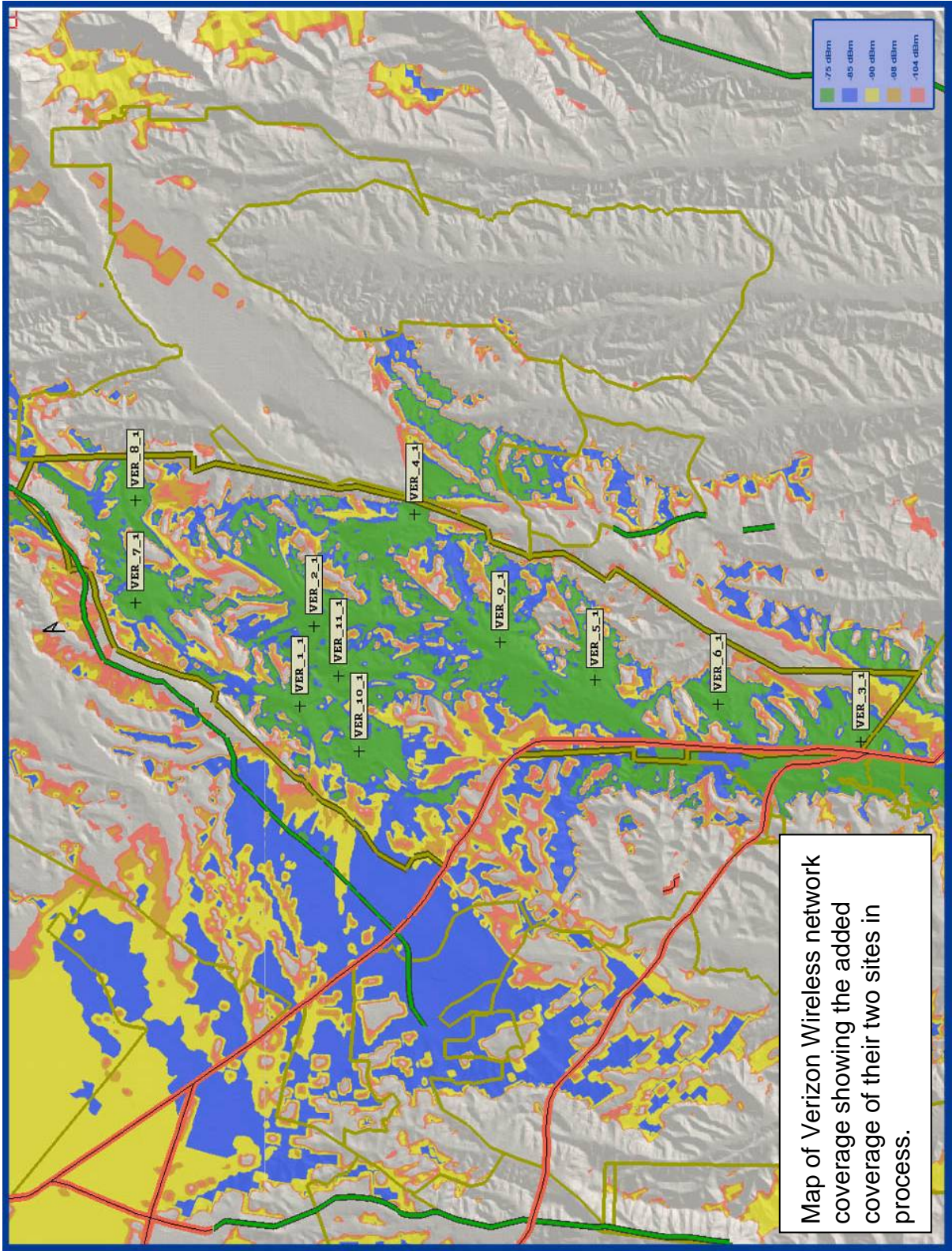
MV-013 Abanico Open Space  
MV-053 Melinda Park  
MV-015 Barbadanes Park

