

RF Radiation Levels from the Westmont Tower

So how much RF radiation exposure from the Westmont tower will local residents and school children endure? Unfortunately, we don't know for sure. The FCC does not require wireless providers to submit engineering analysis for individual base stations (cell site towers) in the manner that it does require for television and radio towers. In addition, T-Mobile has not made this information public. However, enough information is publicly available that a preliminary assessment can be made.

There are some informed estimates used in this analysis, all parameters and values used are listed at the end of this article. T-Mobile is welcome to dispute this assessment and provide actual values. We will happily recompile the assessment with information supplied by T-Mobile.

Figures 1 and 2 below show the predicted RF radiation exposures (power densities) in the vicinity of the T-Mobile cell tower.

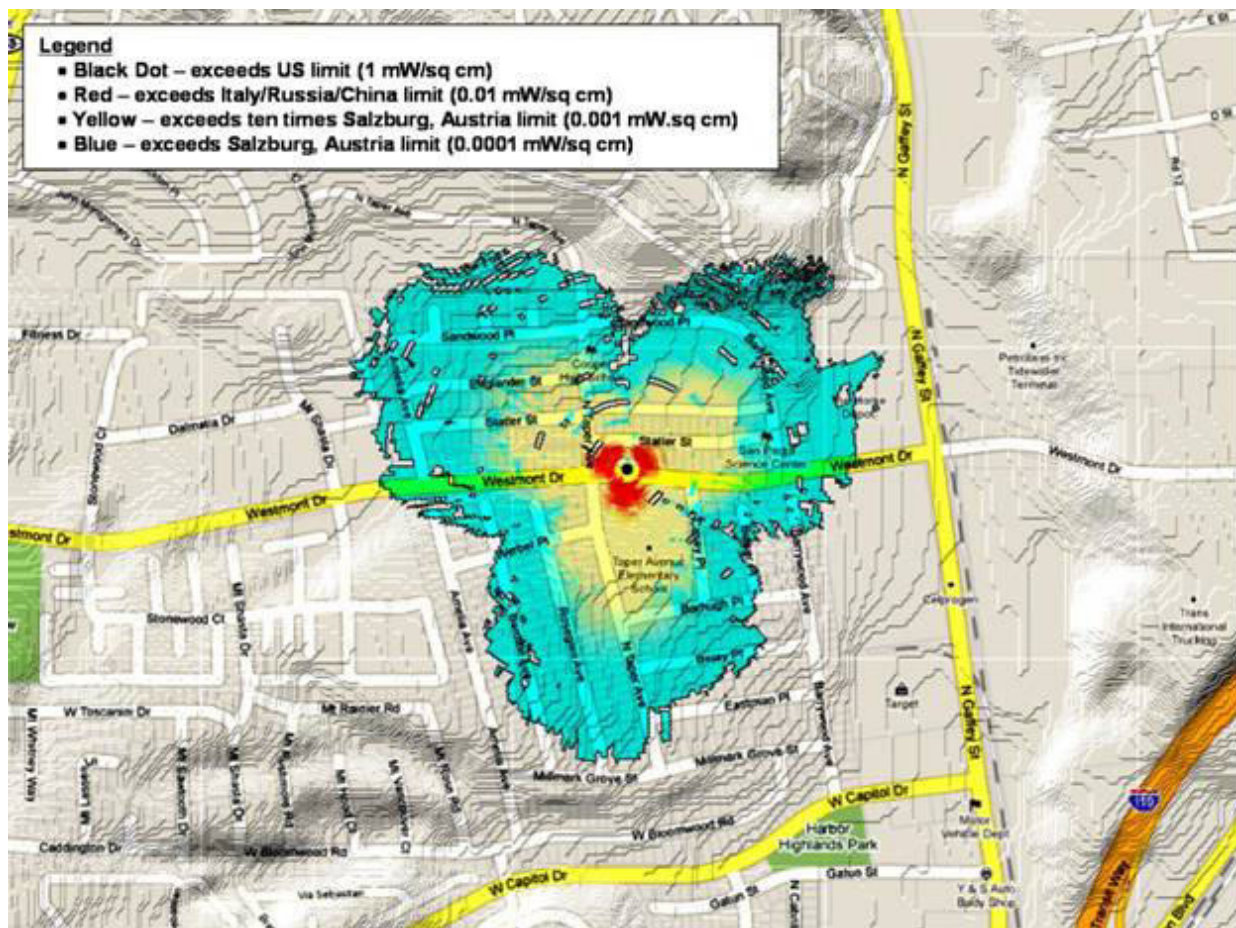


Figure 1: Map of Westmont cell site. Gray contours indicate area topography; contour lines are spaced at 1 meter increments. Streets appear as white and yellow. RF radiation exposure levels are shown as black, red, yellow, and blue colored contours. Three-lobed contour shape derives from antenna arrangement on tower.

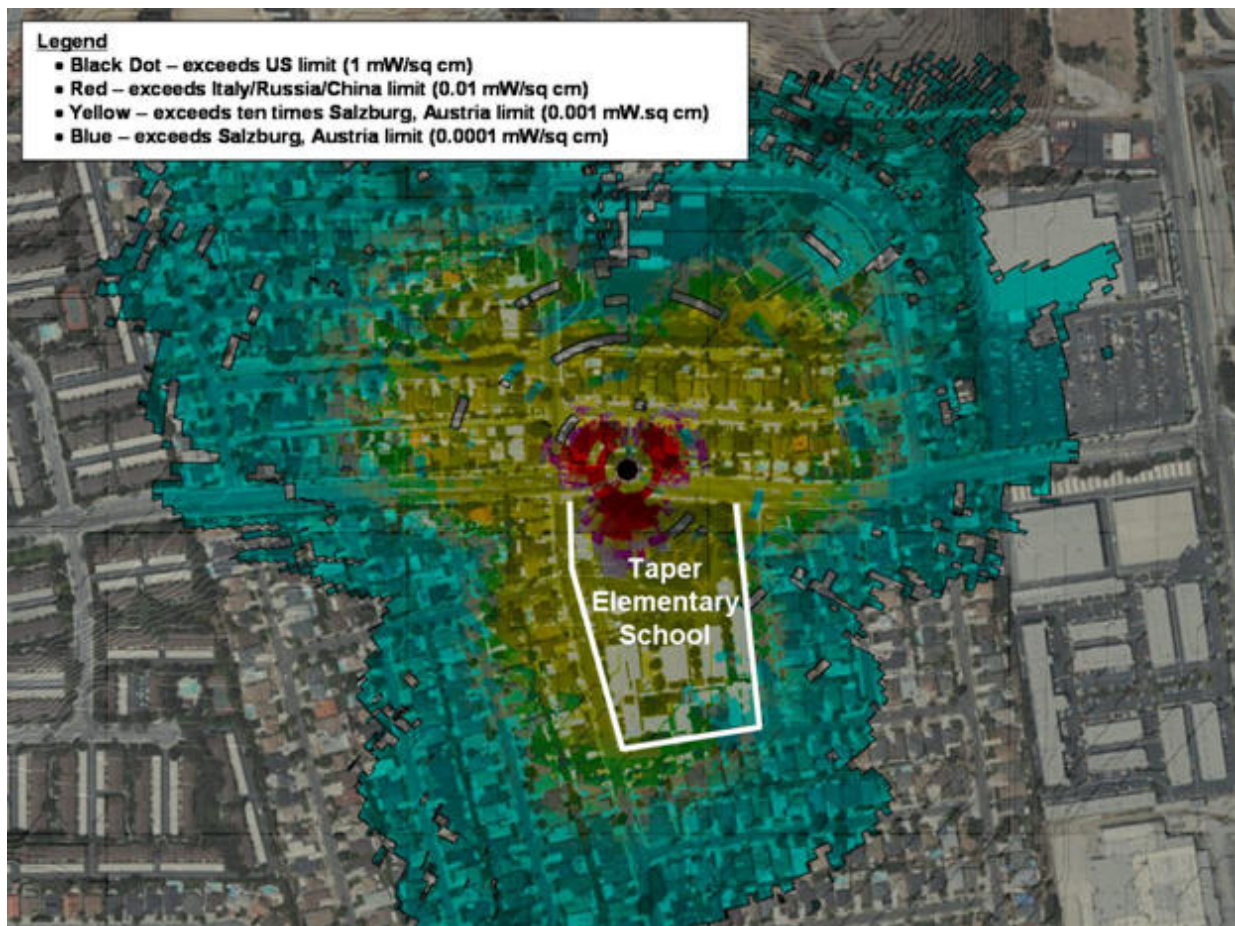


Figure 2: Westmont zoomed aerial photo with exposure contours. Note hundreds of residences and school grounds within the red, yellow and blue exposure areas.

