Council Agenda Report

Special Meeting
11-30-21
Item 2.A.

To: Mayor Grisanti and the Honorable Members of the City Council

Prepared by: Susan Dueñas, Public Safety Manager

Approved by: Steve McClary, Interim City Manager

Date prepared: October 27, 2021 Meeting date: November 30, 2021

Subject: Indoor Warning Systems

RECOMMENDED ACTION: 1) Review options for indoor emergency warning systems; and 2) Provide direction to staff if appropriate.

FISCAL IMPACT: There is no fiscal impact associated with the recommended action. Depending on what direction Council provides on indoor emergency warning systems, an appropriation from the General Fund Undesignated Reserve may be necessary.

WORK PLAN: This task is included as item 1.g. in the Adopted Work Plan for Fiscal Year 2021-2022.

DISCUSSION: On August 5, 2020, the Siren Feasibility Report, prepared by Mission Critical Partners, was presented to the Public Safety Commission for a recommendation. This study provided siren options for Malibu but emphasized that a siren alerting system is an outdoor warning system. While there may be instances where someone will hear a siren indoors, depending on the construction of the building, location, and distance from the siren, siren systems are primarily for outdoor alerting. Indoor notification is not guaranteed.

Therefore, the Commission recommended that an item be brought back with other systems for alerting the community when they are indoors with a specific focus on nighttime warnings.

Staff engaged the services of Mission Critical Partners to prepare a report regarding options for an emergency warning system that would notify residents in their homes of an

impending disaster. That report presented to the Public Safety Commission on July 7, 2021 described five different systems:

- Tone Alert Radios
- Frequency Modulation (FM) Alerting
- Integrated Public Alert and Warning System (IPAWS)
- National Oceanic and Atmospheric Administration (NOAA) Weather Radios using Specific Area Message Encoding (SAME)
- National Weather Radio (NWR) Transmission Interrupt

The Commission formed an Indoor Emergency Warning System Ad Hoc Committee (Committee) of Vice Chair Stewart and Commissioner Gibbs to work with City staff and members of the public to analyze the options presented. On July 26, 2021, the Committee held a meeting that was also attended by Ex Officio Member Brent Woodworth, Public Safety Manager Dueńas, Richard Garvey, communications coordinator for the Malibu Community Emergency Response Team (CERT), and Hans Laetz, General Manager of KBUU-FM Malibu. A summary of that meeting, including potential recommendations (Attachment 2), was presented to the Public Safety Commission on September 1, 2021.

The Committee's report considered how the options presented by the consultant might fit within the existing notification systems, such as the Everbridge disaster notification system, Wireless Emergency Alerts, text messages, and social media, as well as the possibility of future outdoor sirens. Another priority was a system's ability to both alert and advise people of actions to take. Since all of the options had drawbacks, some significant, the Committee recommended that the City implement improvements to foundational structures that can be built upon rather than deploying one of the five options identified by the Mission Critical Partners report at this time. The Commission recommendation included:

- Enhance FM radio coverage in Malibu by upgrading the transmitter(s) or boosters for KBUU
- Investigate the possibility of utilizing the City's existing but dormant AM transmitter(s) and licenses from the late 1990s for updating to current equipment and emergency broadcast authority
- Evaluate the use of the CERT/City UHF repeater and license to operate a Tone Alert Radio system
- Contact the one vendor for the FM Alert System to begin the FM Alert process as it develops and to incorporate the FM radio platforms for eventual Malibu coverage
- Incorporate the action of referring people to KBUU for more information into the annual test of the City's disaster notification system and publicize to the community
- Direct the Public Safety Commission to review the status of this project on an annual basis

Since September 1, the Committee and Public Safety staff have acquired additional information about NOAA Weather Radio and the FM Alerting options. Staff was recently informed by the Los Angeles County Office of Emergency Management (OEM) about a program to implement the NOAA Weather Radios using SAME to provide fire alerts. Through an agreement with NOAA, OEM will be able to transmit fire alerts through NOAA weather radios, which can run on battery and do not require cell service. In addition, OEM has secured a grant to purchase a large quantity of the radios to provide to community members who participate in an alert and warning training. City staff are working with OEM to ensure that one of these trainings is scheduled in Malibu. While this program seems promising, the notifications cannot be targeted to a specific region, and the City would depend on the County to activate the messaging.

On November 1, the Committee met again to discuss information provided by Alert FM, a vendor that provides FM radio-based and satellite notification systems. With this system, targeted alerts can be sent through FM stations that have frequencies that reach Malibu should a station agree to having the required equipment installed. The FM alerting equipment would enable the City to use the FM station's frequency as a conduit to sending alerts and would only be accessible by the City and not the FM station owner. While this system provides many advantages, such as local control, the cost can be substantial, and more time is needed to evaluate its effectiveness in Malibu.

Staff recommends that the Council consider the recommendations of the Indoor Warning System report, the Public Safety Commission and its Ad Hoc Committee, as well as the new program being rolled out by OEM and provide direction to staff. Since funding for an indoor warning system was not included in the Adopted Budget for Fiscal Year 2021-2022, an allocation from the General Fund Undesignated Reserve would be necessary for any system authorized by the City Council. If the Council wants to move forward on any of the warning options, staff will bring back an item to Council for approval the necessary funding.

ATTACHMENTS:

1. Indoor Warning System Report
2. Public Safety Commission Indoor Emergency Warning System Ad Hoc Committee Meeting Summary

Meeting Report (Final)

Ad Hoc Committee of the Public Safety Commission ("PSC") to review Indoor Alerting Options based upon the Mission Critical Partners Report of June 2021 as authorized by the Commission at its July 7, 2021, meeting. The Ad Hoc meeting was held at City Hall, July 26, 2021.

MEETING ATTENDEES: Richard Garvey – CERT, Han Laetz – KBUU, Brent Woodworth -Ex Officio Member of Public Safety Commission, Keegan Gibbs and Doug Stewart – Public Safety Commission Members, and Susan Duenas – Malibu Public Safety.

MEETING OBJECTIVE: The Mission Critical Partners Report presented five options for providing an indoor warning system in Malibu. These five options are all radio-based and are, Tone Alert Radio (TAR), FM Alerting using the Radio Broadcast Data Systems (RBDS), Integrated Public Alert and Warning System (IPAWS), and two versions both using the NOAA Weather Radio system one with Specific Area Message Encoding (SAME) and the other Transmission Interrupt. The Committee's charge is to evaluate these options to develop a response that can be reviewed by the PSC for submission to the City Council. This evaluation is to include how these options might fit within the existing notification systems such as Reverse 9-1-1, text messages, and social media as well as the possible outdoor sirens. Please refer to the Mission Critical Report which was included in the July 7, PSC meeting agenda for more detail on these options.

SUMMARY OF MEETING FINDINGS:

The Committee determined that all the five options in the Mission Critical Report had drawbacks and by themselves were not a stand-alone solution to provide the sought after capability to Alert and Advise the public indoors. The ideal solution would be low cost, operate regardless of public utility status, broadly cover all of Malibu, and could be operated by the Malibu Emergency Operations Center ("EOC") staff without dealing with external constraints. Of the five options, the three utilizing IPAWS and the NOAA platforms are deemed not capable now or even in the near term to reasonably meet these requirements. The remaining two options of Tone Alert Radio and FM Alerting do have merit worthy of future consideration.

For the Tone Alert Radio (TAR), the Committee was mainly concerned about the limited availability of the end-user units and the current cost per unit. Each receiver is currently $300 to $450 for example. Furthermore, the operation and maintenance would be the City's responsibility. There may be an opportunity to better price the end receivers if a source other than high end commercial equipment such as Motorola is used. Presently, there is not such a supplier known to the Committee. For future evaluation, the CERT/City repeater should be investigated as to its possible use as a base station for such a system provided lower cost

receivers would be available. For these reasons, the Tone Alert option was determined to be a second-tier option.

The FM Alert option has many desirable features, but its actual deployment and use is still in a formative stage. Willing to participate FM radio stations, end-user receivers, and the actual management of the system by a city such as Malibu are all yet to be finalized. This system has the potential to be our first-tier option when these issues are resolved. For the time being, deployment is most likely to occur with the eventual rollout of the "Shake Alert" notifications (similar to Japan and Mexico) which will utilize the FM Alert platform. It was determined that while the FM Alert is a future solution, improving radio coverage and operations now would be a substantial upgrade to our existing situation. These improvements would be essential to operate an FM Alert system when it becomes available.

The ability to deliver the emergency Alert and/or Advisories by whatever radio, siren or other notification system is 100% dependent upon the City's ability to operate the system in an emergency. This would require the ability and people to deliver the notifications, updates, and advisories quickly and accurately. Such a foundational underpinning could be enhanced even with the existing small staff..

SUMMARY OF RECOMMENDATIONS:

Rather than recommend the deployment of one of the five options identified by the Mission Critical Report, the Committee is suggesting that the City implement improvements to what was referred to as the Malibu Emergency Alert Notification System (MEANS) in a phased approach. This would limit the acquisition of unproven or high cost technologies in favor of foundational structures that can be built upon when these better delivery systems become firmly available. In the meantime, the City will have the best capabilities that are available as well as being confidently operational.

POSSIBLE IMPROVEMENT PROJECTS:

NEAR TERM - (next 12 months)

1. Enhance FM Radio coverage in Malibu by upgrading the transmitter(s) or boosters for KBUU. Also, evaluate if it is possible to have non-commercial and commercial FM stations that have strong coverage in Malibu to allow for emergency broadcasting in association with KBUU in the event of a Malibu emergency. (Cost estimate of $50,000 or less.)
2. Investigate the possibility of utilizing the City's existing but dormant AM transmitter(s) and licenses from the late '90s for updating to current equipment and emergency broadcast authority. i.e., the ability to temporarily boost emergency output power to 100 watts vs. 10 watts during standard conditions and/or obtain a better operating frequency. While this is not part of the Mission Critical Study, this is a system that the City has spent considerable money on and if workable would be a second tier advisory

option vs the first tier option of FM. The Malibu CERT Communications team has offered to see if this AM system can be utilized going forward. However, there are many constraints today that were not present two decades ago. Among these are now more powerful AM commercial stations with nearby frequencies that may interfere with the Malibu signal, the lack of AM radios in electric vehicles due to in-car interference, the impact of more household electronics that produce AM radio interference, and the inherently limited coverage of the current low power AM. There also may be improvements to equipment and FCC attitudes that may offer benefits as well. Any proposal to revive and upgrade would be separate from the FM improvements cited above. (Cost estimate of $10,000 to $20,000 or less but cost estimates will require additional study.)

3. Evaluate the use of the CERT/City UHF repeater and license to operate a Tone Alert Radio system, provided the end-user receivers can be cost justified. (Cost estimate is minimal.)
4. Contact the one vendor for the FM Alert system (Page 7 of the Mission Critical Report) to begin the FM Alert process as it develops and to incorporate the FM radio platforms of item 1 into the alert network for eventual Malibu coverage. (Cost estimate is minimal.)
5. Incorporate the action of referring people to KBUU for more information into the annual test of the City's disaster notification system and publicize to the community. (Cost is staff time only)

MID-TERM-(Years 2 to 4)

1. Support the FCC rulemaking known as Simple 250 for a second class of low power FM stations for up to 250 watts. This would be a significant upgrade for KBUU and the other non-commercial stations providing the foundation for the future FM Alert. (Page 7 of Mission Critical Report)
2. Implement the Tone Alert and/or FM Alert system as possible and feasible utilizing the FM, AM, UHF capabilities developed in the near term. This may involve the residents buying and installing their own personal low cost receivers as envisioned in the Shake Alert program.
3. Enhance the City's EOC capabilities to match the expanded notification systems.

