



## EL DORADO COUNTY PLANNING & BUILDING DEPARTMENT

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Date: July 20, 2021

To: Board of Supervisors

From: Rommel (Mel) Pabalinas, Planning Manager  
Matthew Aselage, Assistant Planner

**Subject: Verizon Wireless Appeal of CUP20-0006 Planning Commission Denial  
File No. CUP-A21-0001  
Applicant: Verizon Wireless  
APN: 121-190-022**

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### Recommendation

Staff recommends the Board of Supervisors grant the appeal of the Planning Commission's denial of the Oak Ridge High School Cell Facility, CUP20-0006, thereby approving the project.

### Background

The Planning Commission held a public hearing on March 11, 2021 to review a request for the proposed Verizon Wireless facility within the Oak Ridge High School football stadium and denied Conditional Use Permit CUP20-0006. As modified since the Planning Commission, the project proposes the removal and replacement of two existing 55-foot-tall football stadium light standards located along the eastern side of the football field with two 80-foot-tall light standards (previously 85-foot-tall light standards). The southeastern light standard, which includes nine antennas and supporting equipment in addition to stadium lights and speakers, will be incorporated into a 175-square-foot lease area and supported by separate ground equipment including back-up battery power units. The northeastern light standard will contain stadium lights and speakers to match the height of the other stadium light standards.

Following the Planning Commission denial of the project, the applicant, Verizon Wireless, timely filed this appeal of the Commission's action on March 19, 2021 within 10 working days. The Zoning Ordinance provides that the appeal of a Planning Commission decision be decided at a public hearing with the Board of Supervisors within 30-days of appeal submission. At Verizon Wireless's request, the hearing was set for July 20, 2021 to allow Verizon Wireless additional time to perform new studies and analysis. A tolling agreement has been signed which extends the time for the Board of Supervisors to reach a decision on this appeal to July 30, 2021.

## Planning Commission Findings for Denial

Details of the Planning Commission's Findings for Denial of Conditional Use Permit CUP20-0006 can be found within Attachment A (PC Denial Findings) and are summarized below:

- The project as proposed may cause significant impacts to the environment including aesthetics, light glare and light pollution, noise, and land use/planning. Therefore, a mitigated negative declaration or environmental impact report would be required.
- There is substantial evidence that raising the field lights by 36 and 40-feet may have impacts to nighttime light and glare that were not analyzed or mitigated (Policy 2.8.1.1, Lighting Standards).
- The project lacks an accurate, stable, and finite project description with respect to lighting and visual impacts (Policy 2.8.1.1, Lighting Standards).
- There is substantial evidence that raising the lighting and speakers to accommodate the cellular facilities on the new light standards may be incompatible with the existing residential development (Policy 2.2.5.21, Compatibility with Surrounding Land Uses).
- There was no analysis regarding the impact to noise levels from raising the speakers and raised speakers may have significant impacts to noise on surrounding sensitive uses (Policy 6.5.1.2, Acoustical Analysis Requirement).
- Based on the statement in the applicant's Alternative Site Analysis, co-location on an existing pole is feasible and thus the proposed project does not meet the intent of the County's Wireless Communications Ordinance Section 130.40.130(A), Communication Facilities Applicability, which provides that "Communication service providers shall: Employ all reasonable measures to site their antennas on existing structures as façade mounts, roof mounts, or co-location on existing towers prior to applying for new towers or poles."
- The record provides no basis to suggest that the Commission's decision to deny the proposed project has unreasonably discriminated against the applicant in favor of providers of functionally equivalent services.
- The record provides insufficient evidence to suggest that the Commission's decision to deny the proposed project has prohibited access to wireless communication services in the geographic area of the proposed project site, or prevents the filling of a significant gap in the wireless service provided by Verizon.
- The Planning Commission reviewed the information regarding the possibility to collocate as described above. The information available to the Planning Commission did not demonstrate that the proposed site is the only alternative for service coverage. Not only is collocation required under Section 130.40.130(A)(1)(a), collocation would avoid the increased impacts to aesthetics, lighting, and noise caused by this project.

As the summary above reflects, the Planning Commission's Findings for Denial were centered around the lack of analysis available at the hearing on several issues. While the Planning Commission was willing to continue the item in order to allow the applicant time to provide the additional analysis, the applicant's agent was unable to obtain authorization to enter a tolling agreement with the County in order to allow for a continuance.

## Verizon Wireless Appeal

The appeal (Attachments B and C) claims that the project has been designed to minimize impacts on the surrounding area by replacing existing public infrastructure at the high school stadium. While the initial appeal filed was relatively short, the County allowed Verizon Wireless to supplement the grounds for the appeal and the evidence in support of it. The appeal now includes a set of exhibits which Verizon Wireless claims satisfies and responds to the Planning Commission's concerns that resulted in the denial determination. These exhibits are as follows:

- Exhibit A: Photo simulations of the Proposed Facility
- Exhibit B: Radio frequency exposure report by Dtech Communications
- Exhibit C: Noise report by Hammett & Edison, Inc., Consulting Engineers
- Exhibit D: Outdoor Lighting Plan prepared by Musco Sports Lighting
- Exhibit E: Alternative Site Analysis
- Exhibit F: Statement of Verizon Wireless RF Engineer Ericson Malana

The appeal items are listed below with appellant's responses summarized by staff immediately following:

- That there was substantial evidence presented that the cell tower facility and project as proposed may cause significant impacts to the environment.

*Response: The Commission found that, based on the lack of analysis and uncertainty about certain potential impacts, the Proposed Facility requires a negative declaration under the California Environmental Quality Act ("CEQA"). However, staff originally recommended a Class Three categorical exemption from CEQA per Section 15303 of the CEQA Guidelines. Class Three consists of "construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure." The CEQA Guidelines provide examples of the Class Three exemptions, including up to four commercial buildings not exceeding 10,000-square-feet in floor area. According to the appellant, the Proposed Facility footprint would total only 495-square-feet, much smaller than the Class Three example projects listed in the CEQA Guidelines. Moreover, courts have approved the application of the Class Three exemption to a wide variety of wireless and telecommunications projects. Based on the new analysis provided in support of the appeal, a Class Three categorical exemption is appropriate.*

- That there is substantial evidence that raising the field lights by 36 and 40 feet on the new light standards installed for the proposed project may have impacts to nighttime light and glare.

*Response: According to the appellant, the new study by Musco Sports Lighting (Exhibit D) confirms that the relocated stadium lights will substantially limit glare and will "cause no impact in light pollution to the surrounding community." Staff has analyzed the lighting*

*study per the requirements of Chapter 130.34 (Outdoor Lighting) and the Community Design Lighting Standards for outdoor sports and performance facilities. Staff has found the lighting study confirms that no direct light will fall outside of the Oak Ridge High School property lines, nor will there be light impacts affecting the Silva Valley right-of-way.*

- That the project lacks an accurate, stable, and finite project description with respect to lighting and visual impacts.

*Response: With respect to outdoor lighting, the appellant has now provided Exhibit D which confirms compliance with County outdoor lighting standards. The appellant states there is no evidence to the contrary. Further, Verizon Wireless has since reduced the height of the light standards from 85-feet to 80-feet. This reduction in height allows the pole top to be flush with the stadium lights, thereby not extending beyond the height necessary for mounting the lighting. Additionally, per the Community Design Lighting Standards, there are no pole height or lumens per acre requirements for the performance area. Photo simulations as found within Exhibit A show minimal visual impacts to the surrounding properties and confirm the light design, location, and setbacks match the other lights serving the stadium. Further, Exhibit A confirms the level of camouflage provided by the existing trees along Silva Valley Parkway.*

- That there is substantial evidence that raising the lighting and speakers to accommodate the cellular facilities on the new light standards may be incompatible with the existing residential development.

*Response: The proposed facility pole is surrounded by three school properties: Oak Ridge High School to the north and west, Silva Valley Elementary School due south, and Rolling Hills Middle School east across Silva Valley Parkway. The replacement stadium light poles that match the existing light poles across the field are entirely compatible with these surrounding school uses. There are no residential parcels directly adjacent to the Proposed Facility. The closest residences are over 300-feet away to the southeast, across Silva Valley Parkway and south of the middle school property. Their distant views of the replacement light poles at the stadium will be substantially blocked by trees along Silva Valley Parkway and within that residential zone. The photo simulations (Exhibit A) demonstrate the minimal visual impact of the replacement light poles from nearby vantage points.*

- That there was no analysis regarding the impact to noise levels from raising the speakers to accommodate the project and that raised speakers may have significant impacts to noise on surrounding sensitive uses, which include two additional schools and many residences

*Response: With respect to noise, the appellant has now provided a noise study (Exhibit C) which confirms compliance with the County noise standards. Relocating the stadium speakers a short distance at the same height will cause no impact on noise levels at the closest residences, which are over 300-feet southeast. The proposed facility will use batteries for back-up power, not a generator.*

- That co-location on an existing pole is feasible and, thus, the proposed project does not meet the intent of the County's Wireless Communications Ordinance.

*Response: As now described in Exhibit E and despite prior statements in the applicant's prior Alternative Site Analysis, co-location of nine additional antennas and nine radios on the currently existing stadium light standards doubling as a cell tower use along the western side of the football stadium is impractical due to structural requirements, as well as the School District's preference for consistent lighting and equipment separation.*

- The record provides no basis to suggest that the Commission's decision to deny the proposed project has unreasonably discriminated against the applicant in favor of providers of functionally equivalent services.

*Response: The appellant claims that the Planning Commission's denial violated Federal Law because it lacked substantial evidence. In contrast, Verizon Wireless has now provided ample evidence to support approval of the proposed facility. Further, the appellant claims that while Verizon Wireless must seek a Conditional Use Permit for its wireless facility on a relocated stadium light pole, the El Dorado Union High School District could replace the light poles on its own with no need for a County zoning permit. State law allows a school board to render a local zoning ordinance inapplicable to a proposed use of school property (Government Code Section 53094). If the School District applied this state law to replace the stadium lights, with no wireless facility, then the new lights would not be subject to the County's zoning code, including the outdoor lighting standards.*

- The record provides insufficient evidence to suggest that the Commission's decision to deny the proposed project has prohibited access to wireless communication services in the geographic area of the proposed project site, or prevents the filling of a significant gap in the wireless service provided by Verizon.

*Response: According to the appellant, a local government's denial of a wireless facility permit violates the "effective prohibition" clause of the Federal Telecommunications Act if the wireless provider can show two things: (1) that it has a "significant gap" in service; and (2) that the proposed facility is the "least intrusive means," in relation to the land use values embodied in local regulations, to address the gap. If a provider proves both elements, the local government must approve the facility, even if there is substantial evidence to deny the permit under local land use provisions (which there is not in this case). As confirmed in the Statement of Verizon Wireless RF Engineer Ericson Malana described above, attached as Exhibit F, Verizon Wireless has identified a significant gap in LTE service coverage in southern El Dorado Hills. In-building service is lacking in residential areas along Silva Valley Parkway south of the high school, and in-vehicle service is lacking along significant stretches of Silva Valley Parkway and Serrano Parkway. Distant Verizon Wireless facilities provide only weak service levels to much of the gap, compromising network accessibility and reliability. The Proposed Facility will provide new, reliable LTE service coverage to these areas. To address the significant gap, Verizon Wireless evaluated seven specific alternatives, as described in the comprehensive Alternatives Analysis discussed above, attached as Exhibit*

*E. Verizon Wireless discounted alternatives that cannot serve the significant gap or are infeasible. The Alternatives Analysis confirms that the Proposed Facility is the least intrusive feasible means to provide wireless service to the significant gap.*

## **Conclusion**

Staff has considered the appellant's updated documentation submitted for this appeal and has found the provided information sufficient towards responding to the Planning Commission's Findings for Denial. Staff recommends the Board of Supervisors grant the appeal CUP-A21-0001, thereby reversing the Planning Commission's denial of the project, resulting in the approval of Conditional Use Permit CUP20-0006 for the proposed Verizon wireless facility at the Oak Ridge High School football stadium, subject to the revised Findings and Conditions of Approval for the project.

The Board of Supervisors may also consider the following alternatives:

1. Deny the appeal, thereby upholding the denial of Conditional Use Permit CUP20-0006 for the proposed Verizon wireless facility, based on the Findings for Denial adopted by the Planning Commission and potentially revised by the Board of Supervisors.
2. Direct staff to remand project to the Planning Commission for further review, consideration, and determination of the appellant's newly submitted documentation, provided that the applicant is willing to execute a new tolling agreement to allow for this additional time.



*Existing*



*Proposed*

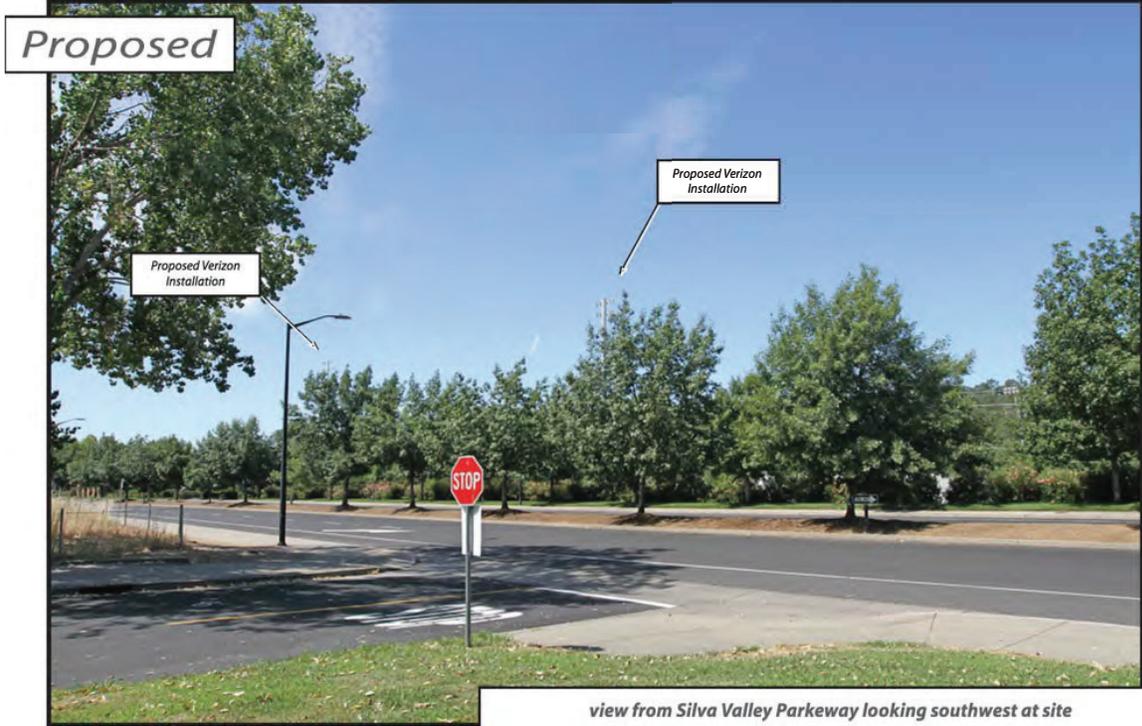
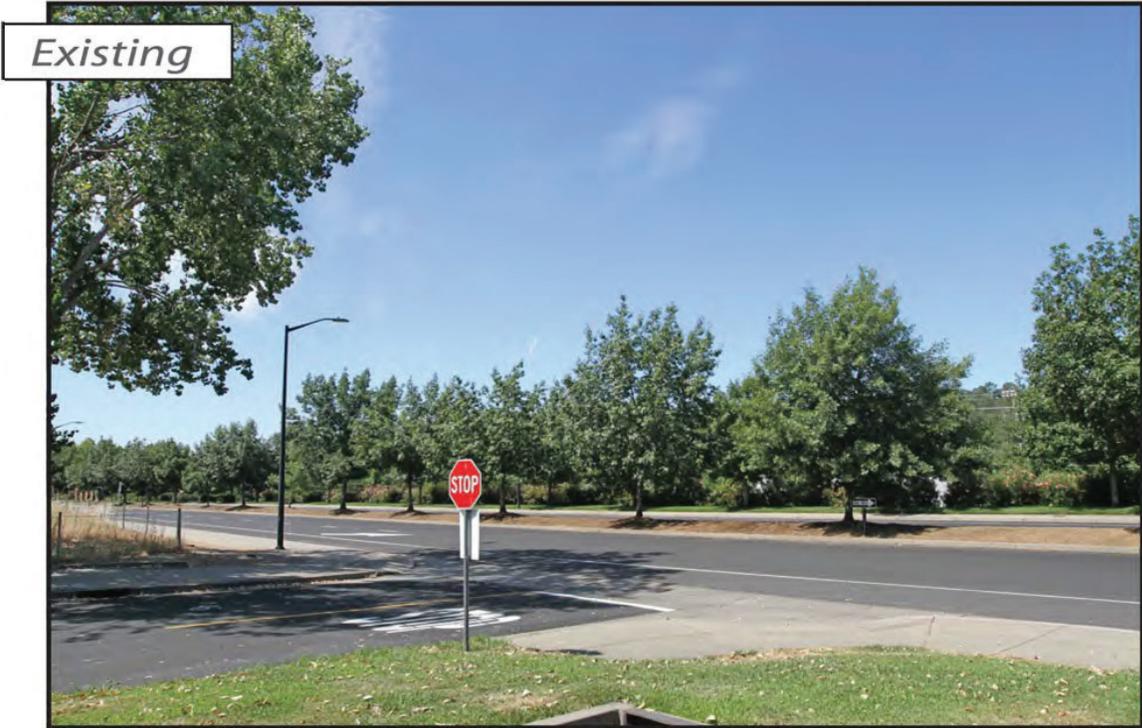