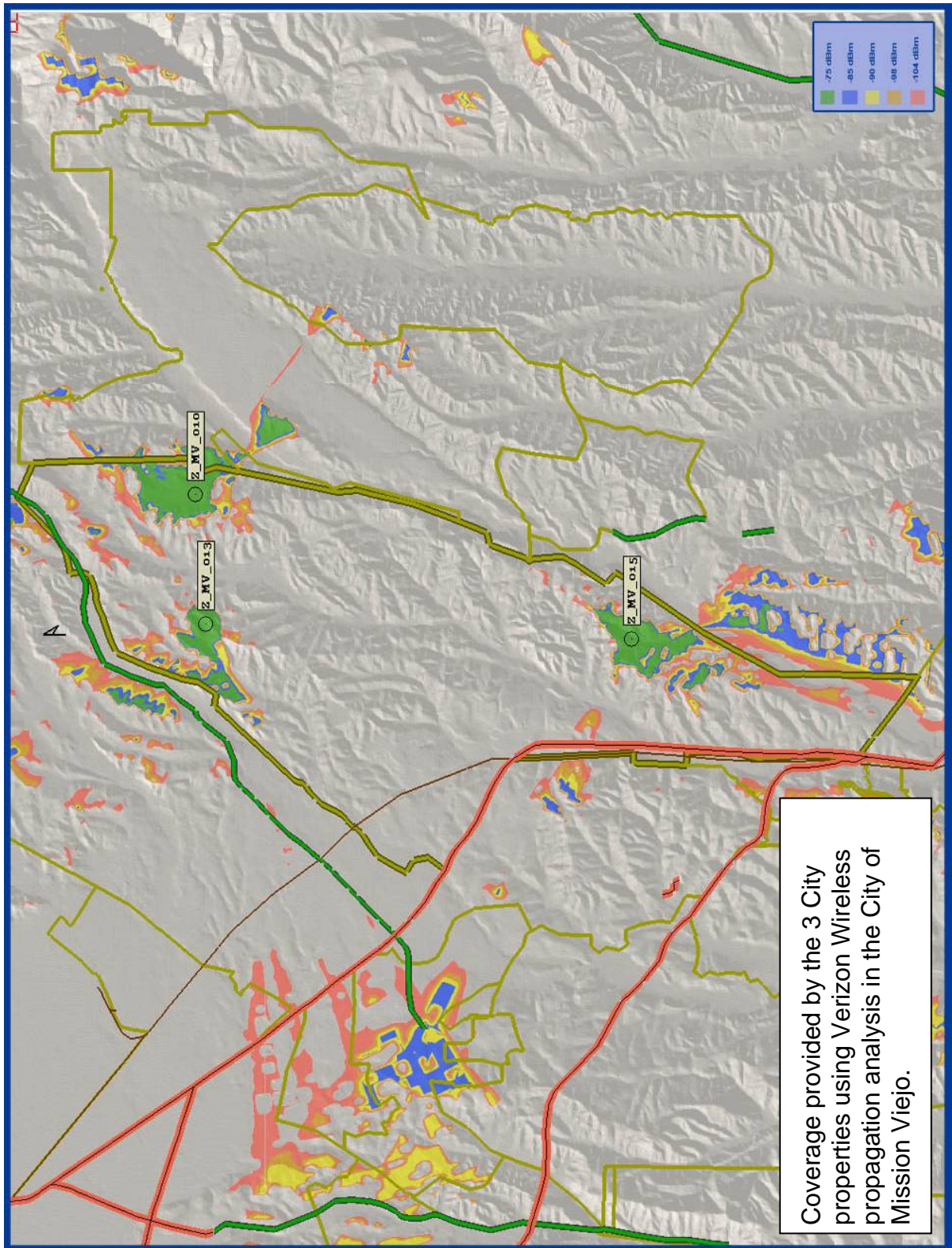


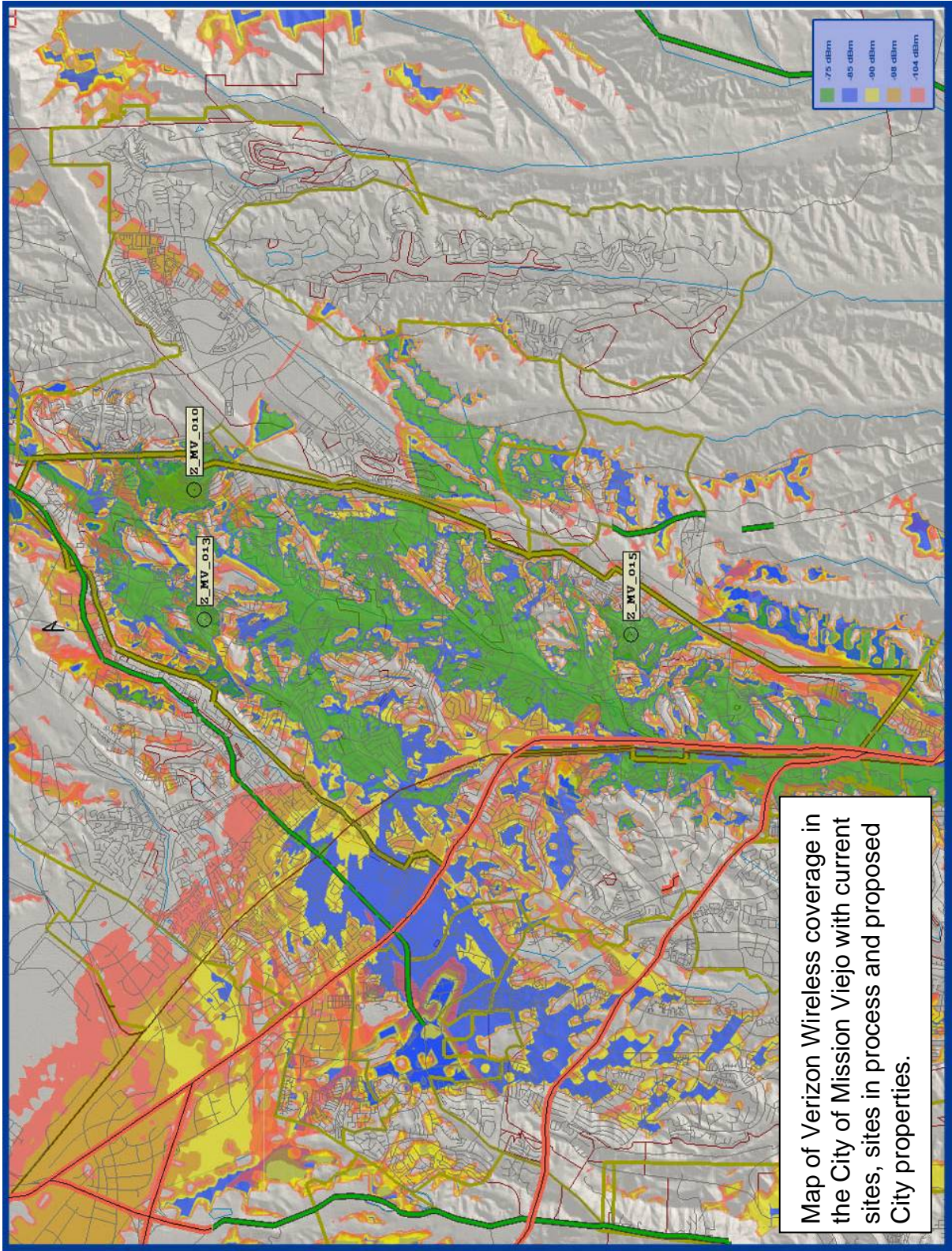
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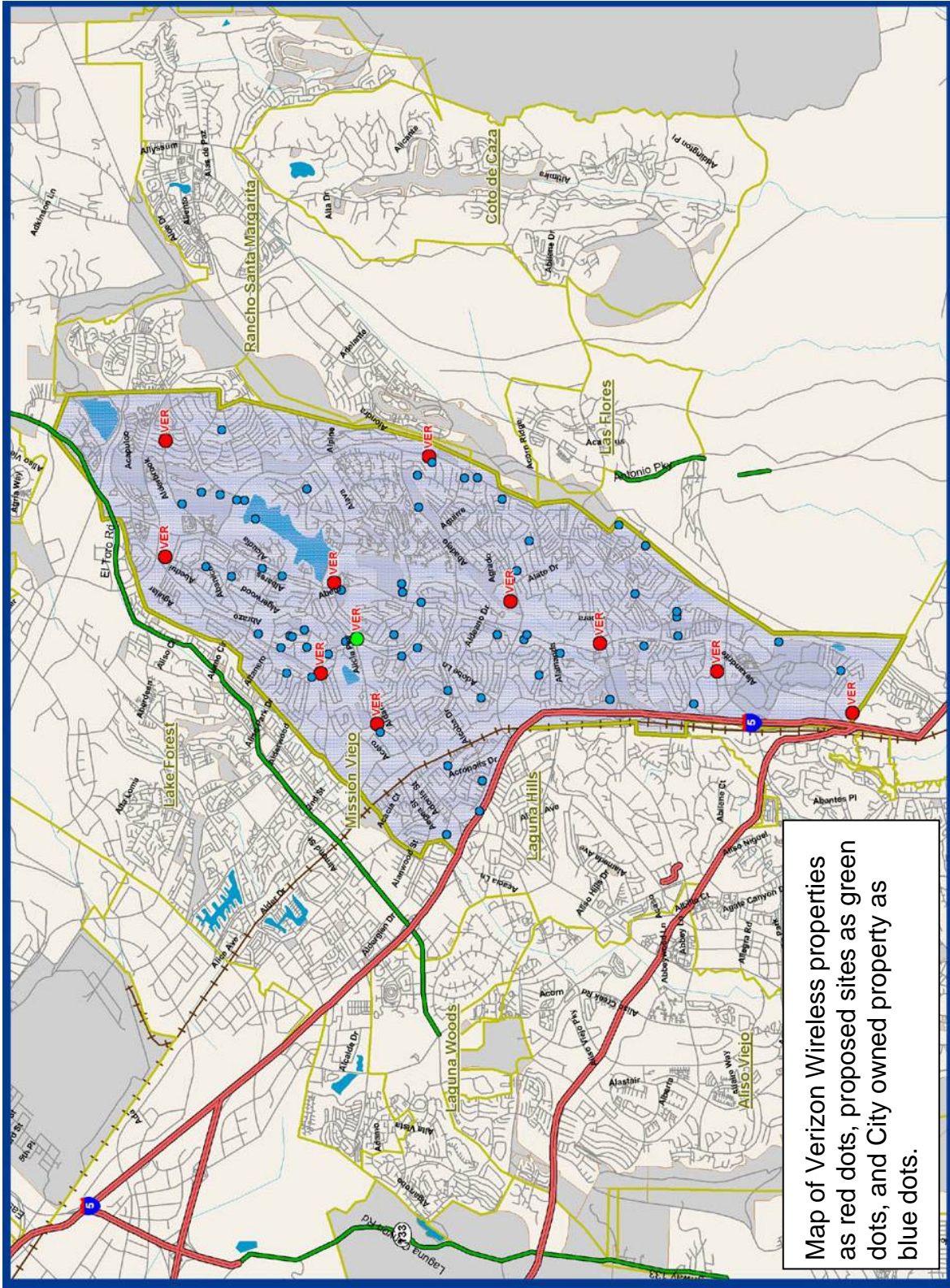














### **Radio Frequency Engineering Methodologies**

The following assumptions and data were used in modeling and calculating existing carrier coverage.

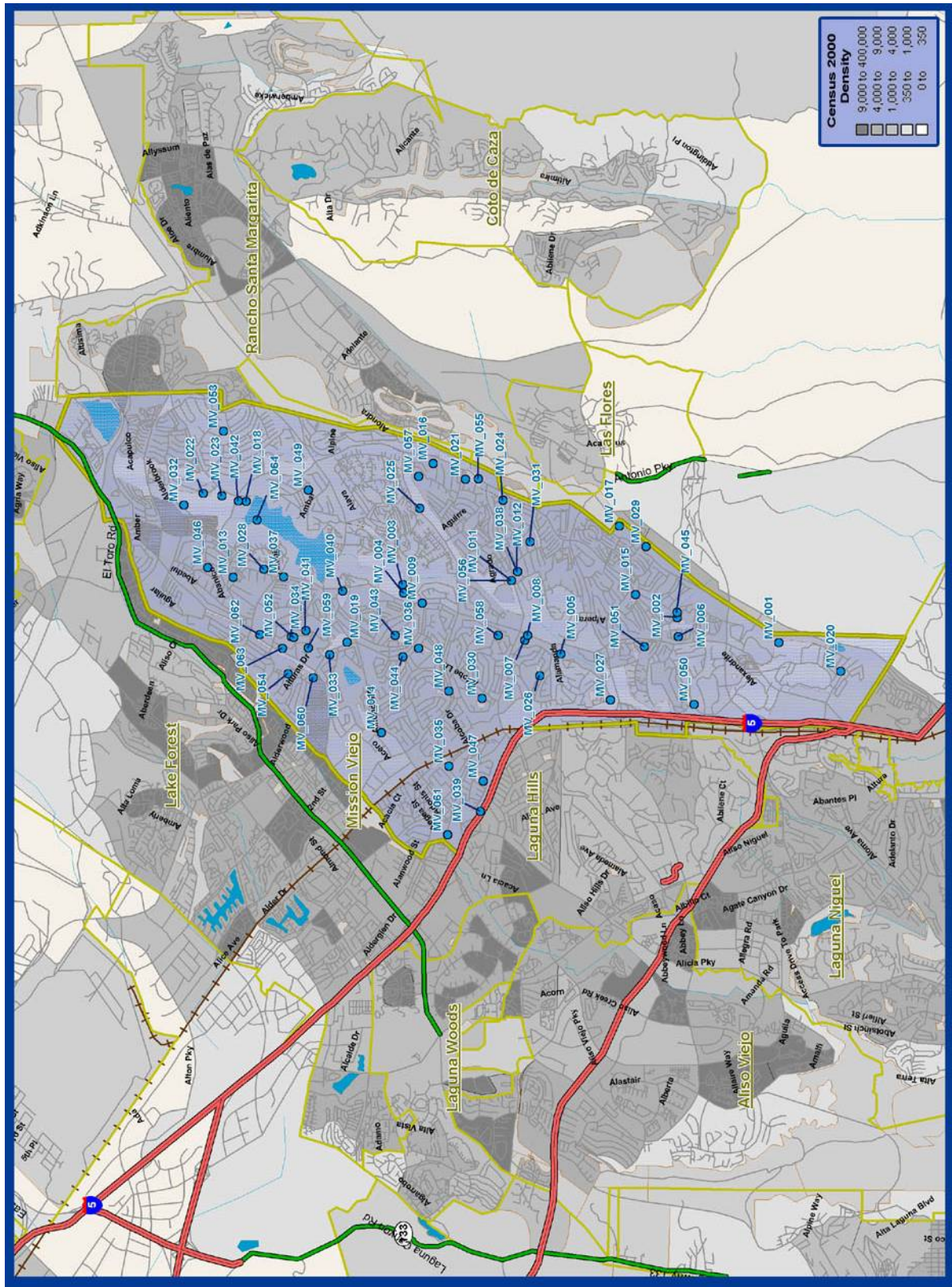
1. Structure heights where either known or estimated at 50 ft
2. Field verified Latitudes and Longitudes.
3. Carrier antenna orientations are not taken into account for the initial study.
4. A theoretical Isotropic (perfect round globe) 10 dBd omni antenna is used for all propagations.
5. 30 meter (1 arc sec) terrain elevation data was used for propagation predictions.
6. 1 meter and 2 meter Satellite Aerial Imagery is used, 30 meter (1 arc sec) terrain was used to overlay Aerial imagery onto.
7. No Clutter data was included as part of the propagation calculations.
8. The Longley Rice model is used with Percentage of time and Percentage of location both set to 90 %, Margin was set to 15 as a conservative correction factor.
9. Electrical or mechanical down tilt, sectorization, directional or high gain antennas are not used for this output.
10. Signal strength thresholds for the color propagation levels were set to -75dBm Green, -85dBm Blue, -90 Yellow, Brown -98dBm and -104dBm Red.
11. Receiver threshold limit is set at -104dBm.
12. Full transmit power (ERP) was set to 20 watts out at the hatch plate at all sites, then typical cable loss was inserted based on structure height to closer model the real life signal losses occurred for each site. 7/8 inch cable was used for the loss calculations with a total of 12ft of 1/2 inch for jumpers.
13. Duplexers, surge suppressors and any other connector line was inserted at .8 dB total loss. Total ERPs for all sites ranged between 96 and 141 watts, with heights ranging from 8 feet to 100 feet.
14. Frequencies used for Cellular and SMR were set to 875MHz and PCS at 1960MHz.

Propagations were produced for each of the carriers, each on-air site and each potential fill in site as part of an initial comprehensive cursory analysis. The aim of this study is to not only determine the highest probability of reliable coverage for each network, but to determine in conjunction with this study how those carriers may be focusing on in both the short and long term as part of a growth strategy.