MissionCriticalPartners
Because the Mission Matters

Indoor Alerting Options

Final

PREPARED JUNE 2021
FOR THE CITY OF MALIBU, CALIFORNIA

Table of Contents

1 Background

The City of Malibu, California (City) sought options for public alerting to meet the city's (Malibu) unique situation. Of particular concern to the City is the effects of Santa Ana winds. The National Weather Service defines Santa Ana winds as "… a weather condition in which strong, hot, dust-bearing winds descend to the Pacific Coast around Los Angeles from inland desert regions."[1] Known for the dry, hot weather that they bring in autumn, the winds often bring the lowest relative humidity of the year to coastal Southern California. The low humidity, combined with the warm, compressional-heated air mass, plus high wind speeds, create critical fire weather conditions.

Malibu relies primarily on communications tools that require electricity during a disaster. These methods include web-based alerts, reverse 911-style alerts, and Wireless Emergency Alerts (WEA). Areas of the city regularly experience power outages during adverse, especially windy, weather conditions. The local utility provider utilizes a Public Safety Power Shut-off (PSPS) program during Red Flag[2] weather conditions. Because of the PSPS program, residents of Malibu could be without power during periods of heightened fire danger, resulting in an increased risk of not receiving important communications, including evacuation orders, via phone, internet, or radio.

Environmental events like these must be fully understood when planning and designing a public alerting system, so the system can clearly and effectively communicate alerts to residents and visitors.

The City contracted with Mission Critical Partners, LLC (MCP) to develop a report on public alerting options to enhance its ability to disseminate emergency alerts, especially in wildfire situations that pose a threat to life and property.

1.1 Alert and Notification Operational Overview

Alerting the public is one of the major functions of government in an emergency. To effectively perform these functions, there are several things to consider. One is understanding the components of effective public alerting. Alert, warning, and notification are different actions, but all are important to protect the public.

[1] "Santa Ana Wind." Glossary. National Weather Service. https://w1.weather.gov/glossary/index.php?word=santa+ana+wind
[2] Red Flag is "a fire weather program which highlights the onset of critical weather conditions conducive to extensive wildfire occurrences." Reference: "Red Flag." Glossary. National Weather Service. https://w1.weather.gov/glossary/index.php?word=red+flag

An alert is giving notice to the public to get their attention that an event has occurred. This is often difficult in the constant noise of today's environment. The alert is often a short sound, action, or message. For a radio listener, the alert would be the Emergency Alert System (EAS) tones and headline that precedes an EAS message.

A warning is used to prepare the public for potential risk. Warnings often include actions the public can take to mitigate the impact of the risk.

A notification has more information and usually has instructions for the public to try to protect them from the event. For a radio listener, this would be the description and instructions in the EAS message.

This report provides several options for alerting. While each has limited notification capabilities, usually a limited number of text characters or limited message time, utilizing any of these in combination or with other notification systems assures a greater reach to the public.

1.2 Indoor versus Outdoor

Indoor warning systems are more complicated than outdoor systems but can provide benefits that outdoor systems cannot. The differences between the two are noted in the table below.

Table 1: Indoor/Outdoor Siren Differences

Indoor	Outdoor
Requires device or compatible system in each target location	Built to cover large areas from a single point
Device can be tailored to the need of the user (Access and Functional Needs community)	Limited to the system capabilities (audio for sirens, visual for signs)

Indoor	Outdoor
Located within the home and placed by the resident(s) in the best location for them to receive alerts	Fixed location outside, limited penetration of modern constructed buildings
Some systems will allow small area or even house-by-house alerting	Limited to general area around a single device

2 Alerting Options

2.1 Tone Alert Radios

2.1.1 Technology

A tone-alert radio (TAR) system is an indoor warning and communication solution designed for one-way radio alerting applications. The radio receiver models use ultra high frequency (UHF) and very high frequency (VHF) bands. Some receiver models are capable of simultaneously decoding multiple formats, including single-tone, two-tone, frequency-shift keying (FSK) digital, and dual-tone multi-frequency (DTMF). These devices provide notifications for all types of emergencies.

Depending on the radio receiver model, it can be mounted to a wall or placed on a flat surface. Some units include flashing lights to indicate an emergency alert has been received or can attach to bed shakers for access and functional needs users. Depending on the manufacturer, make, and model, the receiver can generate various alarm sounds and prerecorded messages.

Power and connectivity requirements are shown in the table below.

User Devices	Infrastructure
• Normally plugged in, but have batteries • Internet not required	• Alert activation site, connection, and transmitter sites require power • Activation can be accomplished by radio; no internet required

2.1.2 High-level Design

To evaluate the operation of a TAR system in Malibu, coverage studies were conducted for the UHF and VHF bands. The radio receiver was modeled on common receiver sensitivity of various units in the market, plus an additional 30 decibels (dB) of building loss, which represents the loss typically introduced with earthquake-resilient buildings prevalent in the area.

Based on the coverage maps, two sites provide coverage to most of the city; however, there are visible gaps in central Malibu as well as in the western and eastern tips of Malibu. The addition of a third site at Trancas Park improves coverage in central and western Malibu. The map below shows where coverage can be expected with a three-site UHF system.

Figure 1: UHF TAR System Coverage (3-site)

Appendix B contains coverage maps for two sites and three sites for both the UHF and VHF bands.

2.1.3 Advantages and Disadvantages

Advantages	Disadvantages
• Wholly owned and controlled system • Proven technology • Provides both alerting and notifications	• Devices required in buildings • Receiving devices cost more than commercial radios • System management and maintenance is the responsibility of the City

2.1.4 Rough Order of Magnitude Pricing

A TAR system consists of infrastructure and devices. For this document, the infrastructure consists of a three-site simulcast radio system and a TAR console for initiating the alerts. This infrastructure cost ranges from $250,000 to $750,000.

The devices have the following costs:

- Receiver: $300 – $450
- Bed shaker: $50 – $150
- Strobe light: $75 – $200

2.2 FM Alerting Malibu Station/Other FM Stations

2.2.1 Technology

Emergency alerts can be broadcast over the commercial frequency modulation (FM) radio system using the Radio Broadcast Data System (RBDS). This communication protocol is used to embed small amounts of information in conventional FM radio broadcasts.

This technology uses specially manufactured devices or cell phones. These devices have power plugs and battery backups that last for extended periods.

Power and connectivity requirements are shown in the table below.

User Devices	Infrastructure
• Normally plugged in, but have batteries • Internet not required	• Alert activation site requires power and internet

2.2.2 High-level Design

For this document, MCP reviewed the *FCC Local Area Plan For the Emergency Alert System (EAS) Communications Operations Orders* for Los Angeles County (Communications Operations Order CA-LA NO.1 Monitoring Plan). MCP looked for primary stations in the plan as these stations generally have more robust infrastructure, such as a backup power source.

The plan indicated two alternative FM stations for monitoring:

- KROQ – 106.7 MHz[3] Burbank, CA LP2-FM[4]
- KCBS-FM – 93.1 MHz Los Angeles, CA LP2-FM

There are three LP1 stations designated for Los Angeles County. KBIG-FM (104.3 MHz), one of three primary EAS FM monitoring sources, also was evaluated.

In addition, MCP looked at four additional local broadcasters.

- KBUU – 97.5 MHz Malibu, CA
- KDAY – 93.5 MHz Redondo Beach, CA

[3] Megahertz
[4] LP is local primary. LP2 represents a secondary broadcast station; LP1 represents the primary.

- KKJZ – 88.1 MHz Long Beach, CA
- KXLU – 88.9 MHz Los Angeles, CA

Coverage studies were conducted on the above-mentioned frequencies and broadcast transmission sites. The FM radio receiver was modeled on common receiver sensitivity of various units in the market, plus added 30 dB of building loss, which represents the loss typically introduced with earthquake-resilient buildings prevalent in the area.

Based on the coverage maps, KBIG-FM (104.3 MHz) offers significantly better coverage than the other two EAS plan FM stations. This was expected as this transmitter emits a much higher effective radiated power (ERP) at 65,000 watts. This solution uses multiple radio stations for better coverage and redundancy. The map below shows the coverage of KBIG-FM.

Figure 2: KBIG-FM Coverage

The four local broadcasters provide better coverage for Malibu. MCP contacted KBUU and learned it can provide digital transmission, which is required for alerting over FM. The other broadcasters were not contacted, yet likely could support digital radio as well. The map below shows the coverage of KBUU.

Figure 3: KBUU Current Coverage

KBUU, the primary local broadcaster, broadcasts from a single transmitter (which was modeled for this report). KBUU is currently fundraising to add two additional transmitters—KBUU-LP1 at Bluffs Park (Civic

Center) and KBUU-LP2 at Trancas Park—to provide additional coverage. Software and hardware to support this effort have been purchased and installed at the KBUU studio and current transmitter. A map of the planned coverage provided by KBUU is in Appendix C.

The Federal Communications Commission (FCC) has a rulemaking that recently closed to public comment that also may provide better coverage. RM-11909, referred to as Simple 250, may permit a second class of service for Low Power FM broadband stations, up to 250 watts. Appendix C has a coverage map of KBUU at 200 watts for comparison.

Appendix C contains coverage maps for all stations evaluated.

2.2.3 Advantages and Disadvantages

Advantages	Disadvantages
• Receiving device costs are similar to commercial radios • System management and maintenance is the responsibility of the vendor • Provides alerting and limited notification	• Devices required in buildings • Not an owned and controlled system • Multiple technologies and vendors are interconnected • Device management is the responsibility of the City

2.2.4 Rough Order of Magnitude Pricing

Currently only one vendor provides for alerts over FM. This vendor recently was approved to provide shake alerts and may have infrastructure planned in the area. This system consists of infrastructure and devices. For this document, the infrastructure consists of a licensing fee for 5-10 years. This infrastructure cost ranges from $750,000 to $1,250,000.

The devices have the following costs:

- Small receiver: $50 – $80
- Wall receiver: $350 – $400
- Bed shaker: $50 – $150
- Strobe light: $75 – $200

2.3 Integrated Public Alert and Warning System

2.3.1 Technology

The Integrated Public Alert and Warning System (IPAWS), managed by the Federal Emergency Management Agency (FEMA), provides for public alerting. IPAWS has several distribution channels:

- EAS
- WEA
- National Oceanic and Atmospheric Administration (NOAA) Weather Radio (coming soon)
- Public distribution to applications that request service

Power and connectivity requirements are shown in the table below.

User Devices	Infrastructure
• Require power; some have battery backup • Internet not required	• Alert activation site requires power and internet

2.3.2 High-level Design

As an additional alert system, a satellite internet connection allows access to any chosen alert authoring tool.

It also is possible to obtain a hardware device for an alert authoring tool. This type of device only requires internet access to send alerts to IPAWS and has no hosted solution provider.