*view from Silva Valley Parkway looking northwest at site*

**AdvanceSim**  
Photo Simulation Solutions  
Contact (925) 202-8507

**verizon**  
239662 Serrano  
1120 Harvard Way, El Dorado Hills, CA  
Photosims Produced on 5-24-2021

CUP-A21-0001 Exhibit A: Photo simulations of the Proposed Facility



view from Silva Valley Parkway looking southwest at site

**verizon** ✓

239662 Serrano  
 1120 Harvard Way, El Dorado Hills, CA  
 Photosims Produced on 5-24-2021

**AdvanceSim** →  
 Photo Simulation Solutions  
 Contact ( 925 ) 202-8507

CUP-A21-0001 Exhibit A: Photo simulations of the Proposed Facility

Existing



Proposed



view from Harvard Way looking south at site

**AdvanceSim**  
Photo Simulation Solutions  
Contact ( 925 ) 202-8507

**verizon**

239662 Serrano  
1120 Harvard Way, El Dorado Hills, CA  
Photosims Produced on 5-24-2021

Existing



Proposed



view from Tah Nee Way looking southeast at site

**AdvanceSim**  
Photo Simulation Solutions  
Contact ( 925 ) 202-8507

**verizon**

239662 Serrano  
1120 Harvard Way, El Dorado Hills, CA  
Photosims Produced on 5-24-2021



**RADIO FREQUENCY ELECTROMAGNETIC FIELDS EXPOSURE REPORT**

Prepared for Verizon

c/o Epic Wireless Group LLC

Site Name: **Serrano**  
Site Type: **Ball-field Light**

Located at:

1120 Harvard Way  
El Dorado Hills, CA 95762  
Latitude: 38.6790 / Longitude: -121.0686

Report Date: **2/5/2019**  
Report By: **Christopher Stollar, P.E.**

Based on FCC Rules and Regulations, Verizon will be compliant provided recommendation(s) are implemented.

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## 1.0 EXECUTIVE SUMMARY

Dtech Communications, LLC (“Dtech”) has been retained by Epic Wireless Group LLC., contractors to Verizon, to determine whether its wireless communications facility complies with the Federal Communications Commission (“FCC”) Radio Frequency (“RF”) Safety Guidelines. This report contains a computer-simulated with an on-site visit analysis of the Electromagnetic Fields (“EMF”) exposure resulting from the facility. The analysis also includes assessment of existing wireless carriers on site, where information is provided. The table below summarizes the results at a glance:

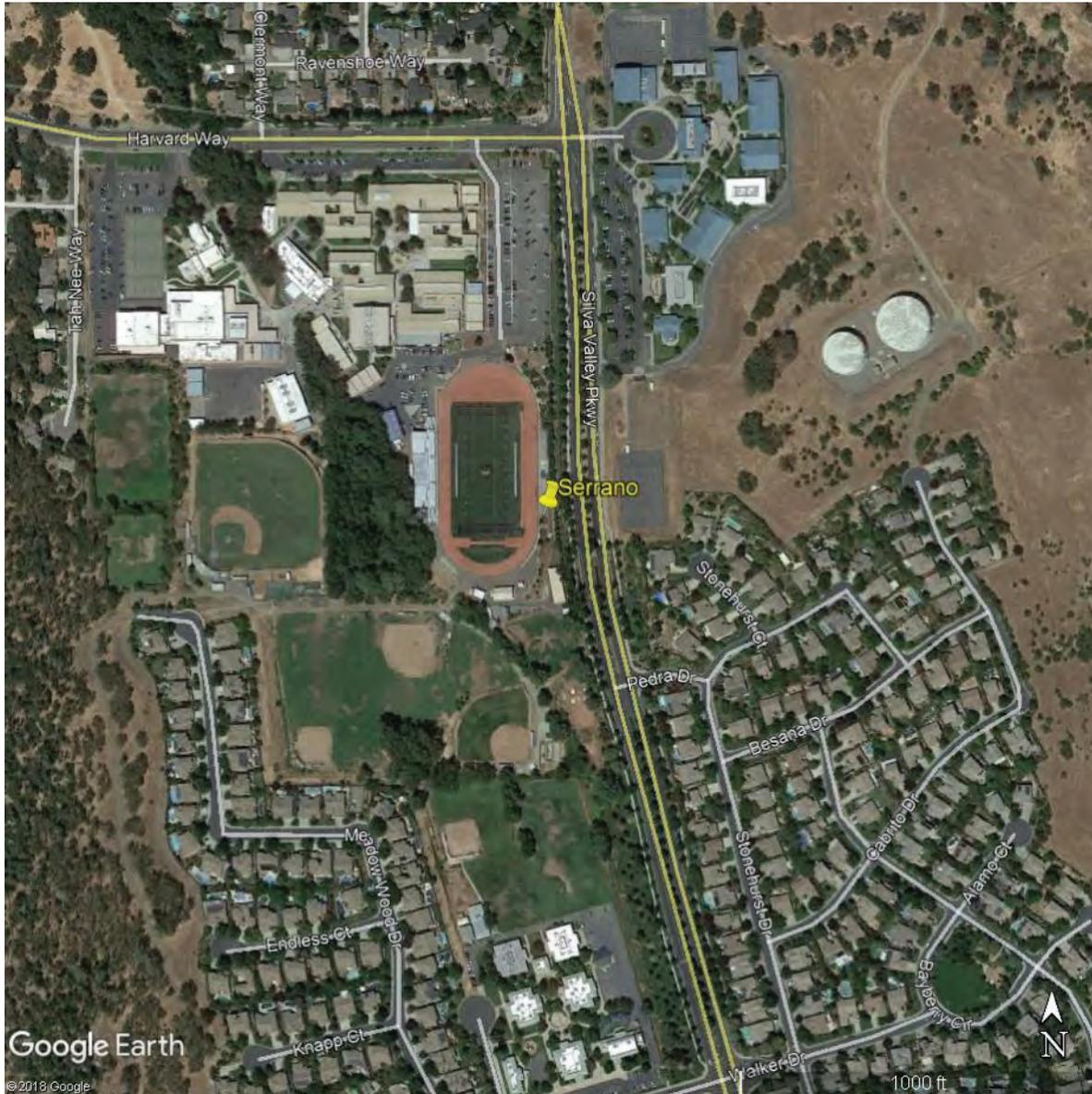
*Table 1: EMF Summary*

<b>Verizon</b>	<b>Summary</b>
<b>Access Type</b>	Man-Lift/Ladder
<b>Access to antennas locked</b>	NA
<b>RF Sign(s) @ access point(s)</b>	Caution (Recommended)
<b>RF Sign(s) @ antennas</b>	None
<b>Barrier(s) @ sectors</b>	NA
<b>Max EMF level for Verizon on Ground</b>	1.0% General Population
<b>Max cumulative EMF level for facility on Ground</b>	1.0% General Population
<b>Min Clearance Distance from Face of Verizon’s Antennas</b>	52 Feet

## 2.0 SITE DESCRIPTION

The wireless telecommunication facility is located on the ground. The facility consists of 3 wireless carrier(s) or operator(s): Verizon, T-Mobile and Sprint. The antennas are typically grouped into sectors pointing in different directions to achieve the desired areas of coverage. Verizon's antennas will be mounted on a ball-field light standard and connected to the equipment via coaxial cables.

### 2.1 Site Map



## 2.2 Site Photographs



Verizon Proposed Location



Verizon Proposed Location



Verizon Proposed Location



Verizon Proposed Location



T-Mobile All Sectors



Sprint All Sectors

## 2.3 Antenna Inventory

Technical specifications in the table below are provided by our clients and/or gathered from physical field surveys where applicable and/or possible. Conservative estimates are used where information is not provided or available.

*Table 2: Site Technical Specifications*

Antenna ID	Operator	Antenna Mfg	Antenna Model	Type	Frequency (MHz)	Orientation (°T)	Horizontal BWidth (°)	Antenna Aperture (ft)	Antenna Gain (dBd)	Total Input Power (Watts)	Total ERP (Watts)	Bottom Tip Height Above Ground (Z) (ft)	Bottom Tip Height Ant Level (Z) (ft)
A1	Verizon	Commscope	NHH-45C-R2B	Panel	746	130	48	8.0	15.4	142	4932	57.0	0.0
A1	Verizon	Commscope	NHH-45C-R2B	Panel	880	130	43	8.0	16.2	142	5902	57.0	0.0
A1	Verizon	Commscope	NHH-45C-R2B	Panel	2120	130	42	8.0	17.7	283	16756	57.0	0.0
A2	Verizon	Commscope	NHH-45C-R2B	Panel	746	130	48	8.0	15.4	142	4932	57.0	0.0
A2	Verizon	Commscope	NHH-45C-R2B	Panel	880	130	43	8.0	16.2	142	5902	57.0	0.0
A2	Verizon	Commscope	NHH-45C-R2B	Panel	1965	130	38	8.0	17.4	283	15459	57.0	0.0
A3	Verizon	Commscope	NHH-45C-R2B	Panel	2120	130	42	8.0	17.7	283	16756	57.0	0.0
B1	Verizon	Commscope	NHH-45C-R2B	Panel	746	190	48	8.0	15.4	142	4932	57.0	0.0
B1	Verizon	Commscope	NHH-45C-R2B	Panel	880	190	43	8.0	16.2	142	5902	57.0	0.0
B1	Verizon	Commscope	NHH-45C-R2B	Panel	2120	190	42	8.0	17.7	283	16756	57.0	0.0
B2	Verizon	Commscope	NHH-45C-R2B	Panel	746	190	48	8.0	15.4	142	4932	57.0	0.0
B2	Verizon	Commscope	NHH-45C-R2B	Panel	880	190	43	8.0	16.2	142	5902	57.0	0.0
B2	Verizon	Commscope	NHH-45C-R2B	Panel	1965	190	38	8.0	17.4	283	15459	57.0	0.0
B3	Verizon	Commscope	NHH-45C-R2B	Panel	2120	190	42	8.0	17.7	283	16756	57.0	0.0
C1	Verizon	Commscope	NHH-45C-R2B	Panel	746	350	48	8.0	15.4	142	4932	57.0	0.0
C1	Verizon	Commscope	NHH-45C-R2B	Panel	880	350	43	8.0	16.2	142	5902	57.0	0.0
C1	Verizon	Commscope	NHH-45C-R2B	Panel	2120	350	42	8.0	17.7	283	16756	57.0	0.0
C2	Verizon	Commscope	NHH-45C-R2B	Panel	746	350	48	8.0	15.4	142	4932	57.0	0.0
C2	Verizon	Commscope	NHH-45C-R2B	Panel	880	350	43	8.0	16.2	142	5902	57.0	0.0
C2	Verizon	Commscope	NHH-45C-R2B	Panel	1965	350	38	8.0	17.4	283	15459	57.0	0.0
C3	Verizon	Commscope	NHH-45C-R2B	Panel	2120	350	42	8.0	17.7	283	16756	57.0	0.0
A1	T-Mobile	Ericsson	AIR 21	Panel	1900	90	62	4.5	15.5	-	2083	44.7	NA
A1	T-Mobile	Ericsson	AIR 21	Panel	2100	90	61	4.5	15.7	-	1936	44.7	NA
A2	T-Mobile	Commscope	LNx-6514DS-VTM	Panel	700	90	65	6.1	13.8	-	1702	44.0	NA
B1	T-Mobile	Ericsson	AIR 21	Panel	1900	180	62	4.5	15.5	-	2083	44.7	NA
B1	T-Mobile	Ericsson	AIR 21	Panel	2100	180	61	4.5	15.7	-	1936	44.7	NA
B2	T-Mobile	Commscope	LNx-6514DS-VTM	Panel	700	180	65	6.1	13.8	-	1702	44.0	NA
C1	T-Mobile	Ericsson	AIR 21	Panel	1900	340	62	4.5	15.5	-	2083	44.7	NA
C1	T-Mobile	Ericsson	AIR 21	Panel	2100	340	61	4.5	15.7	-	1936	44.7	NA
C2	T-Mobile	Commscope	LNx-6514DS-VTM	Panel	700	340	65	6.1	13.8	-	1702	44.0	NA
A1	Sprint	Unknown	Unknown	Panel	1900	90	66	6.0	15.8	-	1500	44.0	NA
A2	Sprint	Unknown	Unknown	Panel	2500	90	60	6.0	14.5	-	1500	36.0	NA
B1	Sprint	Unknown	Unknown	Panel	1900	180	66	6.0	15.8	-	1500	44.0	NA
B2	Sprint	Unknown	Unknown	Panel	2500	180	60	6.0	14.5	-	1500	36.0	NA
C1	Sprint	Unknown	Unknown	Panel	1900	340	66	6.0	15.8	-	1500	44.0	NA
C2	Sprint	Unknown	Unknown	Panel	2500	340	60	6.0	14.5	-	1500	36.0	NA

### 3.0 ANALYSIS

#### 3.1 Site Diagram

Figure 1: Site Diagram - Plan (bird's eye) view



### 3.2 Emission Predictions

Figure 2: Plan (bird's eye) view map of results compared to FCC's General Population MPE (Maximum Permissible Exposure) Limits. Gray represents areas where exposure levels are calculated to be at or below 5%; Green- between 5% & 100% (below MPE limits); blue, yellow & red – greater than 100% (exceeds MPE limits). Individuals can safely occupy areas in gray and green for indefinite amount of time; whereas areas in blue, yellow & red must be restricted to RF trained personnel who has been made fully aware of potential for exposure, has control and knows how to reduce their exposure with the use of personal protection equipment or has the ability to power down the transmitters.

