



STAFF REPORT

TO: PLANNING COMMISSION

PREPARED BY: Anjana Mepani, Associate Planner

GENERAL INFORMATION

APPLICANT: Verizon Wireless/Ridge Communications, Inc. - Chip Griffin

PROPERTY OWNER: Michael and Norma Hansen

LOCATION: PG&E Tower at 814 Carter Acres Lane (APN 365-150-053)

GENERAL PLAN: CUL: Open Space/Conservation Use Land

ZONING: Residential: R-80 (One-Family Residential: 80,000 sq. ft. minimum lot area) / ECD (Environmental Conservation District)

ENVIRONMENTAL: Staff has yet to determine the level of environmental review that will be required for this project. All environmental documentation will be presented to the Planning Commission for either adoption or denial at a subsequent Commission hearing. Copies of the Initial Study document, if one is to be required for this project, will be made available to the general public at a date to be determined, at City Hall.

PROPOSAL: Study session to discuss and receive public input on a proposal for an installation of a new co-located wireless telecommunications facility on an existing PG&E tower located on a private residential lot. The proposed project consists of adding a 12' lattice structure, with 9 antennas, on top of the existing approximately 162' tall tower. Verizon will be leasing an approximately 473 sq. ft. area within the tower footprint for an equipment enclosure. The proposed project is located in a residential zoning district, which requires a Use Permit and Design Review.

RECOMMENDATION

Review proposal, accept public comment, and provide input and direction to staff and the applicant on the proposal. The purpose of the study session is to allow for preliminary project review. No Planning Commission action is to be taken at this time. Should the Commission find that it can support such a project, the applicant will be instructed on the formal application process.

SITE, CONTEXT, PROJECT DESCRIPTION

The existing Pacific Gas and Electric Company (PG&E) utility tower and easement is located on a private residential lot at 814 Carter Acres Lane. The subject property has a lot size of 2.27 acres (99,055 sq. ft.) and contains one single-family residence, which is located over 100 feet away from the tower. The PG&E 100-foot right-of-way easement traverses along a portion of Carter Acres Lane and the PG&E tower is located at the western edge of the subject property. Further, T-Mobile currently operates a wireless telecommunications facility at the PG&E tower, which consists of antennas on the tower and an equipment area at the base of the tower.

The subject property is located in a residential zoning district, where pursuant to Martinez Municipal Code Chapter 22.39, "Wireless Telecommunications Facilities," a Use Permit and Design Review approval is required for any wireless facility installation. The subject property is located in a residential neighborhood, where many of the surrounding single-family residences are also located on large lots. According to the applicant, the nearest residence besides the Hansen residence is more than 200 feet away. To the north of the subject property is the Briones Horse Center and Briones Regional Park is located nearby. On July 6, 2011, the applicant held a neighborhood meeting at the Hansen residence with the property owners that reside on Carter Acres Lane to describe the project and to answer questions.

The applicant is proposing to install a new wireless telecommunications facility by adding a 12-foot lattice top hat extension structure and 9 antennas to the top of an existing approximately 162 foot tall PG&E tower. The applicant is also proposing to place an equipment enclosure at the base of the tower. Verizon will be leasing an approximately 473 sq. ft. area within the towers footprint. According to the applicant, the proposed facility is needed to provide cell and LTE (3G) coverage to Alhambra Valley and the surrounding area that currently receive no or inadequate Verizon wireless coverage. The improved network coverage would effectively meet the wireless service needs and expectations of Verizon's customer base, which consist of local area residents, commuters, and professionals in the area.

The wireless facility will operate unmanned and the equipment will be serviced twice monthly. Further, a noise study was conducted for the proposed equipment area along with the noise generated from the existing T-Mobile equipment area and the noise requirements set in the Martinez Municipal Code Chapter 8.34.020 will be met (see attached Noise Study). In addition, the attached Radio Frequency Radiation Report demonstrates that the proposed wireless facility, along with the operation of the other wireless carrier, will be within the permissible public exposure standards set by the Federal Communications Commission (FCC). It should be noted that the Telecommunications Act of 1996 states that no state or local governmental entity may regulate the placement, construction, or modification of wireless facilities on the basis of environmental effects of radio frequency emissions to the extent that the emissions comply with FCC regulations.

DISCUSSION

Use Permit

As mentioned above, a Use Permit is required to permit a wireless telecommunications facility of this type. The “Wireless Telecommunications Facilities” ordinance (MMC Chapter 22.39) promotes co-location of wireless facilities to reduce the amount of wireless facility sites, which applies to the proposed project. Co-location occurs when a single tower or building supports one or more antennas, dishes, or similar devices owned by more than one public or private entity, such as multiple wireless carriers. Also, in order for a wireless telecommunications facility to be located in a residential area the applicant must demonstrate that no other feasible alternative site exists. The applicant considered an alternate site on an existing PG&E tower in Briones Regional Park. However, Verizon was unable to gain access to the tower, which was the only other co-locatable site in the search ring to provide adequate service. According to the applicant, there were no other viable alternative sites without the need for a monopole (see attached Alternative Site Analysis).

Design Review

The existing PG&E tower is approximately 162 feet high, with existing antennas that belong to T-Mobile located at 67.9 feet high. The applicant is proposing to add a 12-foot lattice extension/top hat structure to the existing tower, thus bringing the overall tower height to approximately 174.2 feet. A top hat is an industry term that refers to a tower extension structure to separate cell antennas from power lines. It should be noted that utility poles and towers are not subject to height limits (Martinez Municipal Code Chapter 22.34.170B). Further, the nine antennas proposed to be placed on the top hat will be located on three sectors around the extension, with three antennas mounted per sector, with the top of the antennas at approximately 174.2 feet in height. To gain the required separation from the PG&E power lines and to get necessary coverage the top hat will accommodate the antennas. The antennas are proposed to be mounted on the top hat extension level to provide Verizon network coverage to the surrounding area that currently has no or poor Verizon cell service. Thus, the top hat will be designed to look like an extension of the PG&E tower. The lattice top hat extension and antennas will be painted to match the existing PG&E tower.

The proposed equipment enclosure will be located within the footprint of the tower, next to an existing equipment area belonging to T-Mobile. At grade, the equipment within the enclosure will not be visible above the 8-foot solid wooden fence line. Further, the antennas on the top hat will be visible to the surrounding area in general. The applicant has provided photo simulations with various views of the lattice top hat extension, antennas, and equipment enclosure (see attached Photo Simulations). Additionally, should the applicant decide to move forward, the project will be reviewed by the Design Review Committee, prior to returning to the Planning Commission.