2.3.3 Advantages and Disadvantages

Advantages	Disadvantages
• Alerts to resident-owned devices • Free service from FEMA • Provides alerting and limited notification	• Requires alert authoring tool that can be expensive • Voluntary service (distribution or devices can be turned off) • EAS distribution may be limited by the statewide EAS plan

2.3.4 Rough Order of Magnitude Pricing

A service plan for satellite internet service ranges from $40 to $130 per month, based on bandwidth needs. The infrastructure is maintained by FEMA, and the devices are common devices owned by the public.

The cost for a standalone IPAWS device ranges from $8,000 to $10,000.

2.4 NOAA Weather Transmitter

2.4.1 Technology

"NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office."[5] The Los Angeles forecast office operates two radio stations that provide information to the city.

KWO37 Los Angeles broadcasts on frequency 162.550 from Mount Lukens/Tujunga, California. The NWR site shows it provides coverage to Malibu.

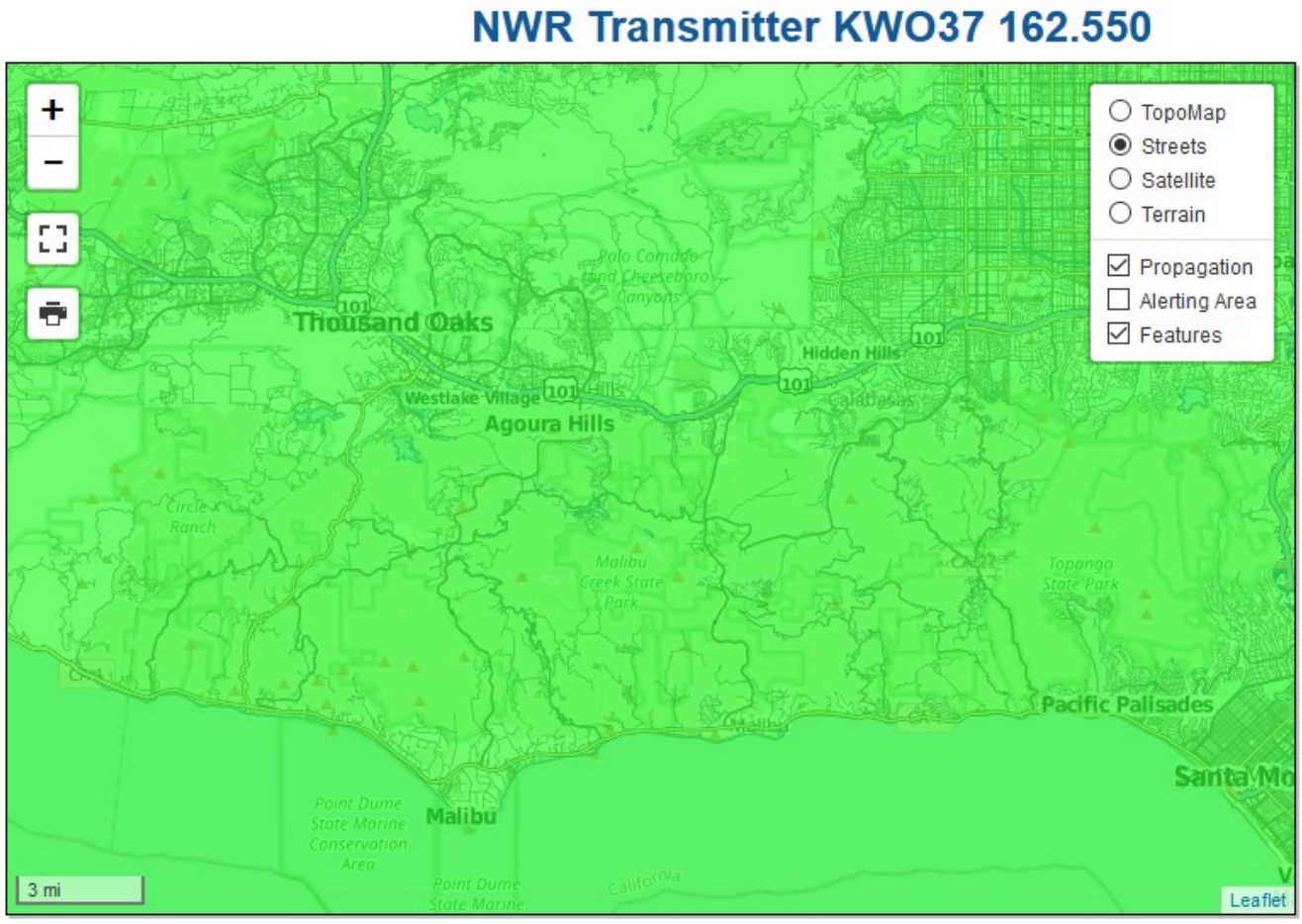


Figure 4: KWO37 Coverage[6]

[5] NOAA Weather Radio
[6] NWR California Coverage (weather.gov)

A second site, KWL22 Malibu Marine, broadcasts on frequency 162.425 from Point Dume, California. Point Dume is a City site, which may have connectivity already. This site is primarily for marine but does have some coverage in the city.

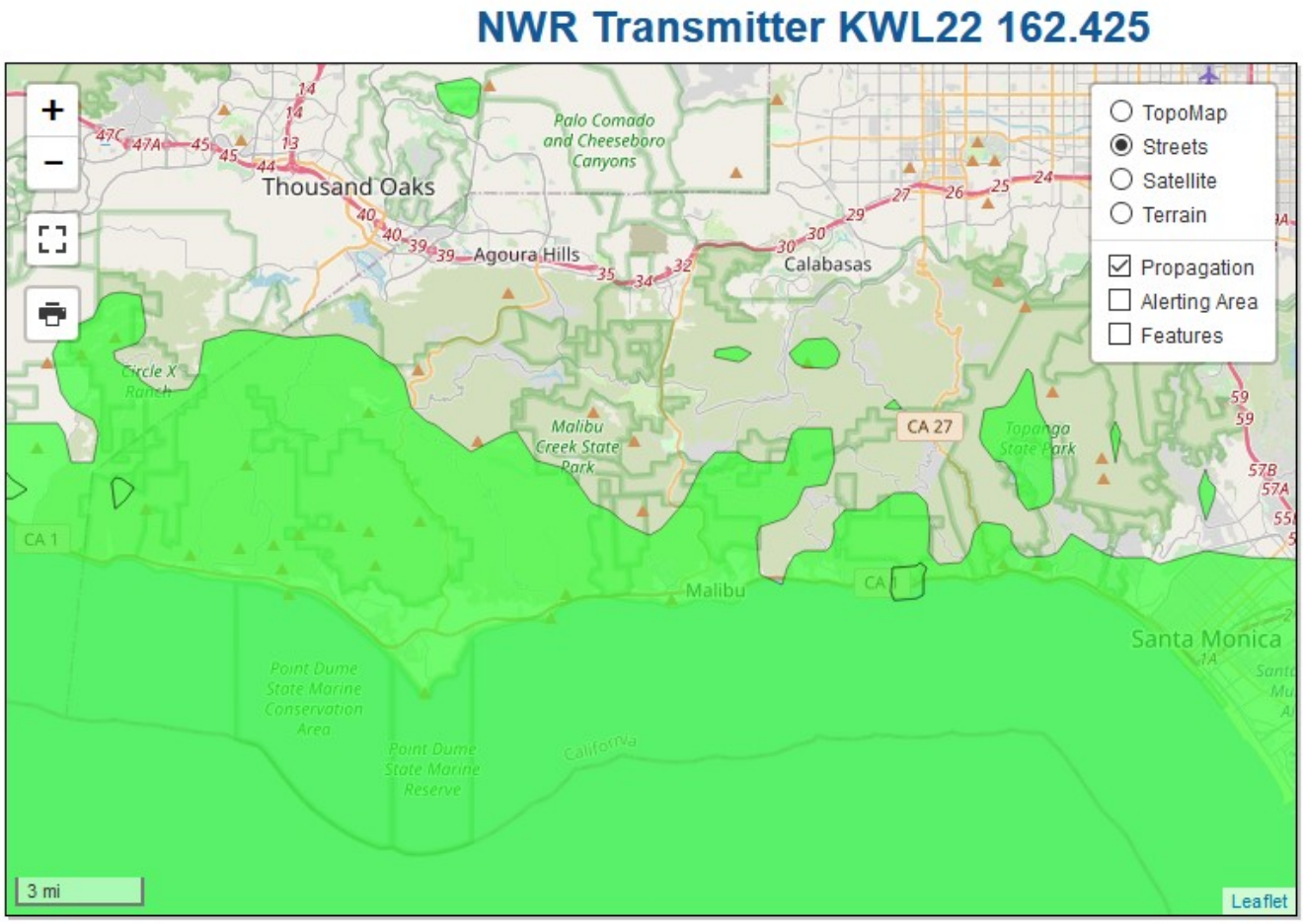


Figure 5: KWL22 Coverage[7]

MCP spoke with Eric Boldt, Warning Coordination Meteorologist, NWS Los Angeles/Oxnard Forecast Office, who recommended that radios be taken to various locations to verify the signals from these transmitters.

2.4.2 High-level Design

The ability to request a countywide alert be sent out by the NWR exists today. MCP has worked in some areas where additional uses of the NWR have been implemented.

[7] Ibid.

Additional alerting options may be to use Specific Area Message Encoding (SAME[8]) or provide an interrupt on the NWR transmission. Both options require coordination with the National Weather Service (NWS). While these options may not be available currently, this information can be used to begin conversations in the future.

Power and connectivity requirements are shown in the table below.

User Devices	Infrastructure
NOAA Weather Transmitter – Specific Area Message Encoding (SAME)	
• Normally plugged in, but have batteries • Internet not required	• If IPAWS is used to activate, see IPAWS above • Telephone call to NWS can be used • If fax is used, power and telephone are required • If email is used, power and internet are required
NOAA Weather Transmitter – NOAA Weather Radio Transmission Interrupt	
• Normally plugged in, but have batteries • Internet not required	• Alert activation site, connection, and transmitter sites require power • Internet not required

Specific Area Message Encoding (SAME)

The NWR uses a six-digit SAME code number to identify specific areas to which an alert applies. Normally the first digit of the SAME code is a zero, and the following digits relate to a specific county. That first digit may be able to be coordinated with the NWS for a smaller area than an entire county; this is referred to as sub-FIPS (Federal Information Processing Standard) codes.

Normally the first digit refers to a part of a county, directionally, using a three-by-three block breakdown:

Northwest	North	Northeast
West	Central	East
Southwest	South	Southeast

[8] SAME is a protocol used for framing and classification of broadcast emergency warning messages developed by the NWS for use on its NOAA Weather Radio network.

Experience has shown that these directions are not clearly understood by the public in many cases. This provides an opportunity for local jurisdictions to work with the NWS to clearly define these areas and assist with the public education that must go with the use of the SAME and sub-FIPS codes.

Sub-FIPS Codes

During MCP's conversation with Mr. Boldt, he stated that a limited number of other NWS offices have been considering sub-FIPS alerting, and some local agencies have asked him about this option before. The use of sub-FIPS codes is possible with the NWR and the devices that use SAME. Mr. Boldt stated he was open to discussions but brought up a potential issue regarding the use of sub-FIPS codes by broadcasters for EAS.