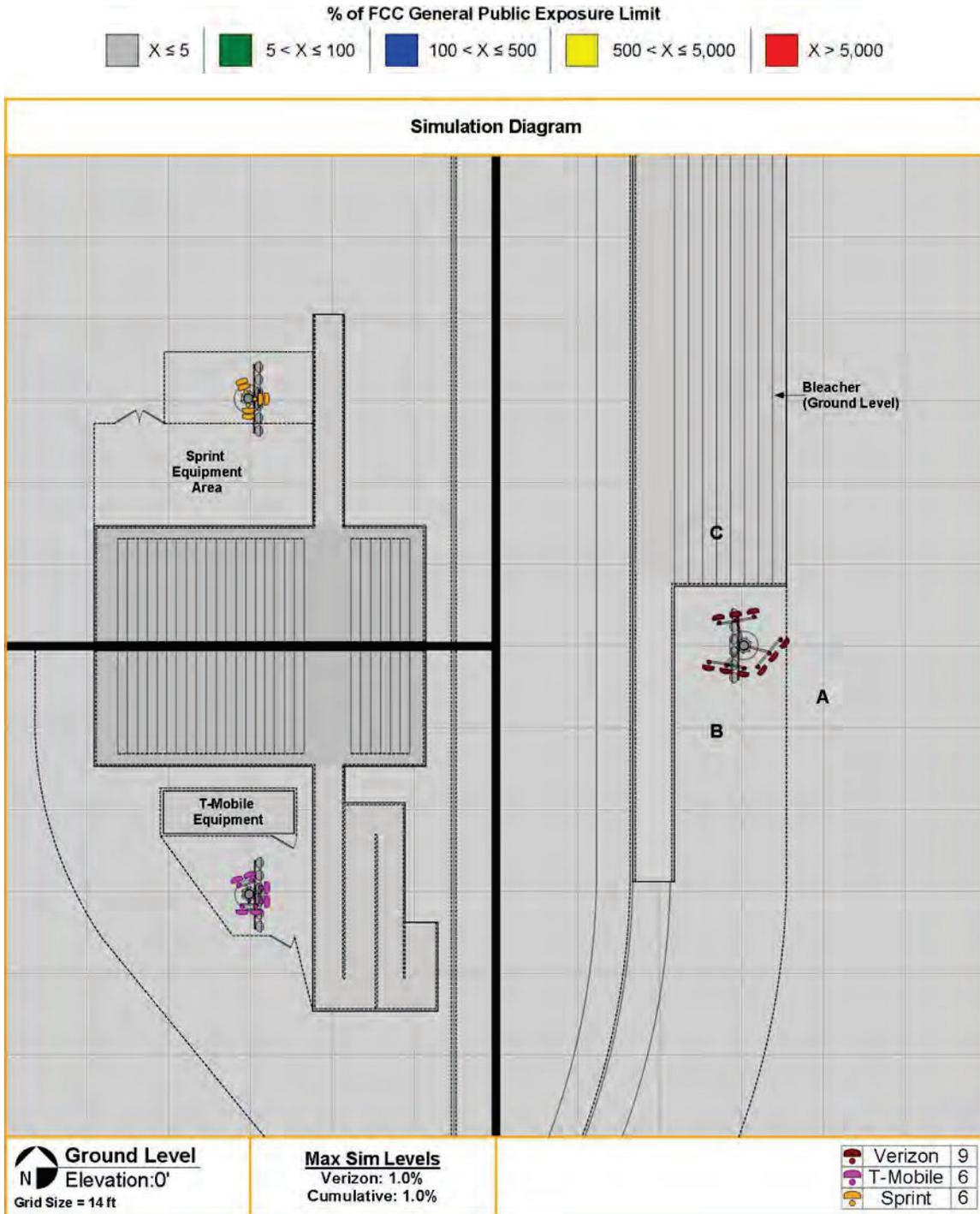
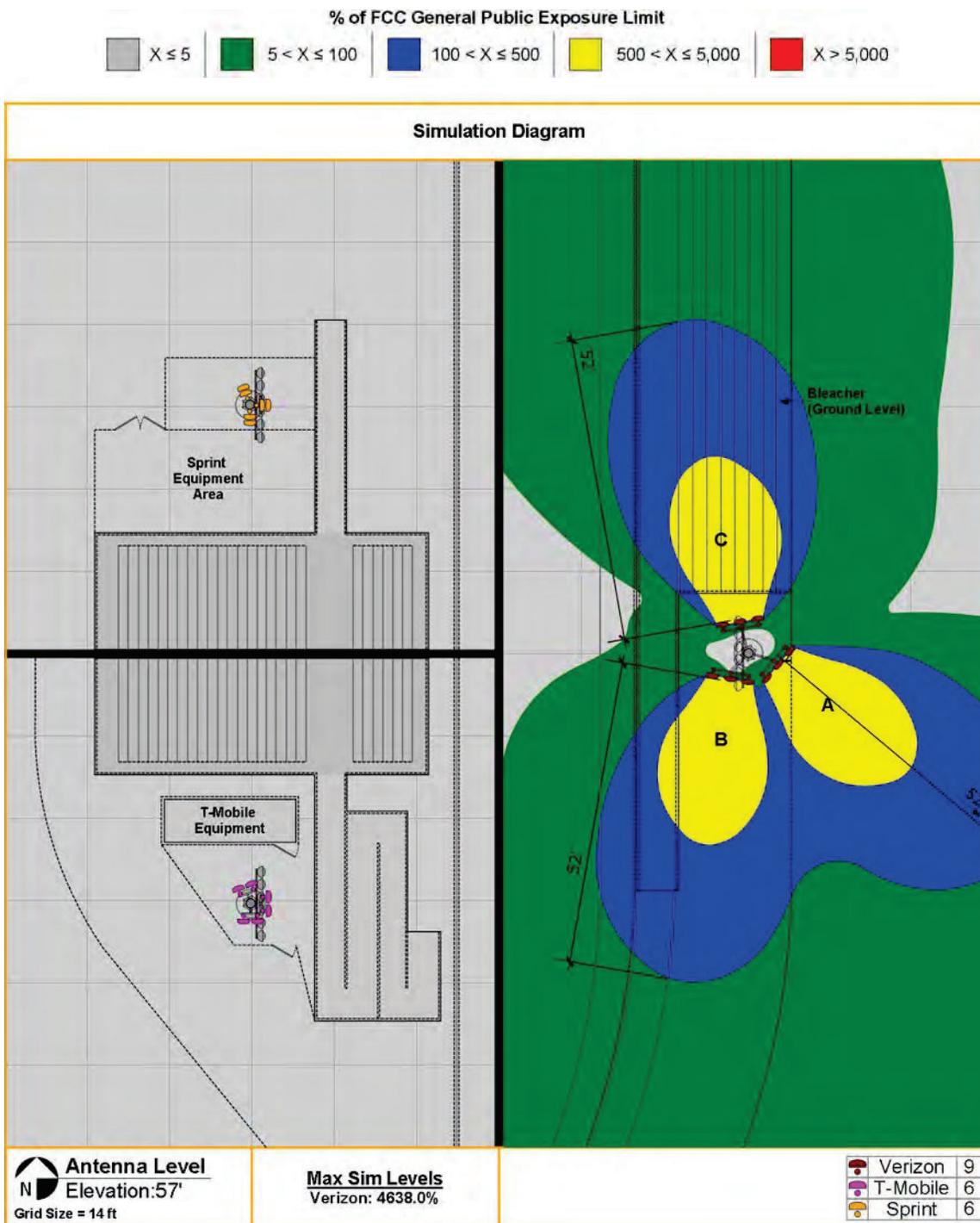


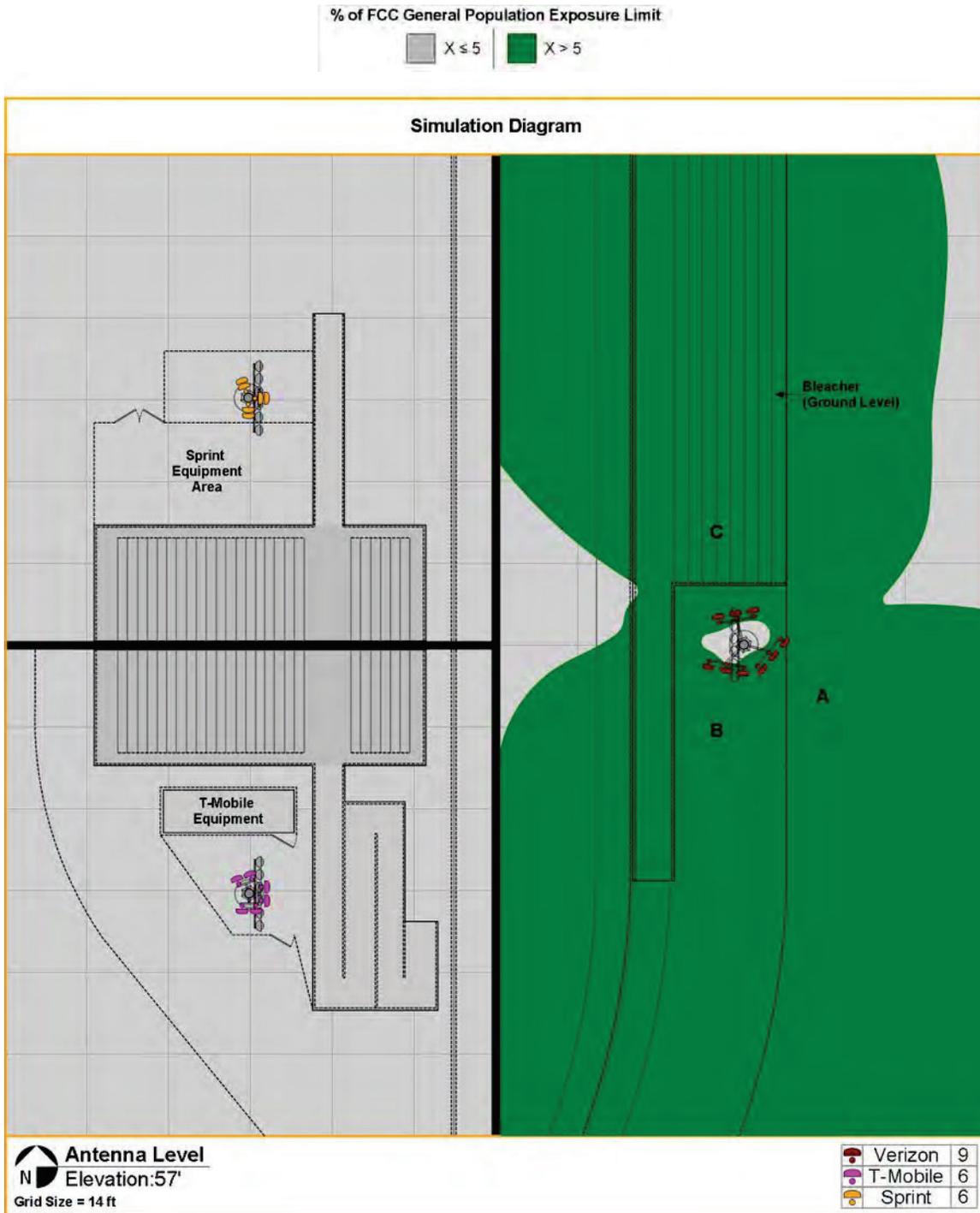
Figure 3: Plan (bird's eye) view map of results compared to FCC's General Population MPE (Maximum Permissible Exposure) Limits. Gray represents areas where exposure levels are calculated to be at or below 5%; Green- between 5% & 100% (below MPE limits); blue, yellow & red – greater than 100% (exceeds MPE limits). Individuals can safely occupy areas in gray and green for indefinite amount of time; whereas areas in blue, yellow & red must be restricted to RF trained personnel who has been made fully aware of potential for exposure, has control and knows how to reduce their exposure with the use of personal protection equipment or has the ability to power down the transmitters.



### 3.3 Five Percent Contributions

Mitigation measures are a shared responsibility for carriers whose RF emission levels exceed five percent of the FCC's exposure limits in areas of non-compliance.

Figure 4: Plan (bird's eye) view map of results compared to FCC's General Population MPE (Maximum Permissible Exposure) Limits. Gray represents areas where exposure levels are calculated to be at or below 5%; Green – greater than 5%.



## 4.0 CONCLUSION

### 4.1 Results

For a person standing on the ground, calculations for Verizon's site including contributions from existing carriers resulted in exposure levels below the FCC's most stringent General Population MPE Limits (see figure 2).

At antenna elevation, the highest calculated exposure level is above the FCC's General Population MPE Limits near the Verizon antennas (see figure 3). The overexposed (yellow and blue) areas extend 52-feet from the front face of the Verizon antennas. From the provided drawings, there are no other buildings or surrounding structures within 52-feet of the Verizon antennas. Beyond 52-feet, exposure levels are predicted to be below the FCC's most stringent General Population MPE Limits.

The antennas are mounted on a tall pole and therefore not accessible by the general public. It is presumed that Verizon employees and contractors are aware of the transmitting antennas and will take appropriate precautions when working near them. However, there may be situations where workers i.e. light standard personnel, etc. may find themselves directly in front of the antennas. Individuals working near/in front of antennas must receive appropriate RF safety training<sup>1</sup> and be made aware of the HotZones (areas where RF exposure may potentially exceed FCC safety limits). In addition, contact information should be made available in the event work is required within the HotZones.

### 4.2 Recommendation(s)

For the facility to be classified as an Occupational/Controlled environment, the following action(s) are recommended in accordance with the FCC's and Verizon's RF Safety Guidelines<sup>2</sup> (see figure 5):

- 1) Install CAUTION Sign(s) on the pole where they will be clearly visible to workers. Signage should be placed at least 9-feet below the antennas, where RF emissions may start to exceed the General Population Limits.

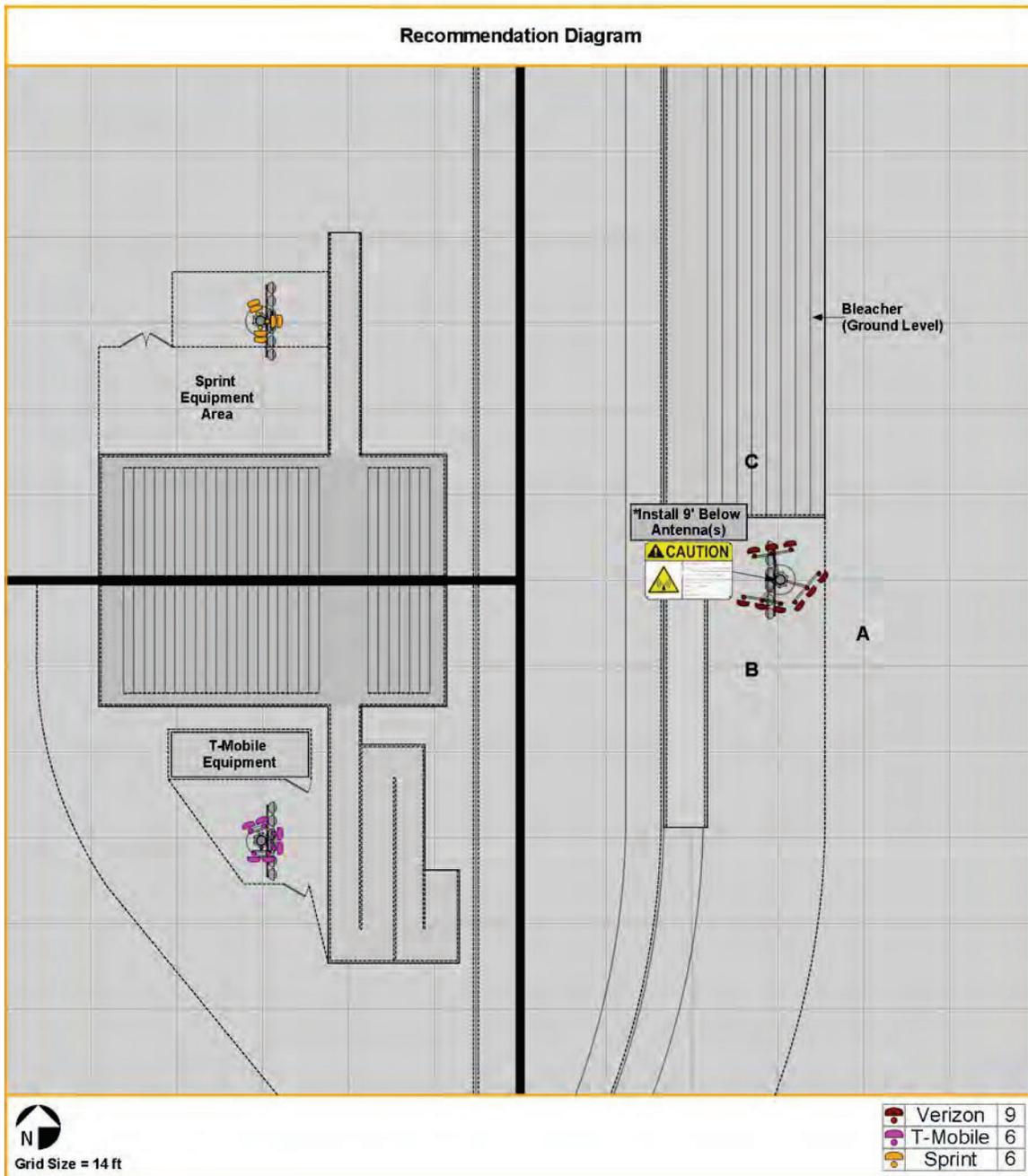
Compliance actions, if necessary, for the other carrier(s) at this site have not been determined as part of this study since estimates were used for their site specifications.

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<sup>1</sup> See Appendix for Dtech's RF Safety training program - AntennaView®

<sup>2</sup> Verizon Radio Frequency Compliance (RFC) Signage & Demarcation Policy – June 2014

Figure 5: Recommendation(s)



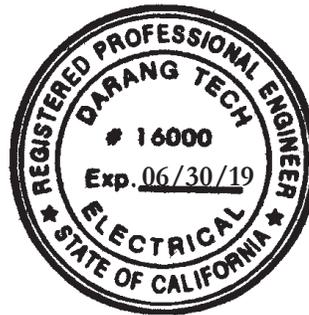
### 4.3 Statement of Compliance

Based on the above results, analysis and recommendation(s), it is the undersigned's professional opinion that Verizon's site including contributions from existing carriers will be compliant with the FCC's RF Safety Guidelines provided recommendation(s) are implemented.

### 4.4 Engineer Certification

This report has been prepared by or under the direction of the following Registered Professional Engineer: Darang Tech, holding California registration number 16000. I have reviewed this report and believe it to be both true and accurate to the best of my knowledge.

  
Darang Tech, P.E.



## Appendix A: Background

Dtech uses the FCC's guidelines described in detail in Office of Engineering & Technology, Bulletin No. 65 ("OET-65") "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields". The table below summarizes the current Maximum Permissible Exposure ("MPE") safety limits classified into two groups: General population and Occupational.

