

**FirstNet &
Wireless Coverage**
Arden-Arcade, CA
Rio Americano H.S.



San Juan Unified Challenges

- Wireless connectivity on the Rio Americano HS campus is provided through the school Wi-Fi.
- Utilizing school Wi-Fi to support wireless connectivity hinders the effectiveness of school systems.
- Wireless connectivity in the area primarily relies on Wi-Fi; if the power goes out or a router fails, wireless connectivity will also be lost.



What is FirstNet?

- 9/11 - After Action Report
- 2012 - Middle-Class Tax Relief and Job Creations Act, law 112-96
 - National Public Safety Broadband Network (NPSBN): FirstNet
 - Dedicated Band 14 to public safety
- 2017 - 25-years public-private partnership with AT&T
- 2018 - 56 US states and territories opt in – Network launched



TWO ORGANIZATIONS: ONE MISSION



The Western Fire Chiefs Association (WFCA) has been a strategic partner since PSTC's inception. Together, we fulfill WFCA's mission of empowering firefighters throughout the Western U.S. by enhancing mission-critical resources, including emergency communications infrastructure.



Public Safety Towers Company (PSTC) is an infrastructure provider based out of Carlsbad, CA that partners with local governments, public safety agencies, and commercial carriers to deliver wireless infrastructure for the purpose of improving public safety communications.

WHY IS WIRELESS COVERAGE IMPORTANT?



Wired Landlines



Voice – No Data



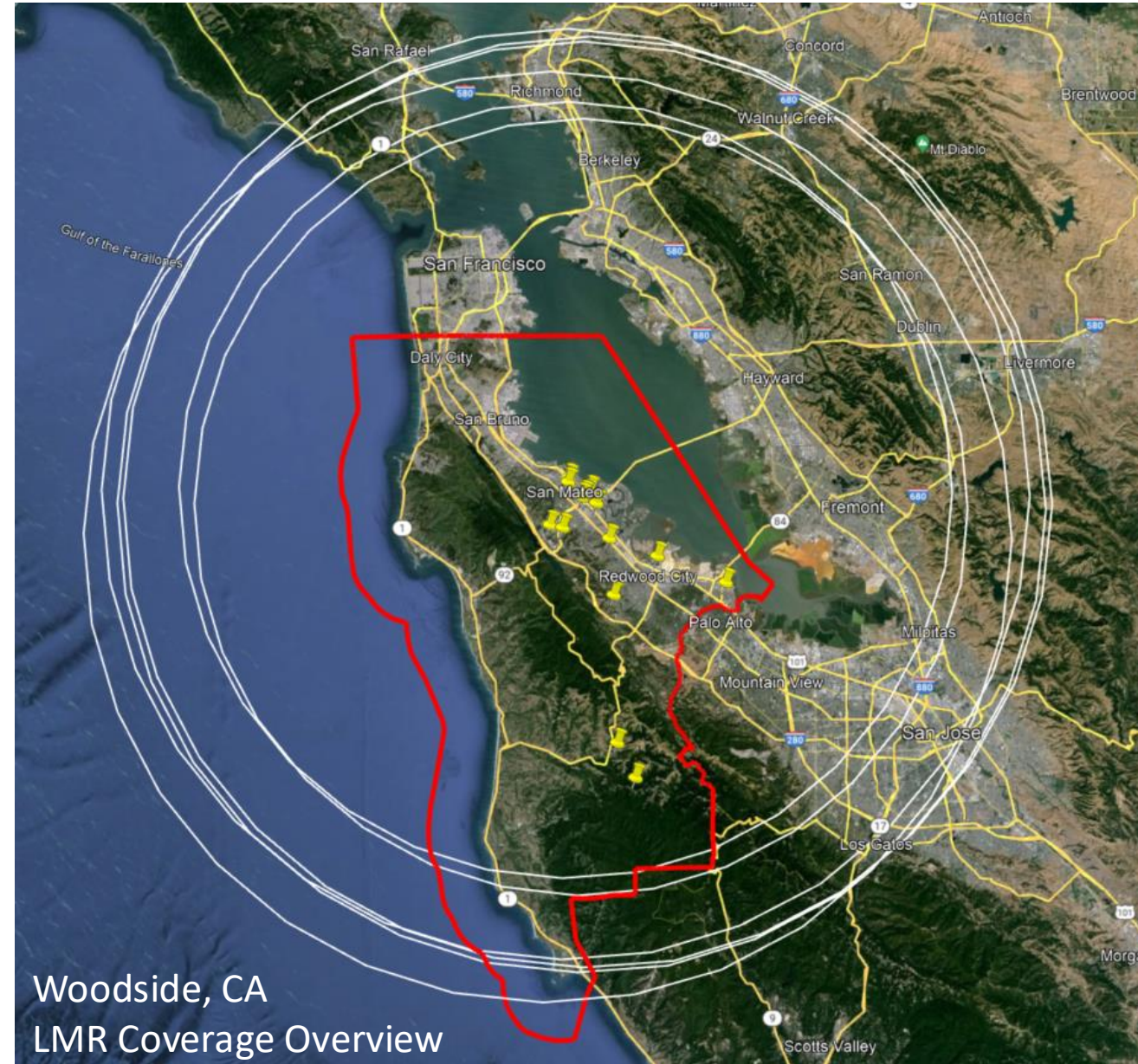
Thomas Bros Map Books



Dispatch Intel



Two-Way Radios



PUBLIC SAFETY TECHNOLOGY TODAY

A circular image showing a firefighter in a helmet and gear, standing in front of a city skyline at night with lights reflecting on water.

~90%

of 9-1-1 calls are made
from wireless devices⁽¹⁾.

A circular image showing a firefighter in a yellow jacket and helmet, standing in front of a pile of rubble and debris.

79.8%

of homes are wireless only
(no landline)⁽²⁾.

- Enhanced 911
- GPS routing & Auto-Vehicle Location (AVL)
- Emergency Notification & Evacuation Management
- Incident Intelligence
- License plate readers
- Wildfire Cameras
- EMS Telemetry
- Firefighter Accountability
- Mobile Data Computers
- Websites
- Social media

1) NENA 9-1-1 Statistics (www.NENA.org)

2) Wireless Substitution: Early Release of Estimates from the National Health Interview Survey



Wireless Communications

Public Safety, Coverage, User Density

SACR02 - User Density

Summary:

Very dense residential area with high traffic streets where all carriers show significant coverage gaps highlighted in following slides

Proposed tower location:

SACR02 - Rio Americano High School

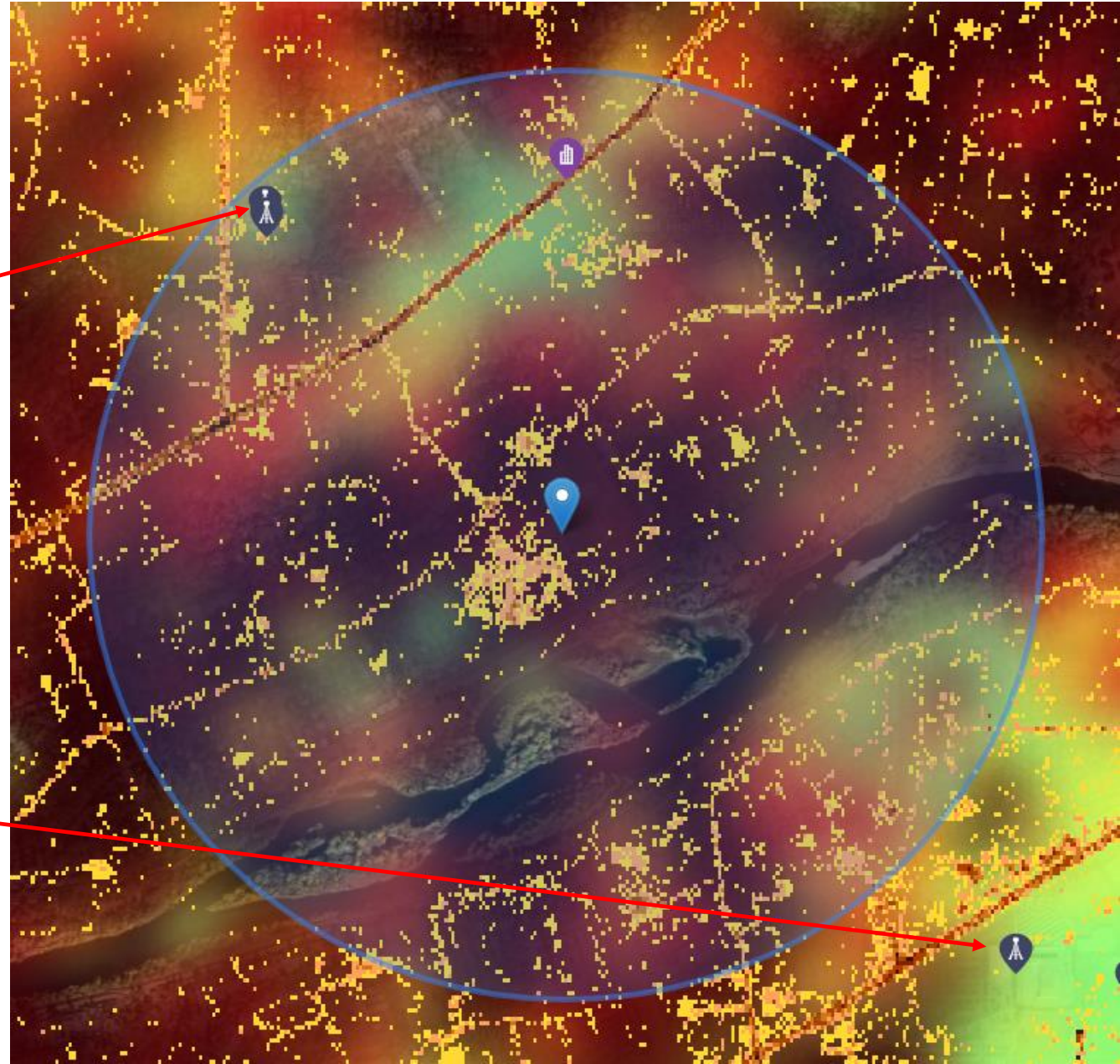
(3) Schools located within ring – circled in RED



SACR02 – Alternative Site Analysis

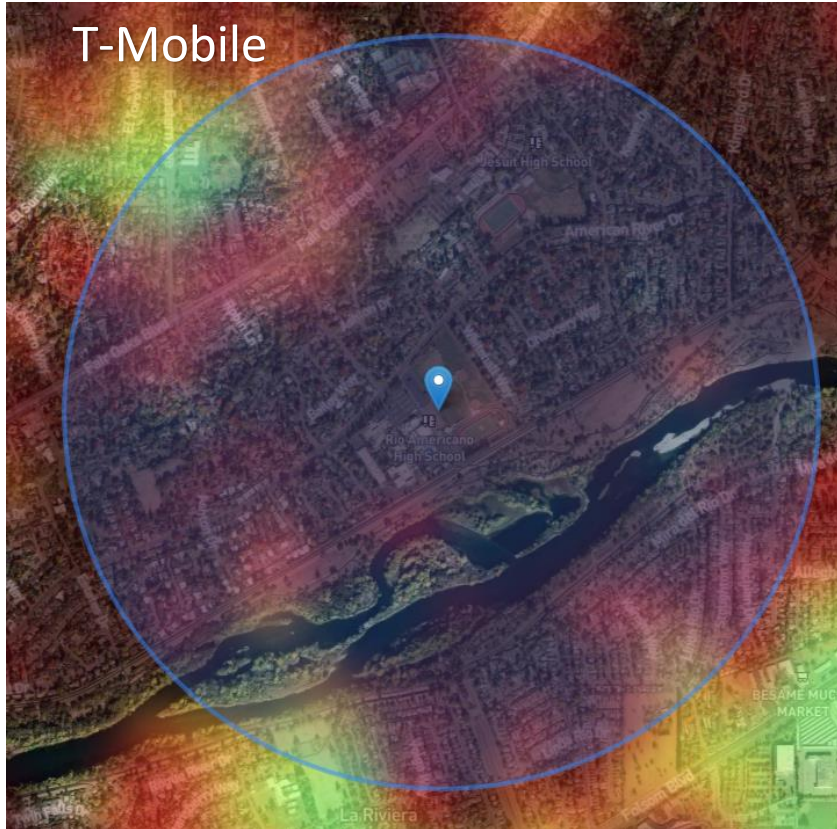
Carriers have attempted to address coverage issues by utilizing parking lights at Acton Academy Placer - Sacramento Campus located in the north portion of the ring.

Wireless facilities have been installed in the commercial and industrial areas to the southeast; however, these are situated well outside the 0.75-mile radius and provide little to no coverage to residential areas to the north.