What is the safe exposure level?

The small black dot around the tower in figures 1 and 2 is where the US federal regulation of 1 mW/cm^2 is exceeded. As can be seen, the black contour extends less than 10 feet from the tower. The tower height and antenna elevation pattern will prevent human exposure above US federal limits.

It is important to know that other countries think the 1 mW/cm^2 federal limit is far too lenient. The US limit was derived from decades-old studies evaluating the tolerable heating impact on human tissue (comparable to the effect of a microwave oven heating food). This limit does not consider other poorly understood effects such as neurological and immunological disturbances, and cancer incidence. In fact, Russian and Chinese medical studies document harmful health effects from RF radiation at levels far below the US limit. These health effects include headaches, fatigability, irritability, sleep disorders, and dizziness. These studies, along with others, have lead countries to impose a much lower exposure limit than that imposed in the US.

Countries/jurisdictions that impose a 0.01 mW/cm^2 limit for uncontrolled exposure (100 times lower than the US limit):

- Russia - (regulatory)
- China - (regulatory)
- Italy - (regulatory)
- Switzerland - (regulatory)
- Poland - (regulatory)
- City of Paris, France - (cooperative agreement)
- City of Toronto, Canada - (cooperative agreement)

The red contour in the maps above shows those areas that exceed this lower limit used in these other

countries (0.01 mW/cm^2). Note that the red contour includes up to 8 residential lots and a portion of the Taper Elementary campus.

It is also important to note that the Salzburg province of Austria has imposed a 0.0001 mW/cm^2 limit (10,000 times lower than the US limit). The Salzburg provincial government imposed this limit as a precautionary measure based on evidence that very low levels of RF radiation can be harmful.

The yellow and blue shaded contours in Figures 1 and 2 exceed the Salzburg limit (0.0001 mW/cm^2). This area includes a majority of the homes on both sides of Westmont.

The information below was compiled by Dr. Theodore Litovitz, Director of the BioElectromagnetics Laboratory at Catholic University of America. Dr. Litovitz evaluated the peer-reviewed medical literature on the biological effects of RF radiation exposure. As can be seen, this table shows biological effects at exposure levels far below the US limits.

**Biological Effects Induced by RF Radiation
Below Present-Day Permissible Levels**

Observed Effect	Exposure Level			How much below US limit	
	W/kg tissue	mW/cm ² low	mW/cm ² high	Low	High
Psychological Changes	0.03	0.020	0.130	1/50	1/8
Immune System Effects	0.015	0.010	0.065	1/100	1/17
Calcium Flux Increased	0.005	0.0034	0.0217	1/300	1/50
DNA Damage Induced	0.0024	0.0016	0.0104	1/600	1/100
Stress Protein Response	0.0010	0.0007	0.0043	1/1600	1/170
Blood-Brain Barrier Effects	0.0004	0.00027	0.00174	1/4000	1/650
Heart Calcium Effects	0.00015	0.00010	0.00065	1/10,000	1/1700
Increased Cell Proliferation (important in tumor growth)	0.000021	0.000014	0.000091	1/76,000	1/12,500

Note: Studies conducted quote specific absorption rate (SAR) in Watts per kilogram of tissue. Since absorption varies by tissue type and RF frequency, level below US limit is expressed as a range.

Table 1: Biological effects of RF radiation exposure from Dr. Theodore Litovitz.

T-Mobile complies with the very lax US regulation, but it appears that this tower would not be allowed in the countries noted above. While the need for these low limits has not been conclusively shown, other parts of the globe are not willing to be the guinea pigs for this real-time experiment. Why do we allow it?