Table 3: FCC MPE Limits (from OET-65)

Frequency (Mhz)	General Population/ Uncontrolled MPE (mW/cm <sup>2</sup> )	Averaging Time (minutes)	Occupational/ Controlled MPE (mW/cm <sup>2</sup> )	Averaging Time (minutes)
30 - 300	0.2	30	1.0	6
300 - 1500	Frequency (Mhz)/1500 (0.2 – 1.0)	30	Frequency (Mhz)/300 (1.0 – 5.0)	6
1500 - 100,000	1.0	30	5.0	6

**General population/uncontrolled** limits apply in situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment, and may not be fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public always fall under this category when exposure is not employment-related.

**Occupational/controlled** limits apply in situations in which persons are exposed as a consequence of their employment, and those persons have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits, as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

It is important to understand that the FCC guidelines specify *exposure* limits not *emission* limits. For a transmitting facility to be out of compliance with the FCC's RF safety guidelines an area or areas where levels exceed the MPE limits must, first of all, be in some way *accessible* to the public or to workers. When accessibility to an area where excessive levels is appropriately restricted, the facility or operation can certify that it complies with the FCC requirements.

## Appendix B: Measurement and/or Computer Simulation Methods

Spatial averaging measurement technique is used. An area between 2 and 6 feet, approximately the size of an average human, is scanned in single passes from top to bottom in multiple planes. When possible, measurements were made at very close proximity to the antennas and inside the main beam where most of the energy is emitted. The spatial averaged values were recorded.

Dtech uses an industry standard power density prediction computer Model<sup>3</sup> to assess the worse-case, cumulative EMF impact of the surrounding areas of the subject site. The Model does not take into account losses due to buildings. Its methodologies are conservative enough to account for typical down-tilts deployed in wireless communications. In addition, the analysis is performed at 100% duty cycle-all transmitters are active at all times and transmitting at maximum power. For purposes of a cumulative study, nearby transmitters are included where possible. The result is a surrounding area map color-coded to percentages of the applicable FCC's MPE Limits. A result higher than 100% exceeds the Limits.

## Appendix C: Limitations

The conclusions in this document rendered by Dtech are based solely upon the information collected during the site survey and/or furnished by our Client which Dtech believes is accurate and correct. Dtech, however, has no responsibility should such Client provided information prove to be inaccurate or incorrect. Third party specification estimates used for cumulative computer simulation purposes, where applicable, are based on common industry practices and our best interpretation of available information. Data, results and conclusions in this document are valid as of its date. However, as mobile technologies continuously change, these data, results and conclusions may also be at variance with such future changes. Dtech has no responsibility to update its survey or report to account for such future technology changes. This document was prepared for the use of our Client only and cannot be utilized by any third party for any purpose without Dtech's written consent. Dtech shall have no liability for any unauthorized use of this document and any such unauthorized user shall defend, indemnify and hold Dtech and its owners, directors, officers and employees harmless from and against any liability, claim, demand, loss or expense (including reasonable attorney's fees) arising from such unauthorized use.

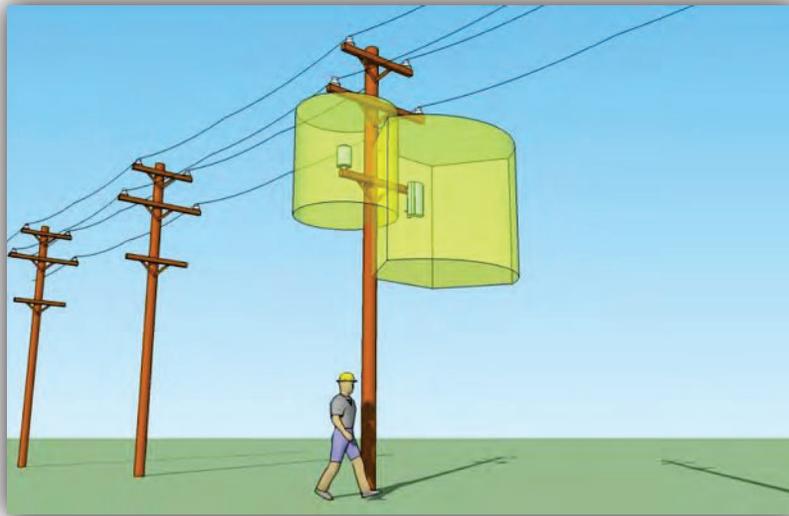
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<sup>3</sup> Dtech uses Roofmaster(tm) 2015 Version 15.7.2.18 per Verizon's direction.

## Appendix D: AntennaView®

Dtech Communications offers a unique, online tool (AntennaView®) to train, identify and inform individuals of site-specific HotZones – areas that may potentially exceed the FCC’s Safety Limits. AntennaView® is an online, interactive training tool that will educate nontechnical people in about ten minutes. It is a site-specific, RF safety training program that requires the end user to sign an online agreement thereby limiting the liability to the landlord and carriers. Some of the advantages include:

- Virtual walk-through in 3-D with corresponding photographs
- Site-specific, interactive, simple to understand
- Delivers pertinent information i.e. HotZones (areas that may potentially exceed FCC safety limits), site owners and contact numbers.
- User online agreement = accountability



We invite you to take a quick tour at [www.AntennaView.com](http://www.AntennaView.com) and see how easy to understand and informative AntennaView® is.

*Under Article 47 CFR § 1.1307(b), the FCC & OSHA mandates wireless operators/facility owners to have an RF survey completed including a safety plan and training to ensure that their tenants, employees and contractors who work in or around RF sites are aware of the potential risks posed by RF radiation. Most cell sites are located on building rooftops where HVAC contractors, window washers, painters, etc. routinely work and generally do not know what antennas even look like. Dtech Communications can help with ongoing FCC/OSHA compliance and provide practical training that is easy to understand by anyone regardless of their technical background.*

## Appendix E: Verizon's RF Advisory Signs



GUIDELINES Sign



NOC INFORMATION Sign



NOTICE Sign



CAUTION Sign



WARNING Sign



**HAMMETT & EDISON, INC.**  
 CONSULTING ENGINEERS  
 BROADCAST & WIRELESS

**Exhibit C**

WILLIAM F. HAMMETT, P.E.  
 RAJAT MATHUR, P.E.  
 ROBERT P. SMITH, JR.  
 ANDREA L. BRIGHT, P.E.  
 NEIL J. OLIJ, P.E.  
 BRIAN F. PALMER  
 M. DANIEL RO  
 NICHOLAS J. PETERS

ROBERT L. HAMMETT, P.E.  
 1920-2002  
 EDWARD EDISON, P.E.  
 1920-2009

DANE E. ERICKSEN, P.E.  
 CONSULTANT

BY E-MAIL SARA.KING@EPICWIRELESS.NET

May 21, 2021

Ms. Sara King  
 Epic Wireless Group LLC  
 605 Coolidge Drive, Suite 100  
 Folsom, California 95630

Dear Sara:

As you requested, we have reviewed the Findings for Denial from the Planning Commission action on March 11, 2021, regarding the Verizon Wireless base station installation proposed at Oak Ridge High School in El Dorado Hills, California. In particular, Findings 3.b. and 4.a. reference an increase in height of the existing loudspeakers when they are relocated to the two replacement light poles on the east side of the football field, but Sheet A-5 of the submitted drawings shows that the speakers are to be mounted at the same height as they are today. While the new poles are taller and will be installed slightly uphill from the existing poles, the speakers are to be mounted at the same elevation above the playing field, and there is not any change in the speaker orientation shown in the drawings.

Thus, the height and orientation of the speakers relative to the houses to the southeast and southwest are unchanged. The distances change a little: about 25 feet closer toward the southeast, out of 370 feet, and about 9 feet further away from the southwest, out of 920 feet. For the houses to the southeast, the calculated difference in sound level is just 0.6 dBA, well below the 3 dBA change that is considered “barely perceptible.”

Therefore, based on the information and analysis above, it is my professional opinion that there would be no impact from the Verizon Wireless proposal on noise levels at nearby houses from the High School’s speaker system at the football field. Please let me know if any further information is required on this matter.

Sincerely yours,

William F. Hammett, P.E.



lw

Enclosure

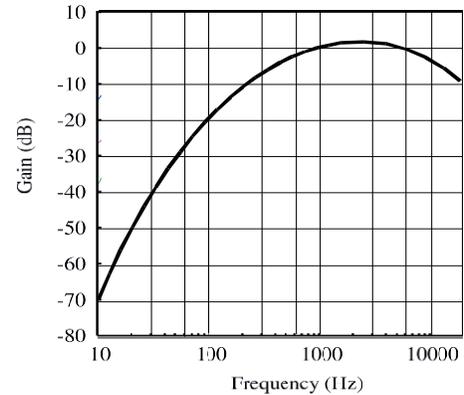
cc: Ms. Lauren Jongsma – BY EMAIL LAUREN.JONGSMA@EPICWIRELESS.NET

Web: www.h-e.com • mail@h-e.com  
 Delivery: 470 Third Street West • Sonoma, California 95476  
 Telephone: 707/996-5200 San Francisco • 707/996-5280 Fax • 202/396-5200 D.C.

KOJG

## 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<sub>P</sub>”) 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. In relative loudness, a 3 dBA change is considered “barely perceptible,” while a change of 5 dBA is required for the difference to be “readily perceptible.”

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<sub>P</sub> is the sound pressure level at distance D<sub>p</sub> and L<sub>K</sub> is the known sound pressure level at distance D<sub>K</sub>.

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<sub>T</sub> is the total sound pressure level and L<sub>1</sub>, L<sub>2</sub>, 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.

**Oak Ridge High School Football**  
 El Dorado Hills, CA

**Lighting System**

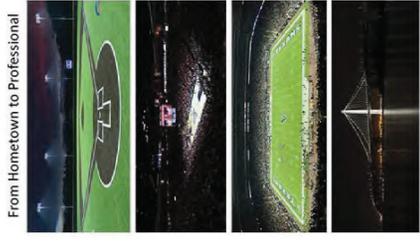
Fixture Return Summary						
Qty	Part Number	Fixture Qty	Luminaire Type	Avg Load	Max Load	Circuit
F1	80'	13	Center Generation	2033 kW	2210 kW	A
F2	80'	13	Center Generation	2033 kW	2210 kW	A
F3	80'	13	TLC-LED-500	1430 kW	1430 kW	A
F4	80'	1	TLC-LED-400	0.40 kW	0.40 kW	B
F5	16'	2	TLC-RT-575	1.15 kW	1.15 kW	A
<b>4</b>		<b>53</b>		<b>7333 kW</b>	<b>7769 kW</b>	

Circuit Summary			
Circuit	Description	Max Load	Fixture Qty
A	Football	7313 kW	51
B	Signs	0.26 kW	2

Fixture Type Summary					
Fixture	Qty	Power	Load	Max Load	Density
TLC-LED-100	100	1430W	1430kW	>120,000	>120,000
TLC-LED-500	13	575W	7475W	>120,000	>120,000
TLC-LED-400	1	400W	400W	>120,000	>120,000
TLC-RT-575	2	575W	1150W	>120,000	>120,000

**Light Level Summary**

Calculation Metric					
Calculation Metric	Value	Units	Max Load	Fixture Qty	Fixture Qty
10' Football Beam	0.40	0	0.77	0.00	A
Football	27.7	5	59	12.47	5.54
Track	11.4	1	36	31.13	11.40
Visitor Bleacher	5	2	7	3.16	2.50
Horizontal					B



From Hometown to Professional



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PROJECT SUMMARY

**Exhibit D**

CUP-A21-0001 Exhibit D: Outdoor Lighting Plan Prepared by Musco Sports Lighting



**EQUIPMENT LIST FOR AREAS SHOWN**

QTY	DESCRIPTION	SIZE	MANUFACTURER	TYPE	HEIGHT	WATTAGE
2	FOOTCANDLE	80"	110-C10-2000	3	1	0
2	FOOTCANDLE	80"	110-C10-2000	3	1	0
2	FOOTCANDLE	80"	110-C10-2000	3	1	0
2	FOOTCANDLE	80"	110-C10-2000	3	1	0
2	FOOTCANDLE	80"	110-C10-2000	3	1	0
2	FOOTCANDLE	80"	110-C10-2000	3	1	0

**Oak Ridge High School Football**

8 Dorinda Hill CA

**GRID SUMMARY**

Name: Victor Balachev

Scale: 10.0' x 10.0'

**ILLUMINATION SUMMARY**

Entire Grid

Scans Average: 5.9

Minimum: 2

Maximum: 7

Age / Min: 2.28

Max / Min: 1.26

US (adj. to 100): 0.34

CL: 0.34

No. of Points: 69

Applied Circuits: 8

Total Load: 0.9 MW

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed to be achieved by the lighting system and fixture layout shown on this drawing. The lighting system and fixture layout shown on this drawing is based on a 100% design factor. Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken at various locations throughout the site. The lighting system and fixture layout shown on this drawing is based on a 100% design factor. **Electrical System Requirements:** Refer to Appendix B for electrical listing. **Installation Requirements:** These fixtures are assumed to be installed in a standard structure located within 3 feet (1 ft) of the sign locations.

This represents a blanket grid that shows the horizontal footcandle measurements within the east bleachers area.



SCALE IN FEET 1:30

ENGINEERED DESIGN By: Yeshon Alexander - File #196236A-Sp111-31, Mar-21

Plot (footcandle) dimensions are relative to 0.0' reference point(s)



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**ILLUMINATION SUMMARY**

EQUIPMENT LIST FOR AREAS SHOWN		LUMINAIR		FOOT COUNTS	
OFF	REQ	TYPE	FOOT COUNTS	FOOT COUNTS	FOOT COUNTS
1	72	80W	11	11	0
2	13+4	80W	11	11	0
4		80W	11	11	0
TOTALS			33	33	0

This represents a grid that shows the horizontal footcandle measurements within the track area surrounding the field.

**Oak Ridge High School Football**  
El Dorado, HI, CA

GRID SUMMARY	
Name:	Track
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY	
Scale Average:	Entire Field
Minimum:	36
Maximum:	9.71
Max / Min:	31.13
UG (adjacent pct):	0.00
UG (adjacent ft):	0.00
No. of Footc:	44
SIGNATURE INFORMATION	
Applied Codes:	A
No. of Footc:	44
Avg. Load:	73.13 kW
Max. Load:	76.81 kW

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and is based on a 35-foot spacing. The actual footcandle measurements may vary from computer calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Appendix B for electrical system requirements.

**Installation Requirements:** Results assume: ± 3% mounting tolerances; all other dimensions and structures located within 1 foot (1m) of design conditions.