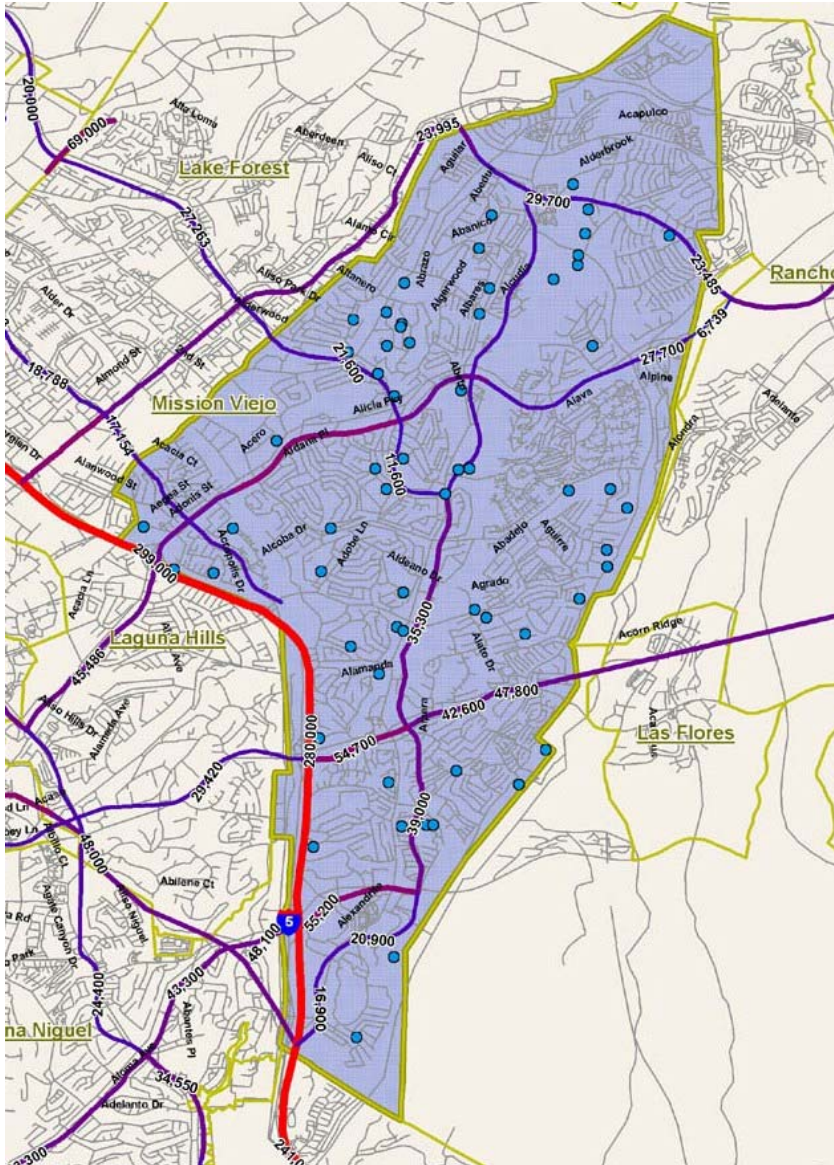
Since actual RF engineered settings from each carrier were not entered and reproduced, the methods used here are generalized for common predictions used for overall systems with relaxed modeling.

Sectorization, directional antennas, downtilts and power were not directly estimated in the modeling per actual carrier settings, this output represents a "perfect" antenna of equal signal gain of 10 dB as written above for this estimation. Growth strategies because of this method of propagation should however, still reflect the probability of areas where carriers need to add additional sites to improve their overall footprint coverage and/or address capacity issues.

In evaluating the capacity needs of each carrier, traffic flow, traffic counts, population and business centers were taken into consideration in determining current network development. The following is an example of the evaluation of population throughout the city performed for each carrier.



While the City of Mission Viejo is essentially built out, traffic flow and traffic counts may be affected over time by development just outside the City. The following is an example of traffic flow counts for one carrier that was taken into consideration.



Except for Metro PCS, each carrier's overall market penetration was considered in evaluating traffic and population. Beyond the ability of this study is how well any one carrier is marketing into the specific Mission Viejo community.

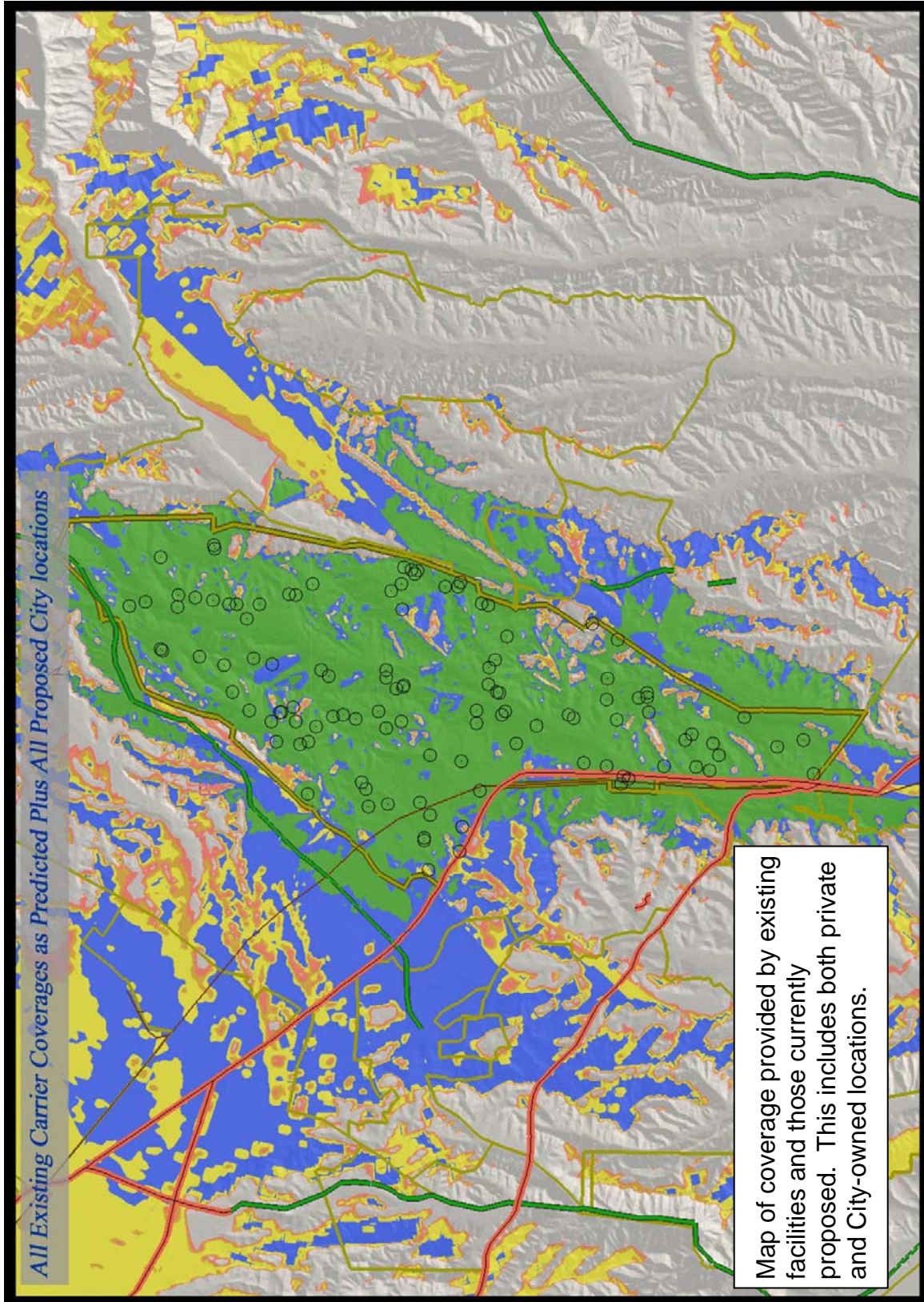
## Future Private Property Locations

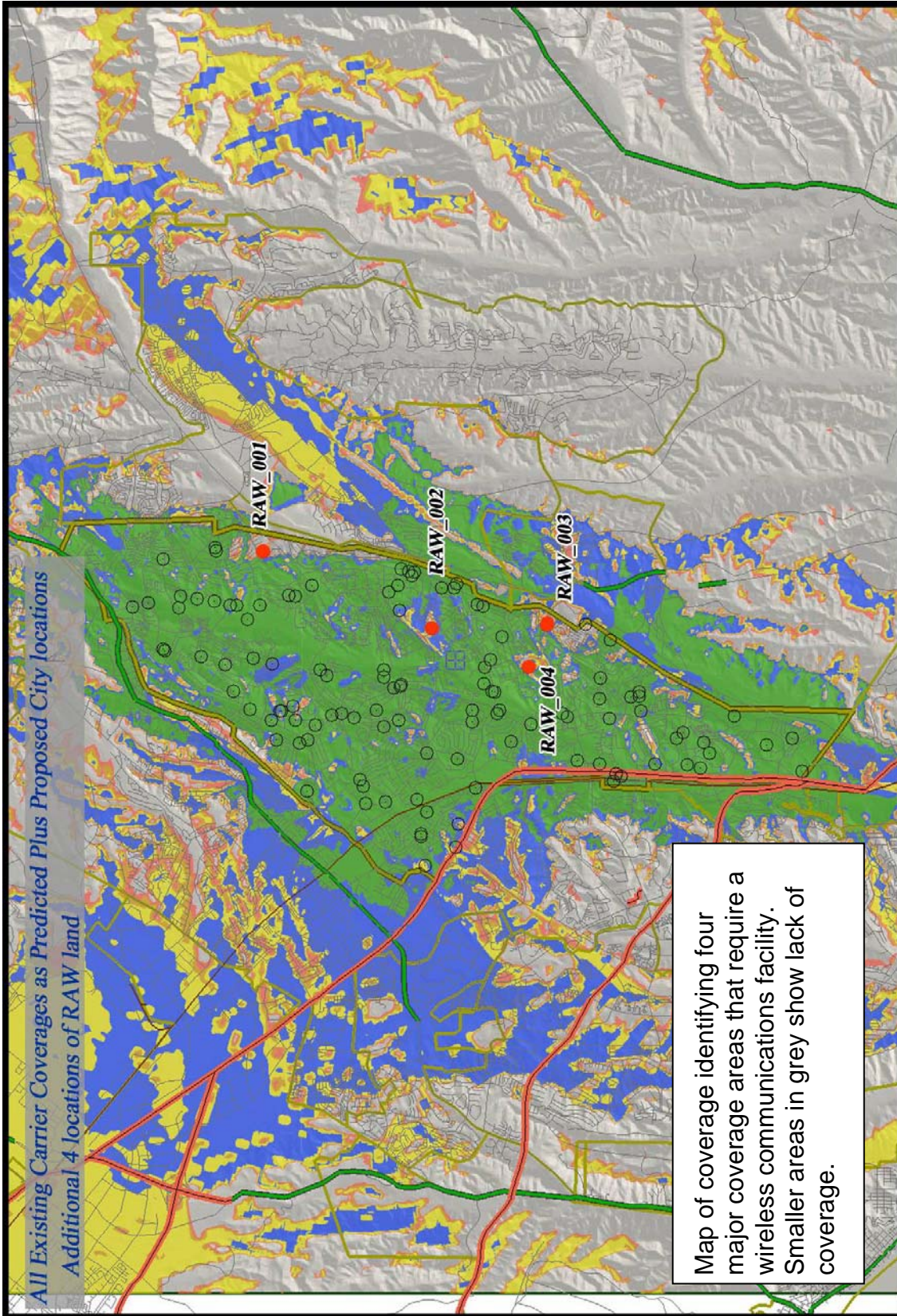
As part of the coverage analysis performed for the City of Mission Viejo, each wireless company has needs beyond those that can reasonably be satisfied by City-owned property. The following sites have been identified as future locations that wireless carriers may need to enhance their coverage and capacity in the City of Mission Viejo.