Why Put the Tower Here?

Why would T-Mobile locate a tower next to homes and an elementary school? They say it can't be helped, the public demands the coverage. The impression has been given that this site is required to provide adequate coverage to the area. This is nonsense.

Using careful location and antenna selection, the area could be served by at least two alternate sites with significantly reduced health risks. The Westmont site appears to have been chosen without any regard to resident RF radiation exposure. The low-lying location places the adjacent elevated schoolyard and second story of nearby residences within the main axis of RF radiation from the tower. If human exposure had been a concern, the tower could have been located at a remote, elevated location using the natural contours of the topography to help shield nearby homes from high-level RF radiation, yet still provide excellent coverage.

Figure 3 shows two alternate locations located nearby. Figure 4 illustrates the RF radiation counters if the tower had been located within the uninhabited San Pedro Fuel Depot immediately north of the neighborhood. Figure 5 is a comparable diagram of the RF radiation contours if the tower had been located East of Gaffey Street adjacent to an industrial area. Both locations have been chosen to shield nearby residences and businesses from high radiation levels.

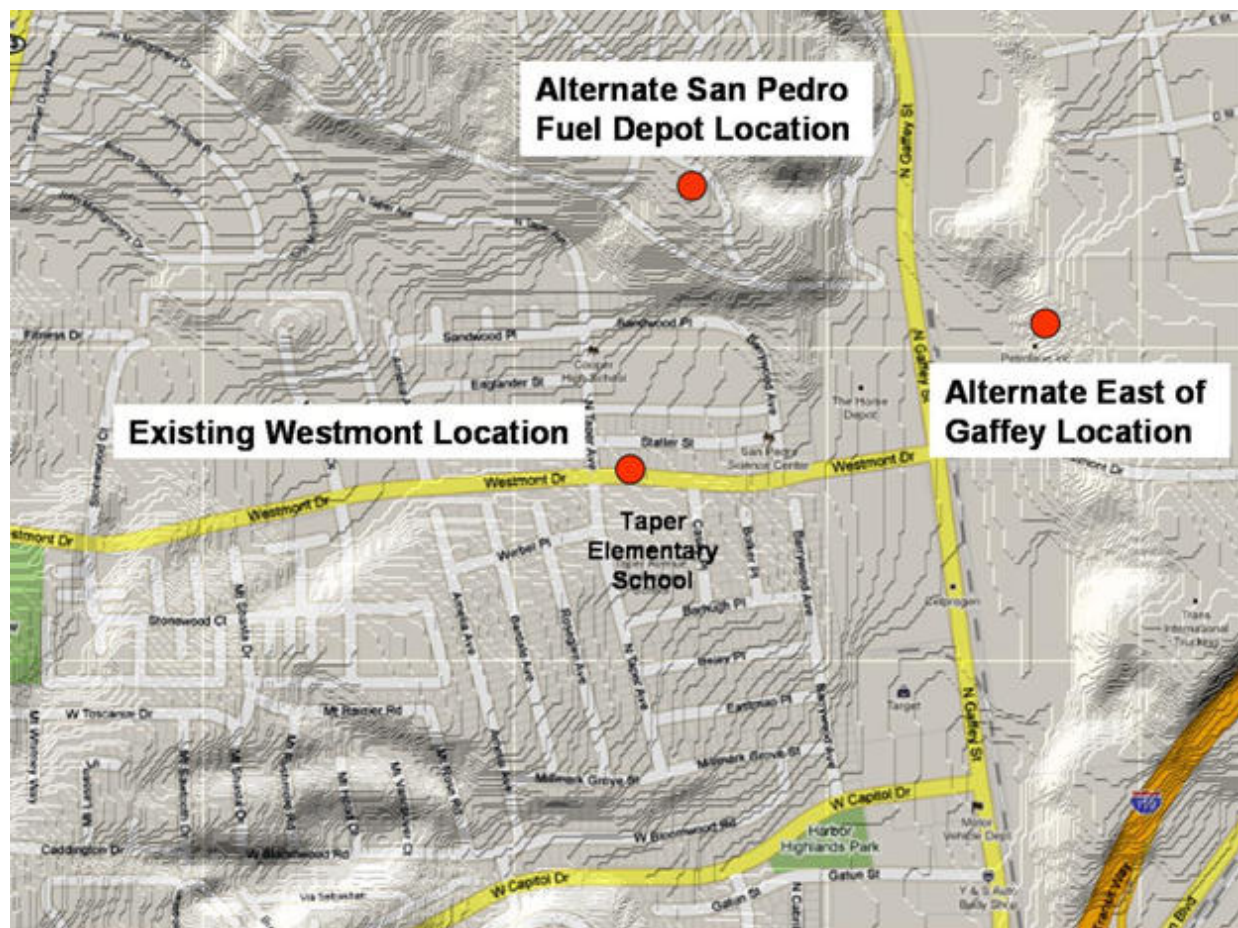


Figure 3: Alternate tower locations that could serve the neighborhood with significantly reduced health risks.



Figure 4: Exposure contours if the tower was located within the uninhabited San Pedro Fuel Depot instead of within the Westmont neighborhood. Note that no residences fall within the red or yellow contours (greater than 0.001 mW/cm²) and only a small portion of the neighborhood falls within the blue contour (0.0001 mW/cm²). Compare to Figure 2.