ATTACHMENTS

Site Context Map

Photo Simulations

Noise Study

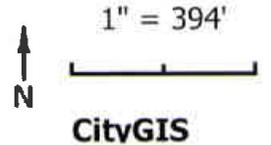
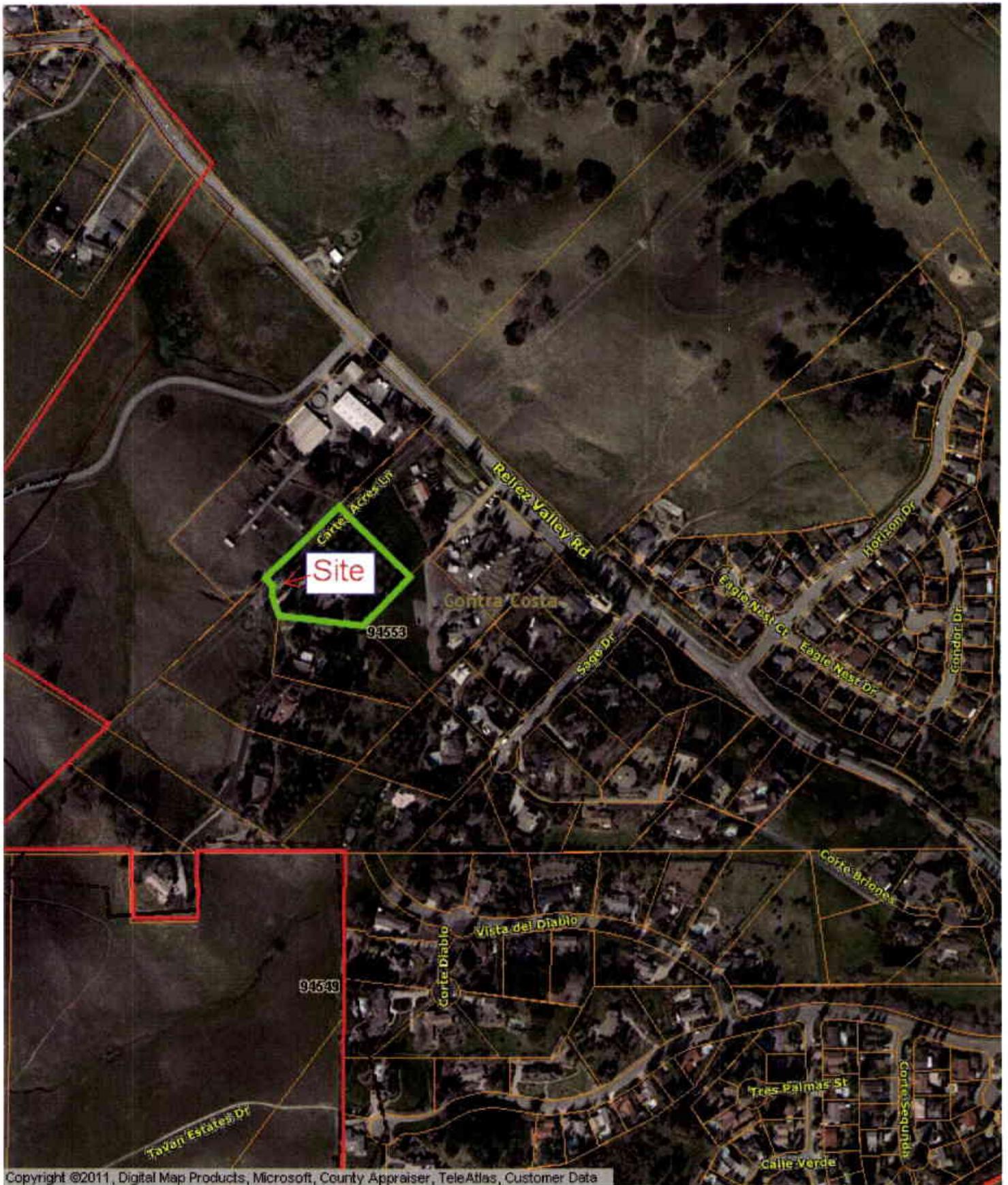
Radio Frequency Radiation Report

Coverage Maps
Alternative Site Analysis
Letter of Authorization from PG&E

EXHIBITS

Topographic Survey, Site Plans, Equipment and Antenna Layout, Equipment Area Plan,
Elevations

F:\Community Development\All Projects\Wireless Facilities\Carter Acres Lane, 814 - Verizon\Verizon Wireless - StudySessnRpt.doc