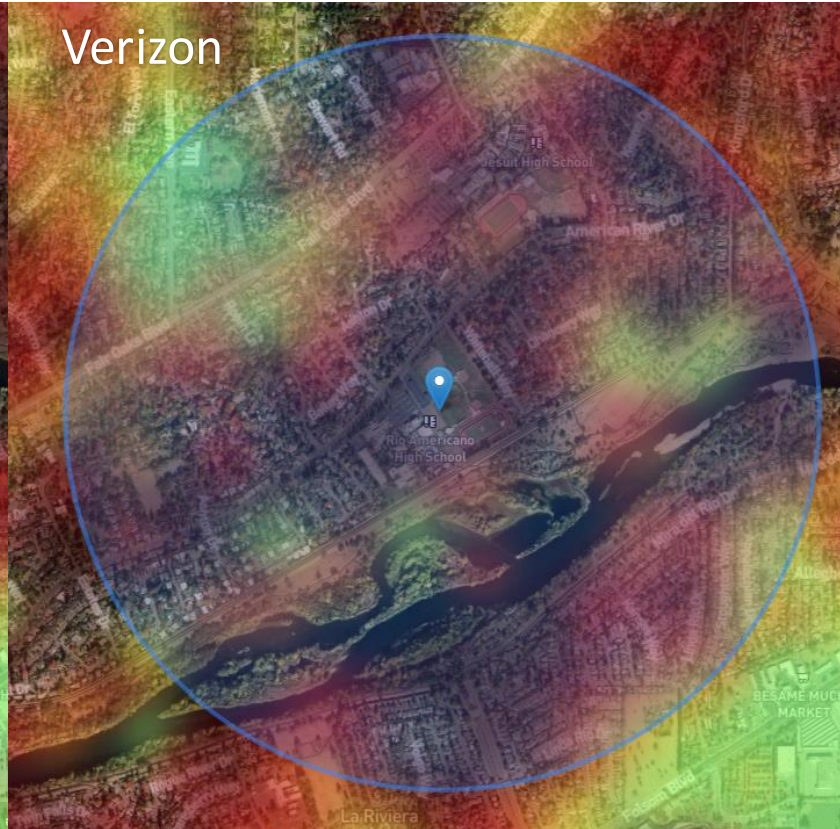


SACR02 – Existing Coverage

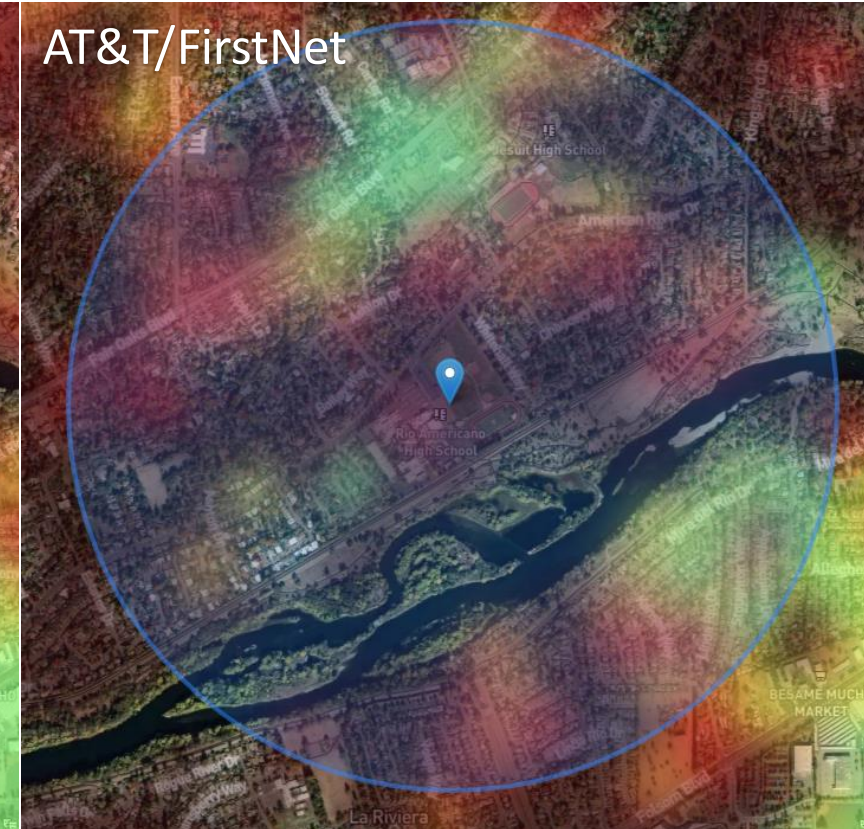
T-Mobile



Verizon



AT&T/FirstNet





Wireless Coverage Improvement Opportunity

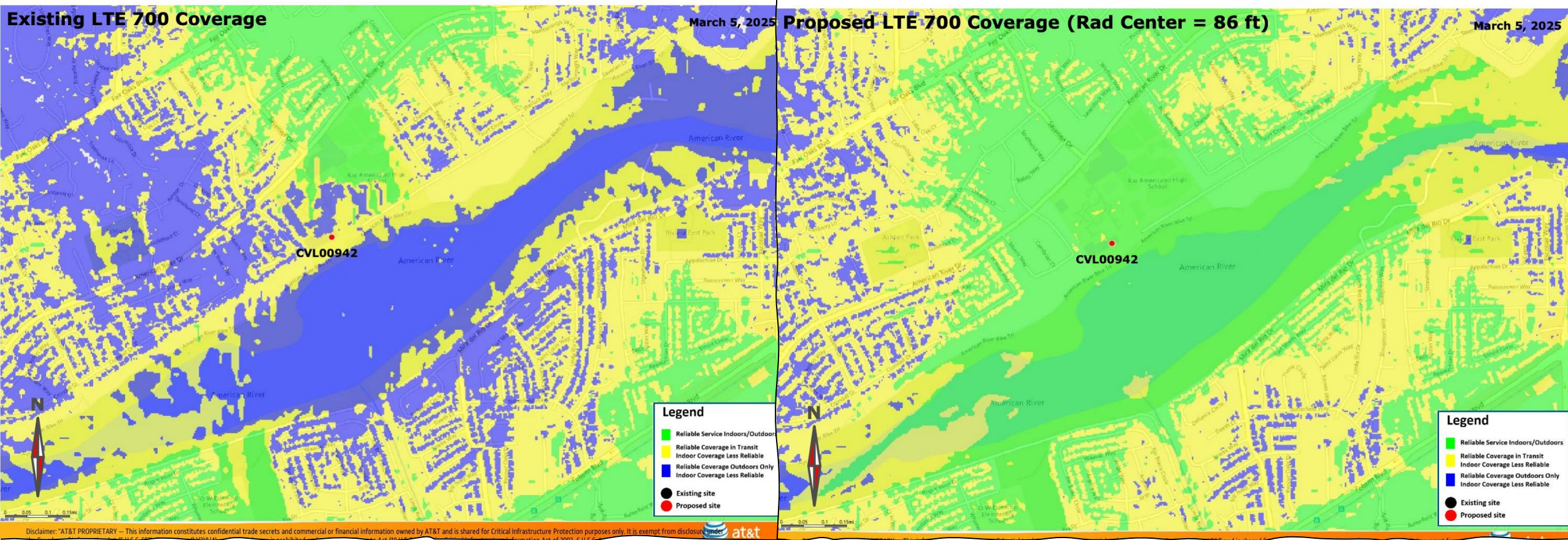




PROPOSED MONOPOLE

Monopole Towers





Coverage

- Existing coverage around the proposed tower (left)
- Proposed coverage from the proposed tower (right)

Important!!!

This site will be developed, and the coverage issues will be addressed at no cost to the School District, the school, or the residents.

Revenue from the ground lease will be utilized to fund HS programs and the K-8 Grant Program.

Cellular & Electromagnetic Safety

Prepared for Rio Americano HS (Sacramento CA)