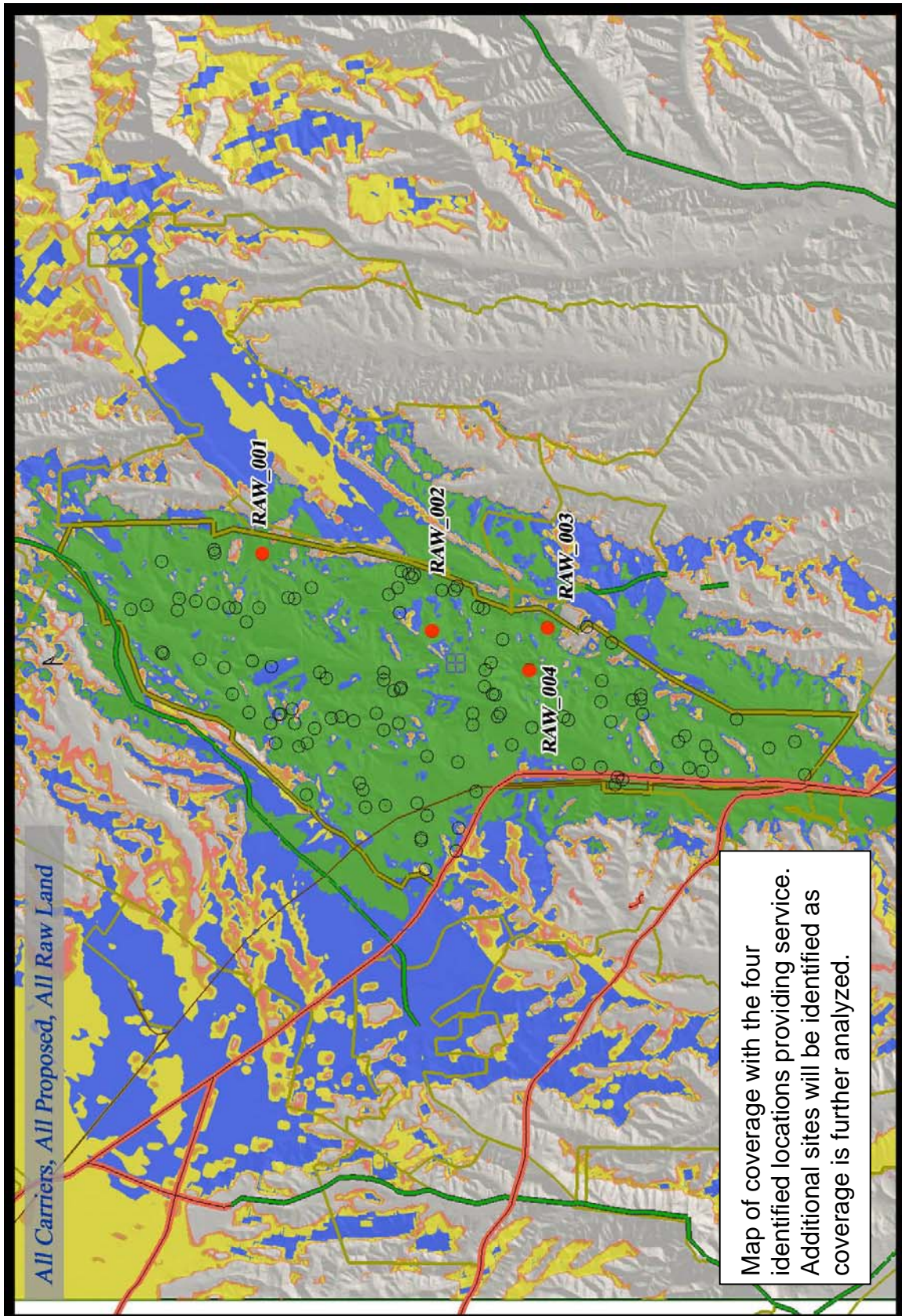
<b>Private Property Location</b>	<b>Wireless Communications Facility</b>
Marguerite & Delemos	Existing carriers at location
Marguerite & Olympiad	No carrier at location
Marguerite & Vista Del Lago	No carrier at location
Marguerite & Trabuco	No carrier at location
Marguerite & Oso Parkway	Existing carriers at location
Los Alisos & Mustang Run	No carrier at location
Los Alisos & Trabuco	Existing carriers at location
San Esteban & Lupe De Vega	No carrier at location
Los Alisos & Vista Del Lago	Existing carriers at location
Marguerite & Avery	Existing carriers at location

Primarily the intersection has been identified as each wireless carrier would allow their site acquisition representatives to evaluate several candidates within a quarter mile circle of the center of their coverage need. The actual service provided may depend on the willingness of some private property owners to allow a wireless communications facility on their property.

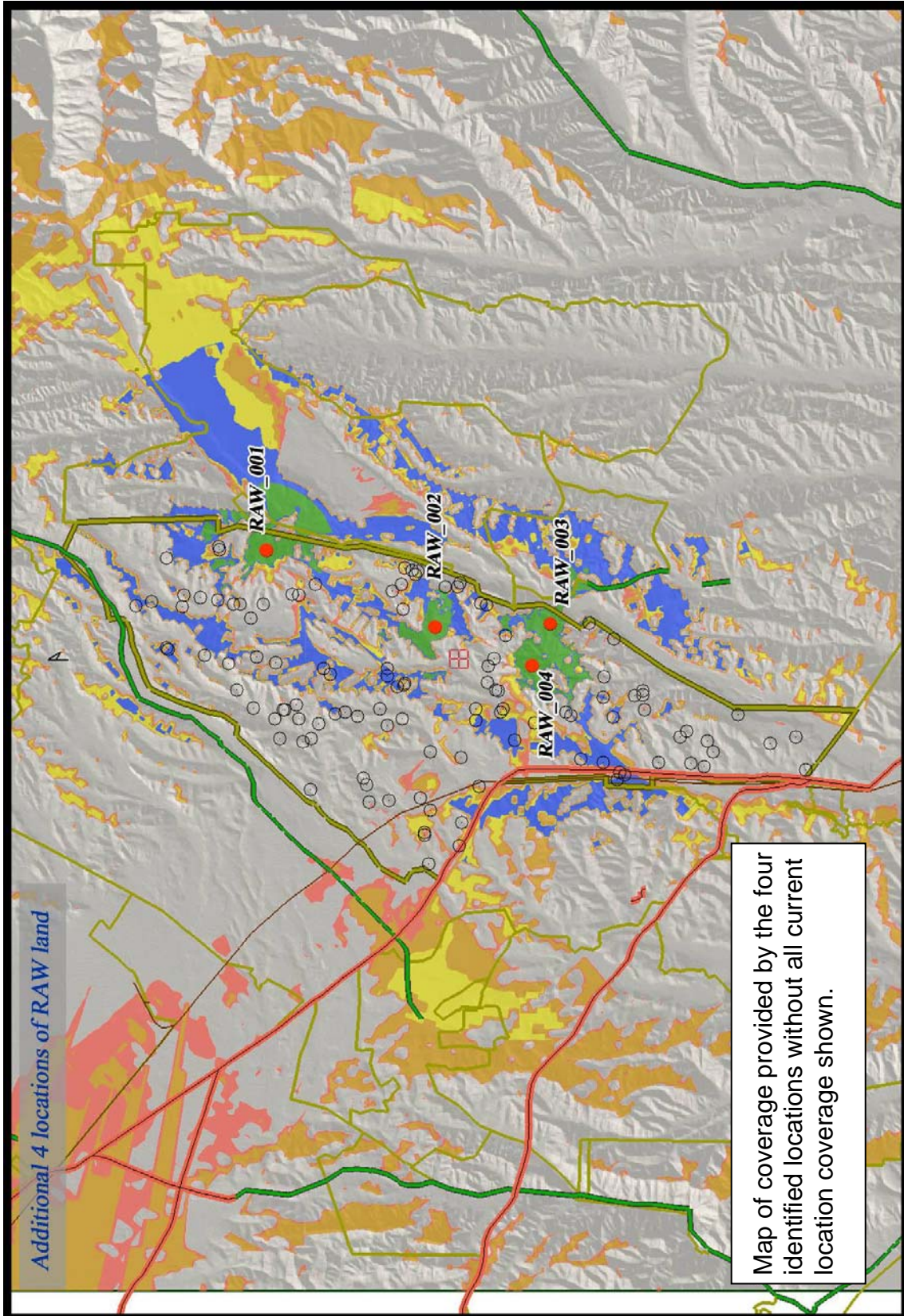
The following coverage maps show some of the identified private property locations. Other properties listed above include those that may substitute City-owned properties. Last, there still exist small pockets of coverage gaps throughout the City. These locations will remain low priority builds until such time as either a new site built by another carrier adequately provides coverage or customer needs drive the development of the site.