Existing

view from Carter Acres Road looking northeast at site



248124 Alhambra Reliez
814 Carter Acres Road, Martinez, CA

RECEIVED

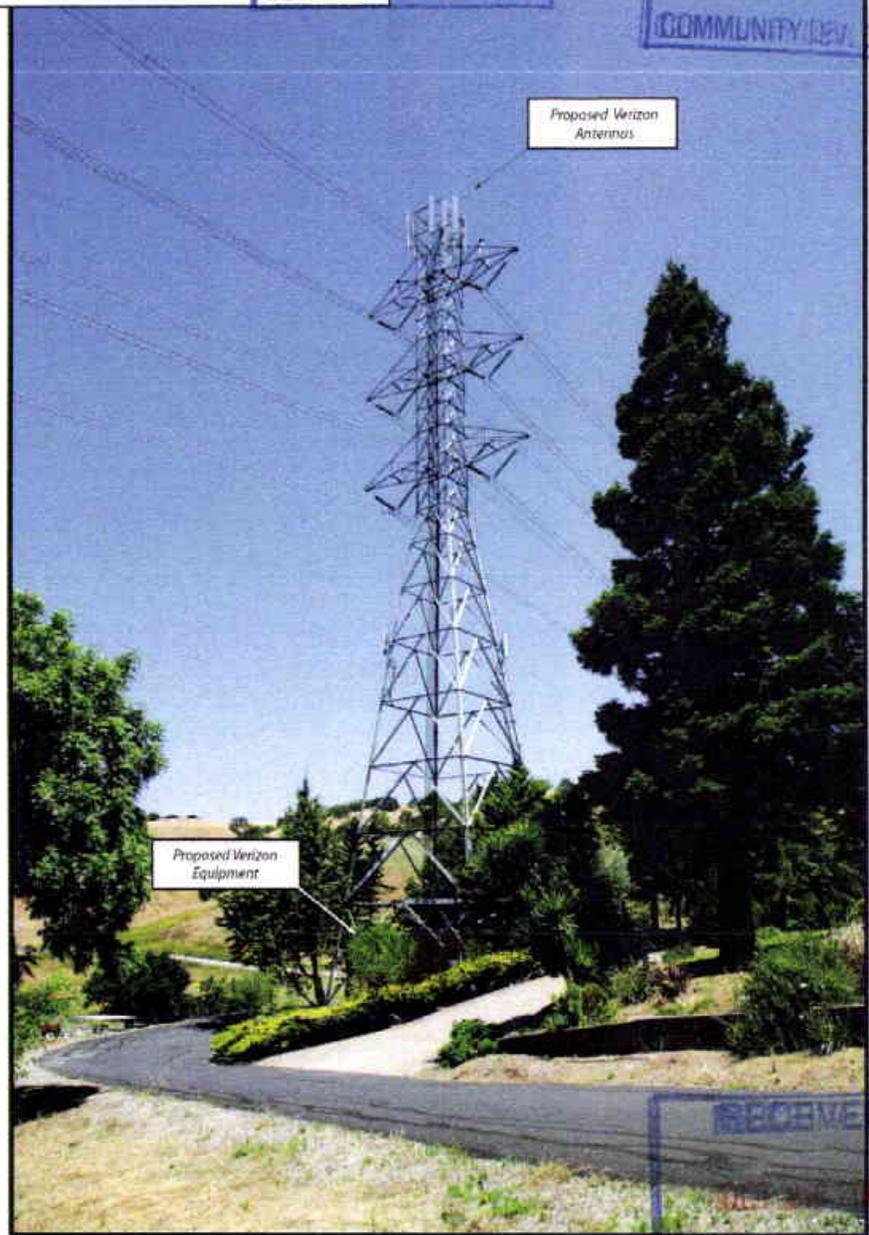
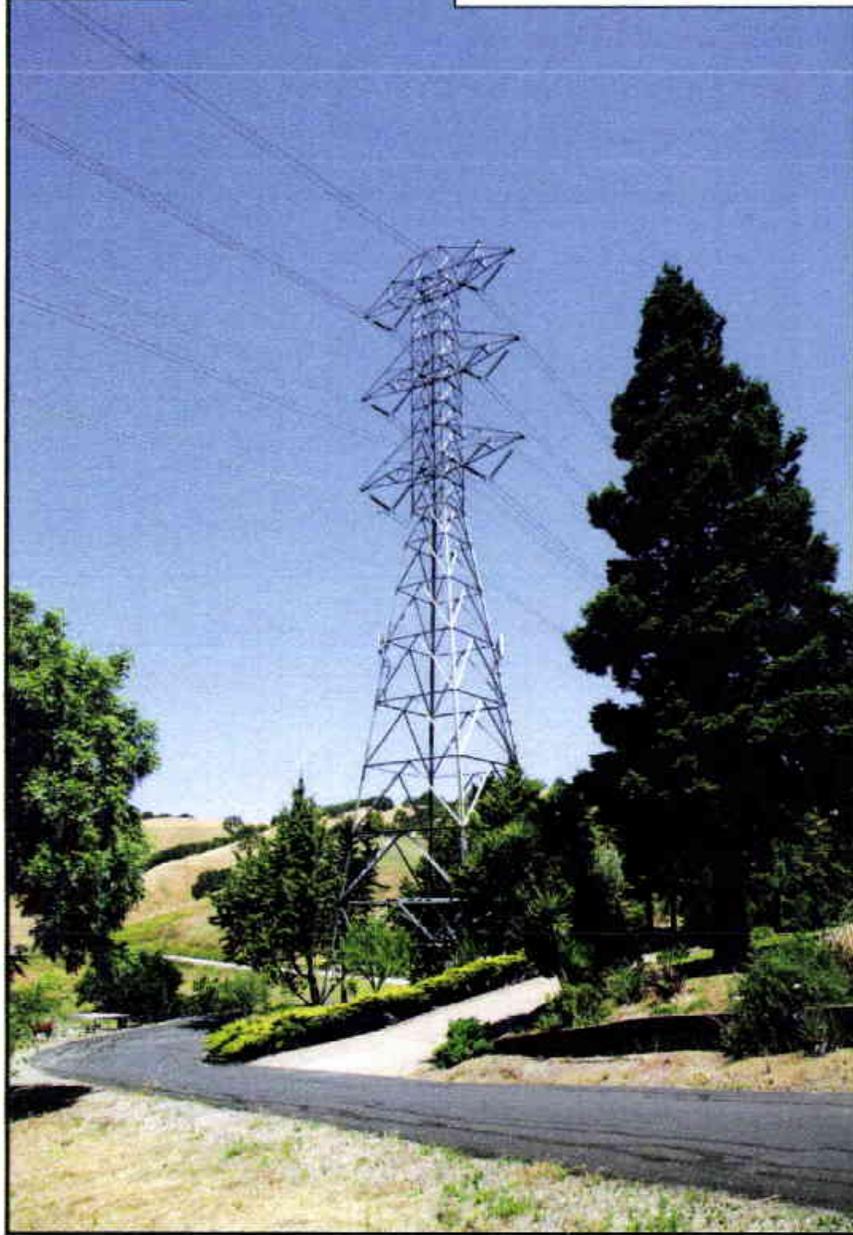
OCT 28 2011

COMMUNITY DEV. DEPT.

RECEIVED

Proposed
OCT 28 2011

COMMUNITY DEV. DEPT.



Proposed Verizon
Antennas

Proposed Verizon
Equipment

RECEIVED

COMMUNITY DEV. DEPT.