May 15th 2024, via Zoom

David Witkowski, CEO, Oku Solutions LLC

www.okusolutions.com



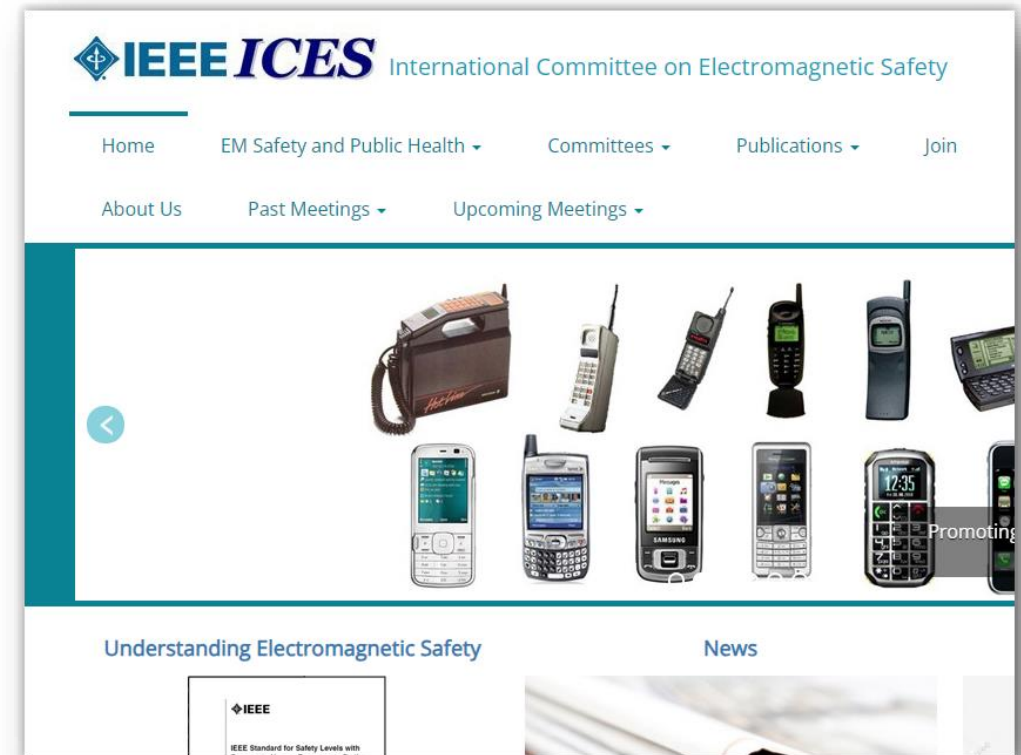
Bio/CV



- U.S. Coast Guard: High-power communications & RADAR.
- University of California (@ Davis), B.Sc. Electrical Engineering, w/ focus on microwave/RF, electromagnetic applied physics.
- Founded Oku Solutions in 2007.
- **Institute of Electrical and Electronic Engineers (IEEE):**
 - Senior Member
 - Life Member, *Microwave Theory and Techniques Society*
 - Steering Committee, *International Microwave Symposium*
 - **Member, IEEE Standards Association, *International Committee on Electromagnetic Safety* (C95 Standards family)**
 - Member, IEEE Engineering in Medicine and Biology Society, *Committee on Man and Radiation*

IEEE International Committee on Electromagnetic Safety (ICES)

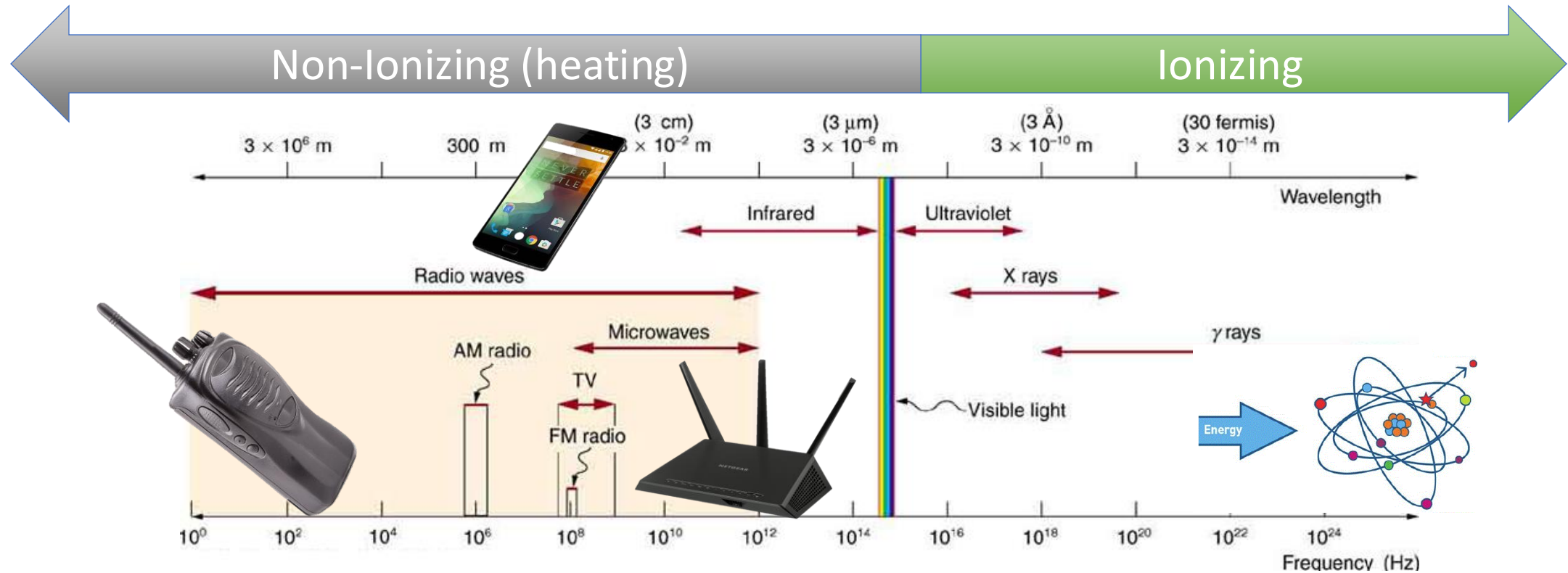
- Over 200 members: scientists, doctors, academics, engineers, and government employees.
- *EMBS COMAR* reviews scientific and medical literature.
- ICES formally meets every six months.
- ICES produces standards for EM exposure, measurement methods, safety practices, dosimetry, etc.
- *Standards are used by regulatory bodies (incl. the FCC) to create maximum permissible exposure guidelines.*



What is Electromagnetic Energy?

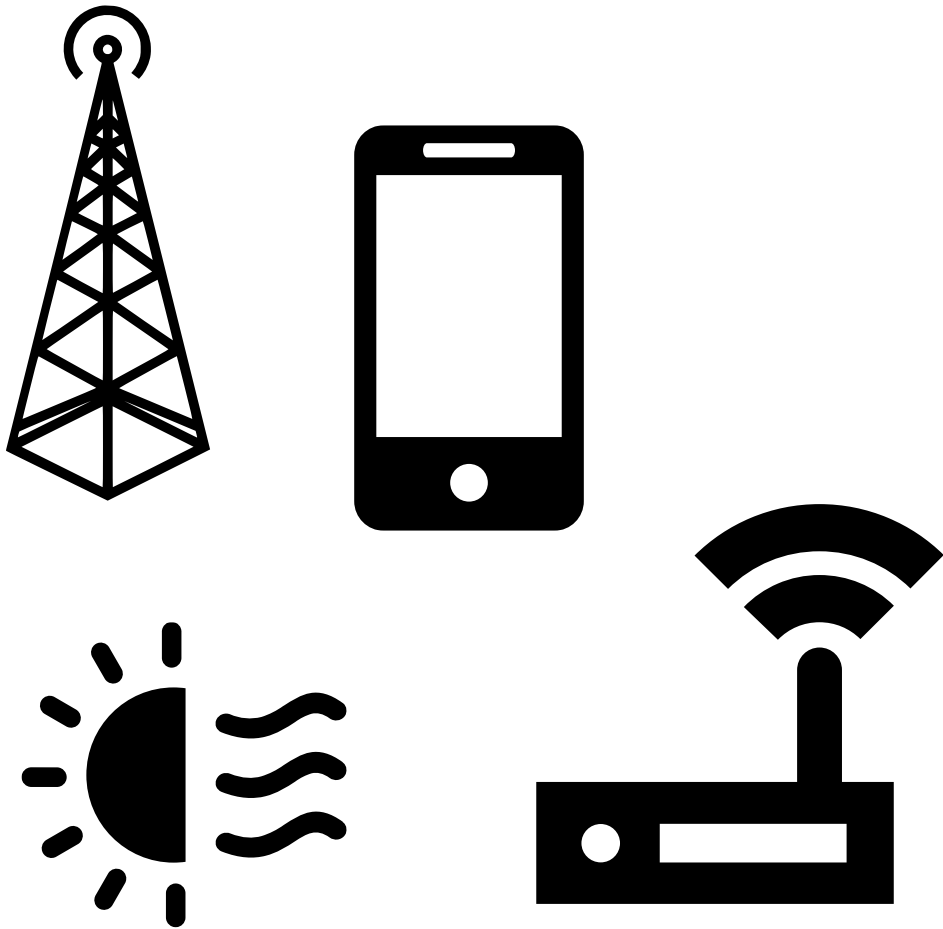
And how does it relate to safety and our lives?