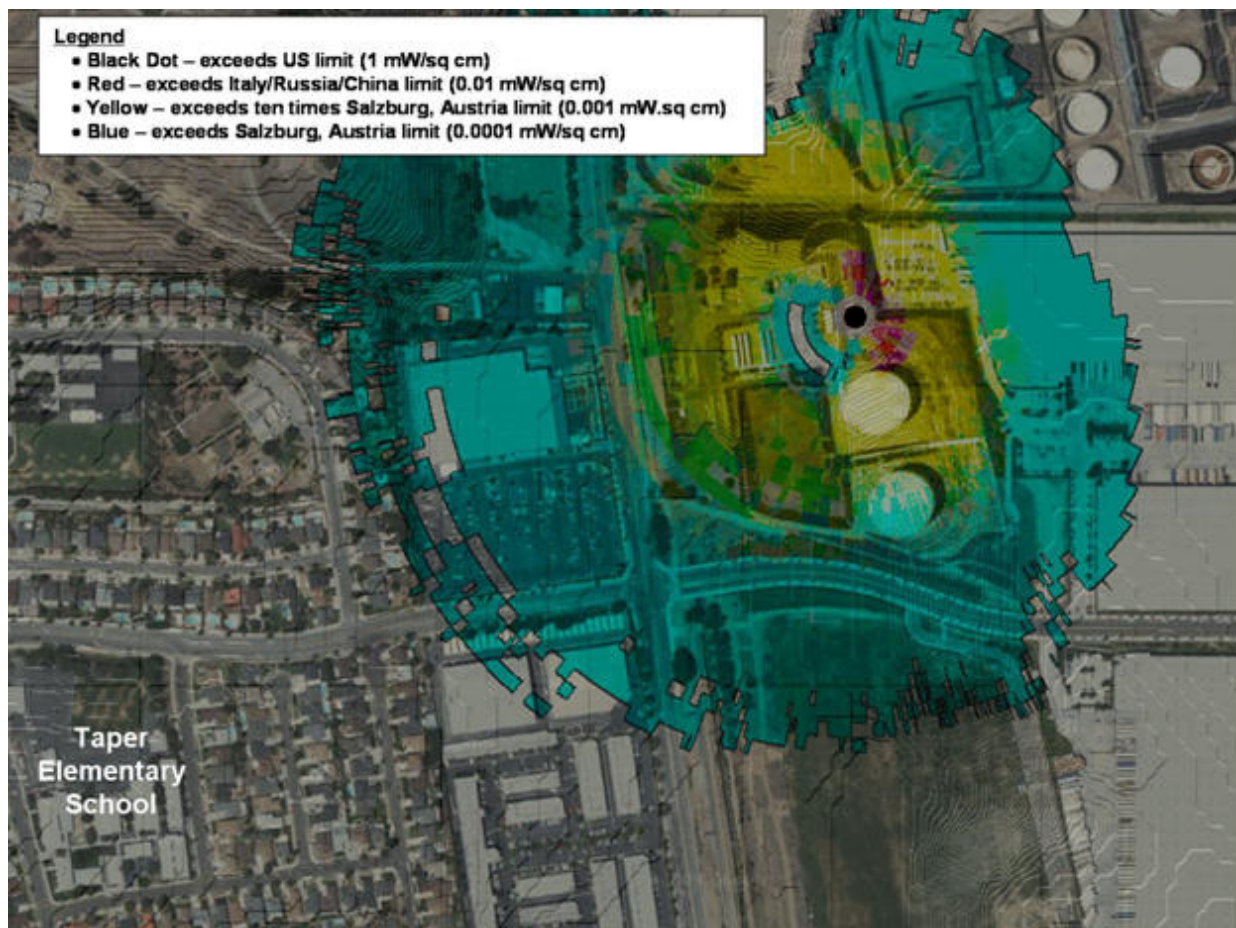


Figure 5: Exposure contours if the tower was located at the uninhabited Gaffey Street location instead of within the Westmont neighborhood. Note that no residences fall within the red or yellow contours (greater than 0.001 mW/cm²) and fewer than ten residences fall within the blue contour (0.0001 mW/cm²). Exposure to the business and the industrial area is limited to the blue contour. Compare to Figure 2.

At the alternate sites, most inhabited areas are now outside of the very low Salzburg exposure limits (the blue contours). The small number of residences that do fall within it are at the exposure fringes. The high-level black, red and yellow contours are well away from the nearest home, school or business. This is a very important consideration as residents will be exposed to these RF radiation levels 7 days a week, 24 hours a day. Unlike their personal cell phones, they can't turn the tower off when they aren't using it. The higher elevation and remoteness of these alternate sites provides comparable coverage using similar equipment with significantly reduced health risks.

Would the Alternate Sites Provide the Same Level of Service?

These alternate sites provide coverage as good as, or better than, the Westmont site. Compare in Figure 6 below the relative coverage of the Westmont site (top) and the coverage provided if the tower was sited at either of the uninhabited alternate sites (bottom). Note that the area topography causes some irregular coverage in low lying and/or shadowed areas, and the alternate sites often provide better coverage of these areas due to their higher elevation. Coverage across North San Pedro is comparable between the sites.