EAS is voluntary for all entities subject to 47 Code of Federal Regulations (CFR) Part 11, Emergency Alert System (EAS), which includes broadcasters. If broadcasters participate, they only are required to broadcast presidential alerts. Alerts from state or local authorities are strictly optional. Hence, a broadcaster may need to program its EAS device to accept and forward the sub-FIPS codes.

In addition, the system that generates the alert would need the capability to pass the sub-FIPS code to the distribution systems.

If IPAWS is used to generate alerts, the alert authoring tool also must have the capability to generate sub-FIPS alerts. The IPAWS Project Management Office (PMO) and Lab were contacted; the Lab is going to conduct some testing to determine if the use of sub-FIPS codes is currently available.

NOAA Weather Radio Transmission Interrupt

Another option is to install hardware that allows the City to interrupt the audio feed of the NWS and transmit a local EAS message. This can be done by building a new radio transmitter for the NWR in an area of limited service—to enhance service to the community—or at an existing NWR site.

To accomplish this, two EAS devices are installed: one at the radio transmitter and one at the warning point. The two devices connect using a phone, network, or microwave. The warning point uses the EAS device to create a message that is sent to the device at the transmitter. When an EAS message is received, it interrupts the audio feed and transmits the EAS message.

The Malibu NWR station was installed to provide coverage in the Malibu area. As this is a City site, connectivity should be available. Mr. Boldt indicated he was not familiar with transmission interrupt but was open to further discussion.

2.4.3 Advantages and Disadvantages

Specific Area Message Encoding (SAME)

Advantages	Disadvantages
• Uses commonly owned NOAA weather radios • NWS is doing this in other parts of the country and is open to discussions • Provides alerting and notification	• Is not limited to the city • Statewide EAS plan and parties to that plan may push back

NOAA Weather Radio Transmission Interrupt

Advantages	Disadvantages
• Local transmitter is nearby • Connectivity should be in place • NWS Forecast Office is open to discussions regarding transmission interrupt • Provides alerting and limited notification	• Single transmitter • May not reach inside all buildings in the city

2.4.4 Rough Order of Magnitude Pricing

Specific Area Message Encoding (SAME)

There are no costs to use SAME, but it does involve a large time commitment to coordinate, if it is possible.

NOAA Weather Radio Transmission Interrupt

To interrupt the NWR audio requires two EAS devices whose cost ranges from $6,500 to $10,000 each. Connectivity costs range from $50,000 to $200,000, depending on the method chosen.

3 Operationalizing Alerting

MCP reviewed the City's website; it is clear that the use of these systems has been planned and used in the past. The use of a dedicated alert webpage for information that is easy to reach works well, and the hot-line information is readily available to the public.

No single system is perfect or works 100% of the time. It is best to layer multiple systems together to get the most alerting to the public. Even then, some people will not turn on TAR devices or replace batteries. Others will turn off the WEA function on their phones. Developing an alerting plan that will reach all communities in the city is the best approach to operationalizing these systems.

Effectively alerting the public relies on several factors and is built on actions by the alerting authority. Some things that can provide this are as follows:

- Plans: Pre-established plans outline what systems will be used by whom. These should include primary and alternate systems as well as systems used by other agencies.
- Policies and Procedures: Clear policies and procedures delineate who, when, how, and why various communications will take place.
- Pre-defined and Pre-approved Messaging Templates: Pre-defined messages should be developed in conjunction with a public information professional.
- Training: Recurring training on system(s) use will improve users' skills. It is important to have multiple people trained on all systems.
- Exercise: Use of these systems regularly will increase effectiveness. This is a constant process with plans trained, exercised, and refined regularly. This process also helps to keep information fresh in the minds of users.

3.1 Plans

The *City of Malibu Emergency Operations Plan* states that one emergency management goal is to "provide effective life safety measures, reduce property loss, and protect the environment." All other plans must support these goals.

To supplement this plan, the City also is in the process of developing an Alert and Warning Plan that will be consistent with the State's Alert and Warning Guidelines, issued in 2019. The Alert and Warning Plan will include guidelines for training, exercises, testing, and policies on emergency and non-emergency use of all systems, including the outdoor warning system once it is implemented.

Appendix A – Alerting Options Comparison

The advantages and disadvantages of the presented alerting options, as well as the power and connectivity requirements, are shown in the table below.

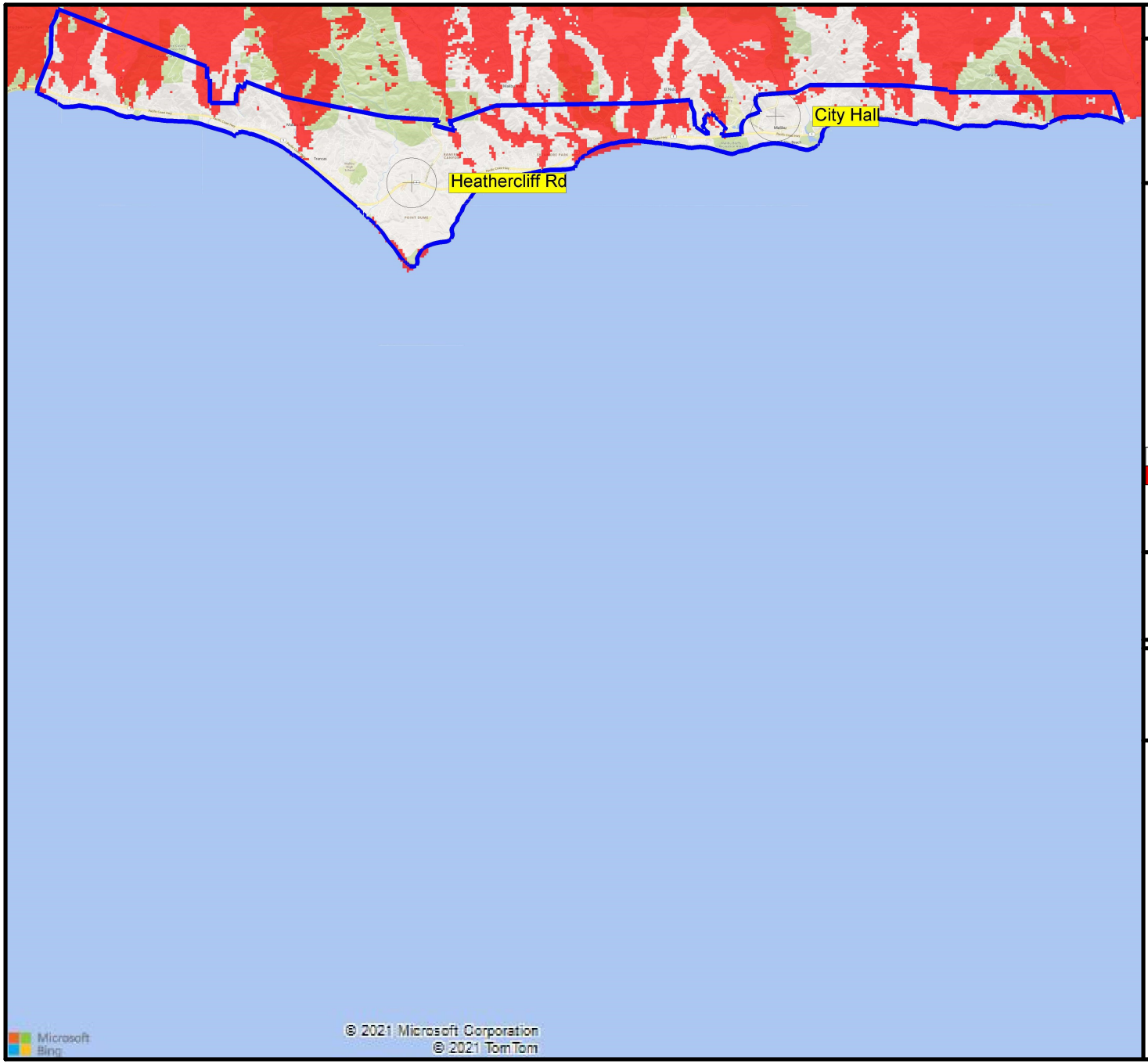
<table>
<tr><th colspan="2">Tone Alert Radios</th></tr>
<tr><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td>Wholly owned and controlled system
Proven technology
Provides both alerting and notifications</td><td>Devices required in buildings
Receiving devices cost more than commercial radios
System management and maintenance is the responsibility of the City</td></tr>
<tr><th colspan="2">Power and Connectivity</th></tr>
<tr><td>User Devices
Normally plugged in, but have batteries
Internet not required</td><td>Infrastructure
Alert activation site, connection, and transmitter sites require power
Activation can be accomplished by radio; no internet required</td></tr>
<tr><th colspan="2">FM Alerting</th></tr>
<tr><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td>Wholly owned and controlled system
Proven technology
Provides both alerting and notifications</td><td>Devices required in buildings
Receiving devices cost more than commercial radios
System management and maintenance is the responsibility of the City</td></tr>
<tr><th colspan="2">Power and Connectivity</th></tr>
<tr><td>User Devices
Normally plugged in, but have batteries
Internet not required</td><td>Infrastructure
Alert activation site requires power and internet</td></tr>
<tr><th colspan="2">IPAWS</th></tr>
<tr><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td>Alerts to resident-owned devices
Free service from FEMA
Provides alerting and limited notification</td><td>Requires alert authoring tool that can be expensive
Voluntary service (distribution or devices can be turned off)</td></tr>
</table>

	• EAS distribution may be limited by the statewide EAS plan
Power and Connectivity	
• User Devices – Require power; some have battery backup – Internet not required	• Infrastructure – Alert activation site requires power and internet
NOAA Weather Transmitter – Specific Area Message Encoding (SAME)	
Advantages	**Disadvantages**
• Uses commonly owned NOAA weather radios • NWS is doing this in other parts of the country and is open to discussions • Provides alerting and notification	• Is not limited to the city • Statewide EAS plan and parties to that plan may push back
Power and Connectivity	
• User Devices – Normally plugged in, but have batteries – Internet not required	• Infrastructure – If IPAWS is used to activate, see IPAWS above – Telephone call to NWS can be used – If fax is used, power and telephone are required – If email is used, power and internet are required
NOAA Weather Transmitter – NOAA Weather Radio Transmission Interrupt	
Advantages	**Disadvantages**
• Local transmitter is nearby • Connectivity should be in place • NWS Forecast Office is open to discussions regarding transmission interrupt • Provides alerting and limited notification	• Single transmitter • May not reach inside all buildings in the city
Power and Connectivity	
• User Devices – Normally plugged in, but have batteries – Internet not required	• Infrastructure – Alert activation site, connection, and transmitter sites require power – Internet not required

Appendix B – TAR Coverage Maps

The following pages contain these coverage maps:

Malibu_UHF_PTO with 30dB building loss
Malibu_3 sites_UHF_PTO with 30dB building loss
Malibu_VHF_PTO with 30dB building loss
Malibu_3 sites_VHF_PTO with 30dB building loss