RF, Microwave, and Light are all electromagnetic energy



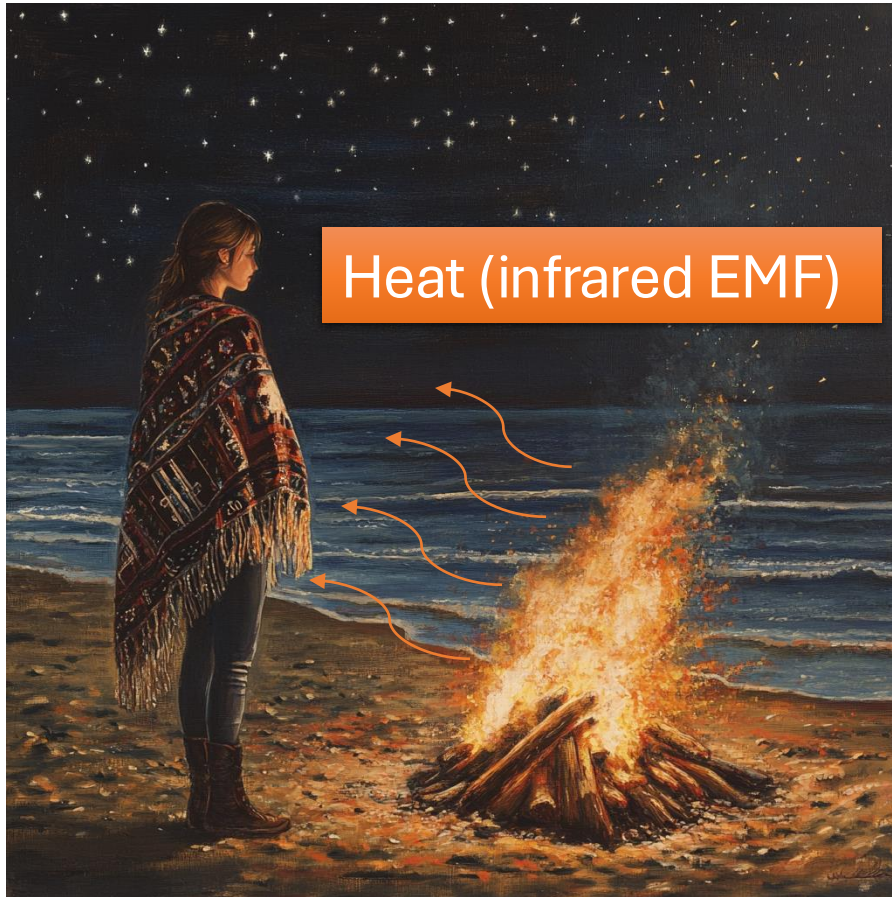
$$EMF \text{ Photon Energy} = h \cdot v = \frac{h \cdot c}{\lambda}$$

Factors Influencing EMF Safety



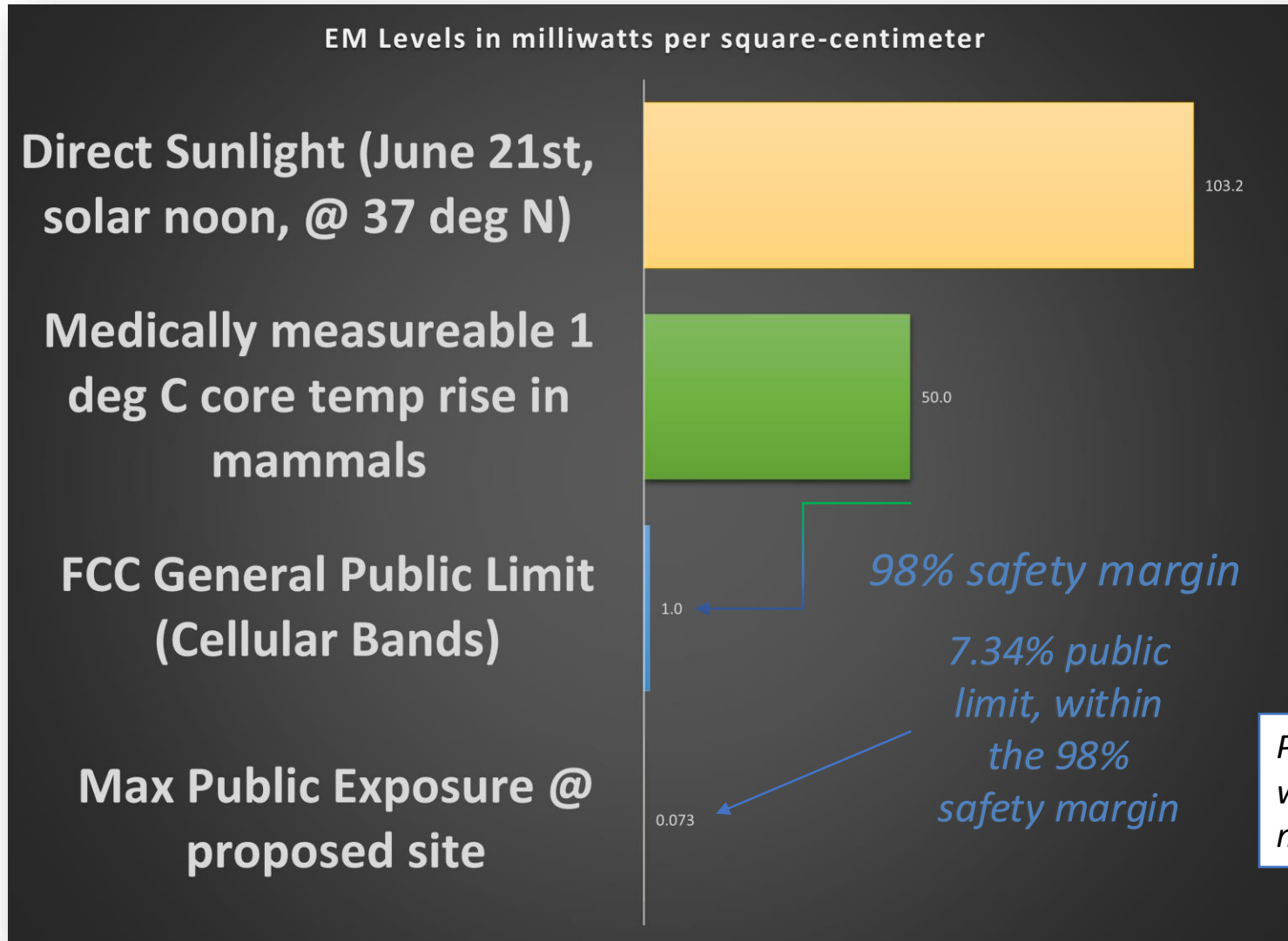
- Power output (wattage)
- Antenna Type (esp. if directional)
- Frequencies used
- Distance from source (*Free-Space Path Loss*)

Free-Space Path Loss



- We experience free-space path loss from heat sources. (Fire, stoves, heaters, heat lamps)
 - Heat is actually infrared EMF.
 - Distance from the source changes our exposure to EMF energies.

Reviewed levels for proposed site



Site Frequencies:

700 MHz
850 MHz
1,900 MHz
2,100 MHz
3,400 MHz
3,700 MHz

- Predicted Ground Level: 7.43% Public Limit, or less.

Predictive EMEs are always worst-case – actual levels will measure 5x to 10x lower.