Five footcandle (5 fc) dimensions are relative to 0.0 ft reference points (0)

SCALE IN FEET 1: 60  
0' 60' 120'

ENGINEERED DESIGN By: Veston Alexander - File #196236A-Spill - 31\_Mar-21



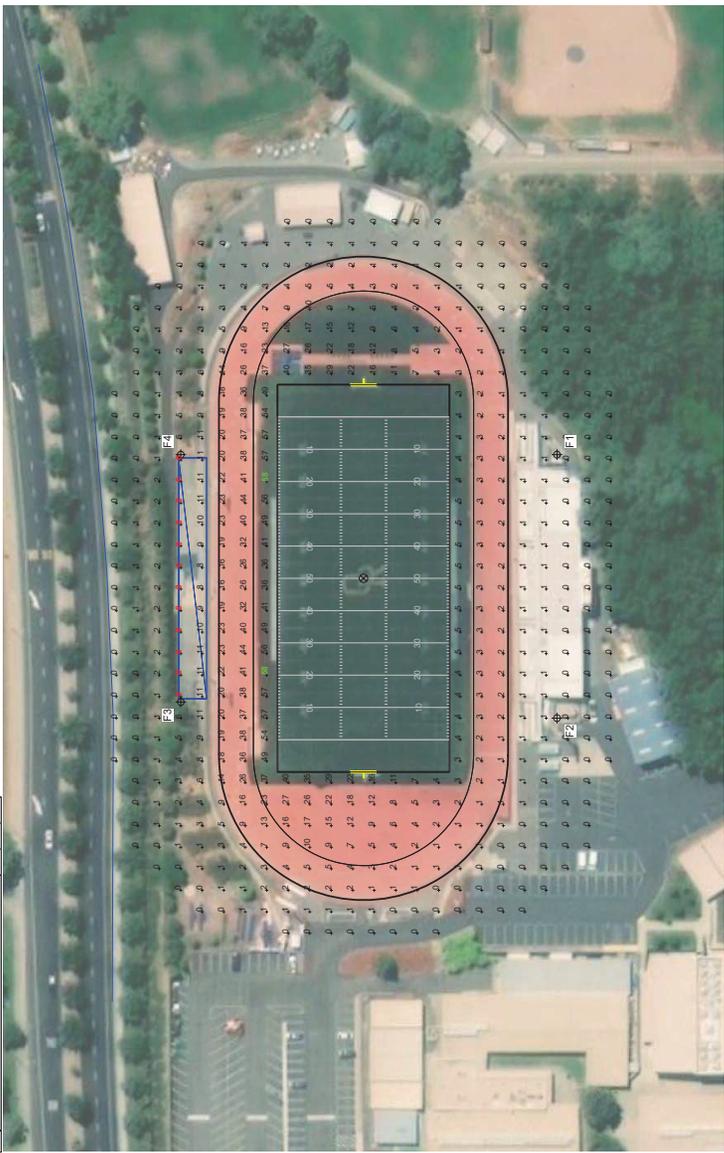
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ILLUMINATION SUMMARY

CUP-A21-0001 Exhibit D: Outdoor Lighting Plan Prepared by Musco Sports Lighting

EQUIPMENT LIST FOR AREAS SHOWN			
OFF	ZONE	QUANTITY	TYPE
1	F1	10	150' Football Blanket
2	F2	10	150' Football Blanket
3	F3	10	150' Football Blanket
4	F4	10	150' Football Blanket
5	F5	10	150' Football Blanket
6	F6	10	150' Football Blanket
7	F7	10	150' Football Blanket
8	F8	10	150' Football Blanket
9	F9	10	150' Football Blanket
10	F10	10	150' Football Blanket
11	F11	10	150' Football Blanket
12	F12	10	150' Football Blanket
13	F13	10	150' Football Blanket
14	F14	10	150' Football Blanket
15	F15	10	150' Football Blanket
16	F16	10	150' Football Blanket
17	F17	10	150' Football Blanket
18	F18	10	150' Football Blanket
19	F19	10	150' Football Blanket
20	F20	10	150' Football Blanket
21	F21	10	150' Football Blanket
22	F22	10	150' Football Blanket
23	F23	10	150' Football Blanket
24	F24	10	150' Football Blanket
25	F25	10	150' Football Blanket
26	F26	10	150' Football Blanket
27	F27	10	150' Football Blanket
28	F28	10	150' Football Blanket
29	F29	10	150' Football Blanket
30	F30	10	150' Football Blanket
31	F31	10	150' Football Blanket
32	F32	10	150' Football Blanket
33	F33	10	150' Football Blanket
34	F34	10	150' Football Blanket
35	F35	10	150' Football Blanket
36	F36	10	150' Football Blanket
37	F37	10	150' Football Blanket
38	F38	10	150' Football Blanket
39	F39	10	150' Football Blanket
40	F40	10	150' Football Blanket
41	F41	10	150' Football Blanket
42	F42	10	150' Football Blanket
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44	F44	10	150' Football Blanket
45	F45	10	150' Football Blanket
46	F46	10	150' Football Blanket
47	F47	10	150' Football Blanket
48	F48	10	150' Football Blanket
49	F49	10	150' Football Blanket
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58	F58	10	150' Football Blanket
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60	F60	10	150' Football Blanket
61	F61	10	150' Football Blanket
62	F62	10	150' Football Blanket
63	F63	10	150' Football Blanket
64	F64	10	150' Football Blanket
65	F65	10	150' Football Blanket
66	F66	10	150' Football Blanket
67	F67	10	150' Football Blanket
68	F68	10	150' Football Blanket
69	F69	10	150' Football Blanket
70	F70	10	150' Football Blanket
71	F71	10	150' Football Blanket
72	F72	10	150' Football Blanket
73	F73	10	150' Football Blanket
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78	F78	10	150' Football Blanket
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88	F88	10	150' Football Blanket
89	F89	10	150' Football Blanket
90	F90	10	150' Football Blanket
91	F91	10	150' Football Blanket
92	F92	10	150' Football Blanket
93	F93	10	150' Football Blanket
94	F94	10	150' Football Blanket
95	F95	10	150' Football Blanket
96	F96	10	150' Football Blanket
97	F97	10	150' Football Blanket
98	F98	10	150' Football Blanket
99	F99	10	150' Football Blanket
100	F100	10	150' Football Blanket

This represents a blanket grid that shows the horizontal footcandle run out to 150' from the field. At Silva Valley Parkway on the School side of the road the values are zero. A horizontal reading is measuring the light contribution with the meter horizontal at 3 feet above grade.



SCALE IN FEET 1:80  
 ENGINEERED DESIGN By: Nathan Alexander - File #190239A-Split - 31, Mar-21

**Oak Ridge High School Football**  
 El Dorado HILCA

GRID SUMMARY	
Name:	150' Football Blanket
Area:	20,000 sq ft
Spacing:	20'0" x 20'0"
Height:	3.0' above grade

ILLUMINATION SUMMARY	
REASONABLE FOOTCANDLES	
Enter Grid	5.773
Scale Name:	5.773
Maximum:	0.00
Minimum:	0.00
CD:	0.22
No. of Footc:	350
LUMINAIRE INFORMATION	
Applied Circuit:	A
No. of Drivers:	73
Avg Load:	73.13 KW
Max Load:	78.81 KW

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document.  
**Measurements:** Individual field measurements may vary from computer calculated predictions and should be taken in accordance with IESNA RP-46-15.  
**Electrical System Requirements:** Refer to Average Footcandle Report for "Musco Control System Summary" for electrical sizing.  
**Installation Requirements:** Results assume a 30% non-usable coverage area side of the driver and structures based on a 10' foot path of obstructions.



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**ILLUMINATION SUMMARY**

CUP-A21-0001 Exhibit D: Outdoor Lighting Plan Prepared by Musco Sports Lighting

**EQUIPMENT LIST FOR AREAS SHOWN**

OFF	LOCATION	SIZE	WATTAGE	HEIGHT	WATTAGE	FOOT COUNTS	FOOT COUNTS	FOOT COUNTS
1	F1	307	80	15.5	15.5	13	13	0
2	F3+4	307	80	15.5	15.5	1	1	0
4			80	15.5	15.5	1	1	0

This represents a horizontal reading on the east side of Silva Valley Parkway, values are zero.



SCALE IN FEET 1:80

ENGINEERED DESIGN By: Yashon Alexander - File #196236A-Split - 31, Mar-21

Peak footcandle(s) dimensions are relative to 0.0ft reference point(s)

**Oak Ridge High School Football**  
El Dorado Hills, CA

**GRID SUMMARY**

Name: Silva Valley Pkwy Northbound  
Location: 2310  
Height: 23.0' above grade

**ILLUMINATION SUMMARY**

ENTIRE SYSTEM  
 Scan Average: 0.000  
 Minimum: 0.00  
 No. of Points: 30  
 Applied Circuits: A, B  
 No. of Luminaires: 53  
 Avg Load: 73.28 W  
 Max Load: 77.28 W

**Guaranteed Performance:** The ILLUMINATION described herein is guaranteed per your fixture Warranty document.

**Field Measurements:** Individual field measurements may vary from computer calculated projections and should be taken on-site.

**Electrical System Requirements:** Refer to Appendix Draw Chart and/or the "Musco Control Systems Summary" for electrical sizing.

**Notes:** Measurements taken by Musco Lighting, LLC are taken at normal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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**ILLUMINATION SUMMARY**

EQUIPMENT LIST FOR AREAS SHOWN									
OFF.	LOCATION	BAR	SIZE	HEIGHT	MONITORING	WATTAGE	TYPE	TIME	OTHER
1	F1	80'	5"	80'	USC-12.00	17	13	0	
2	F2	80'	5"	80'	USC-12.00	17	13	0	
3	F3	80'	5"	80'	USC-12.00	17	13	0	
4	F4	80'	5"	80'	USC-12.00	17	13	0	

This depicts the vertical footcandles on the east side of Silva Valley Parkway. A vertical reading is taken by pointing the meter back at the most offense light source. Values are zero.



**Oak Ridge High School Football**  
at Dorado HILCA

GRID SUMMARY	
Name:	Silva Valley Pkwy Northbound
Spacing:	30' or above grade
Height:	12' or above grade

ILLUMINATION SUMMARY	
Scan Average:	0.000
Minimum:	0.00
Maximum:	0.00
No. of Points:	30
LUMINAIRE INFORMATION	
Manufacturer:	A, B
No. of Luminaire:	58
Avg Load:	73.93 KW
Max Load:	77.84 KW

**Guaranteed Performance:** The ILLUMINATION described herein is guaranteed per your Musco Warranty document.  
**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken at various locations.  
**Backsight System Requirements:** Refer to Appendix Draw: Chart and/or the "Musco Control System Summary" for electrical listing.  
**Installation Requirements:** Refer to Appendix "B" for details. All luminaire structures located within 3 feet (1 m) of design locations.



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**ILLUMINATION SUMMARY**

CUP-A21-0001 Exhibit D: Outdoor Lighting Plan Prepared by Musco Sports Lighting

EQUIPMENT LIST FOR AREAS SHOWN										
OFF	LOCATION	SIZE	TYPE	HEIGHT	SPACING	WATTAGE	WATTAGE	WATTAGE	WATTAGE	WATTAGE
1	1	12	12	80'	12'	150W	150W	150W	150W	150W
2	1374	80'	5'	20.05'	15.00'	150W	150W	150W	150W	150W
4						150W	150W	150W	150W	150W

This is the depicted candela values on the east side of Silva. Candela is the measure of brightness from a light source. A car driving down Silva Parkway with its low beam headlights on would produce around 15,000 candela on low beam and around 30,000 candela on hi beam. Our Candela Average on the east side of Silva Valley is average is around 3. It is fair to conclude that you would experience no glare from the lights on the East side of the parkway and would most likely not be able to even see any light sources.

### Oak Ridge High School Football

Donovan Hill, CA

#### GRID SUMMARY

Site: Silva Valley Hwy Northbound  
 Spacing: 30 ft  
 Height: 23.5' above grade

#### ILLUMINATION SUMMARY

(CANDELA PER FOOTCANDLE)

Scale Average: 81270  
 Minimum: 6100  
 No. of Luminaires: 35

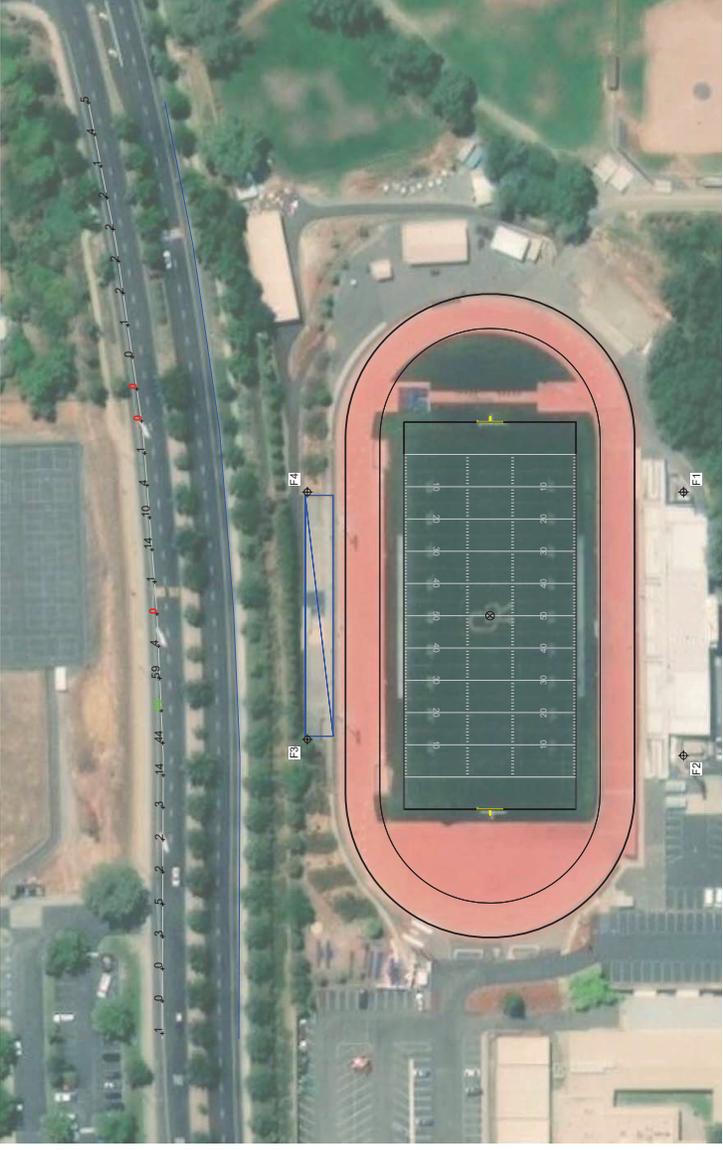
Applied Circuits: A, B  
 No. of Luminaires: 23 @ 30 W  
 Max Load: 77 @ 30 W

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document.

**Field Measurements:** Individual field measurements may vary from the above values. All measurements were taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Ampage and Voltage Requirements for "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume a 30' nominal voltage at line side of three wire and structures located within 3 feet (1m) of design locations.



Pin locations: dimensions are relative to 0.00 (reference point)

SCALE IN FEET 1"=80'  
 0' 80' 160'

ENGINEERED DESIGN By: Veshon Alexander - File #196236A-Spill - 31-Mar-21

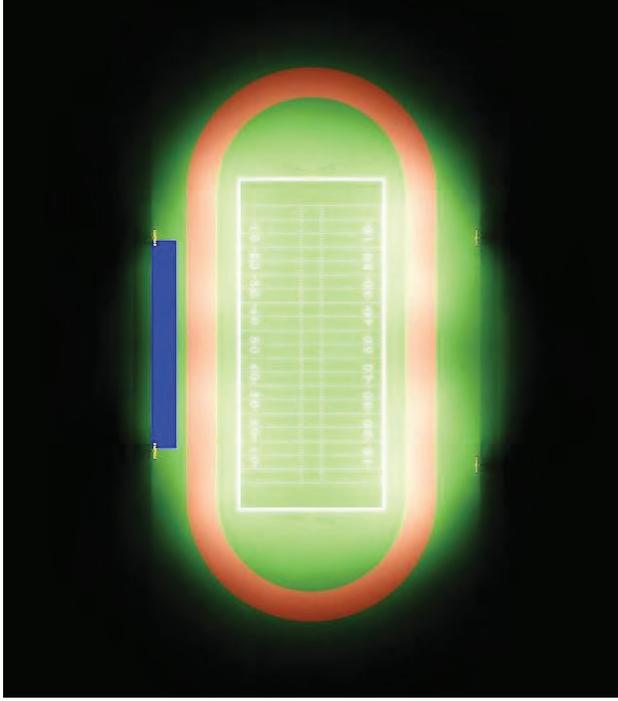


Musco Lighting, LLC. ©1987-2021 Musco Sports Lighting, LLC.  
 Sports Lighting, LLC. ©1987-2021 Musco Sports Lighting, LLC.

#### ILLUMINATION SUMMARY



This is a rendering of the anticipated lighting results for this specific field, with these lights, at the specified elevation.



Design Location	Old Rollings Hills School Football Field, El Dorado Hills, CA
Date	21 May 2021
Engineer	H. Soborn

**CONCLUSION:**  
The neighborhood to the south of Rollings Hills Middle School would experience no vertical, no horizontal and no measurable candela from the proposed lighting improvements. This project will cause no impact in light pollution to the surrounding community.

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Print Date: 21 May 2021 8:11 AM (EST)



# Alternatives Analysis

## Serrano Facility

Oak Ridge High School Stadium  
1120 Harvard Way, El Dorado Hills



**May 28, 2021**

**Summary of Site Evaluations  
Conducted by Verizon Wireless**

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### Map of Alternatives

## **I. Executive Summary**

Verizon Wireless must fill a significant gap in service in southern El Dorado Hills along Silva Valley Parkway. Based on the review of seven alternative sites set forth in the following analysis, Verizon Wireless believes that placing a new facility on a replacement field light at the Oak Ridge High School stadium (the “Proposed Facility”) constitutes the least intrusive feasible alternative to serve the identified gap in network service based on the values expressed in the El Dorado County Ordinance Code (the “Code”).

## **II. Significant Gap**

There is a significant gap in Verizon Wireless network service in southern El Dorado Hills. There is a gap in in-building LTE coverage in residential areas along Silva Valley Parkway south of the high school. Reliable in-vehicle coverage is lacking in a larger area, including along significant stretches of Silva Valley Parkway and Serrano Parkway. Distant Verizon Wireless facilities provide only weak service levels to much of the gap, compromising network accessibility and reliability. (Collectively, the “Significant Gap”) The Significant Gap is described in detail in the *Statement of Verizon Wireless Radio Frequency Design Engineer Ericson Malana* (the “RF Engineer’s Statement”). To remedy the Significant Gap, Verizon Wireless must place a new facility to ensure reliable network service.