Existing

view from Carter Acres Road looking southwest at site



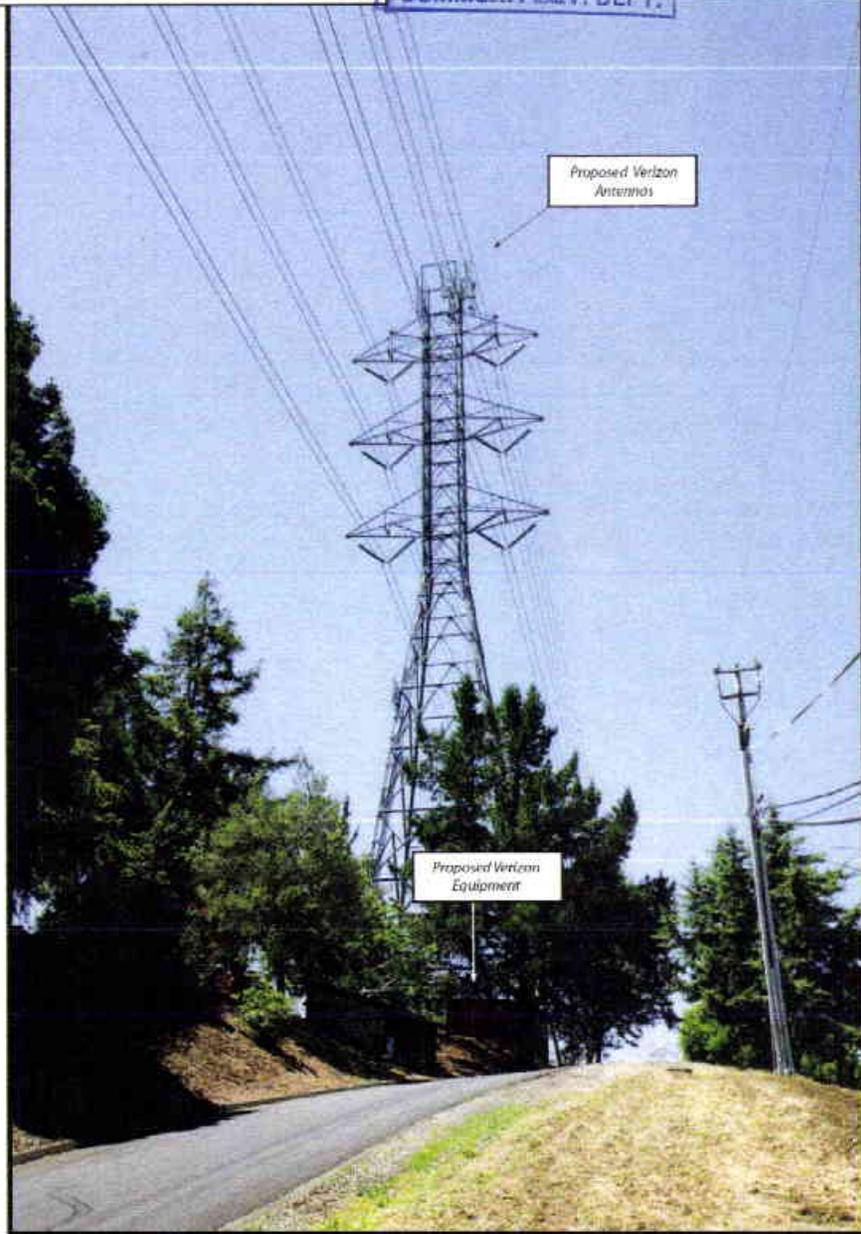
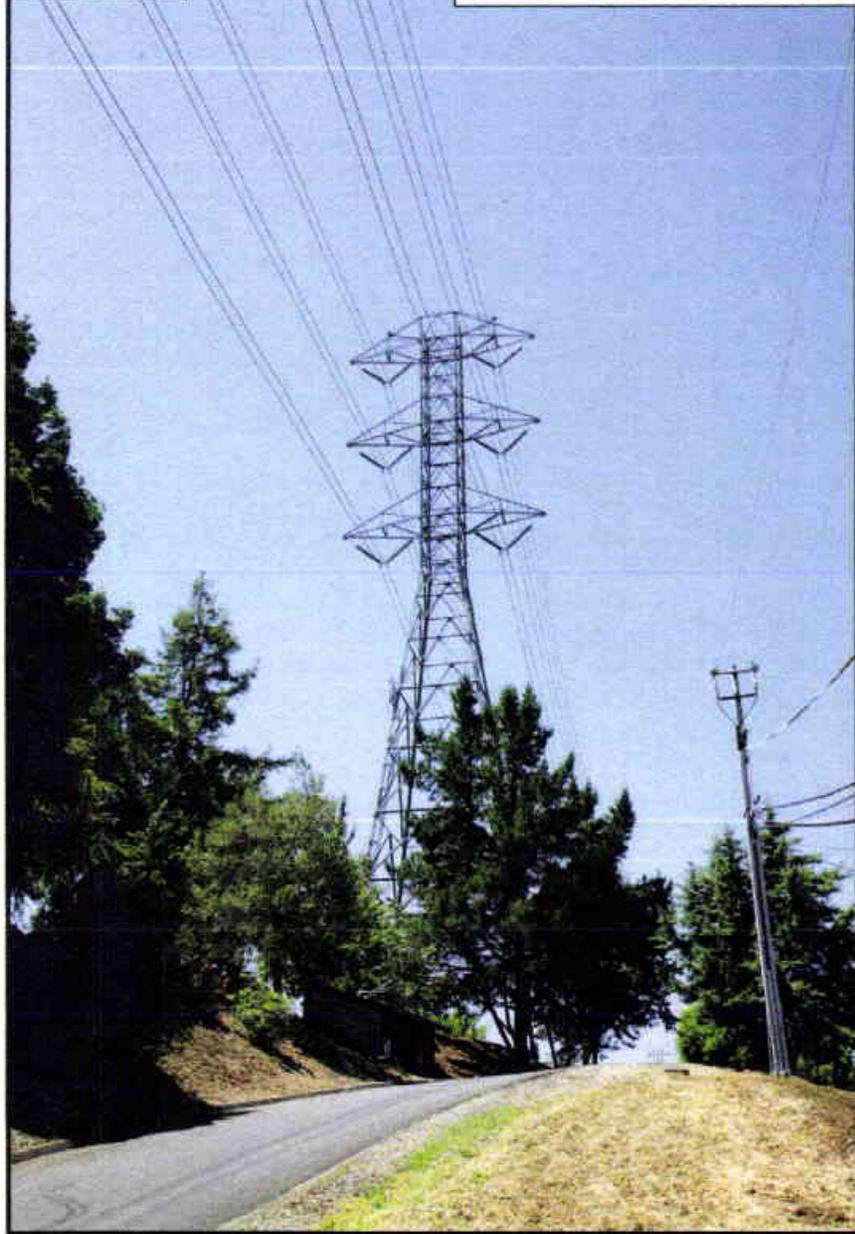
248124 Alhambra Reliez
814 Carter Acres Road, Martinez, CA

RECEIVED

OCT 28 2011

COMMUNITY DEV. DEPT.

Proposed



Proposed Verizon Antennas

Proposed Verizon Equipment

Existing

RECEIVED

JUL 15 2011

COMMUNITY DEV. DEPT.

close up view

Proposed

Proposed Verizon
Antennas

close up view

view from Reliez Valley Road looking south at site

AdvanceSim

verizon

248124 Alhambra Reliez
814 Carter Acres Road, Martinez, CA

**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra-Reliez")
814 Carter Acres Lane • Martinez, California**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a personal telecommunications carrier, to evaluate its base station (Site No. 248124 "Alhambra-Reliez") proposed to be located at 814 Carter Acres Lane in Martinez, California, for compliance with appropriate guidelines limiting sound levels from the installation.

Executive Summary

Verizon proposes to install a new base station at the base of a tall lattice tower located at 814 Carter Acres Lane in Martinez. The proposed operation will, together with the existing base station at the site, comply with the City's Code limiting noise emissions from the site.

Prevailing Standard

The City of Martinez sets forth regulations on sound levels in Chapter 8.34 (Noise Control) of its Code of Ordinances, including in Section 8.34.020 the following limits for noise:

<u>Time Period</u>	<u>Noise Limit</u>
"Day" 7 a.m. to 10 p.m.	60 dBA
"Night" 10 p.m. to 7 a.m.	50 dBA

Figure 1 attached describes the calculation methodology used to determine applicable noise levels for evaluation against the prevailing standard.

General Facility Requirements

Wireless telecommunications facilities ("cell sites") typically consist of two distinct parts: the electronic base transceiver stations ("BTS" or "cabinets") that are connected to traditional wired telephone lines, and the antennas that send wireless signals created by the BTS out to be received by individual subscriber units. The BTS are often located outdoors at ground level and are connected to the antennas by coaxial cables. The BTS typically require environmental units to cool the electronics inside. Such cooling is often integrated into the BTS, although external air conditioning may be installed, especially when the BTS are housed within a larger enclosure.

Most cell sites have back-up battery power available, to run the site for some number of hours in the event of a power outage. Many sites have back-up power generators installed, to provide continued operation of the base stations during an extended power outage.



**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra-Reliez")
814 Carter Acres Lane • Martinez, California**

Site & Facility Description

According to information provided by Verizon Wireless, including zoning drawings by Delta Groups Engineering, Inc., dated July 8, 2011, and a site detail, dated October 10, 2011, that carrier proposes to install five equipment cabinets – two Lucent "Modcell," two for LTE (assumed for the purpose of this study to be Ericsson Model 6601, and one for batteries (assumed to be a Commscope Model RBA72) – on a concrete pad within a fence enclosure to be constructed at the base of the 162-foot PG&E lattice tower sited west of the two-story residence located at 814 Carter Acres Lane in Martinez.

Also within the fenced enclosure, Verizon proposes to install a Generac Model SD030 stand-by diesel power generator for emergency use, in the event of a commercial power outage. Such generators typically operate for a 15-minute test period once a week during normal business hours on a non-holiday weekday, in order to ensure their readiness in the event of a power outage.

The nearest property line is to the northwest, at a distance of 5 feet from the enclosure. The property lines in other directions are considerably farther away.

Presently located under the tower are two cabinets, assumed to be Ericsson Model 2106/3106, for use by T-Mobile, another telecommunications carrier, with directional panel antennas installed about 68 feet above ground on the existing 162-foot PG&E lattice tower. Verizon proposes to install its own antennas at the top of tower. Neither the tower nor the antennas emit acoustic energy.