EME Report Review

Certification

The undersigned is a Professional Engineer, holding a California Registration No. 19677

Reviewed and approved by:



John Bachoua, PE

Date: April 11, 2022

Per the EME Report:

OSC Engineering

11-April-2022

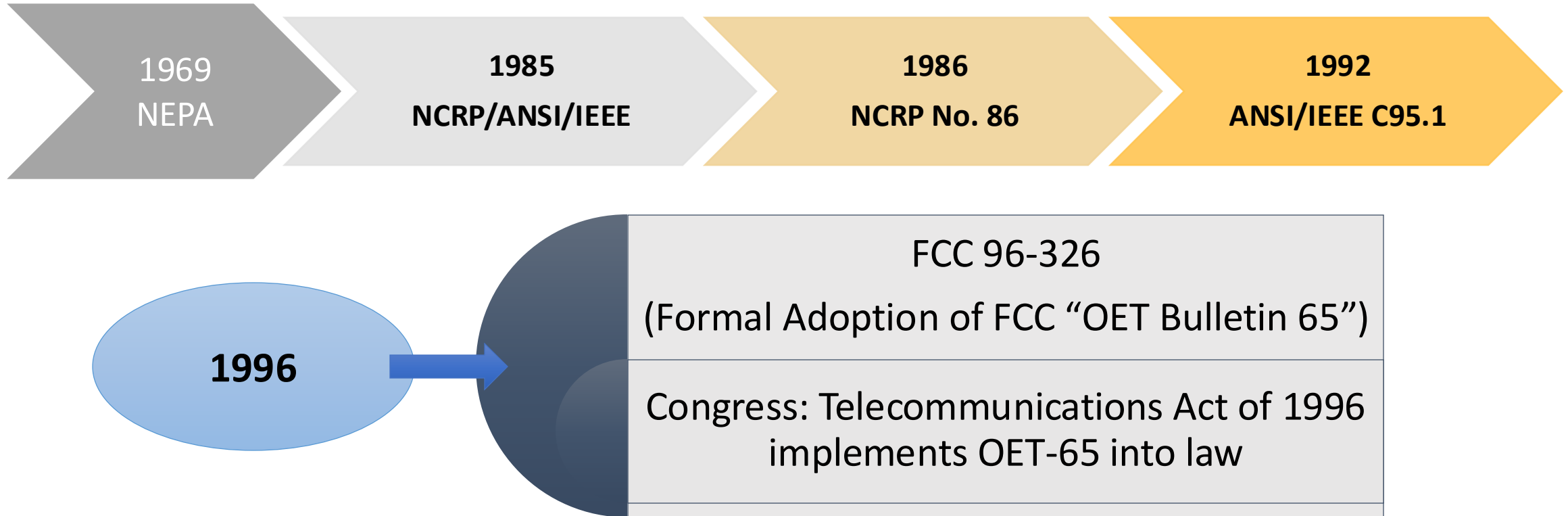
CA Professional Engineer: J. Bachoua

Compliance Req'd: Signage on tower.

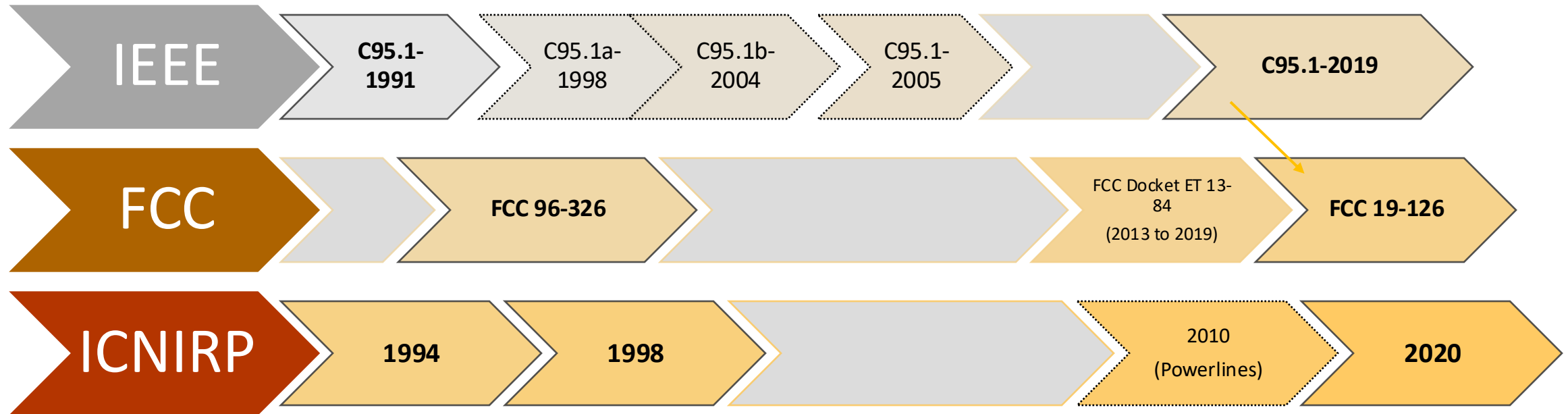
Predicted MPE Level for this site
on the ground: 7.35% of the
Public Limit, or less.

*Important: Predictive EMEs are
always worst-case – actual levels
will measure 5x to 10x lower.*

EMF Safety Standard History



EMF Safety Regulation History



What does current high-quality research tell us about Electromagnetic Safety?

Research Quality

- Good Research:
 - Uses large numbers of test subjects.
 - Uses only objective results and blinded experimental methods.
 - Is reliably reproducible by other researchers.
 - Is peer-reviewed by reputable experts.



Research Quality

- Poor Research:
 - Mixes subjective and objective results.
 - Fails to consider for and control confounding variables.
 - Is poorly (or not) reproducible by other researchers.
 - Seeks to validate pre-conclusions, or rejects counter-factual findings.
 - Fails peer-review, or relies on biased peer-review.