## **III. Methodology**

Once a significant gap has been determined, Verizon Wireless seeks to identify a location and design that will provide required network service through the “least intrusive means” based upon the values expressed by local regulations. In addition to seeking the least intrusive alternative, sites proposed by Verizon Wireless must be feasible. In this regard, Verizon Wireless reviews the available height, structural capacity, equipment space, radio frequency propagation, proximity to end users, access, terrain, environmental impacts and other critical factors such as a willing landlord in completing its site analysis.

### ***Code Requirements***

The Code encourages co-location on an existing site if feasible, or multi-carrier sites that facilitate future co-location. Code § 130.40.130(A)(1)(b). The County may consider several smaller facilities if less visually obtrusive than a single monopole. Code § 130.40.130(A)(2).

An administrative permit may be approved for the following types of facilities, if they meet certain standards: (Code §§ 130.40.130(B)(2), (3), (5))

- Facade-mounted antennas in all zones
- Roof-mounted antennas in commercial, industrial and research/development zones not adjacent to a state highway or scenic corridor
- Co-located antennas on existing monopoles or towers

A minor use permit may be approved by the Zoning Administrator for the following, if they meet certain standards: (Code §§ 130.40.130(B)(4), (6)(a))

- Co-location on existing structures such as signs, water tanks, utility towers and light standards.
- New towers, or an increase in height of towers, in commercial, industrial and research/development zones not adjacent to a state highway or scenic corridor, or within 500 feet of a residential zone.

A conditional use permit is required for all other facilities, including those that do not meet the standards to qualify for an administrative or minor use permit. Code § 130.40.130(B)(7).

Facilities must be designed to blend with the surrounding area, either painted or constructed with stealth technology to blend with the architecture or natural features of the site. Code § 130.40.130(D)(1).

### ***Coverage Map Explanation***

Coverage maps are provided to illustrate why certain alternatives cannot serve the Significant Gap. Coverage maps depict the anticipated level of signal, and therefore the projected LTE coverage provided by a wireless facility at a given location. In the El Dorado Hills area, 61 percent of Verizon Wireless’s LTE bandwidth is in the mid-band AWS (2100 MHz) and PCS (1900 MHz) frequencies, with 39 percent in low-band frequencies (700 and 850 MHz). The coverage maps have been prepared using the AWS frequency band. The AWS and PCS bands use similar frequencies and have similar propagation characteristics.

Referenced signal receive power (RSRP) is a measurement of signal level in decibels (dBm), which is a negative number that decreases due to distance and other factors.

The AWS LTE RSRP coverage thresholds are:

	<b>In-building</b> $\geq$ -75 dBm. Green depicts good coverage that meets or exceeds thresholds for reliable network coverage in homes and vehicles.
	<b>In-vehicle</b> $\geq$ -85 dBm. Yellow depicts reliable in-vehicle coverage only.
	<b>Outdoor</b> $\geq$ -95 dBm. Red depicts reliable outdoor service only.
	<b>Unreliable</b> $\geq$ -105 dBm. Gray depicts unreliable service levels.

## IV. Analysis

Verizon Wireless first sought locations where a facility could be permitted with an administrative permit. Buildings in the target area are of insufficient height for façade-mounted antennas to serve the gap. There are no industrial or research/development zones in the gap area, and in the lone commercial zone at Village Green, most buildings are of insufficient height for a rooftop facility to serve the gap, and all have hip roofs that impede construction of a rooftop tower projection required to elevate antennas. Verizon Wireless considered a slightly taller building at Village Green, but this was determined to be infeasible (Alternative 1). The closest existing wireless tower identified already supports Verizon Wireless antennas, which is the Silva Valley Parkway facility 1.7 miles south. Other nearby wireless facilities are mounted on other structures.

Verizon Wireless next sought locations where a facility could be permitted with a minor use permit, first examining collocation on existing stadium lights with antennas at Oak Ridge High School, which is impractical (Alternative 2). Verizon Wireless also considered a water tank property and a PG&E transmission tower which were determined to be infeasible (Alternatives 3 and 4). There is no minor use permit option for a new tower in the gap area, as the Village Creek commercial zone is within 500 feet of residential zones.

Next, Verizon Wireless sought locations where a facility could be allowed with a conditional use permit, readily identifying replacement of a high school stadium field light as the best option, which is supported by the El Dorado Union High School District (Alternative 5). Verizon Wireless also considered new tower facilities at two locations east and west of the Proposed Facility that were determined to be infeasible (Alternatives 6 and 7).

*Alternatives Allowed with an Administrative Permit*

While buildings in the gap area generally are of insufficient height and elevation for façade- or rooftop-mounted antennas to serve the gap, Verizon Wireless investigated the following option.

**1. Parker Development Company**

Address: 4525 Serrano Parkway

Elevation: 820 feet

Zoning: CC – Commercial Community



Verizon Wireless investigated this office building in Village Green, 0.5 miles southeast of the Proposed Facility and 15 feet greater in elevation. The tallest portion of the building has a small hip roof that impedes construction of a 15-foot rooftop tower projection that would be required to elevate antennas. Verizon Wireless previously approached the parcel owner, Parker Development Company, regarding development at the Village Green site, but was unable to negotiate a lease. This is not a feasible alternative to the Proposed Facility.

*Alternatives Allowed with a Minor Use Permit*

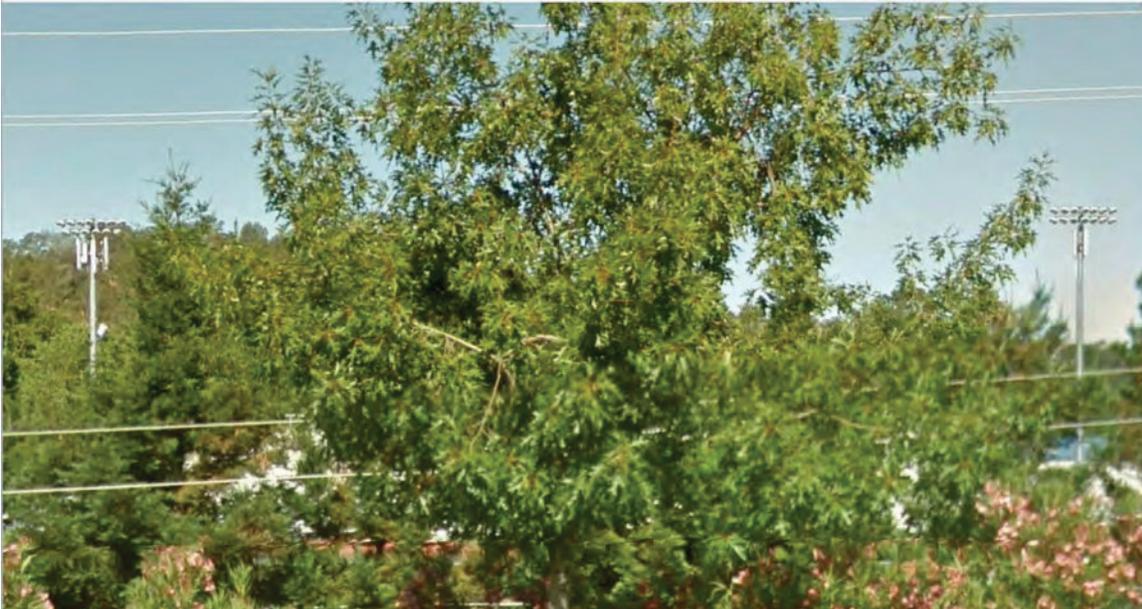
The Code allows facilities co-located on existing light standards, water tanks, and utility towers with a minor use permit. Verizon Wireless examined the following three locations.

**2. Existing Stadium Lights – Oak Ridge High School Stadium**

Address: 1120 Harvard Way

Elevation: 805 feet

Zoning: R1 – Residential



Verizon Wireless considered collocating its antennas on one of the existing field light poles on the west side of the Oak Ridge High School stadium. Both of these light poles already support antennas for T-Mobile and Sprint. Because its customer base is much larger than those carriers, Verizon Wireless would need to place nine panel antennas and nine radio units on one of these poles to serve the Significant Gap, along with two surge suppressors and mounting hardware. Collocation of all this required equipment on these poles is impractical due to structural requirements, as well as the School District's preference for consistent lighting and equipment separation.

Verizon Wireless worked with the School District to design a project that would replace and relocate the eastern stadium lights, which is the Proposed Facility reviewed as Alternative 5.

### 3. El Dorado Irrigation District Water Tanks

Address: Cabrito Drive

Elevation: 925 feet

Zoning: OS – Open Space



Verizon Wireless considered this 3.2-acre water tank property 0.2 miles east of the Proposed Facility and 120 feet greater in elevation. Antennas mounted to the tanks could be allowed with a minor use permit. A new tower would require a conditional use permit. Verizon Wireless approached the El Dorado Irrigation District regarding placement of a facility on the property, but the District declined due to access issues. Lacking a willing landlord, this is not a feasible alternative to the Proposed Facility.

#### 4. PG&E Tower

Address: Breese Circle

Elevation: 930 feet

Zoning: OS – Open Space



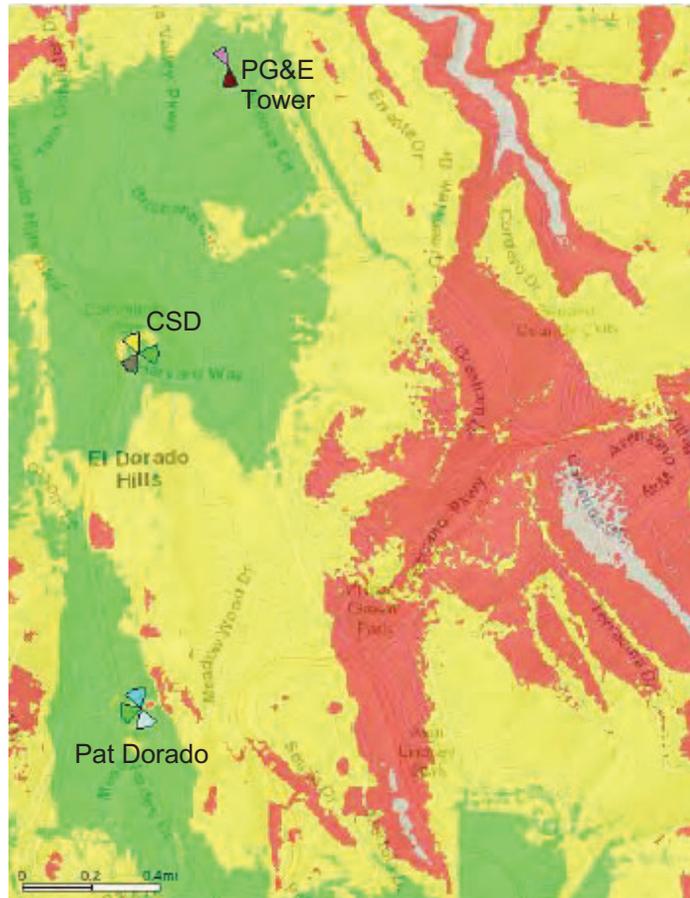
Verizon Wireless considered this PG&E transmission tower between Silva Valley Parkway and Breese Circle, 1.1 miles north of the Proposed Facility and 125 feet greater in elevation. Located along the span of PG&E towers to the north, this is the closest tower with higher elevation. Several of the other PG&E towers northwest near El Dorado Hills Boulevard support wireless facilities, but they are well beyond Verizon Wireless's CSD facility, and lower in elevation than the Proposed Facility.

Verizon Wireless engineers determined that a facility on this PG&E tower cannot serve the Significant Gap due to distance, even with a significant elevation advantage. As shown in the following coverage map, a facility on top of this tower could not provide any new in-building coverage to the gap area to the south of the high school, and it would leave a significant gap in in-vehicle coverage along Silva Valley Parkway and Serrano Parkway. This is not a feasible alternative to the Proposed Facility.

*AWS Coverage of Facility  
at PG&E Tower  
(120-foot Antenna Centerline)*

**AWS LTE RSRP Coverage**

	In-building $\geq -75$ dBm
	In-vehicle $\geq -85$ dBm
	Outdoor $\geq -95$ dBm
	Unreliable $\geq -105$ dBm



## *Alternatives Allowed with a Conditional Use Permit*

Verizon Wireless considered installations that could be allowed with a conditional use permit, readily identifying the Proposed Facility location at the high school. While a new tower would pose more visual impact than a replacement stadium light, Verizon Wireless also considered two locations for a new tower east and west of the Proposed Facility.

### **5. Proposed Facility – Oak Ridge High School Stadium**

Address: 1120 Harvard Way

Elevation: 805 feet

Zoning: R1 – Residential



Verizon Wireless proposes to replace the two 48-foot 5-inch field light poles on the east side of the high school stadium with 80-foot light poles, relocated to each end of the bleachers, and elevated an additional five feet on the adjacent slopes. On the southeast pole, Verizon Wireless will mount three panel antennas on each of three crossarms, for a total of nine antennas at a centerline of 61 feet. Behind the antennas, the crossarms also will support nine radio units and two surge suppressors. In a separate 320-square foot lease area located south beyond the field, Verizon Wireless will place two network equipment cabinets, along with two battery cabinets and other network gear. This equipment area will be surrounded by a six-foot chain link fence with green slats.

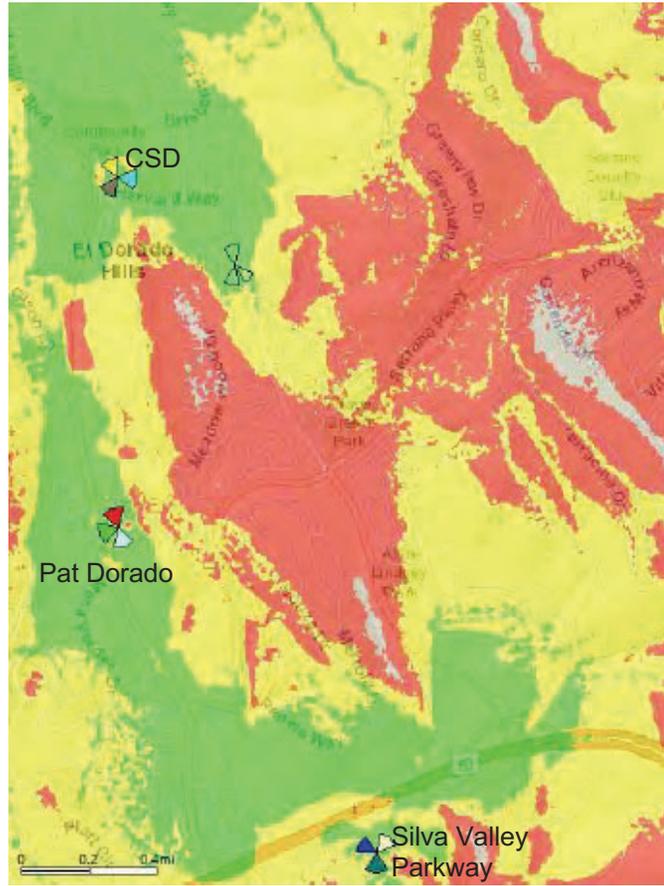
With panel antennas placed at a 61-foot centerline at this optimal location, the Proposed Facility will provide reliable Verizon Wireless LTE service to the Significant Gap. As shown in the following coverage maps, the Proposed Facility will provide new reliable in-building and in-vehicle LTE coverage in areas along Silva Valley Parkway. It also will provide strong new dominant signal to relieve surrounding Verizon Wireless facilities. An analysis comparing existing and proposed service is found in the RF Engineer's Statement. This is Verizon Wireless's preferred location and design for the Proposed Facility.