Study Results

The equipment manufacturers report maximum sound pressure reference levels as follows:

<u>Manufacturer</u>	<u>Reference* Noise Level</u>	<u>Reference Distance</u>	<u>Reference Direction</u>
Lucent	65.0 dBA	5 ft	rear
Ericsson (6601)	53.0	1 m	front
Commscope	58.7	5 ft	any
Ericsson (x106)	60.2	1 m	front
Generac	65.6	23 ft†	front

The calculated noise level at the nearest property line for the combined operations of all the fans in all five Verizon equipment cabinets is 47.9 dBA. Including the simultaneous operation of the two T-Mobile cabinets, the calculated cumulative noise level 48.8 dBA, which is under the City's most restrictive nighttime limit of 50 dBA.

* Adjusted as required to approximate noise level at 100°F ambient temperature.

† Measured from the center of the unit.

**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra-Reliez")
814 Carter Acres Lane • Martinez, California**

For the day on which the generator is tested, the additive noise level over the 15-hour "daytime" period specified in the City Code is 48.3 dBA. This brings the cumulative average daytime noise level, for the Verizon and T-Mobile cabinets plus the generator, to 51.5 dBA, well below the City's daytime limit of 60 dBA.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the operation of the Verizon Wireless base station proposed to be located at 814 Carter Acres Lane in Martinez, California, will comply with that city's standards limiting acoustic noise emission levels and, therefore, will not for this reason have an adverse impact on the environment.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2013. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

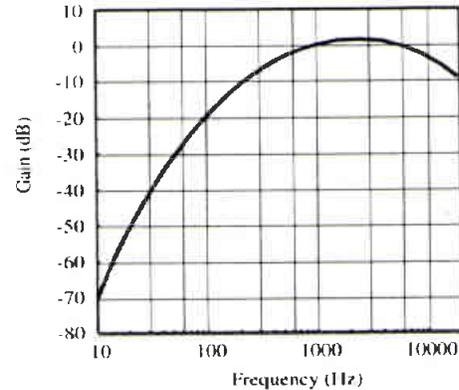


William F. Hammett
William F. Hammett, P.E.
707/996-5200

October 25, 2011

Noise Level Calculation Methodology

Most municipalities and other agencies specify noise limits in units of dBA, which is intended to mimic the reduced receptivity of the human ear to Sound Pressure (“L_p”) at particularly low or high frequencies. This frequency-sensitive filter shape, shown in the graph to the right as defined in the International Electrotechnical Commission Standard No. 179, the American National Standards Institute Standard No. 5.1, and various other standards, is also incorporated into most calibrated field test equipment for measuring noise levels.



30 dBA	library
40 dBA	rural background
50 dBA	office space
60 dBA	conversation
70 dBA	car radio
80 dBA	traffic corner
90 dBA	lawnmower

The dBA units of measure are referenced to a pressure of 20 μPa (micropascals), which is the threshold of normal hearing. Although noise levels vary greatly by location and noise source, representative levels are shown in the box to the left.

Manufacturers of many types of equipment, such as air conditioners, generators, and telecommunications devices, often test their products in various configurations to determine the acoustical emissions at certain distances. This data, normally expressed in dBA at a known reference distance, can be used to determine the corresponding sound pressure level at any particular distance, such as at a nearby building or property line. The sound pressure drops as the square of the increase in distance, according to the formula:

$$L_P = L_K + 20 \log(D_K/D_P),$$

where L_P is the sound pressure level at distance D_P and L_K is the known sound pressure level at distance D_K.

Individual sound pressure levels at a particular point from several different noise sources cannot be combined directly in units of dBA. Rather, the units need to be converted to scalar sound intensity units in order to be added together, then converted back to decibel units, according to the formula:

where L_T is the total sound pressure level and L₁, L₂, etc are individual sound pressure levels.

$$L_T = 10 \log (10^{L_1/10} + 10^{L_2/10} + \dots),$$

Certain equipment installations may include the placement of barriers and/or absorptive materials to reduce transmission of noise beyond the site. Noise Reduction Coefficients (“NRC”) are published for many different materials, expressed as unitless power factors, with 0 being perfect reflection and 1 being perfect absorption. Unpainted concrete block, for instance, can have an NRC as high as 0.35. However, a barrier’s effectiveness depends on its specific configuration, as well as the materials used and their surface treatment.



**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra Reliez")
814 Carter Acres Lane • Martinez, California**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a personal wireless telecommunications carrier, to evaluate the base station (Site No. 248124 "Alhambra Reliez") proposed to be located at 814 Carter Acres Lane in Martinez, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Executive Summary

Verizon proposes to install directional panel antennas on the tall PG&E lattice tower sited in front of the residence located at 814 Carter Acres Lane in Martinez. The proposed operation will, together with the existing base station at the site, comply with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. A summary of the FCC's exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. The most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several personal wireless services are as follows:

<u>Wireless Service</u>	<u>Frequency Band</u>	<u>Occupational Limit</u>	<u>Public Limit</u>
Microwave (Point-to-Point)	5,000–80,000 MHz	5.00 mW/cm ²	1.00 mW/cm ²
BRS (Broadband Radio)	2,600	5.00	1.00
AWS (Advanced Wireless)	2,100	5.00	1.00
PCS (Personal Communication)	1,950	5.00	1.00
Cellular	870	2.90	0.58
SMR (Specialized Mobile Radio)	855	2.85	0.57
700 MHz	700	2.35	0.47
[most restrictive frequency range]	30–300	1.00	0.20

Power line frequencies (60 Hz) are well below the applicable range of these standards, and there is considered to be no compounding effect from simultaneous exposure to power line and radio frequency fields.



**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra Reliez")
814 Carter Acres Lane • Martinez, California**

General Facility Requirements

Base stations typically consist of two distinct parts: the electronic transceivers (also called "radios" or "channels") that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The transceivers are often located at ground level and are connected to the antennas by coaxial cables. A small antenna for reception of GPS signals is also required, mounted with a clear view of the sky. Because of the short wavelength of the frequencies assigned by the FCC for wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. Along with the low power of such facilities, this means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Computer Modeling Method

The FCC provides direction for determining compliance in its Office of Engineering and Technology Bulletin No. 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation," dated August 1997. Figure 2 attached describes the calculation methodologies, reflecting the facts that a directional antenna's radiation pattern is not fully formed at locations very close by (the "near-field" effect) and that at greater distances the power level from an energy source decreases with the square of the distance from it (the "inverse square law"). The conservative nature of this method for evaluating exposure conditions has been verified by numerous field tests.

Site and Facility Description

Based upon information provided by Verizon, including zoning drawings by Delta Groups Engineering, Inc., dated April 29, 2011, it is proposed to install nine Andrew directional panel antennas – six Model LNX-6515DS-VTM and three Model HBX-6517DS-VTM – on a 12-foot extension to the existing 174-foot PG&E lattice tower sited in front of the residence located at 814 Carter Acres Lane in Martinez. The antennas would be mounted with up to 4° downtilt at an effective height of about 170 feet above ground and would be oriented in groups of three (two LNX and one HBX) toward 130°T, 270°T, and 340°T. The maximum effective radiated power in any direction would be 3,070 watts, representing simultaneous operation at 390 watts for PCS, and 2,280 watts for cellular, and 400 watts for 700 MHz service.