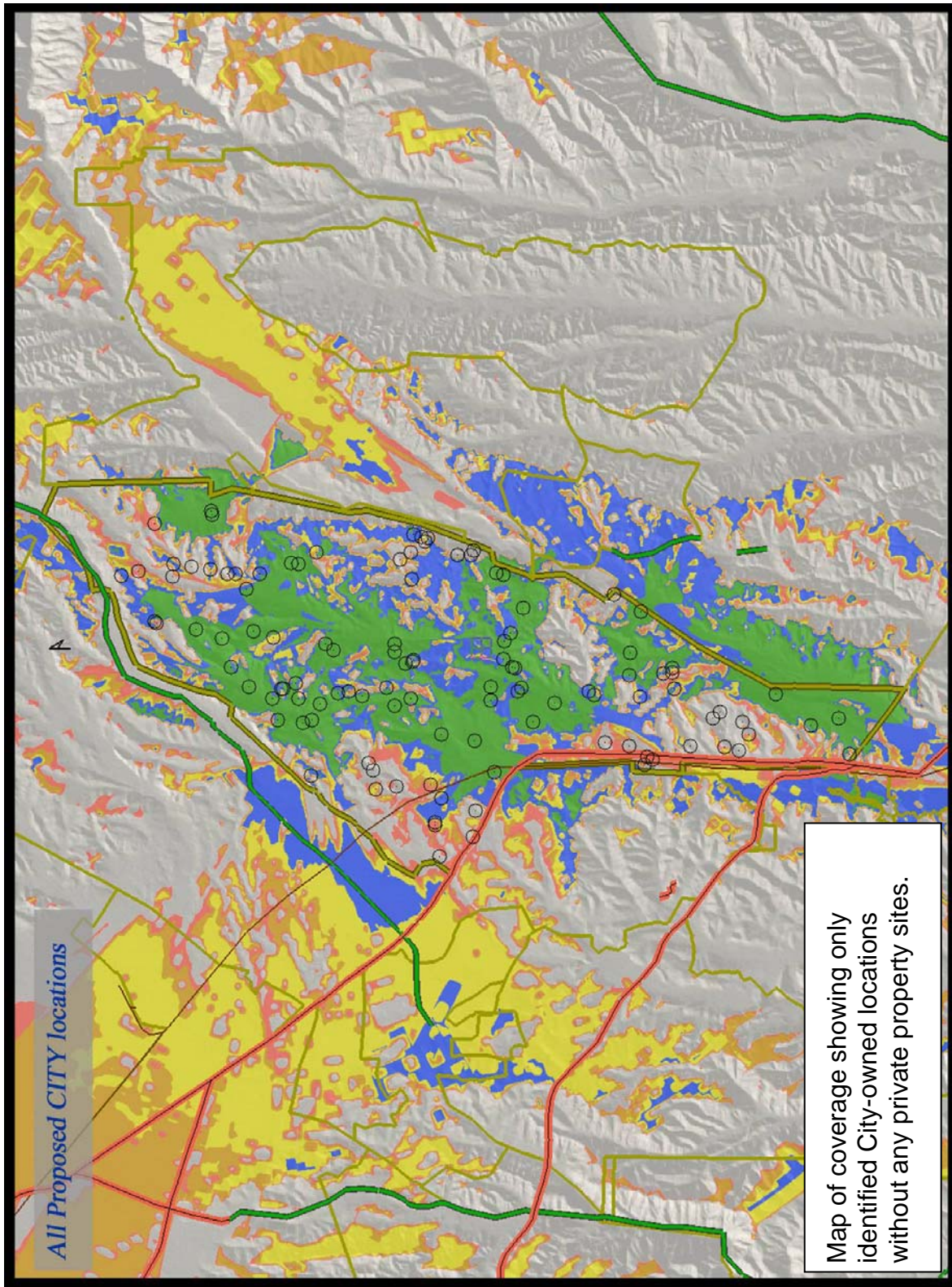












### Detailed Inventory of Wireless Communications Facilities

Page	City Ref #	Site Name	Year	Current Carrier	Original Carrier
148	pdp2001-56	Congregation Eilat	2001	Sprint	Sprint
149	pdp2002-94	Congregation Eilat	2002	T-Mobile	Cingular
150	pdp2001-69	SCE @ Flo Jo Park	2001	T-Mobile	Cingular
151	sp96-261	Buck Building	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp1999-06	Buck Building	1999	Cingular	AT&T
	pdp2001-67	Buck Building	2001	Verizon Wireless	Verizon
152	sp92-114a	Lakeside Plaza	1992	Cingular	LA Cellular/AT&T
	sp93-116a	Lakeside Plaza	1993	Verizon Wireless	Pactel Cellular/Verizon
	sp95-216	Lakeside Plaza	1995	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp2001-59	Lakeside Plaza	2001	Cingular	Cingular
153	sp95-206p	MNWD Via Bahia	1995	Nextel	Nextel
	sp96-222	MNWD Via Bahia	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp2000-44	MNWD Via Bahia	2000	Cingular	AT&T
154	pdp2000-31	La Alameda Building	2000	Nextel	Nextel
155	sp93-133p	Capistrano Valley HS	1993	Verizon Wireless	PacTel Cellular/Verizon
	sp94-152p	Capistrano Valley HS	1994	Nextel	Nextel
156	pdp2000-34	Chabad Jewish Center	2000	T-Mobile	Pacific Bell/Cingular/T-Mobile
157	pdp2001-65	Pavion Park	2001	T-Mobile	Cingular

Page	City Ref #	Site Name	Year	Current Carrier	Original Carrier
158	pdp2001-73	Vista Paint	2001	Sprint	Sprint
159	pdp2001-61	Beebe Park	2001	Sprint	Sprint
	pdp2001-72	Beebe Park	2001	Verizon Wireless	Verizon
	pdp2001-75	Beebe Park	2001	Nextel	Nextel
160	sp96-253p	Felipe Water Tank	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp1999-05	Felipe Water Tank	1999	Cingular	LA Cellular/AT&T
161	sp96-255	Pala Building	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp2000-22	Pala Building	2000	Nextel	Nextel
162	pdp2000-48	Acero Bldg North	2000	Cingular	AT&T
163	sp96-248	Acero Bldg East	1996	Cingular	Pacific Bell/Cingular/T-Mobile
	pdp2000-26	Acero Bldg East	2000	Sprint	Sprint
164	sp96-223p	Shepherd of the Hills	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
165	sp96-226p	True Value Hardware	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
166	pdp1999-04	MV Presbyterian Church	1999	Verizon Wireless	AirTouch/Verizon
167	pdp2004-125	El Toro Water District	2004	T-Mobile	Cingular
168	pdp2001-76	Fairfield Inn	2001	Nextel	Nextel
169	pdp2000-19	SCE @ Crown Valley	2000	T-Mobile	Pacific Bell/Cingular/T-Mobile
	pdp2002-87	SCE @ Crown Valley	2002	Cingular	AT&T

Page	City Ref #	Site Name	Year	Current Carrier	Original Carrier
170	sp96-259	MV Church of Christ	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
171	pdp2000-36	MV Church of Christ	2000	Sprint	Sprint
	pdp2002-89	MV Church of Christ	2002	Cingular	AT&T
172	pdp2001-51	Plaza Drive	2001	Verizon Wireless	Verizon
173	sp96-224p	MNWD Camino Capistrano	1996	Cingular	LA CellularAT&T
	pdp2000-37	MNWD Camino Capistrano	2000	T-Mobile	Pacific Bell/Cingular/T-Mobile
174	sp96-266	MNWD Preciados	1996	T-Mobile	Pacific Bell/Cingular/T-Mobile
175	pdp2001-60	Trabuco MacDonalds	2001	T-Mobile	Cingular
176	pdp2002-91	MV Christian Church	2002	T-Mobile	Cingular
177	pdp2001-62	YMCA Clock Tower	2001	Sprint	Sprint
	pdp2004-133	YMCA Clock Tower	2004	Cingular	AT&T
178	pdp2000-23	MV Regional Medical Center	2000	Sprint	Sprint
179	pdp2000-47	Trabuco Hills Professional Center	2000	Verizon Wireless	Verizon
	pdp2004-124	Trabuco Hills Professional Center	2004	Cingular	AT&T
180	pdp2002-83	Kaleidoscope	2002	T-Mobile	Cingular
181	sp92-099p	Saddleback Community College	1992	Cingular	LA Cellular/AT&T
182	pdp2000-49	Ayres Suites	2000	T-Mobile	Cingular
	pdp2004-131	Ayres Suites	2004	Verizon Wireless	Verizon
	pdp2005-138	Ayres Suites	2005	Cingular	AT&T

Page	City Ref #	Site Name	Year	Current Carrier	Original Carrier
183	pdp2003-105	Melinda Park	2003	T-Mobile	Cingular
184	pdp2000-30	Robinsons May Dept Store	2000	T-Mobile	Pacific Bell/Cingular/T-Mobile
185	pdp2002-88	SCE @ Beebe Park	2002	Cingular	AT&T
186	pdp2000-32	Mission Hills	2000	Nextel	Nextel
187	pdp1999-14	MNWD Delemos	1999	Nextel	Nextel
	pdp1999-17	MNWD Delemos	1999	T-Mobile	Pacific Bell/Cingular/T-Mobile
188	pdp2000-35	SCE @ California Court	2000	Cingular	Pacific Bell/Cingular/T-Mobile
189	pdp2000-38	Oso Viejo Park	2000	Verizon Wireless	Verizon
	pdp2000-40	Oso Viejo Park	2000	Cingular	AT&T
	pdp2001-50	Oso Viejo Park	2001	Nextel	Nextel
190	pdp2001-77	SCE @ Oso	2001	Sprint	Sprint
191	pdp2004-128	SCE @ Melinda	2004	Sprint	Sprint
192	pdp2001-64	SCE @ La Barca	2001	Cingular	AT&T
	pdp2003-109	SCE @ La Barca	2003	Nextel	Nextel

## Congregation Eilat

### Site View



**Last Update:** March 2006  
**Site Name:** Congregation Eilat  
**City Reference:** PDP 2001-56  
**Coordinates:** Lat: 33.642483  
Long. -117.655366  
**Coord. System:** ■ NAD84  
**Site Address:** 22081 Hidalgo  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2001  
**Property Type:** Church/School  
**Elevation:** 796' (AMSL)  
**Roof Ht.:** 27' (AGL)  
**Tower Type:** Rooftop/Pole  
**Existing Carrier:** Sprint  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 33'  
**Line of Sight:** Yes – 280 degrees



## Congregation Eilat

### Site View



**Last Update:** December 2006

**Site Name:** Congregation Eilat

**City Reference:** PDP 2002-94

**Coordinates:** Lat: 33.642483  
Long: - 117.655366

**Coord. System:** ■ NAD84

**Site Address:** 22081 Hidalgo  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2002

**Property Type:** Church/School

**Elevation:** 796' (AMSL)

**Structure Ht:** 60' (AGL)

**Tower Type:** Mono-pine

**Existing Carrier:** T-Mobile & Cingular

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 50' & 40'

**Line of Sight:** Yes – 280 degrees





## Florence Joyner Park

### Site View



**Last Update:** March 2006  
**Site Name:** Florence Joyner Park  
**City Reference:** PDP 2001-69  
**Coordinates:** Lat: 33.63295  
Long: - 117.635383  
**Coord. System:** ■ NAD84  
**Site Address:** 22760 Olympiad  
Mission Viejo, CA 92692  
**Site County:** Orange  
**Built:** 2001  
**Property Type:** SCE Right of Way  
**Elevation:** 802" (AMSL)  
**Tower Ht:** 160' (AGL)  
**Tower Type:** S.C.E. Tower  
**Carrier:** T-Mobile  
**Sectors:** 2  
**Antennas:** 3  
**RAD Height:** 50'  
**Line of Sight:** Yes – 360 degrees



## Buck Building

### Site View



**Last Update:** June 2006

**Site Name:** Buck Building

**City Reference:** SP 96-261

**Coordinates:** Lat: 33.629613  
Long: - 117.665468

**Coord. System:** ■ NAD84

**Site Address:** 22951 Los Alisos Blvd.  
Mission Viejo, CA

**Site County:** Orange

**First Built:** PacBell in 1996

**Property Type:** Commercial building

**Elevation:** 597' (AMSL)

**Roof Ht.:** 28'(AGL)

**Tower Type:** Roof Mount

**Carrier:** Cingular, T-Mobile, Verizon  
Wireless

**Sectors:** 3

**Antennas:** 1

**RAD Height:** 29'

**Line of Sight:** Yes – 280`



## Lakeside Plaza

### Site View



**Last Update:** July 2006

**Site Name:** Lakeside Plaza

**City Reference:** SP 92-114a

**Coordinates:** Lat: 33.627455  
Long: -117.65078

**Coord. System:** ■ NAD83

**Site Address:** 23120 Alicia Pkwy.  
Mission Viejo, CA

**Site County:** Orange

**First Built:** LA Cellular in 1992

**Property Type:** Commercial

**Elevation:** 647' (AMSL)

**Roof Ht.:** 38' (AGL)

**Structure Type:** roof mount

**Carrier:** Cingular, T-Mobile, Verizon  
Wireless

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 35"