EDX® SignalPro®: Malibu_CA_2021

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 10.2dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: City Hall
N34°02'21.73" W118°41'34.71" 97.7 ft
City_UHF Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-vertical/0.0° 450.0000 MHz

Site: Heathercliff Rd
N34°01'19.62" W118°48'24.05" 215.8 ft
He_UHF Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-vertical/0.0° 450.0000 MHz

UHF PTO

>= -86.1 dBmW @12 dB SINAD with 30 d
< -86.1 dBmW

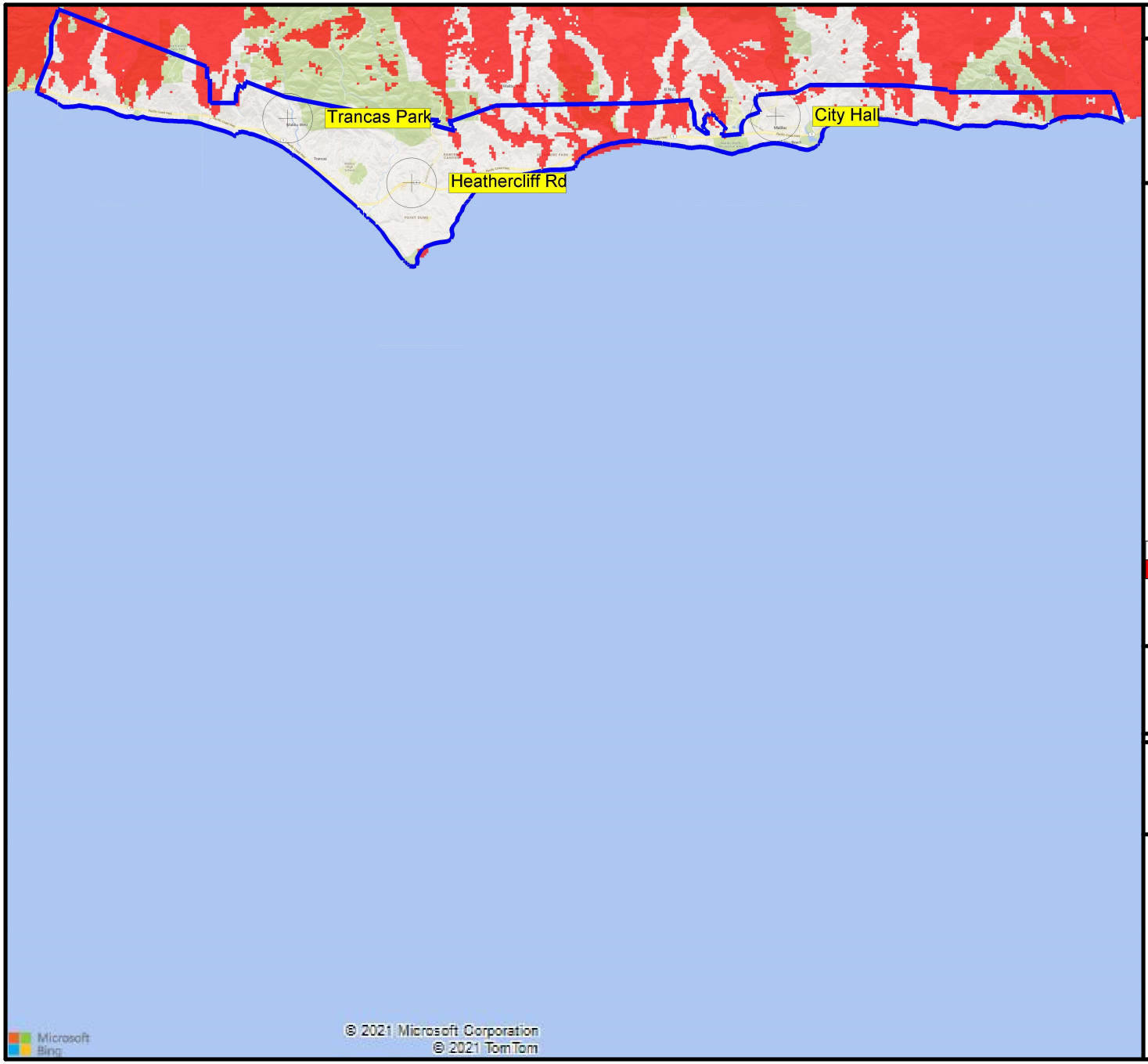
Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

Malibu _CA

UHF

PTO_with 30dB building loss Fri Apr 23 17:03:45 2021



EDX® SignalPro®: Malibu_CA_2021

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 10.2dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: City Hall
N34°02'21.73" W118°41'34.71" 97.7 ft
City_UHF Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-vertical/0.0° 450.0000 MHz

Site: Heathercliff Rd
N34°01'19.62" W118°48'24.05" 215.8 ft
He_UHF Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-vertical/0.0° 450.0000 MHz

Site: Trancas Park
N34°02'20.09" W118°50'43.41" 193.5 ft
TranUHF Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-vertical/0.0° 450.0000 MHz

UHF PTO

>= -86.1 dBmW @12 dB SINAD with 30 d
< -86.1 dBmW

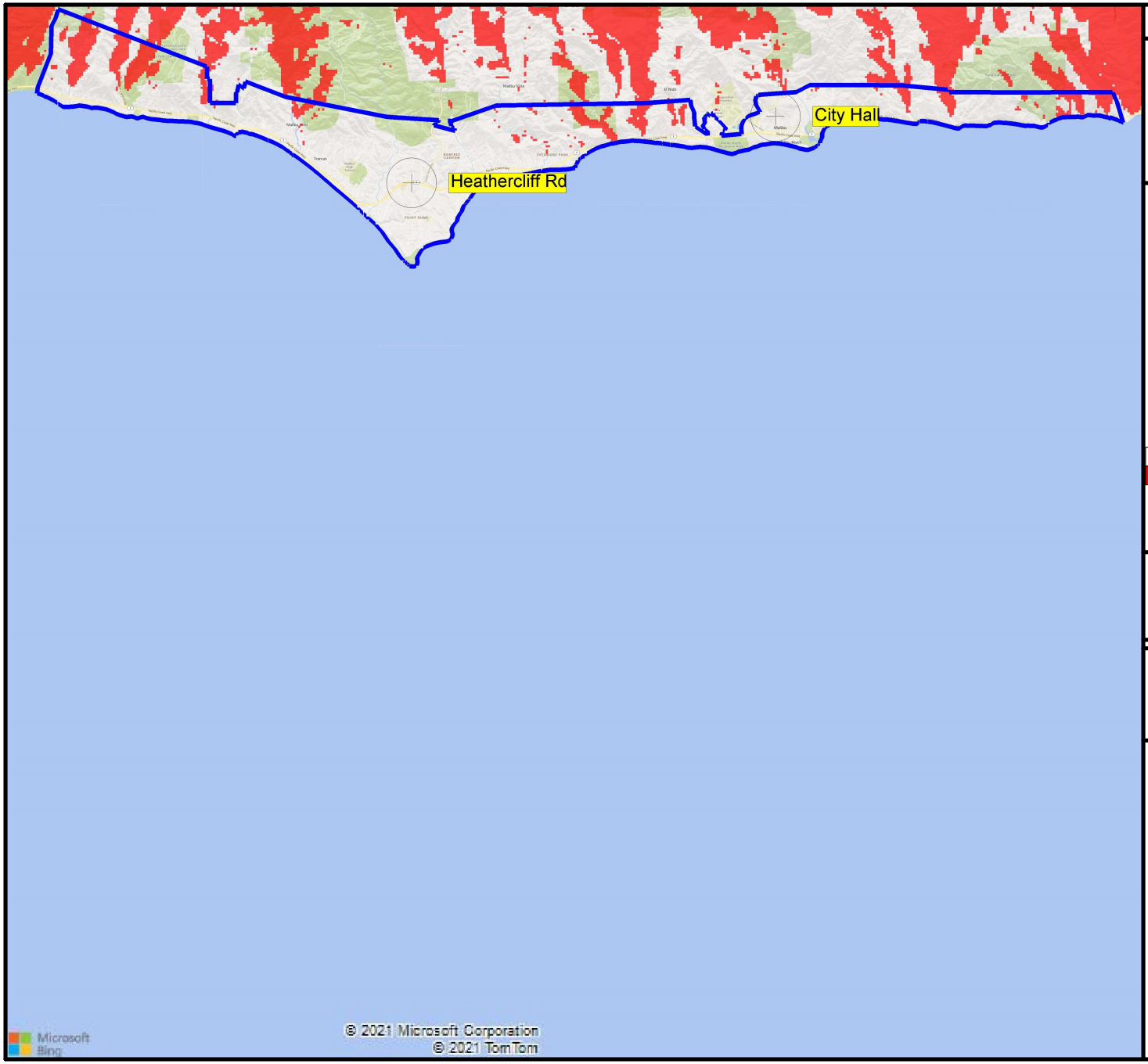
Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

Malibu _CA

UHF

PTO_with 30dB building loss Fri Apr 23 17:13:07 2021



EDX® SignalPro®: Malibu_CA_2021

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 10.2dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: City Hall
N34°02'21.73" W118°41'34.71" 97.7 ft
CityHall Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 150.0000 MHz

Site: Heathercliff Rd
N34°01'19.62" W118°48'24.05" 215.8 ft
He Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 150.0000 MHz