**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra Reliez")
814 Carter Acres Lane • Martinez, California**

Presently located on the same tower are similar antennas for use by T-Mobile. For the limited purpose of this study, the transmitting facilities of that carrier are assumed to be as follows:

<u>Operator</u>	<u>Service</u>	<u>Maximum ERP</u>	<u>Antenna Model</u>	<u>Downtilt</u>	<u>Height</u>
T-Mobile	AWS	1,500 watts	Andrew TMBX-6516	2°	80½ ft
	PCS	1,500			

Study Results

For a person anywhere at ground, the maximum RF exposure level due to the proposed Verizon operation by itself is calculated to be 0.00042 mW/cm², which is 0.074% of the applicable public exposure limit. The maximum calculated cumulative level at ground, for the simultaneous operation of both carriers, is 0.16% of the public exposure limit. The maximum calculated cumulative level at the second-floor elevation of any nearby residence* is 0.19% of the public exposure limit. It should be noted that these results include several "worst-case" assumptions and therefore are expected to overstate actual power density levels.

No Recommended Mitigation Measures

Due to their mounting locations, the Verizon antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. It is presumed that PG&E already takes adequate precautions to ensure that there is no unauthorized access to its tower. To prevent exposures in excess of the occupational limit by authorized PG&E workers, it is expected that they will adhere to appropriate safety protocols adopted by that company.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that operation of the base station proposed by Verizon Wireless at 814 Carter Acres Lane in Martinez, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken at other operating base stations.

* Located at least 110 feet away, based on photographs from Google Maps.

**Verizon Wireless • Proposed Base Station (Site No. 248124 "Alhambra Reliez")
814 Carter Acres Lane • Martinez, California**

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2013. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.



William F. Hammett

William F. Hammett, P.E.

707/996-5200

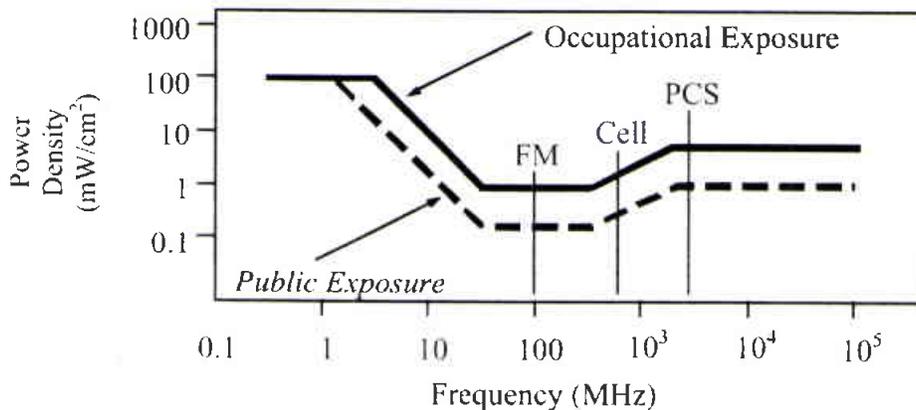
June 16, 2011

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (<i>f</i> is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/f	<i>823.8/f</i>	4.89/f	<i>2.19/f</i>	900/f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√ <i>f</i>	<i>1.59√f</i>	√ <i>f</i> /106	<i>√f/238</i>	f/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.



Assessment by Calculation of Compliance with FCC Exposure Guidelines

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The maximum permissible exposure limits adopted by the FCC (see Figure 1) apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits.

Near Field.

Prediction methods have been developed for the near field zone of panel (directional) and whip (omnidirectional) antennas, typical at wireless telecommunications base stations, as well as dish (aperture) antennas, typically used for microwave links. The antenna patterns are not fully formed in the near field at these antennas, and the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) gives suitable formulas for calculating power density within such zones.

For a panel or whip antenna, power density $S = \frac{180}{\theta_{BW}} \times \frac{0.1 \times P_{net}}{\pi \times D \times h}$, in mW/cm²,

and for an aperture antenna, maximum power density $S_{max} = \frac{0.1 \times 16 \times \eta \times P_{net}}{\pi \times h^2}$, in mW/cm²,

- where θ_{BW} = half-power beamwidth of the antenna, in degrees, and
- P_{net} = net power input to the antenna, in watts,
- D = distance from antenna, in meters,
- h = aperture height of the antenna, in meters, and
- η = aperture efficiency (unitless, typically 0.5-0.8).

The factor of 0.1 in the numerators converts to the desired units of power density.

Far Field.

OET-65 gives this formula for calculating power density in the far field of an individual RF source:

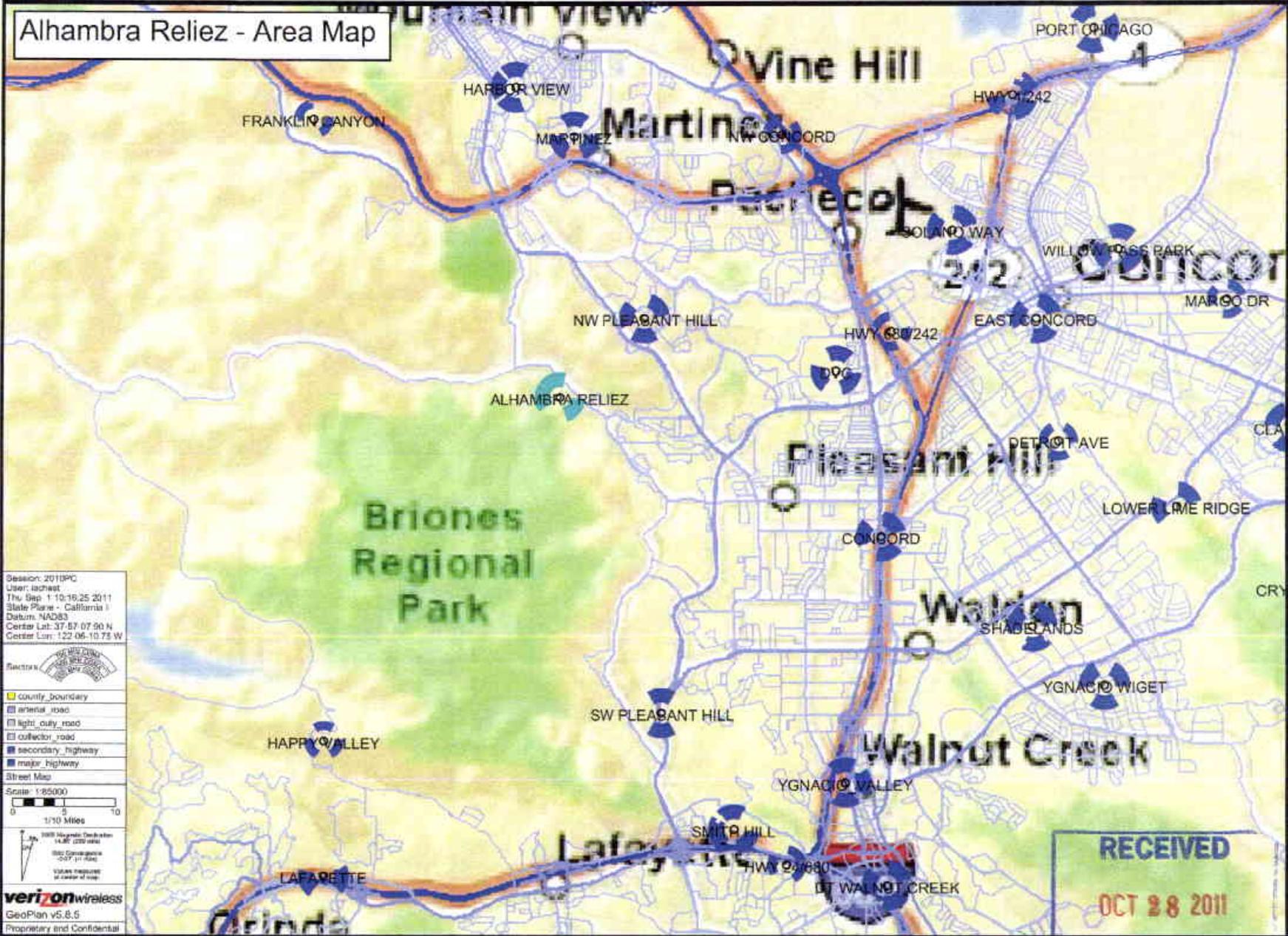
power density $S = \frac{2.56 \times 1.64 \times 100 \times RFF^2 \times ERP}{4 \times \pi \times D^2}$, in mW/cm²,