**Line of Sight:** Yes – 360 degrees

## Via Bahia MNWD

### Site View



T-Mobile



Cingular



**Last Update:** May 2006

**Site Name:** Via Bahia MNWD

**City Reference:** SP 95-206p

**Coordinates:** Lat: 33.623766  
Long: - 117.659866

**Coord. System:** ■ NAD84

**Site Address:** 23391 Via Bahia  
Mission Viejo

**Site County:** Orange

**First Built:** Nextel in 1995

**Property Type:** Water tank facility

**Elevation:** 714' (AMSL)

**Structure Ht.:** Water tank @ 30' (AGL)  
Monopole @ 55'

**Tower Type:** Water tank and Monopole

**Carrier:** Cingular, Nextel, T-Mobile

**Sectors:** 3

**Antennas:** 3

**RAD Height:** Tank mount @ 25'  
Monopole @ 52'

**Line of Sight:** Yes -360 degrees

## La Alameda Building

### Site View



**Last Update:** June 2006  
**Site Name:** La Alameda Building  
**City Reference:** PDP 2000-31  
**Coordinates:** Lat: 33.563633  
Long: - 117.670533  
**Coord. System:** ■ NAD84  
**Site Address:** 26300 La Alameda  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2000  
**Property Type:** Commercial  
**Elevation:** 397' (AMSL)  
**Roof Ht.:** approx. 60' (AGL)  
**Tower Type:** Roof Mount  
**Carrier:** Nextel  
**Sectors:** 1  
**Antennas:** 4  
**RAD height:** 50'  
**Line of Sight:** Yes – 360



## Capistrano Valley High School

### Site View



**Last Update:** June 2006  
**Site Name:** Capo Valley High School  
**City Reference:** SP 93-133p  
**Coordinates:** Lat: 33.54365  
Long: - 117.6719  
**Coord. System:** ■ NAD84  
**Site Address:** 23601 Via Escolar  
Mission Viejo, CA  
**Site County:** Orange  
**First Built:** PacTel Cellular in 1993  
**Property Type:** School  
**Elevation:** 381' (AMSL)  
**Structure Ht.:** 100' (AGL)  
**Tower Type:** Monopole  
**Carrier:** Nextel, Verizon Wireless  
**Sectors:** 3  
**Antennas:** 4  
**RAD Height:** Nextel @ 70' & Verizon @100'  
**Line of Sight:** Yes – 360



## Chabad Jewish Center

### Site View



**Last Update:** June 2006

**Site Name:** Chabad Jewish Center

**City Reference:** PDP 2000-34

**Coordinates:** Lat: 33.614674  
Long: -117.654675

**Coord. System:** ■ NAD83

**Site Address:** 24041 Marguerite  
Mission Viejo, CA

**Site County:** Orange

**First Built:** PacBell in 2000

**Property Type:** Community College

**Elevation:** 597' (AMSL)

**Roof Ht.:** 35' (AGL)

**Tower Type:** Rooftop

**Carrier:** T-Mobile

**Sectors:** 3

**Antennas:** 1

**RAD Height:** 30'

**Line of Sight:** Yes – 360`

## Pavion Park

### Site View



**Last Update:** June 2006

**Site Name:** Pavion Park

**City Reference:** PDP 2001-65

**Coordinates:** Lat: 33.615561  
Long: -117.63464

**Coord. System:** ■ NAD83

**Site Address:** 24051 Pavion  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2001

**Property Type:** City Park

**Elevation:** 759' (AMSL)

**Structure Ht.:** 70' (AGL)

**Tower Type:** Mono-pine

**Carrier:** T-Mobile

**Sectors:** 3

**Antennas:** 2

**RAD Height:** 65'

**Line of Sight:** Yes – 360 degrees



## Vista Paint

### Site View



**Last Update:** June 2006  
**Site Name:** Vista Paint  
**City Reference:** PDP 2001-73  
**Coordinates:** Lat: 33.60992  
Long: - 117.685448  
**Coord. System:** ■ NAD84  
**Site Address:** 24164 Alicia Pkwy  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2001  
**Property Type:** Vista Paint  
**Elevation:** 399' (AMSL)  
**Structure Ht.:** 45' (AGL)  
**Tower Type:** Mono-pine  
**Carrier:** Sprint  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 40'  
**Line of Sight:** Yes – 360`



## Beebe Park

### Site View



**Last Update:** May 2006

**Site Name:** Beebe Park

**City Reference:** PDP 2001-61

**Coordinates:** Lat: 33.612133  
Long: - 117.63035

**Coord. System:** ■ NAD84

**Site Address:** 24190 Olympiad  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2001 by Sprint PCS

**Property Type:** City Park

**Elevation:** 836' (AMSL)

**Structure Ht.:** 70' (AGL)

**Tower Type:** Light Pole

**Carrier:** Nextel, Sprint, Verizon  
Wireless

**Sectors:** 3

**Antennas:** 3

**RAD Height:** approx. 60'

**Line of Sight:** Yes -360 degrees

## Felipe Water Tank

### Site View



Cingular



**Last Update:** July 2006

**Site Name:** MNWD Felipe Water Tank

**City Reference:** SP 96-253p

**Coordinates:** Lat: 33.60375  
Long: - 117.633033

**Coord. System:** ■ NAD84

**Site Address:** 24988 Felipe Rd.  
Mission Viejo, CA

**Site County:** Orange

**First Built:** 1996 by PacBell

**Property Type:** Water tank facility

**Elevation:** 703' (AMSL)

**Structure Ht.:** 35' (AGL)

**Tower Type:** Water Tank

**Carrier:** Cingular, T-Mobile

**Sectors:** 2

**Antennas:** 2

**RAD Height:** T-Mobile @ 38'  
Cingular @ 32'

**Line of Sight:** Yes – 360 degrees

## Pala Building

### Site View



**Last Update:** August 2006  
**Site Name:** Pala Building  
**City Reference:** SP 96-255  
**Coordinates:** Lat: 33.619483  
Long: -117.678583  
**Coord. System:** ■ NAD83  
**Site Address:** 25909 Pala  
Mission Viejo, CA  
**Site County:** Orange  
**First Built:** 1996 by Pacific Bell  
**Property Type:** Commercial building  
**Elevation:** 529' (AMSL)  
**Roof Ht.:** 45' (AGL)  
**Tower Type:** Roof mount  
**Carrier:** Nextel, T-Mobile  
**Sectors:** Nextel 2, T-Mobile 2, 1  
**Antennas:** Nextel 4, T-Mobile 2, 4  
**RAD Height:** 40'  
**Line of Sight:** Yes – 360'



## Acero Building North



**Last Update:** August 2006  
**Site Name:** Acero Building North  
**City Reference:** PDP 2000-48  
**Coordinates:** Lat: 33.616157  
Long: -117.678212  
**Coord. System:** ■ NAD83  
**Site Address:** 25910 Acero  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2000  
**Property Type:** Commercial building  
**Elevation:** 504' (AMSL)  
**Roof Ht.:** 65' (AGL)  
**Tower Type:** Roof mount  
**Carrier:** Cingular  
**Sectors:** 3  
**Antennas:** 4  
**RAD Height:** 60'  
**Line of Sight:** Yes – 360'



## Acero Building East

### Site View



**Last Update:** August 2006  
**Site Name:** Acero Building East  
**City Reference:** SP 96-248  
**Coordinates:** Lat: 33.61065  
Long: -117.677716  
**Coord. System:** ■ NAD83  
**Site Address:** 25950 Acero  
Mission Viejo, CA  
**Site County:** Orange  
**First Built:** 1996 by Pacific Bell  
**Property Type:** Commercial building  
**Elevation:** 504' (AMSL)  
**Roof Ht.:** 65' (AGL)  
**Tower Type:** Roof mount  
**Carrier:** Cingular, Sprint  
**Sectors:** 2/1  
**Antennas:** 2/1  
**RAD Height:** 60'  
**Line of Sight:** Yes – 360'

## Shepherd of the Hills

### Site View



**Last Update:** July 2006

**Site Name:** Shepherd of the Hills

**City Reference:** SP 96-223p

**Coordinates:** Lat: 33.600483  
Long: - 117.675316

**Coord. System:** ■ NAD84

**Site Address:** 26001 Muirlands  
Mission Viejo, CA

**Site County:** Orange

**Built:** 1996

**Property Type:** Church

**Elevation:** 397" (AMSL)

**Structure Ht.:** 40' (AGL)

**Tower Type:** Monopole

**Carrier:** T-Mobile

**Sectors:** 3

**Antennas:** 1

**RAD Height:** 40'

**Line of Sight:** Yes – 360 degrees



## True Value Hardware

### Site View



**Last Update:** June 2006  
**Site Name:** True Value Hardware  
**City Reference:** SP 96-226p  
**Coordinates:** Lat: 33.585302  
Long: - 117.659908  
**Coord. System:** ■ NAD84  
**Site Address:** 26006 Marguerite  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 1996  
**Property Type:** Commercial Property  
**Elevation:** 398' (AMSL)  
**Roof Ht.:** 37' (AGL)  
**Tower Type:** Roof Mount  
**Carrier:** T-Mobile  
**Sectors:** 2  
**Antennas:** 1  
**RAD Height:** 40'  
**Line of Sight:** Yes – 360`





## Mission Viejo Presbyterian Church

### Site View



**Last Update:** July 2006

**Site Name:** Presbyterian Church

**City Reference:** PDP 1999-04

**Coordinates:** Lat: 33.5845  
Long: - 117.660583

**Coord. System:** ■ NAD84

**Site Address:** 26051 Marguerite Pkwy  
Mission Viejo, CA

**Site County:** Orange

**Built:** 1999

**Property Type:** Church

**Elevation:** 397' (AMSL)

**Structure Ht.:** 50' (AGL)

**Tower Type:** Mono-pine

**Carrier:** Verizon Wireless

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 45'

**Line of Sight:** Yes – 360



## El Toro Water District

### Site View



**Last Update:** September 2006

**Site Name:** El Toro Water District

**City Reference:** PDP 2004-125

**Coordinates:** Lat: 33.629722  
Long: - 117.676077

**Coord. System:** ■ NAD84

**Site Address:** 26081 Via Pera  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2004

**Property Type:** Water Tank

**Elevation:** 563' (AMSL)

**Structure Ht.:** 8' (AGL)

**Tower Type:** Water tank

**Carrier:** T-Mobile

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 8'