## AWS LTE Coverage Maps

### Coverage of Existing Facilities

**AWS LTE RSRP Coverage**

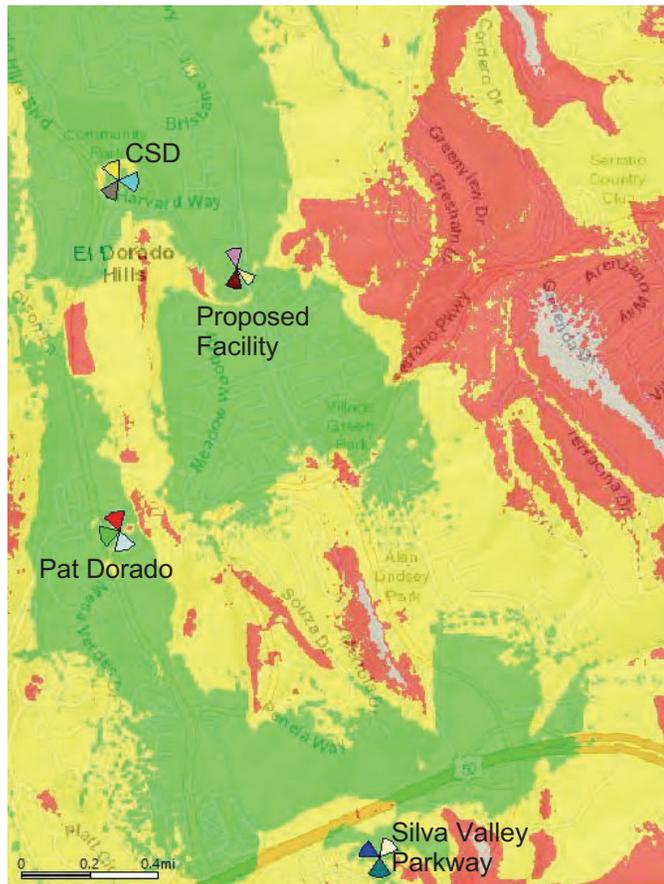
	In-building $\geq -75$ dBm
	In-vehicle $\geq -85$ dBm
	Outdoor $\geq -95$ dBm
	Unreliable $\geq -105$ dBm



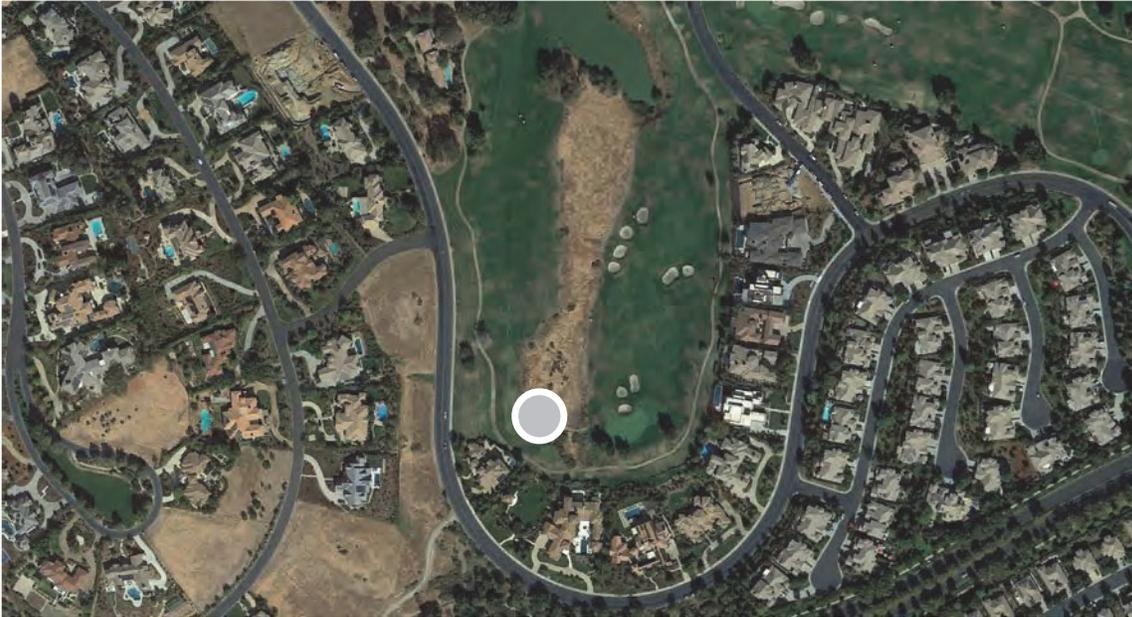
### Coverage Including Proposed Facility

**AWS LTE RSRP Coverage**

	In-building $\geq -75$ dBm
	In-vehicle $\geq -85$ dBm
	Outdoor $\geq -95$ dBm
	Unreliable $\geq -105$ dBm



Zoning: R1 – Residential



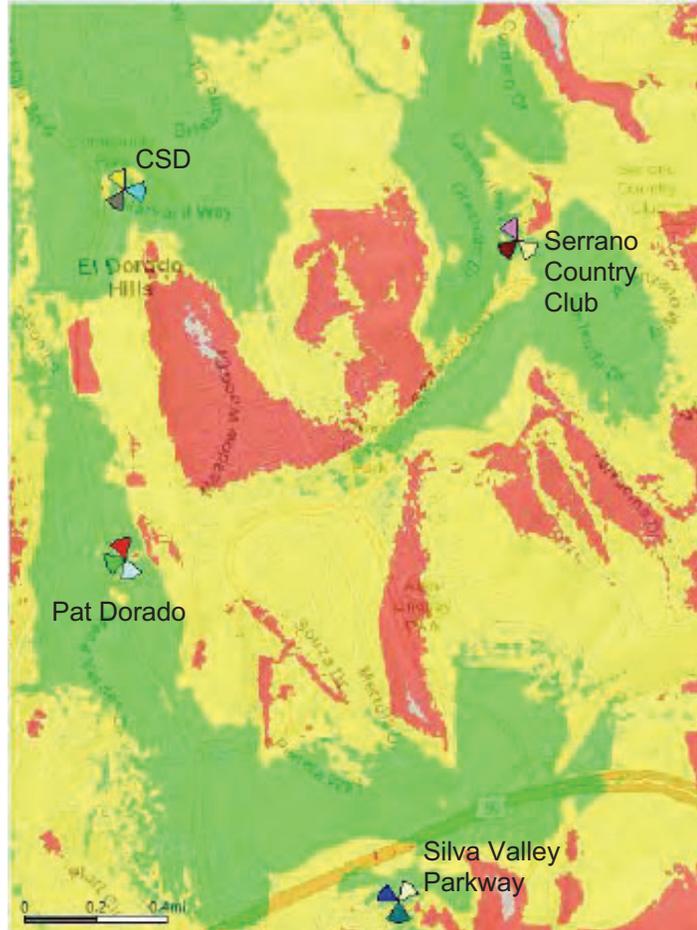
hole at the Country Club golf course, 0.75 miles east of the Proposed Facility and 310 feet greater in elevation. The third hole is the closest to the Proposed Facility and the gap area. Verizon Wireless engineers determined that even with a 100-foot antenna centerline on a very tall tower, a facility at this location cannot serve the Significant Gap due to distance and intervening terrain.

To the west of the golf course, an intervening ridge rising up to 1,225 feet would impede signal from reaching the gap area beyond. As shown in the following coverage map, a tall tower at this location would provide barely any new in-building coverage to the gap area, leaving a significant gap in residential areas along Silva Valley Parkway south of the high school. It also would leave gaps in in-vehicle coverage along Silva Valley Parkway. This is not a feasible alternative to the Proposed Facility.

*AWS Coverage of Facility  
at Serrano Country Club  
(100-foot Antenna Centerline)*

**AWS LTE RSRP Coverage**

	In-building $\geq -75$ dBm
	In-vehicle $\geq -85$ dBm
	Outdoor $\geq -95$ dBm
	Unreliable $\geq -105$ dBm



### 7. Sahtout Property

Address: Adam Court (APN 121022012)

Elevation: 850-965 feet

Zoning: R1 – Residential



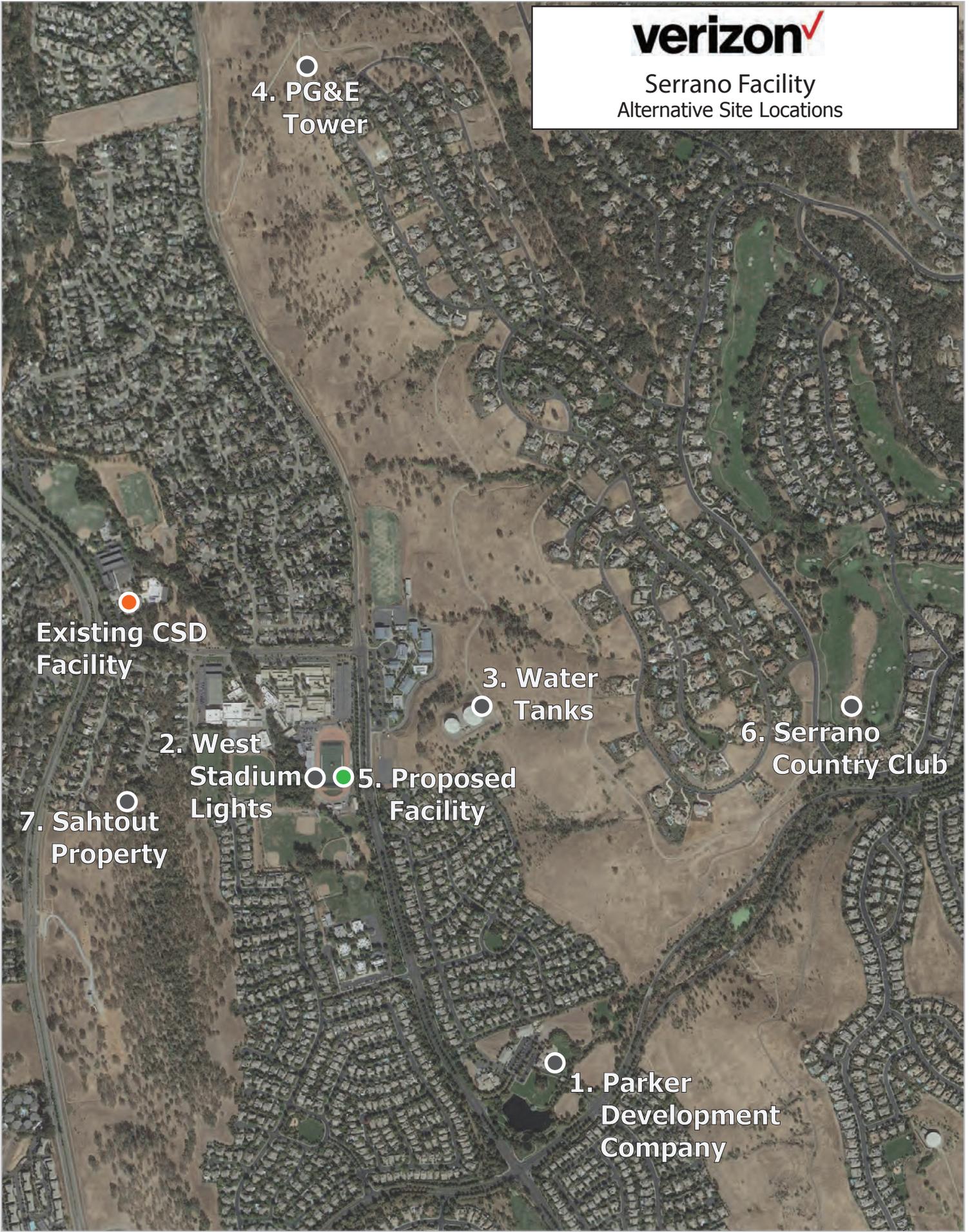
Verizon Wireless considered placement of a new tower on this 4.4-acre property due west of the high school, cresting 0.3 miles west of the Proposed Facility at an elevation 160 feet greater. Verizon Wireless mailed several letters of interest to the property owner, Mustafa Sahtout, regarding placement of a facility on the property, but never received a reply. Lacking landlord interest, this is not a feasible alternative to the Proposed Facility.

## **V. Conclusion**

Verizon Wireless has reviewed seven specific alternatives to fill the Significant Gap in service in southern El Dorado Hills. Based upon the values expressed in County regulations, the Proposed Facility clearly constitutes the least intrusive feasible location for Verizon Wireless's new facility.



Serrano Facility  
Alternative Site Locations



4. PG&E  
Tower

Existing CSD  
Facility

2. West  
Stadium  
Lights

3. Water  
Tanks

5. Proposed  
Facility

6. Serrano  
Country Club

7. Sahtout  
Property

1. Parker  
Development  
Company

May 27, 2021

**To: El Dorado County Board of Supervisors**

**From: Ericson Malana, Radio Frequency Design Engineer  
Verizon Wireless Network Engineering Department**

**Subject: Statement in Support of Verizon Wireless's Proposed Facility  
Oak Ridge High School, El Dorado Hills**

### **Executive Summary**

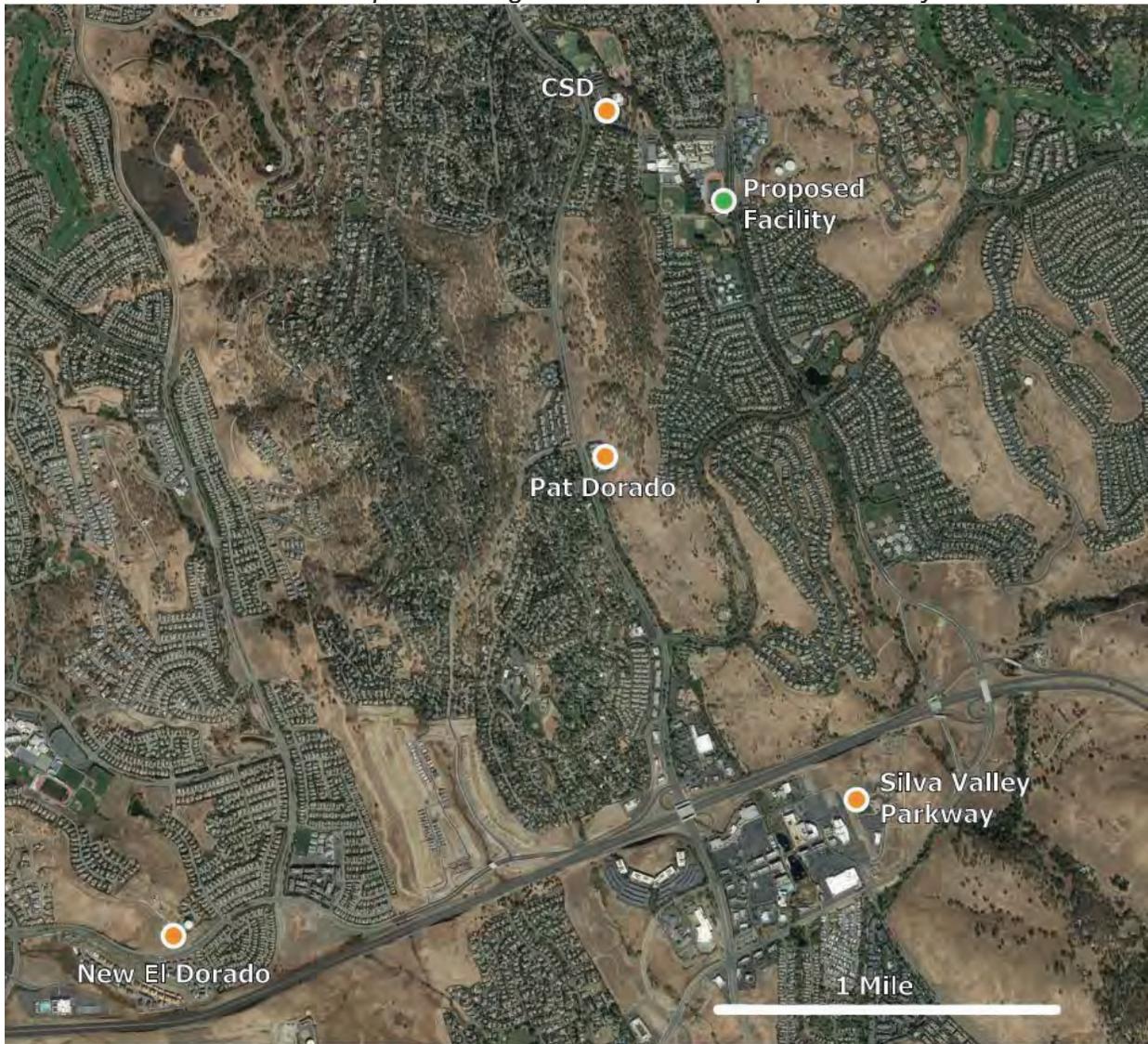
Verizon Wireless has identified a significant gap in its fourth-generation long-term evolution (LTE) service in southern El Dorado Hills along Silva Valley Parkway. This area currently receives inadequate LTE service coverage from the existing Verizon Wireless CSD facility 0.4 miles northwest of the proposed facility and the Silva Valley Parkway facility 1.7 miles south. The Pat Dorado facility 0.8 miles southwest does not serve the gap area because it is much lower in elevation with a ridge in between, and its antenna sectors face away from the gap. The New El Dorado facility on a tall tower 2.7 miles southwest provides limited, weak coverage to the gap area. There are no facilities nearby to the east that provide usable service levels. A network map is shown on the following page.

Due to the distance from existing facilities and a lack of strong dominant signal, there is a gap in reliable LTE in-building and in-vehicle service coverage in southern El Dorado Hills in areas along Silva Valley Parkway.