- where ERP = total ERP (all polarizations), in kilowatts,
- RFF = relative field factor at the direction to the actual point of calculation, and
- D = distance from the center of radiation to the point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 (1.6 x 1.6 = 2.56). The factor of 1.64 is the gain of a half-wave dipole relative to an isotropic radiator. The factor of 100 in the numerator converts to the desired units of power density. This formula has been built into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radiation sources. The program also allows for the description of uneven terrain in the vicinity, to obtain more accurate projections.



Alhambra Reliez - Area Map



Session: 2011PC
 User: iachest
 Thu, Sep 1 10:16:25 2011
 State Plane - California I
 Datum: NAD83
 Center Lat: 37.87 07.90 N
 Center Lon: 122.06-10.73 W

- Legend
- county boundary
 - arterial road
 - light duty road
 - collector road
 - ▬ secondary highway
 - ▬ major highway

Street Map
 Scale: 1:85000
 0 5 10
 1/10 Miles

2008 NAD83 Coordinate
 14.87 (220 miles)
 1000 Contours
 2007 1:10,000
 USGS National
 at center of map

verizon wireless
 GeoPlan v5.8.6
 Proprietary and Confidential

RECEIVED
 OCT 28 2011
 COMMUNITY DEV. DEPT

Alhambra Reliez - Existing Coverage



Session: 2010PC
 User: lachest
 Thu Sep 1 10:15:14 2011
 State Plane - California 1
 Datum: NAD83
 Center Lat: 37.67-07.90 N
 Center Lon: 122-06-10.76 W



- county boundary
- arterial road
- light duty road
- collector road
- secondary highway
- major highway
- F1 CDMA Ec

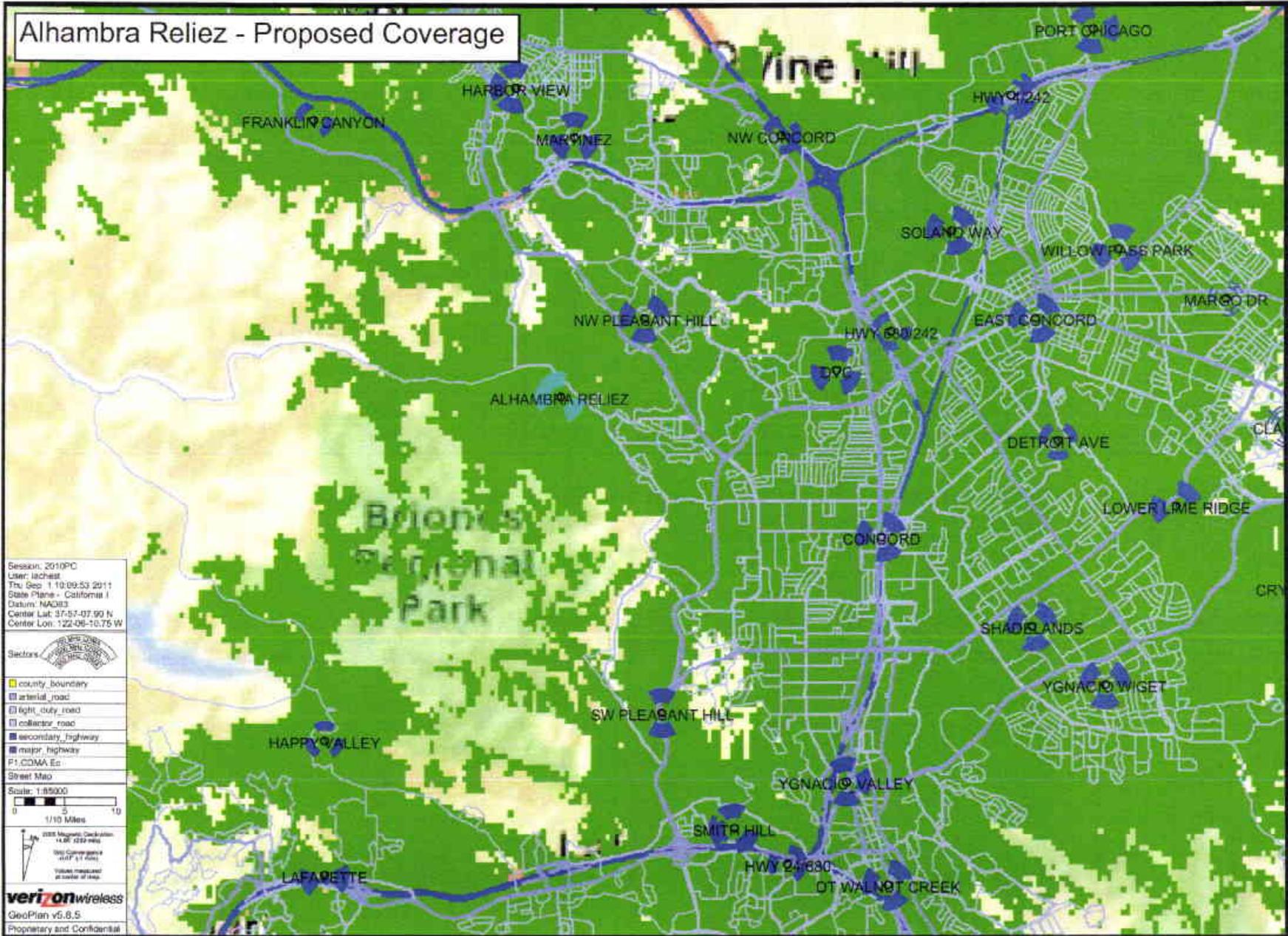
Street Map
 Scale: 1:85000
 0 5 10
 1/10 Miles

2008 Vertical Coordinate
 NAD 83
 UTM Zone 18N
 Values measured
 at center of job

verizonwireless
 GeoPlan v5.8.5
 Proprietary and Confidential

RECEIVED
 OCT 28 2011
 COMMUNITY DEV

Alhambra Reliez - Proposed Coverage



7/15/2011

**Alternative Site Analysis
Site No. 248124
814 Carter Acres Lane
Martinez, CA 94553**



Coverage Objective:

This site is considered a coverage site which means it will provide Verizon Wireless coverage to a surrounding area that currently has no or poor cell coverage..