**Line of Sight:** Yes – 270



## Fairfield Inn

### Site View



**Last Update:** June 2006  
**Site Name:** Fairfield Inn  
**City Reference:** PDP 2001-76  
**Coordinates:** Lat: 33.578966  
Long: - 117.67044  
**Coord. System:** ■ NAD84  
**Site Address:** 26328 Oso Pkwy  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2001  
**Property Type:** Fairfield Inn  
**Elevation:** 394' (AMSL)  
**Roof Ht.:** approx. 48' (AGL)  
**Tower Type:** Roof Mount  
**Carrier:** Nextel  
**Sectors:** 1  
**Antennas:** 4  
**RAD Height:** 50'  
**Line of Sight:** Yes – 360`



## SCE @ Crown Valley

### Site View



**Last Update:** July 2006

**Site Name:** SCE @ Crown Valley

**City Reference:** PDP 2000-19

**Coordinates:** Lat: 33.564333  
Long: - 117.663833

**Coord. System:** ■ NAD84

**Site Address:** 26523 ½ Crown Valley Pkwy  
Mission Viejo, CA

**Site County:** Orange

**First Built:** PacBell in 2000

**Property Type:** S.C.E. Tower

**Elevation:** 485' (AMSL)

**Structure Ht.:** 160' (AGL)

**Tower Type:** S.C.E. Tower

**Carrier:** Cingular, T-Mobile

**Sectors:** 3

**Antennas:** 2

**RAD Height:** T-Mobile @ 50'  
Cingular @ 32'

**Line of Sight:** Yes – 360



## Mission Viejo Church of Christ

### Site View



**Last Update:** June 2006

**Site Name:** MV Church Of Christ

**City Reference:** SP 96-259

**Coordinates:** Lat: 33.5735  
Long: - 117.656533

**Coord. System:** ■ NAD84

**Site Address:** 26558 Marguerite Pkwy  
Mission Viejo, CA

**Site County:** Orange

**First Built:** PacBell in 1996

**Property Type:** Church

**Elevation:** 545' (AMSL)

**Structure Ht.:** 53' (AGL)

**Tower Type:** Mono-pine

**Carrier:** Sprint, T-Mobile

**Sectors:** 3

**Antennas:** 2

**RAD Height:** T-Mobile @ 37'  
Sprint @ 45'

**Line of Sight:** Yes – 360

## Mission Viejo Church of Christ

### Site View



**Last Update:** June 2006  
**Site Name:** MV Church Of Christ  
**City Reference:** PDP 2002-89  
**Coordinates:** Lat: 33.5735  
Long: - 117.656533  
**Coord. System:** ■ NAD84  
**Site Address:** 26558 Marguerite Pkwy  
Mission Viejo, CA



**Site County:** Orange  
**Built:** 2002  
**Property Type:** Church  
**Elevation:** 545' (AMSL)  
**Roof Ht.:** approx. 32'(AGL)  
**Tower Type:** Roof Mount  
**Carrier:** Cingular  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 35'  
**Line of Sight:** Yes – 360



## Plaza Drive

### Site View



**Last Update:** June 2006  
**Site Name:** Plaza Drive  
**City Reference:** PDP 2001-51  
**Coordinates:** Lat: 33.565547  
Long: - 117.665096

**Coord. System:** ■ NAD84  
**Site Address:** 26691 Plaza Drive  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2001

**Property Type:** Commercial Property

**Elevation:** 445' (AMSL)

**Roof Ht.:** approx. 50' (AGL)

**Tower Type:** Roof Mount

**Carrier:** Verizon Wireless

**Sectors:** 1

**Antennas:** 4

**RAD Height:** 60'

**Line of Sight:** Yes – 360°



## MNWD Camino Capistrano

### Site View



**Last Update:** May 2006

**Site Name:** MNWD Camino Capistrano

**City Reference:** SP 96-224p

**Coordinates:** Lat: 33.575183  
Long: -117.672883

**Coord. System:** ■ NAD84

**Site Address:** 26742 Camino Capistrano  
Mission Viejo, CA

**Site County:** Orange

**First Built:** LA Cellular in 1996

**Property Type:** Water facility

**Elevation:** 394' (AMSL)

**Structure Ht.:** 50' – 55' (AGL)

**Tower Type:** Monopole & flag pole

**Carrier:** Cingular, T-Mobile

**Sectors:** 3

**Antennas:** 3

**RAD Height:** Cingular @ 50'  
T-Mobile @ 55'

**Line of Sight:** Yes – 280 degrees



## MNWD Preciados

### Site View



**Last Update:** September 2006

**Site Name:** MNWD Preciados

**City Reference:** SP 96-266

**Coordinates:** Lat: 33.601085  
Long: -117.661585

**Coord. System:** ■ NAD84

**Site Address:** 26852 Preciados  
Mission Viejo, CA

**Site County:** Orange

**Built:** 1996

**Property Type:** Water Tank

**Elevation:** 597' (AMSL)

**Structure Ht.:** 25' (AGL)

**Tower Type:** Water Tank

**Carrier:** T-Mobile

**Sectors:** 3/2

**Antennas:** 3/2

**RAD Height:** 25'

**Line of Sight:** Yes – 240

## Trabuco McDonalds

### Site View



**Last Update:** June 2006  
**Site Name:** Trabuco McDonalds  
**City Reference:** PDP 2001-60  
**Coordinates:** Lat: 33.621604  
Long: - 117.660785  
**Coord. System:** ■ NAD84  
**Site Address:** 26902 Trabuco Rd.  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2001  
**Property Type:** McDonalds  
**Elevation:** 625' (AMSL)  
**Roof Ht.:** 45' (AGL)  
**Tower Type:** Flagpole  
**Carrier:** T-Mobile  
**Sectors:** 3  
**Antennas:** 1  
**RAD Height:** 45'  
**Line of Sight:** Yes – 360`



## Mission Viejo Christian Church

### Site View



**Last Update:** June 2006  
**Site Name:** M.V. Christ Church  
**City Reference:** PDP 2002-91  
**Coordinates:** Lat: 33.609866  
Long: - 117.684966  
**Coord. System:** ■ NAD84  
**Site Address:** 27192 Jeronimo Rd.  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2002  
**Property Type:** Church  
**Elevation:** 398' (AMSL)  
**Roof Ht.:** approx. 38'(AGL)  
**Tower Type:** Roof Mount  
**Carrier:** T-Mobile  
**Sectors:** 3  
**Antennas:** 4  
**RAD Height:** 42'  
**Line of Sight:** Yes -360`



## YMCA Clock Tower

### Site View



**Last Update:** June 2006  
**Site Name:** Y.M.C.A. Clock Tower  
**City Reference:** PDP 2001-62  
**Coordinates:** Lat: 33.613493  
Long: - 117.654277  
**Coord. System:** ■ NAD84  
**Site Address:** 27341 Trabuco Cir.  
Mission Viejo, CA  
**Site County:** Orange  
**First Built:** Sprint PCS in 2001  
**Property Type:** Recreation  
**Elevation:** 597' (AMSL)  
**Structure Ht.:** 60' (AGL)  
**Tower Type:** Clock tower  
**Carrier:** Cingular, Sprint  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** Sprint PCS @ 50'  
Cingular @ 35'  
**Line of Sight:** Yes – 360°



## Mission Viejo Medical Center

### Site View



**Last Update:** July 2006

**Site Name:** M.V. Medical Center

**City Reference:** PDP 2000-23

**Coordinates:** Lat: 33.560833  
Long: - 117.665833

**Coord. System:** ■ NAD84

**Site Address:** 27700 Medical Center Rd.  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2000

**Property Type:** Hospital

**Elevation:** 819' (AMSL)

**Roof Ht.:** 303' (AGL)

**Tower Type:** Wall Mount

**Carrier:** Sprint

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 82'

**Line of Sight:** Yes – 360`

## Trabuco Hills Professional Center

### Site View



**Last Update:** August 2006

**Site Name:** Trabuco Hills Prof. Center

**City Reference:** PDP 2000-47

**Coordinates:** Lat: 33.65481  
Long: -117.646566

**Coord. System:** ■ NAD83

**Site Address:** 27725 Rancho Santa  
Margarita  
Mission Viejo, CA

**Site County:** Orange

**First Built:** 2000 by Verizon Wireless

**Property Type:** Shopping Center

**Elevation:** 797' (AMSL)

**Roof Ht.:** 35' (AGL)

**Tower Type:** Roof mount

**Carrier:** Cingular, Verizon Wireless

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 35'

**Line of Sight:** Yes – 360'

## Kaleidoscope

### Site View



**Last Update:** June 2006  
**Site Name:** Kaleidoscope  
**City Reference:** PDP 2002-83  
**Coordinates:** Lat: 33.561333  
Long: - 117.671166  
**Coord. System:** ■ NAD84  
**Site Address:** 27741 Crown Valley Pkwy  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2002  
**Property Type:** Commercial  
**Elevation:** 394' (AMSL)  
**Roof Ht.:** approx. 68'(AGL)  
**Tower Type:** Roof top wall mount  
**Carrier:** T-Mobile  
**Sectors:** 3  
**Antennas:** 4  
**RAD Height:** 65'  
**Line of Sight:** Yes – 280'

## Saddleback Community College

### Site View



**Last Update:** June 2006

**Site Name:** Saddleback Community College

**City Reference:** SP 92-099p

**Coordinates:** Lat: 33.549883  
Long: - 117.6664

**Coord. System:** ■ NAD84

**Site Address:** 28000 Marguerite  
Mission Viejo, CA

**Site County:** Orange

**Built:** 1992

**Property Type:** Community College

**Elevation:** 397' (AMSL)

**Structure Ht.:** 60' (AGL)

**Tower Type:** Monopole

**Carrier:** Cingular

**Sectors:** 3

**Antennas:** 4

**RAD Height:** 60'

**Line of Sight:** Yes – 360°





## Ayres Suites

### Site View



**Last Update:** May 2006  
**Site Name:** Ayres Suites  
**City Reference:** PDP 2000-49  
**Coordinates:** Lat: 33.654698  
Long: - 117.627781  
**Coord. System:** ■ NAD84  
**Site Address:** 28941 Los Alisos Blvd.  
Mission Viejo, CA 92692  
**Site County:** Orange  
**First Built:** Cingular 2000  
**Property Type:** Hotel  
**Elevation:** 984' (AMSL)  
**Roof Ht.:** 30' (AGL)  
**Tower Type:** Roof Top  
**Carrier:** Cingular, T-Mobile, Verizon  
Wireless  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 30' & 43'  
**Line of Sight:** Yes – 360 degrees



## Melinda Park

### Site View



**Last Update:** May 2006  
**Site Name:** Melinda Park  
**City Reference:** PDP 2003-105  
**Coordinates:** Lat: 33.64575  
Long: - 117.625333  
**Coord. System:** ■ NAD84  
**Site Address:** 28591 Melinda  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2005  
**Property Type:** City Park  
**Elevation:** 997' (AMSL)  
**Structure Ht.:** 45' (AGL)  
**Tower Type:** Monopole  
**Carrier:** Cingular, T-Mobile  
**Sectors:** 3  
**Antennas:** 1  
**Ant Rad Hgt :** 45'  
**Line of Sight:** Yes – 360 degrees