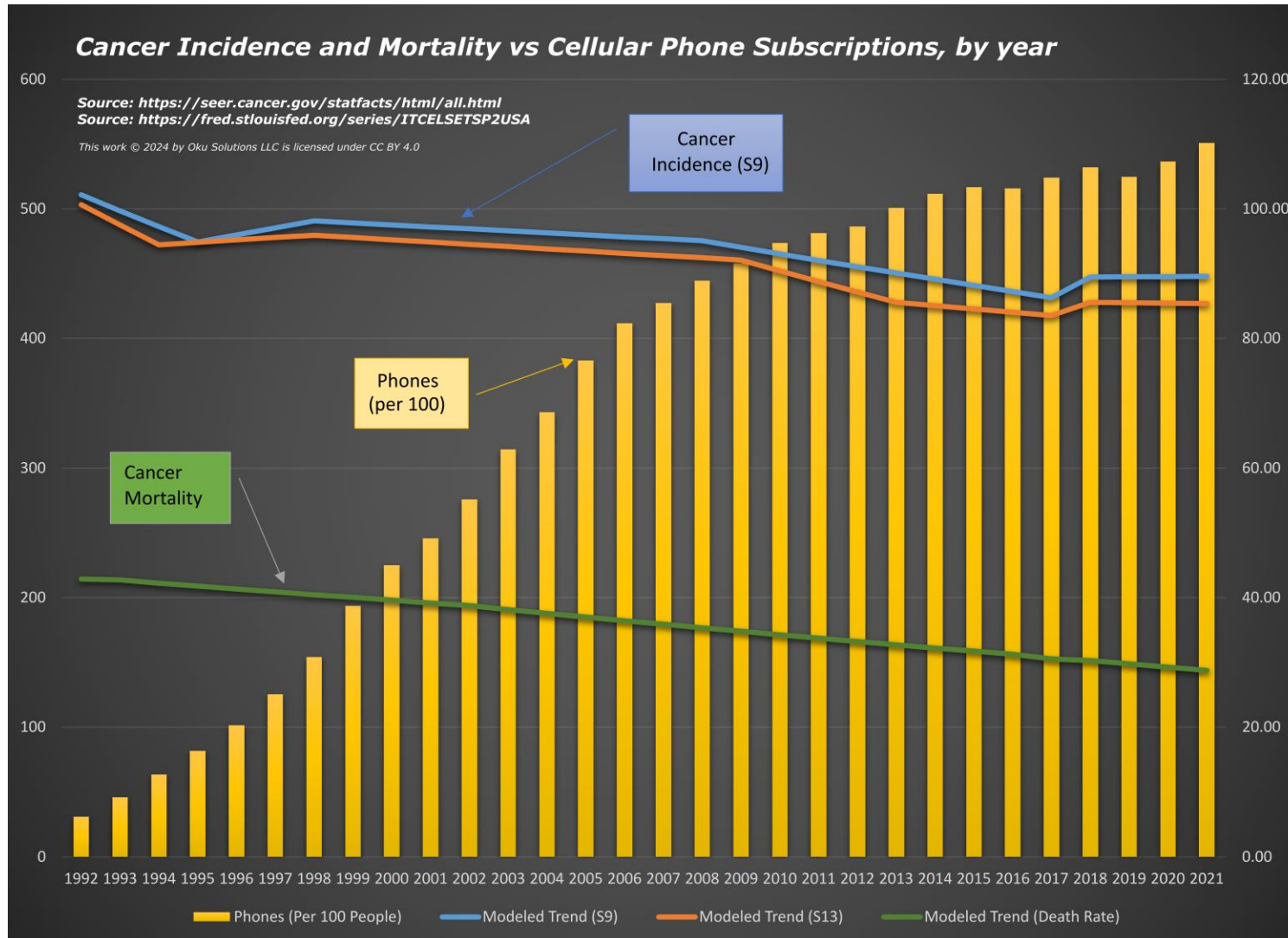


International Cohort Study of Mobile Phone Use and Health (COSMOS)

- International Agency for Research on Cancer, 2024:
Looked at mobile phone use and brain tumor risk in over 250,000 phone users, many with 15 years or more of use.
 - *“Emergence of tumors in the cohort groups did not correlate with phone usage.”*
- *Tracks with previous cohort studies e.g. the Danish Cohort.*



Phones vs Cancer



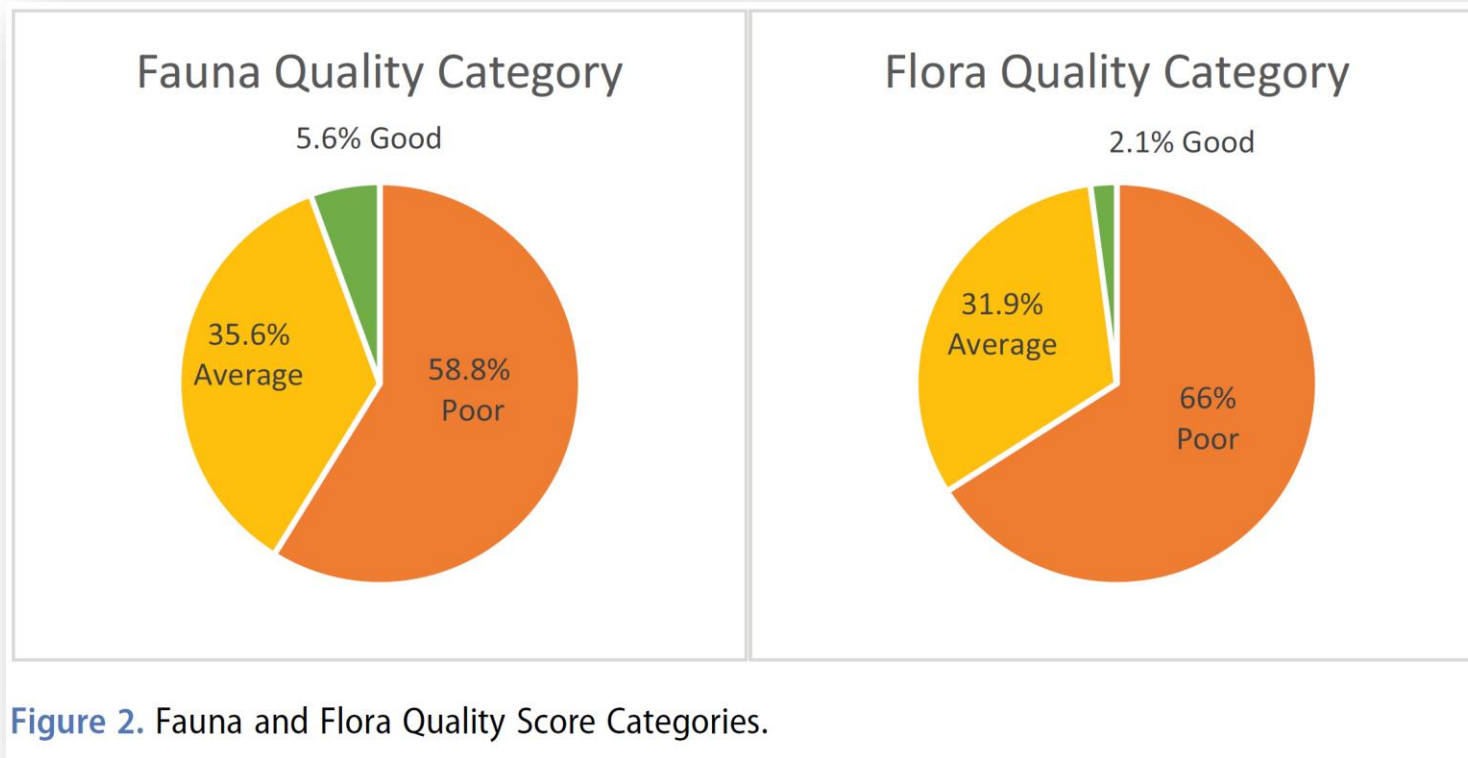
- The number of cellular phones (and by extension cellular sites) is *increasing*, while cancer incidence and mortality are *decreasing*.

World Health Organization

- 2024: Meta-Analysis of 63 studies (selected from over 5,000 proposed)
- 2024: Cognition, Self-Reported EHS, Male Fertility.
- 2023: Tinnitus Migraine and Non-specific Symptoms, Pregnancy and Birth Defect Outcomes.
- *All had negative or likely-negative findings.*



Impacts to Flora and Fauna



Chris Brzozek, Rohan Mate, Chhavi Raj Bhatt, Sarah Loughran, Andrew W. Wood & Ken Karipidis (30 Jul 2024): ***Investigating the impact of anthropogenic radiofrequency electromagnetic fields on animals and plants in the environment: analysis from a systematic map***, International Journal of Environmental Studies, DOI: 10.1080/00207233.2024.2375861