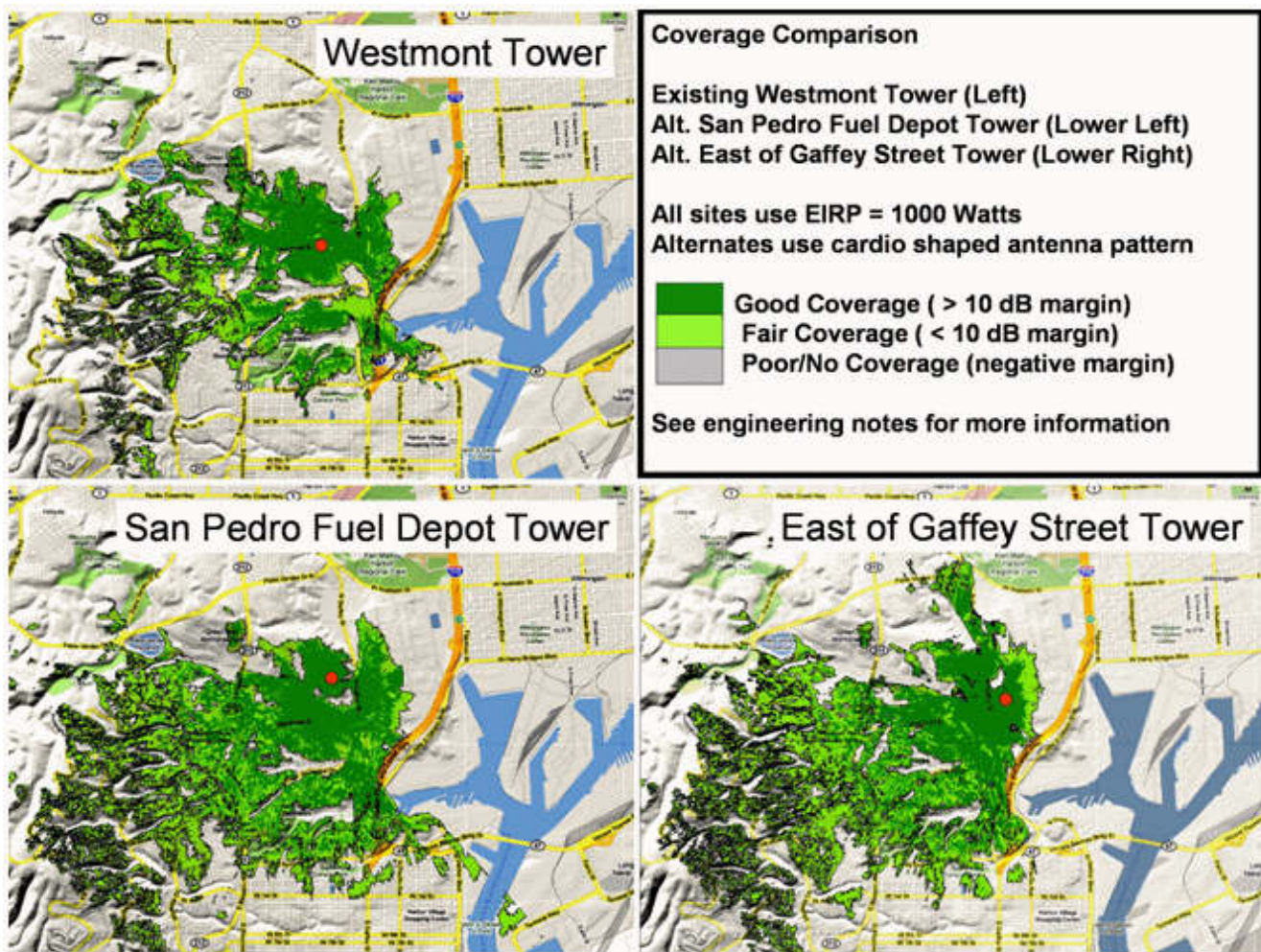


Figure 6: Westmont cell tower coverage on top left, coverage of alternate tower locations in uninhabited areas on bottom. Tower location shown by red dot. Different contour colors indicate strength of signal. Coverage is comparable in all locations.

So why has T-Mobile chosen the Westmont site? Because it's free to use and very easy to build. Utility easements, along with very lax City of Los Angeles planning and building codes, allow them to place the antennas on an existing phone poles **rent free** with virtually no input from the public or public agencies. The adjacent schoolyard allows them a place to locate the noisy equipment vault away from neighbors who might complain. If they were to erect a tower at either alternate site, they might need to negotiate a lease agreement and would probably need to meet higher engineering and code standards. The utility easement loophole allows them free reign.