To meet increased local demand, Verizon Wireless is deploying efficient high-speed fourth-generation LTE technology. In the El Dorado Hills area, 61 percent of Verizon Wireless's LTE bandwidth is in the mid-band AWS (2100 MHz) and PCS (1900 MHz) frequencies, with 39 percent in low-band frequencies (700 and 850 MHz). Higher frequencies mean greater data capacity. However, the mid-band frequencies do not travel as far as low-band frequencies, and require facilities closer together and closer to the end user to provide reliable LTE service. Verizon Wireless designs its networks to ensure that mid-band frequencies can provide adequate capacity as well as coverage.

We describe below the significant gap in coverage that Verizon Wireless seeks to remedy (the "Significant Gap"). To provide reliable LTE coverage and strong dominant signal in southern El Dorado Hills, the Significant Gap must be remedied through construction of a new facility on a stadium light pole at Oak Ridge High School (the "Proposed Facility").

*Network Map – Existing Facilities and Proposed Facility*



## Coverage Gap

Verizon Wireless is experiencing a gap in its LTE service coverage in southern El Dorado Hills, in the valley along Silva Valley Parkway. In-building service is lacking in residential neighborhoods west and east of Silva Valley Parkway, south of Oak Ridge High School and north of Serrano Parkway and Sortwell Court.

In-vehicle service is lacking in a larger area, including a 0.8-mile stretch of Silva Valley Parkway between Walker Drive and Elk Meadow Elementary with over 17,400 vehicle trips per weekday, and a 0.5-mile stretch of Serrano Parkway between Boundary Oaks Drive and Village Green Drive with over 13,300 vehicle trips per weekday.<sup>1</sup> (Collectively, the “Coverage Gap”)

The Proposed Facility will provide new reliable LTE in-building coverage to those residential areas, as well as new reliable in-vehicle service to those stretches of Silva Valley Parkway and Serrano Parkway where lacking. In total, the Proposed Facility will improve coverage to an area of 1.08 square miles, with a population of 2,020.

A graphic description of the LTE coverage gap is shown on the following coverage map, followed by a map showing the improved coverage to be provided by the Proposed Facility. The coverage maps have been prepared using the AWS frequency band. The AWS and PCS bands use similar frequencies and have similar propagation characteristics.

Referenced signal receive power (RSRP) is a measurement of signal level in decibels (dBm), which is a negative number that decreases due to distance and other factors.

The LTE RSRP coverage thresholds are:

	<b>In-building</b> $\geq -75$ dBm. Green depicts good coverage that meets or exceeds thresholds for reliable network coverage in homes and vehicles.
	<b>In-vehicle</b> $\geq -85$ dBm. Yellow depicts reliable in-vehicle coverage only.
	<b>Outdoor</b> $\geq -95$ dBm. Red depicts reliable outdoor service only.
	<b>Unreliable</b> $\geq -105$ dBm. Grey depicts unreliable service levels.

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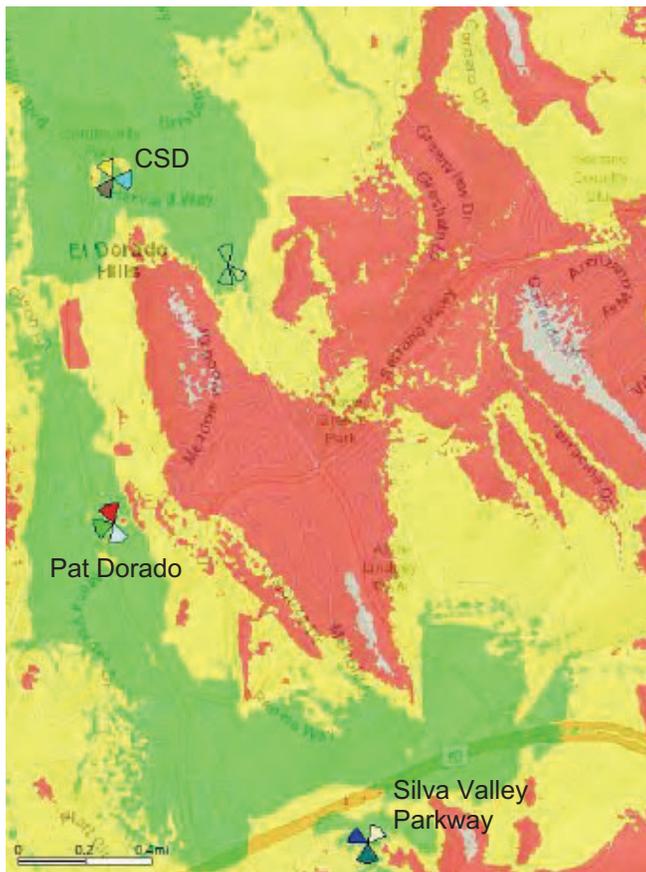
<sup>1</sup> El Dorado County Department of Transportation, 2020 Traffic Counts Annual Summary.

# AWS LTE Coverage Maps

## Coverage of Existing Facilities

**AWS LTE RSRP Coverage**

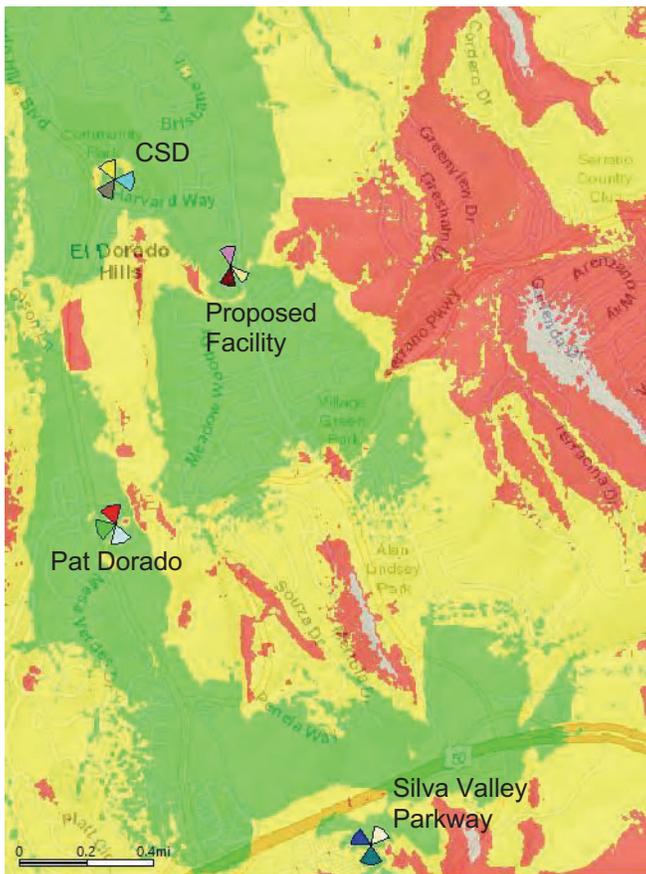
In-building	$\geq -75$ dBm
In-vehicle	$\geq -85$ dBm
Outdoor	$\geq -95$ dBm
Unreliable	$\geq -105$ dBm



## Coverage Including Proposed Facility

**AWS LTE RSRP Coverage**

In-building	$\geq -75$ dBm
In-vehicle	$\geq -85$ dBm
Outdoor	$\geq -95$ dBm
Unreliable	$\geq -105$ dBm

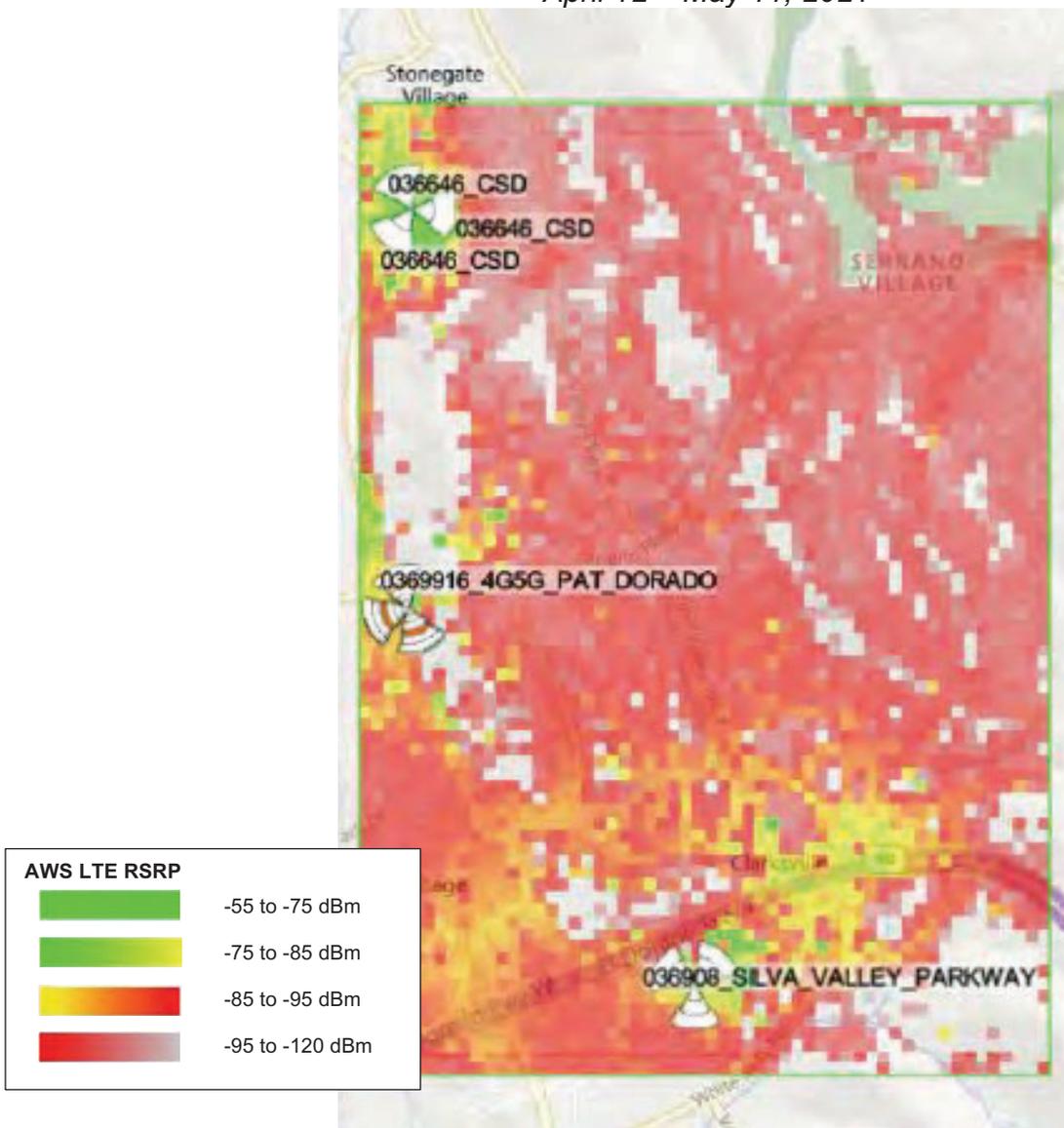


The following map shows the average AWS signal level from existing Verizon Wireless facilities received by customer devices in the gap area over one month, April 12 to May 11, 2021. Customer devices report this data to the network, and Verizon Wireless uses its TrueCall tool to analyze this data and optimize system performance.

Similar to the coverage maps, yellow and red squares show decreasing signal level. Gray squares indicate unreliable service levels. White squares indicate vacant areas (e.g., fields) where no data was reported that day.

The map shows how signal level from the existing Verizon Wireless facilities decreases with distance. The map demonstrates the poor signal levels received in the gap area in the center of the map, with a pronounced lack of in-building and in-vehicle service levels (green and yellow squares). The broad area of red and gray squares indicate only an outdoor level of service or unreliable service levels.

*Existing AWS LTE Signal Level Measured by Customer Devices  
April 12 – May 11, 2021*



## **Dominant Signal**

As described above, the identified gap area receives inadequate service from nearby Verizon Wireless facilities which provide only weak dominant signal to the area. Dominant signal is the strongest signal from a particular Verizon Wireless facility received by a customer's wireless device in area. This is apparent in the following best server maps, which depict the areas of dominant signal from each existing facility. Signal from each antenna sector of these facilities is depicted in a different color.

Although dominant, the signal from existing Verizon Wireless facilities is weak in the gap area. The CSD facility is on a rooftop and only 35 feet in height, limiting its area of dominant signal (shown in light brown and green at the top of the best server maps). The Silva Valley Parkway facility is distant at 1.7 miles, and its northeast-facing antenna sector serves a very large area (shown in light purple), including a portion of the gap. The New El Dorado facility is very distant at 2.7 miles southwest, and its northeast-facing antenna sector likewise serves a very large area (shown in red), with very weak dominant signal to a portion of the gap.

The lack of strong, reliable dominant signal degrades network performance, resulting in unreliable service, particularly during busy hours. This affects the reliability of Verizon Wireless service for residents, workers and visitors as well as for critical communications with emergency service personnel. Nationwide, most 911 calls are placed from mobile phones, and in emergencies, first responder agencies increasingly rely on dependable Verizon Wireless service.

At times of high traffic volume, the coverage area of the surrounding Verizon Wireless facilities shrinks to accommodate an increasing number of mobile devices closer to each facility. As a result, the Coverage Gap area expands and is exacerbated during times of high customer usage. The contraction of coverage during times of high usage has become more relevant as the demand for wireless services has increased rapidly over time.

As shown on the second best server map, the Proposed Facility is strategically located to provide strong, new dominant signal to the gap area. Of note, its southwest- and southeast-facing antenna sectors (shown in dark brown and light yellow) will provide new dominant signal to residential areas currently served by the distant Silva Valley Parkway and New El Dorado facilities. This will relieve the demand on those facilities so they can devote their resources to customers closer to their locations. This will improve overall network performance in the greater vicinity.

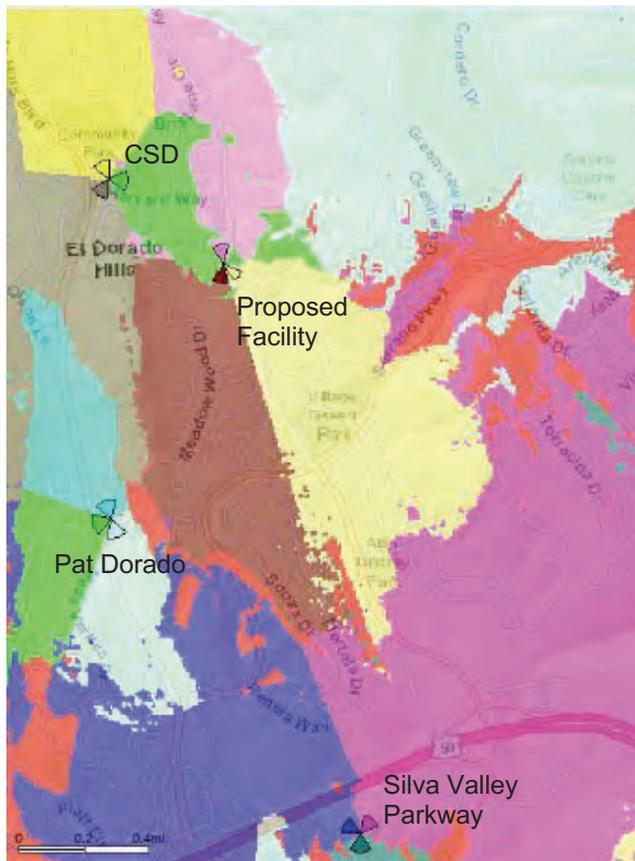
*See Best Server Maps on Following Page*

# AWS Best Server Maps

## Existing Facilities



## Including Proposed Facility



## Conclusion

As the Verizon Wireless network matures, the network must be supplemented with more sites closer to customers, in large measure due to the increase in usage of the network. The LTE technology used to provide fourth-generation service requires facilities closer to customers, and this service cannot be provided adequately by the existing facilities serving the gap area. These network challenges have led to the Significant Gap in Verizon Wireless LTE coverage in southern El Dorado Hills. Verizon Wireless must deploy the Proposed Facility to provide reliable LTE service to customers, and to avoid further degradation of its network in the area of the Significant Gap.

Please feel free to contact me with any questions or comments regarding Verizon Wireless's proposed facilities.

Respectfully submitted,



Ericson Malana  
RF Design Engineer  
Network Engineering Department  
Verizon Wireless

My responsibilities include planning, design and implementation of improvements to network infrastructure to provide reliable service. I have been in the wireless telecommunications industry for 27 years. I have eight years of experience in cellular RF network design. I received my Bachelor's degree in Electronics and Communications Engineering at Mapua Institute of Technology in the Philippines.