VHF PTO

>= -86.1 dBmW 12 dB SINAD with 30 dB
< -86.1 dBmW

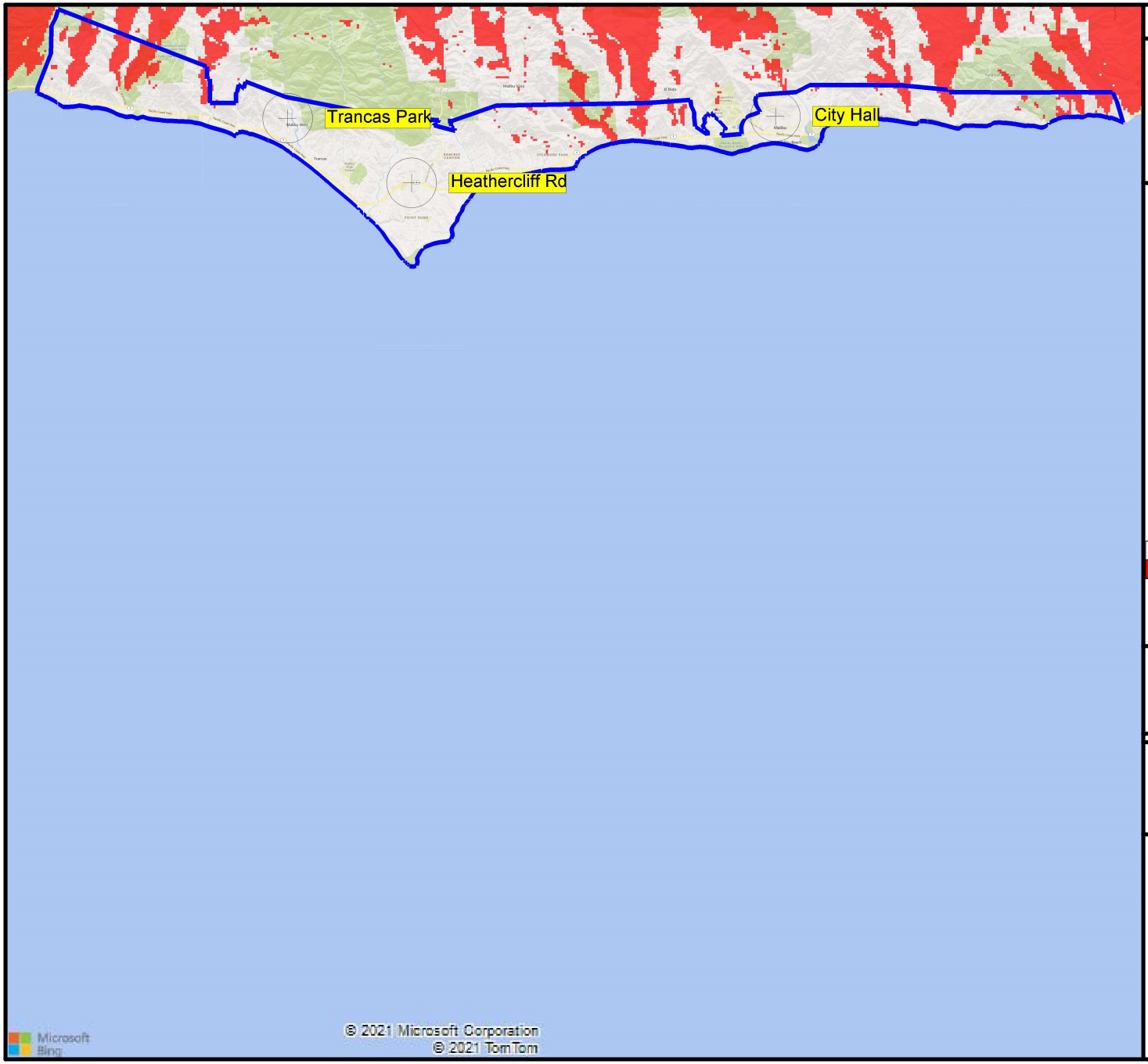
Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Fri Apr 23 17:00:58 2021



EDX® SignalPro®: Malibu_CA_2021

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 10.2dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: City Hall
N34°02'21.73" W118°41'34.71" 97.7 ft
CityHall Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 150.0000 MHz

Site: Heathercliff Rd
N34°01'19.62" W118°48'24.05" 215.8 ft
He Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 150.0000 MHz

Site: Trancas Park
N34°02'20.09" W118°50'43.41" 193.5 ft
Trancas Tx.Ht.AGL: 60.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 150.0000 MHz

VHF PTO

>= -86.1 dBmW 12 dB SINAD with 30 dB
< -86.1 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

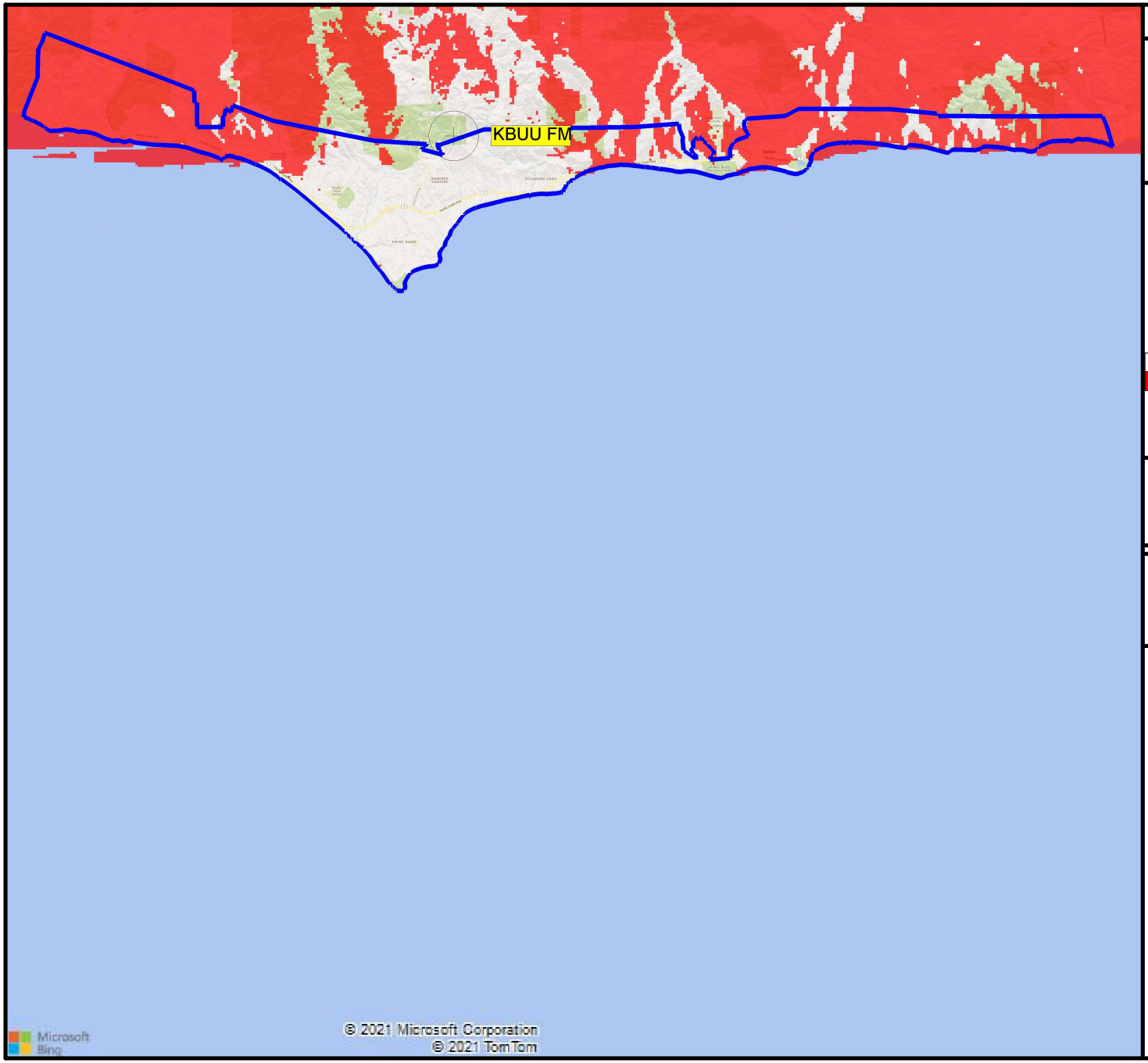
Malibu _CA
VHF
PTO_with 30dB building loss Fri Apr 23 17:15:12 2021

Appendix C – FM Coverage Maps

The following pages contain these coverage maps:

KBUU_FM_-65dB_PTO with 30dBbuilding loss
KBUU_FM_200W_-65dB_PTO with 30dBbuilding loss (if the FCC allows increased power)
KBUU Main Plus Boosters Before And After JPG (Provided by KBUU)
KDAY_FM_-65dB_PTO with 30dBbuilding loss
KKJZ_FM_-65dB_PTO with 30dBbuilding loss
KXLU FM_-65dB_PTO with 30dBBuilding loss
KROQ_FM_-65dB_PTO with 30dBbuilding loss
KCBS_FM_-65dB_PTO with 30dBbuilding loss
KBIG_FM_-65dB_PTO with 30dBbuilding loss

Red on the coverage maps depicts areas with no coverage.



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KBUU FM
N34°02'26.10" W118°47'23.00" 936.0 ft
KBUU Tx.Ht.AGL: 23.0 ft Total ERPd: 71.00 W
Model: 1 Isotropic-horizontal/0.0° 99.1000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

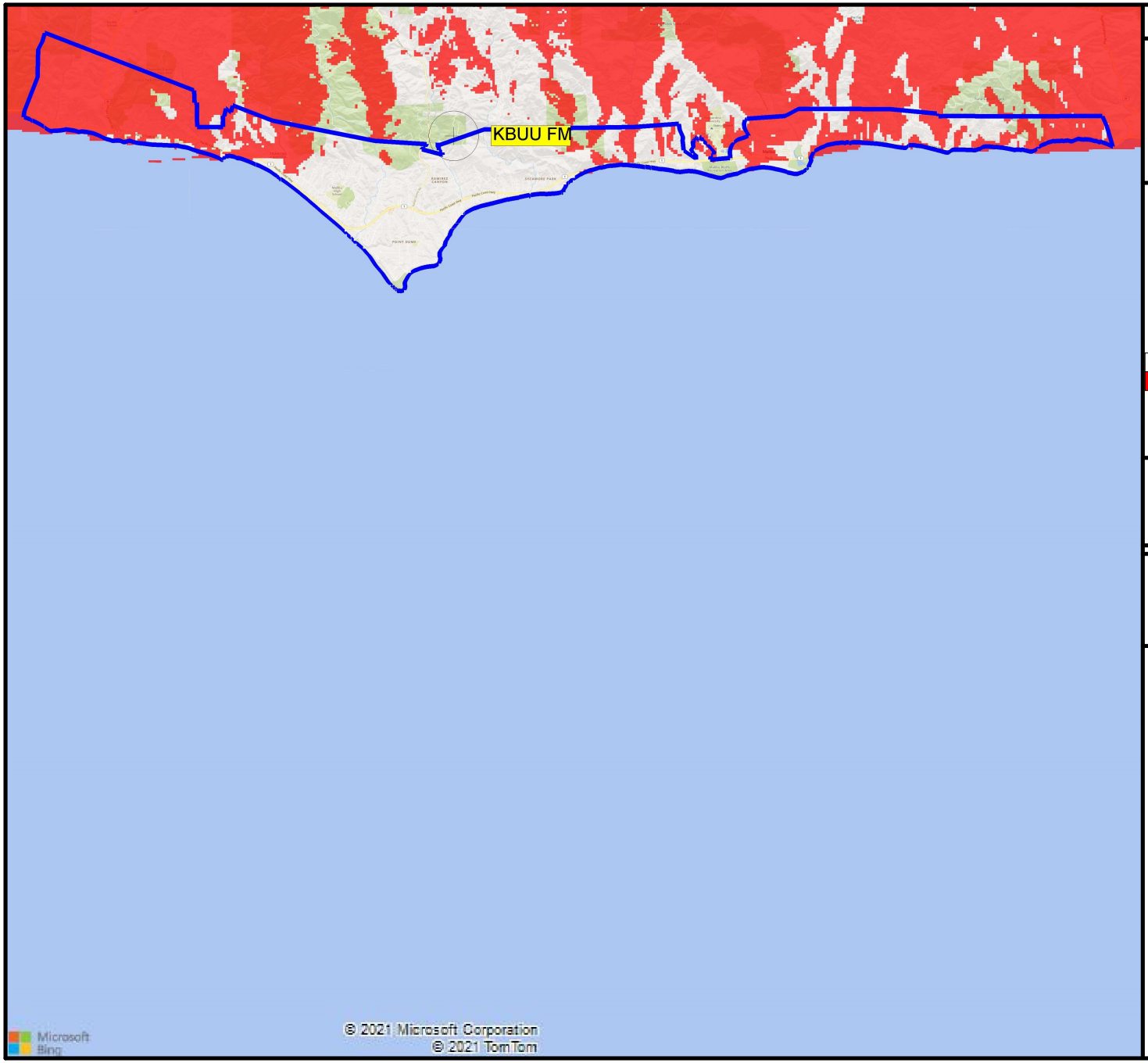
Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Mon Jun 14 13:00:46 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KBUU FM
N34°02'26.10" W118°47'23.00" 936.0 ft
KBUU Tx.Ht.AGL: 23.0 ft Total ERPd: 200.00 W
Model: 1 Isotropic-horizontal/0.0° 99.1000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES
-1 0 4