It is clear the location selection was not determined by safety concerns as safer alternate sites are available. It was not determined by coverage needs as alternate sites are just as good or better. It appears the site location was driven entirely by T-Mobile's bottom line.

Engineering Information

The following parameters were used in the coverage contour assessment:

Site
 Tower height: 28 feet AGL to antenna center
 Height above ground level for exposure contours: 13 feet (simulate 2nd floor or residences)

Antenna
 Quantity: Six
 Type: Panel
 Pattern: 92 deg Azimuth HPBW, 14 deg Elevation HPBW
 Gain: 14.0 dBi

Polarization: Dual Linear
Azimuth Orientation: 63 deg, 182 deg and 240 deg
Elevation tilt: None

Transmitter

Frequency: 1900 MHz (assume PCS GSM)
Drive: 40 Watts per antenna port (EIRP 1000 W maximum)

Receiver Performance for Coverage Maps:

Sensitivity: -102 dBm
Antenna Gain: 0 dBi
Fading and Penetration Margin: 8 dB
Interference Margin: 3 dB
Body Loss: 3 dB
Height above ground: 4.5 feet

Poor/No Coverage areas have negative margin using the above criteria

Fair Coverage areas maintain 0 to 10 dB margin

Good Coverage areas maintain greater than 10 dB margin