## Robinsons May Dept Store

### Site View



**Last Update:** August 2006  
**Site Name:** Robinsons May Dept Store  
**City Reference::** PDP 2000-30  
**Coordinates:** Lat: 33.559779  
Long: -117.668111  
**Coord. System:** ■ NAD83  
**Site Address:** 300 The Shops @ MV  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2000  
**Property Type:** Shopping Center  
**Elevation:** 405' (AMSL)  
**Roof Ht.:** 40' (AGL)  
**Tower Type:** Roof mount  
**Carrier:** T-Mobile  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 45'  
**Line of Sight:** Yes – 360'

## SCE @ Beebe Park

### Site View



**Last Update:** August 2006

**Site Name:** SCE @ Beebe Park

**City Reference:** PDP 2002-88

**Coordinates:** Lat: 33.613357  
Long: -117.629833

**Coord. System:** ■ NAD83

**Site Address:** Jeronimo & Olympiad  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2002

**Property Type:** SCE Right of Way

**Elevation:** 903' (AMSL)

**Structure Ht.:** 160' (AGL)

**Tower Type:** SCE Tower

**Carrier:** Cingular

**Sectors:** 3

**Antennas:** 2

**RAD Height:** 32'

**Line of Sight:** Yes – 360'

## Mission Hills

### Site View



**Last Update:** March 2006  
**Site Name:** Mission Hills  
**City Reference:** PDP 2000-32  
**Coordinates:** Lat: 33.66  
Long: -117.6377  
**Coord. System:** ■ NAD84  
**Site Address:** SE corner Marguerite/El Toro  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2000  
**Property Type:** Raw land  
**Elevation:** 993' (AMSL)  
**Structure Ht.:** 65' (AGL)  
**Tower Type:** Mono-pine  
**Carrier:** Nextel  
**Sectors:** 3  
**Antennas:** 4  
**RAD Height:** 60'  
**Line of Sight:** Yes – 360 degrees



## MNWD Delemos

### Site View



**Last Update:** September 2006

**Site Name:** MNWD Delemos

**City Reference:** PDP 1999-14

**Coordinates:** Lat: 33.578896  
Long: - 117.656865

**Coord. System:** ■ NAD84

**Site Address:** 27169 Delamos  
Mission Viejo, CA



**Site County:** Orange

**Built:** 1999

**Property Type:** Water Tank

**Elevation:** 597' (AMSL)

**Structure Ht.:** 32' (AGL)

**Tower Type:** Water Tank

**Carrier:** Nextel, T-Mobile

**Sectors:** 2

**Antennas:** 4

**RAD Height:** 32'

**Line of Sight:** Yes – 270



## SCE @ California Terrace

### Site View



**Last Update:** August 2006  
**Site Name:** SCE @ California Terrace  
**City Reference:** PDP 2000-35  
**Coordinates:** Lat: 33.657284  
Long: -117.636832  
**Coord. System:** ■ NAD83  
**Site Address:** Los Alisos & California Ct.  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2000  
**Property Type:** SCE Right of Way  
**Elevation:** 931' (AMSL)  
**Structure Ht.:** 160' (AGL)  
**Tower Type:** SCE Tower  
**Carrier:** Cingular  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 60'  
**Line of Sight:** Yes – 360'



## Oso Viejo Park

### Site View



**Last Update:** August 2006

**Site Name:** Oso Viejo Park

**City Reference:** PDP 2000-38

**Coordinates:** Lat: 33.59898  
Long: -117.653788

**Coord. System:** ■ NAD83

**Site Address:** 27301 La Paz Road  
Mission Viejo, CA

**Site County:** Orange

**First Built:** 2000 by Verizon Wireless

**Property Type:** Municipal Park

**Elevation:** 573' (AMSL)

**Structure Ht.:** 60' to 70' (AGL)

**Tower Type:** Monopole and light pole

**Carrier:** Cingular, Nextel, Verizon Wireless

**Sectors:** 2

**Antennas:** 3

**RAD Height:** Verizon Wireless @ 58'  
Cingular @ 64' and 74'  
Nextel @ 70'

**Line of Sight:** Yes – 360'



## SCE @ Oso

### Site View



**Last Update:** June 2006

**Site Name:** SCE Tower @ Oso

**City Reference:** PDP 2001-77

**Coordinates:** Lat: 33.576479  
Long: -117.674067

**Coord. System:** ■ NAD84

**Site Address:** Oso Pkwy/Interstate 5  
Mission Viejo, CA

**Site County:** Orange

**Built:** 2001

**Property Type:** S.C.E. Tower

**Elevation:** 394" (AMSL)

**Roof Ht.:** 160' (AGL)

**Tower Type:** S.C.E. Tower

**Carrier:** Sprint

**Sectors:** 3

**Antennas:** 1

**RAD Height:** 45' & 65'

**Line of Sight:** Yes – 360`

## SCE @ Melinda

### Site View



**Last Update:** June 2006  
**Site Name:** SCE @ Melinda  
**City Reference:** PDP 2004-128  
**Coordinates:** Lat: 33.637966  
Long: - 117.63745  
**Coord. System:** ■ NAD84  
**Site Address:** Olympiad/Melinda  
Mission Viejo, CA  
**Site County:** Orange  
**Built:** 2004  
**Property Type:** SCE Tower  
**Elevation:** 812' (AMSL)  
**Structure Ht.:** 160' (AGL)  
**Tower Type:** S.C.E. Tower  
**Carrier:** Sprint  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** 68'  
**Line of Sight:** Yes – 360`



## La Barca

### Site View



**Last Update:** March 2006  
**Site Name:** La Barca  
**City Reference:** PDP 2001-64  
**Coordinates:** Lat: 33.645786  
Long: - 117.636627  
**Coord. System:** ■ NAD84  
**Site Address:** 28354 La Barca  
Mission Viejo, CA 92692  
**Site County:** Orange  
**First Built:** AT&T in 2001  
**Property Type:** SCE Right of Way  
**Elevation:** 834' (AMSL)  
**Structure Ht.:** 160' (AGL)  
**Tower Type:** S.C.E. Tower  
**Carrier:** Cingular, Nextel  
**Sectors:** 3  
**Antennas:** 2  
**RAD Height:** Cingular @ 21'  
Nextel @ 47'  
**Line of Sight:** Yes – 360 degrees



**Existing Designs**

Type of build	Site Name	Year	Carrier
Clock Tower	YMCA Clock Tower	2001	Sprint PCS
Clock Tower	YMCA Clock Tower	2004	Cingular
Flag Pole	Trabuco MacDonalds	2001	Cingular
Light Pole	MNWD Camino Capistrano	1996	Cingular
Light Pole	Oso Viejo Park	2000	Cingular
Light Pole	MNWD Camino Capistrano	2000	T-Mobile
Light Pole	Oso Viejo Park	2000	Verizon Wireless
Light Pole	Beebe Park	2001	Nextel
Light Pole	Oso Viejo Park	2001	Nextel
Light Pole	Beebe Park	2001	Sprint PCS
Light Pole	Beebe Park	2001	Verizon Wireless
Mono-Pine	MV Church of Christ	1996	T-Mobile
Mono-Pine	MV Presbyterian Church	1999	Verizon Wireless
Mono-Pine	Mission Hills	2000	Nextel
Mono-Pine	MV Church of Christ	2000	Sprint PCS
Mono-Pine	Pavion Park	2001	Cingular
Mono-Pine	Vista Paint	2001	Sprint PCS
Mono-Pine	Congregation Eilat	2002	Cingular
Mono-Pole	Saddleback Community College	1992	Cingular
Mono-Pole	CVHS	1993	Verizon Wireless
Mono-Pole	CVHS	1994	Nextel
Mono-Pole	MNWD Via Bahia	1995	Nextel
Mono-Pole	MNWD Via Bahia	1996	T-Mobile
Mono-Pole	Shepherd of the Hills	1996	T-Mobile
Mono-Pole	Melinda Park	2003	Cingular
Mono-Pole	El Toro Water District	2004	Cingular
SCE Tower	SCE @ Crown Valley	2000	T-Mobile
SCE Tower	SCE @ 241 Toll Road	2000	T-Mobile
SCE Tower	SCE @ Flo Jo Park	2001	Cingular
SCE Tower	SCE @ La Barca	2001	Cingular
SCE Tower	SCE @ Oso	2001	Sprint PCS
SCE Tower	SCE @ Crown Valley	2002	Cingular
SCE Tower	SCE @ Beebe Park	2002	Cingular
SCE Tower	SCE @ La Barca	2003	Nextel
SCE Tower	SCE @ Melinda	2004	Sprint PCS
Screened Roof Mount	Lakeside Plaza	1992	Cingular
Screened Roof Mount	Lakeside Plaza	1993	Verizon Wireless
Screened Roof Mount	Lakeside Plaza	1995	T-Mobile
Screened Roof Mount	Pala Building	1996	T-Mobile

Type of build	Site Name	Year	Carrier
Screened Roof Mount	Acero Bldg East	1996	T-Mobile
Screened Roof Mount	Acero Bldg North	2000	Cingular
Screened Roof Mount	Ayres Suites	2000	T-Mobile
Screened Roof Mount	La Alameda Building	2000	Nextel
Screened Roof Mount	Pala Building	2000	Nextel
Screened Roof Mount	Acero Bldg East	2000	Sprint PCS
Screened Roof Mount	Chabad Jewish Center	2000	T-Mobile
Screened Roof Mount	Trabuco Hills Professional Center	2000	Verizon Wireless
Screened Roof Mount	Lakeside Plaza	2001	Cingular
Screened Roof Mount	Fairfield Inn	2001	Nextel
Screened Roof Mount	Plaza Drive	2001	Verizon Wireless
Screened Roof Mount	Chabad Jewish Center	2002	Cingular
Screened Roof Mount	MV Church of Christ	2002	Cingular
Screened Roof Mount	MV Christian Church	2002	Cingular
Screened Roof Mount	Kaleidoscope	2002	Cingular
Screened Roof Mount	Trabuco Hills Professional Center	2004	Cingular
Screened Roof Mount	Ayres Suites	2004	Verizon Wireless
Screened Roof Mount	Ayres Suites	2005	Cingular
Visible Roof Mount	Buck Building	1996	T-Mobile
Visible Roof Mount	True Value Hardware	1996	T-Mobile
Visible Roof Mount	Buck Building	1999	Cingular
Visible Roof Mount	MV Regional Medical Center	2000	Sprint PCS
Visible Roof Mount	Robinsons May Dept Store	2000	T-Mobile
Visible Roof Mount	Congregation Eilat	2001	Sprint PCS
Visible Roof Mount	Buck Building	2001	Verizon Wireless
Water Tank	Felipe Water Tank	1996	T-Mobile
Water Tank	MNWD Precidios	1996	T-Mobile
Water Tank	Felipe Water Tank	1999	Cingular
Water Tank	MNWD Delemos	1999	Nextel
Water Tank	MNWD Delemos	1999	T-Mobile
Water Tank	MNWD Via Bahia	2000	Cingular