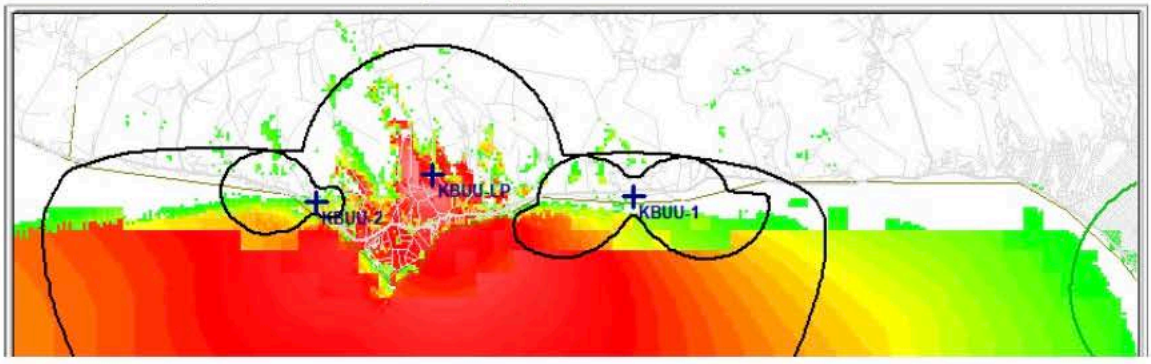
Malibu _CA

VHF

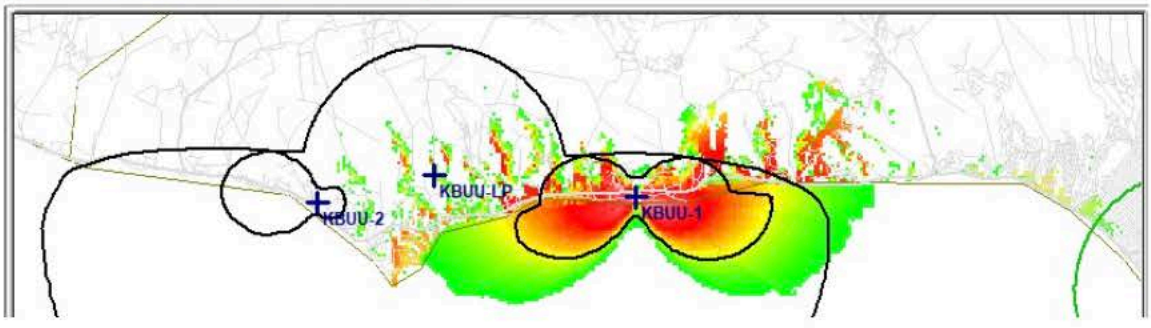
PTO_with 30dB building loss Tue Jun 22 10:24:48 2021

COVERAGE OF PRIMARY STATION IN PROPOSED BOOSTER AREA

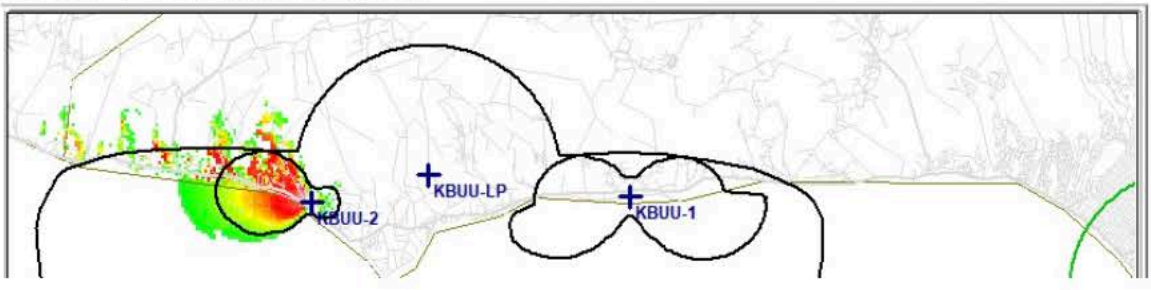
Current coverage of KBUU-LP primary station:



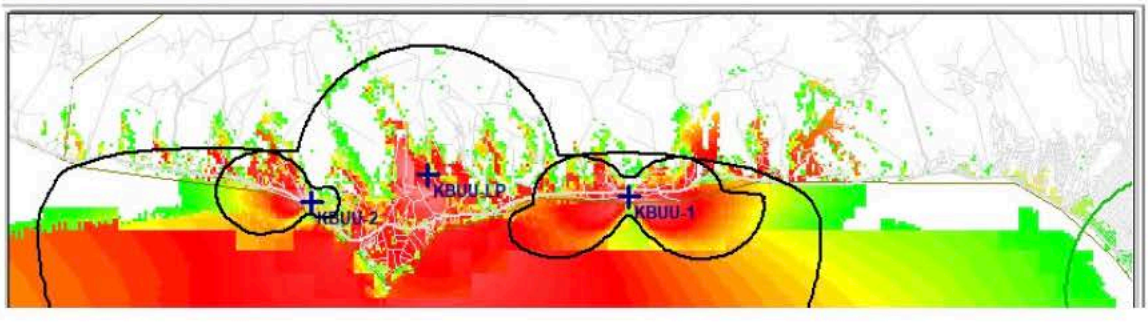
KBUU-LP-FM1 (Malibu Beach):



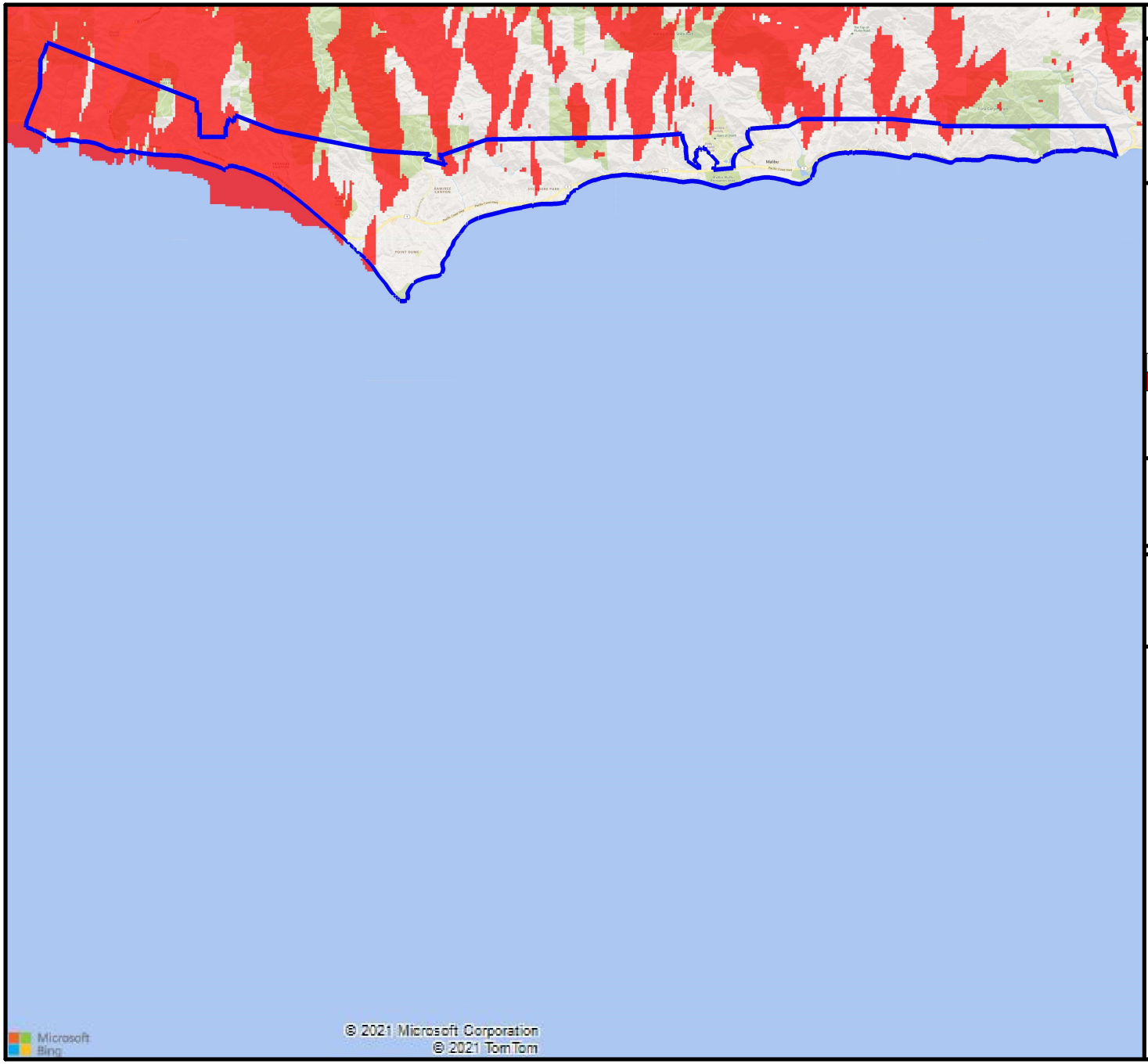
KBUU-LP-FM2 (Zuma Beach):



Combined Single Frequency Network:



Longley Rice field strength of 50 dB or greater.