Impacts to Flora and Fauna

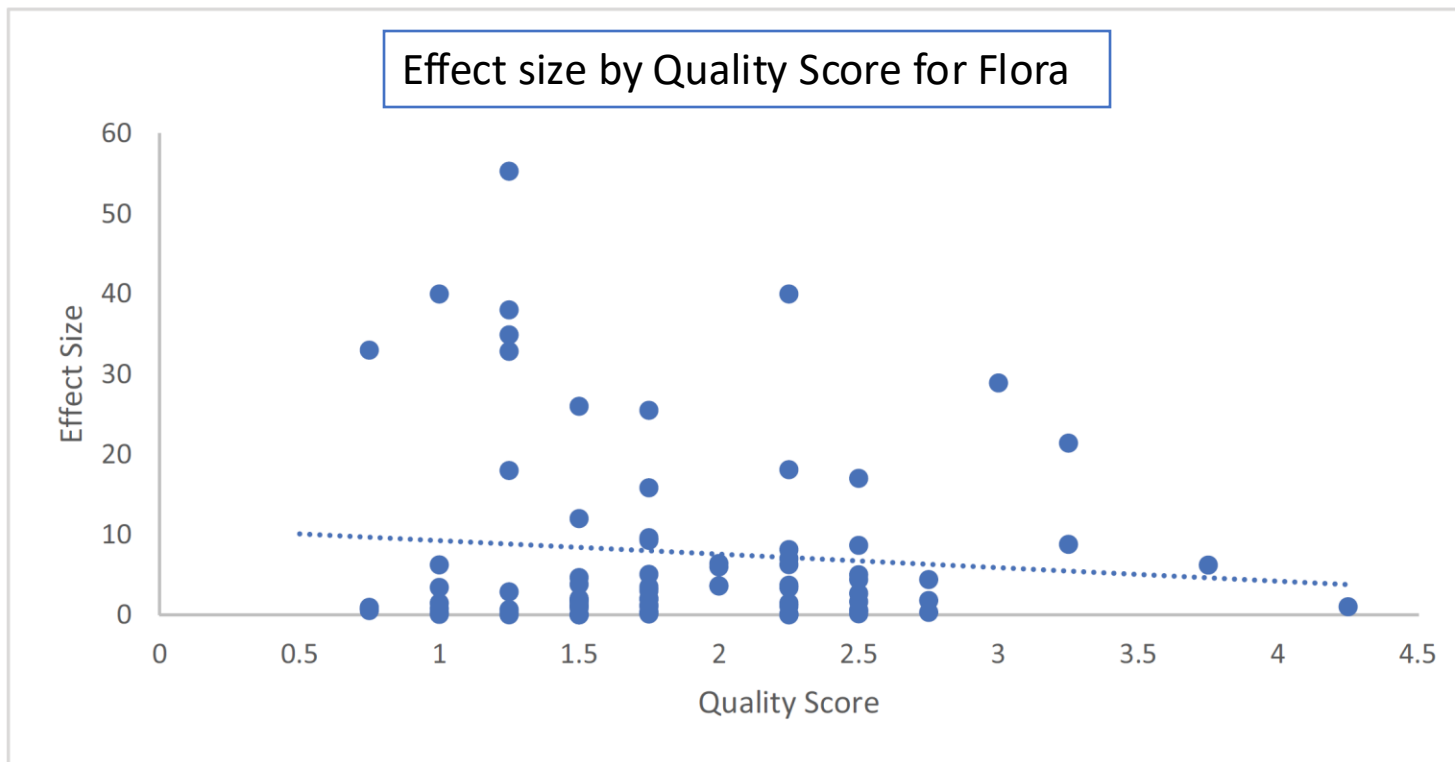
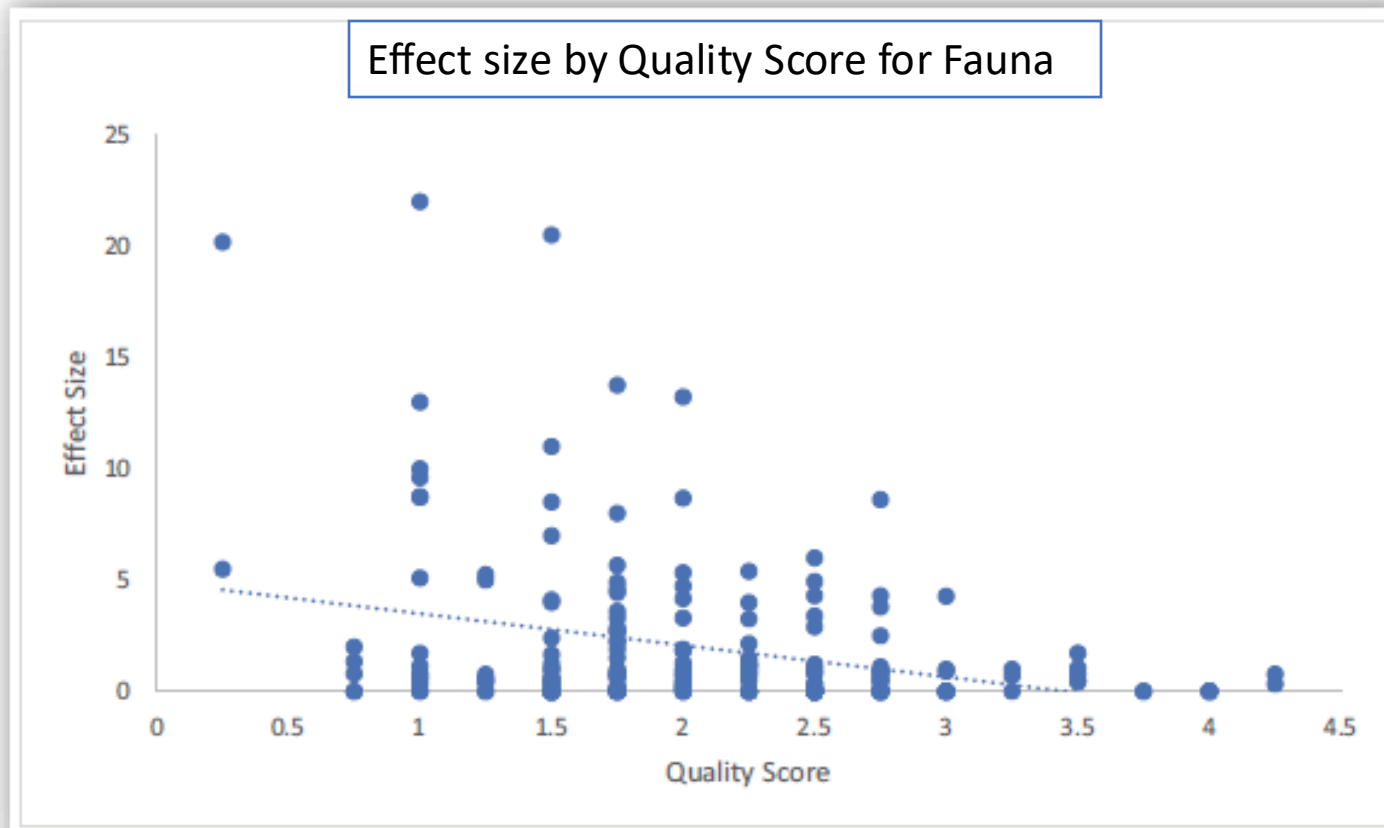


Figure 4. Effect size by quality score for flora studies.

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Real Estate Valuation



- 2005 *survey* by a realtor in NZ
 - Claimed up to 20% reduction in valuations – but this was a *survey*
- Scientific studies have *not* found this effect using objective data
 - JVSV (2012 & 2021) :
<http://bit.ly/cellsiteMLSstudy> and
<https://bit.ly/SCREstudy>
 - Valbridge (2018: Boston, Dallas, Phoenix*, and Raleigh-Durham) :
<https://www.valbridge.com/market-studies>
 - Maennig (2010 : Hamburg DE)
<https://econpapers.repec.org/RePEc:hce:wpaper:039>



Questions?

If you have a question, please type it in the chat or use the raise your hand feature.

If raising your hand, we will unmute you when we get to you in the queue so you can ask your question.

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Why There's No Coverage...