Faced with the continued demand and utilization of wireless communications services, Verizon Wireless is working to improve network coverage to effectively meet the needs and expectations of its customer base. The proposed facility is necessary to provide adequate wireless service to local area residents, commuters, and professionals in the area. The lack of coverage presents an issue of concern in the event of an emergency when call volume is highest. In the case of accidents, fires, seismic events or other disasters, adequate coverage is needed to handle call volume on the network. Without it calls cannot be made or received, a serious issue for public safety in the event of an emergency.

- 1. PG&E tower adjacent to the west of the proposed tower along the same line. This tower is located on unimproved land owned by East Bay Regional Park District within Briones Park. This tower was looked at because it was the only other co-locatable facility in the search ring that provided adequate coverage. VZW was unable to gain access to the tower and it was therefore eliminated. See attached map for approximate location.**

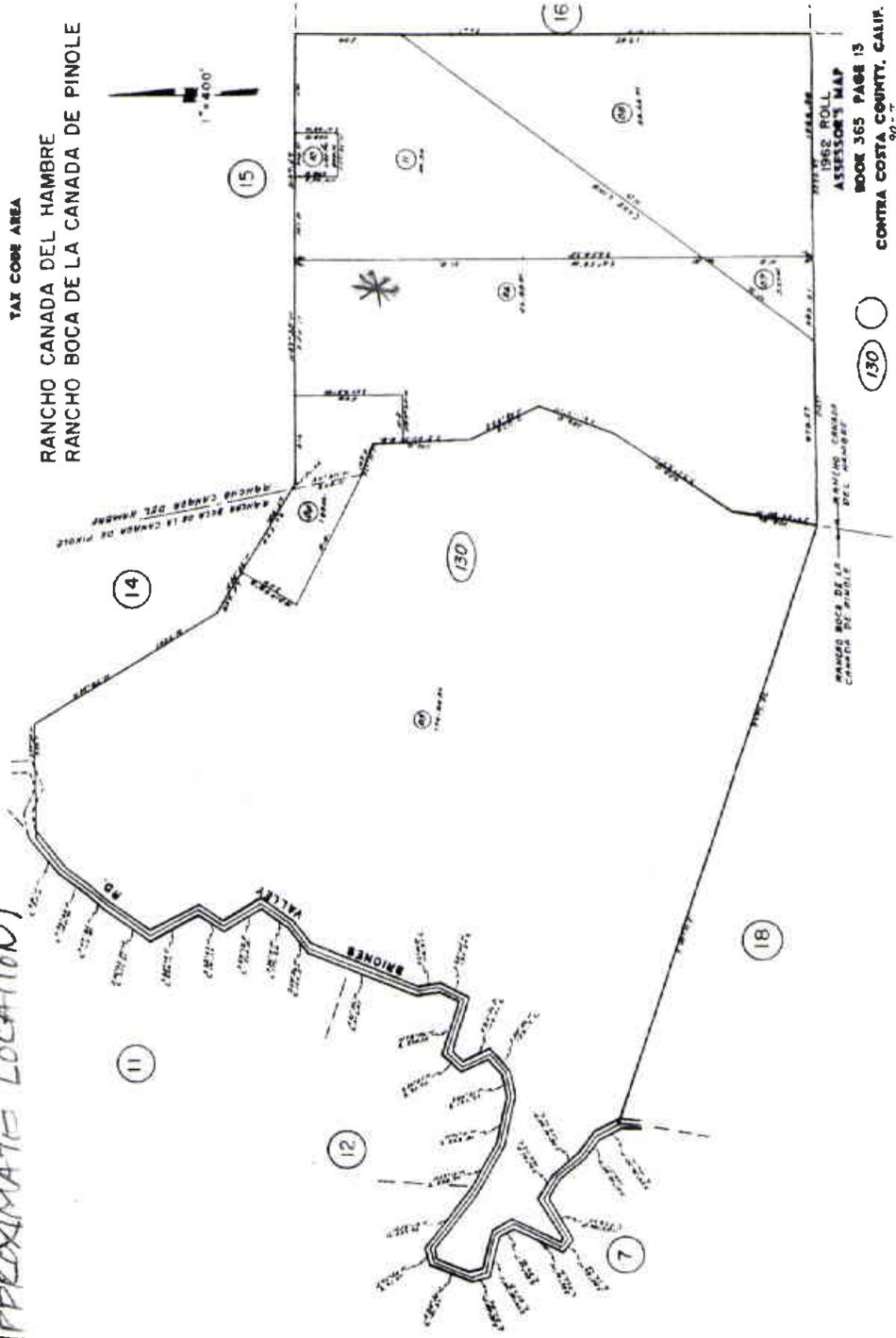
There were no other viable alternative sites without the need for a monopole.

ALTERNATIVE SITE

ALTERNATIVE TOWER SITE

LOCATED NEARBY

(APPROXIMATE LOCATION)



TAX CODE AREA

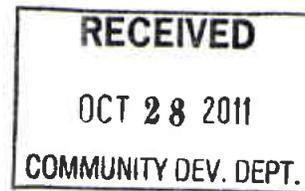
RANCHO CANADA DEL HAMBRE
RANCHO BOCA DE LA CANADA DE PINOLE

1962 ROLL
ASSESSOR'S MAP
BOOK 365 PAGE 13
CONTRA COSTA COUNTY, CALIF.



Letter of Authorization

Wireless Provider: Verizon Wireless
Tower #: 16/80
Line Name: Pittsburg-Sobrante 230 kV
Location: 814 Carter Acres Lane, Martinez
APN: 365-150-053



Pacific Gas and Electric Company, as the owner of the transmission tower noted above, hereby authorizes the Wireless Provider, its agents, and contractors to:

- Access the parcel noted above, subsequent to advance notice
- Conduct necessary activities such as site design visits, radio frequency tests
- Apply for and obtain all land use approvals and permits, which are appropriate for the installation, construction, and continued operation of a PCS communications site (including antennas and all ancillary equipment and structures).

In granting this authorization, the Wireless Provider, its agents and contractors understand and agree to the following:

- As the applicant, the Wireless Provider and/or its agents and contractors (not PG&E) are fully responsible for the payment of all application, review and permitting fees
- The Wireless Provider, its agents and contractors will be licensed and insured for any work they perform;
- The Wireless Provider, its agents and contractors will hold harmless and indemnify PG&E from any claims for damages resulting from the above-mentioned activities
- The Wireless Provider, its agents and contractors will not interfere with or impair access to the property
- Signing this letter does not constitute a legally binding agreement to lease the property
- The Wireless Provider shall be responsible and liable for all conditions contained in a conditional use permit issued by the responsible jurisdiction on behalf of "owner," "applicant" and/or "development permit holder" as referenced in the conditional use permit for as long as the same may exist (without regard to the term of the Master License Agreement).

Eric Jacobson

Eric Jacobson
Manager, Wireless Business Development
Pacific Gas and Electric Company

Site #: VZN-248124
Site Name: Alhambra Reliez

Date: September 14, 2011