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KDAY FM
N34°00'19.00" W118°21'44.00" 484.7 ft
KDAY Tx.Ht.AGL: 102.0 ft Total ERPd: 4200.00 W
Model: 1 Isotropic-vertical/0.0° 93.5000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

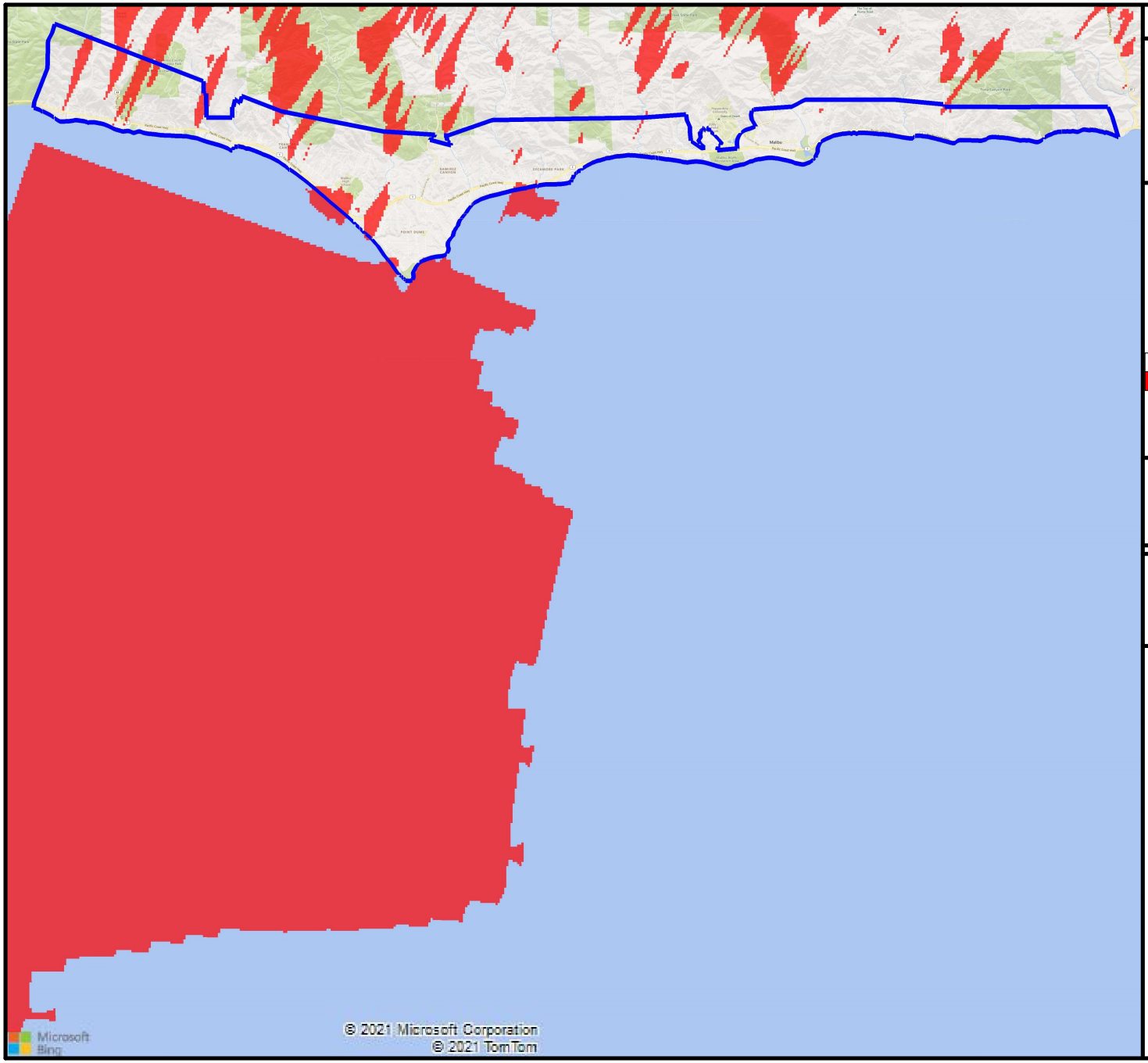
MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Tue Jun 22 11:16:17 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KKJZ FM
N33°47'58.00" W118°09'43.00" 341.2 ft
KKJZ Tx.Ht.AGL: 141.0 ft Total ERPd: 30000.00 W
Model: 1 Isotropic-vertical/0.0° 88.1000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

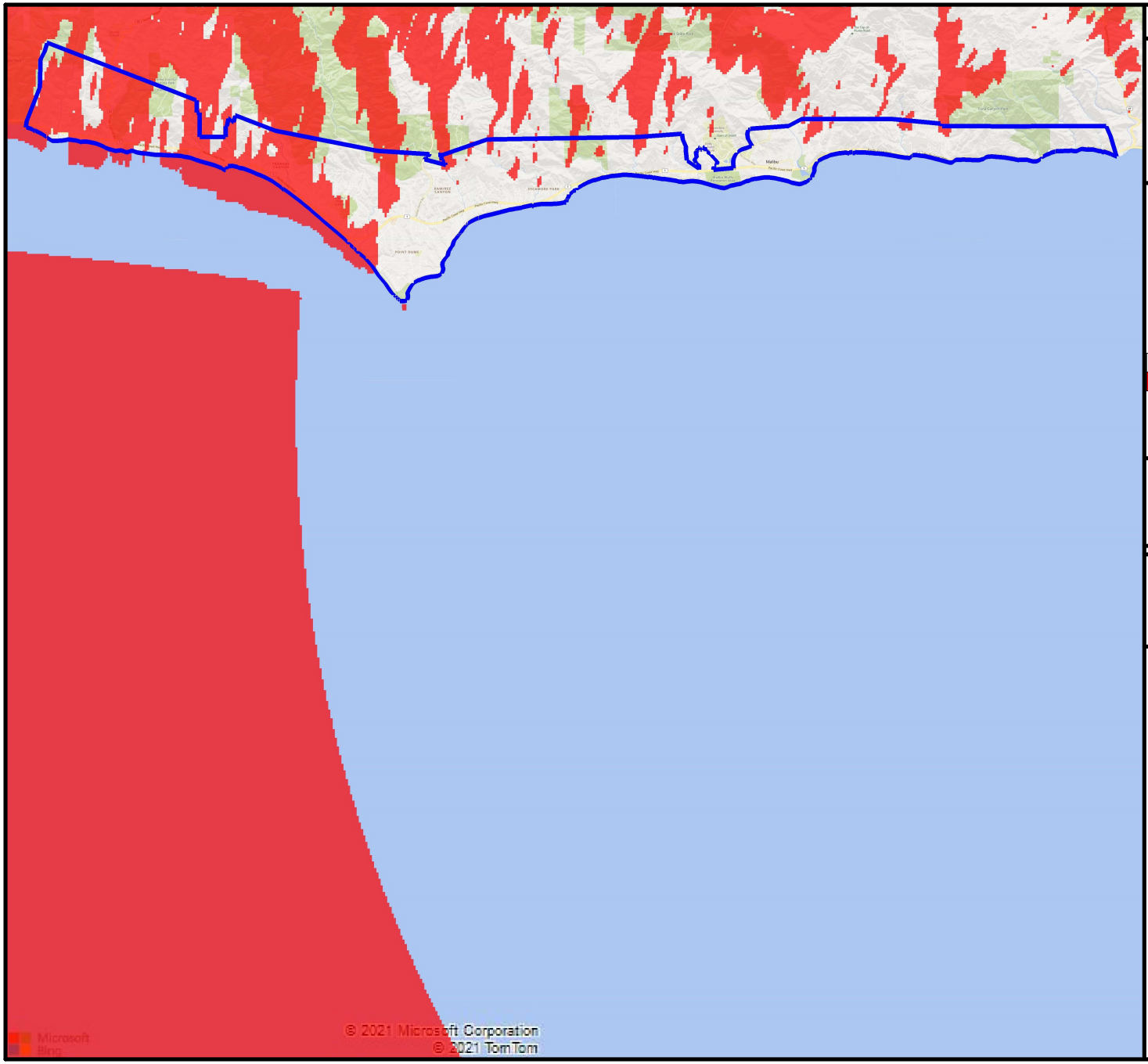
MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Tue Jun 22 13:04:12 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KXLU FM
N33°58'16.00" W118°24'59.30" 136.2 ft
KXLU Tx.Ht.AGL: 75.0 ft Total ERPd: 2900.00 W
Model: 1 Isotropic-vertical/0.0° 88.9000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

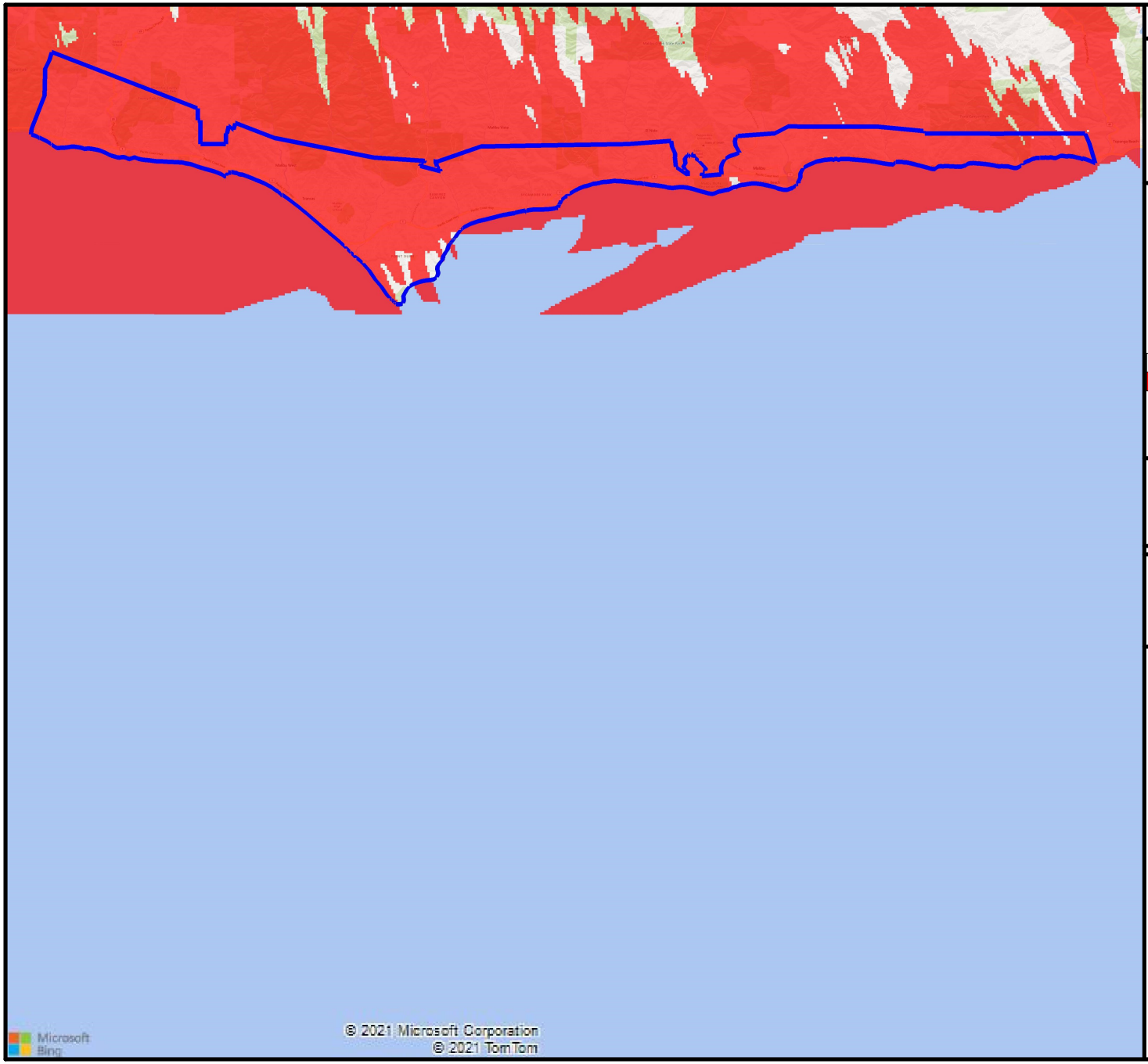
MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Tue Jun 22 11:09:23 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KROQ
N34°11'49.00" W118°15'33.30" 2656.5 ft
KROQ Tx.Ht.AGL: 207.0 ft Total ERPd: 5500.00 W
Model: 1 Isotropic-horizontal/0.0° 106.7000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

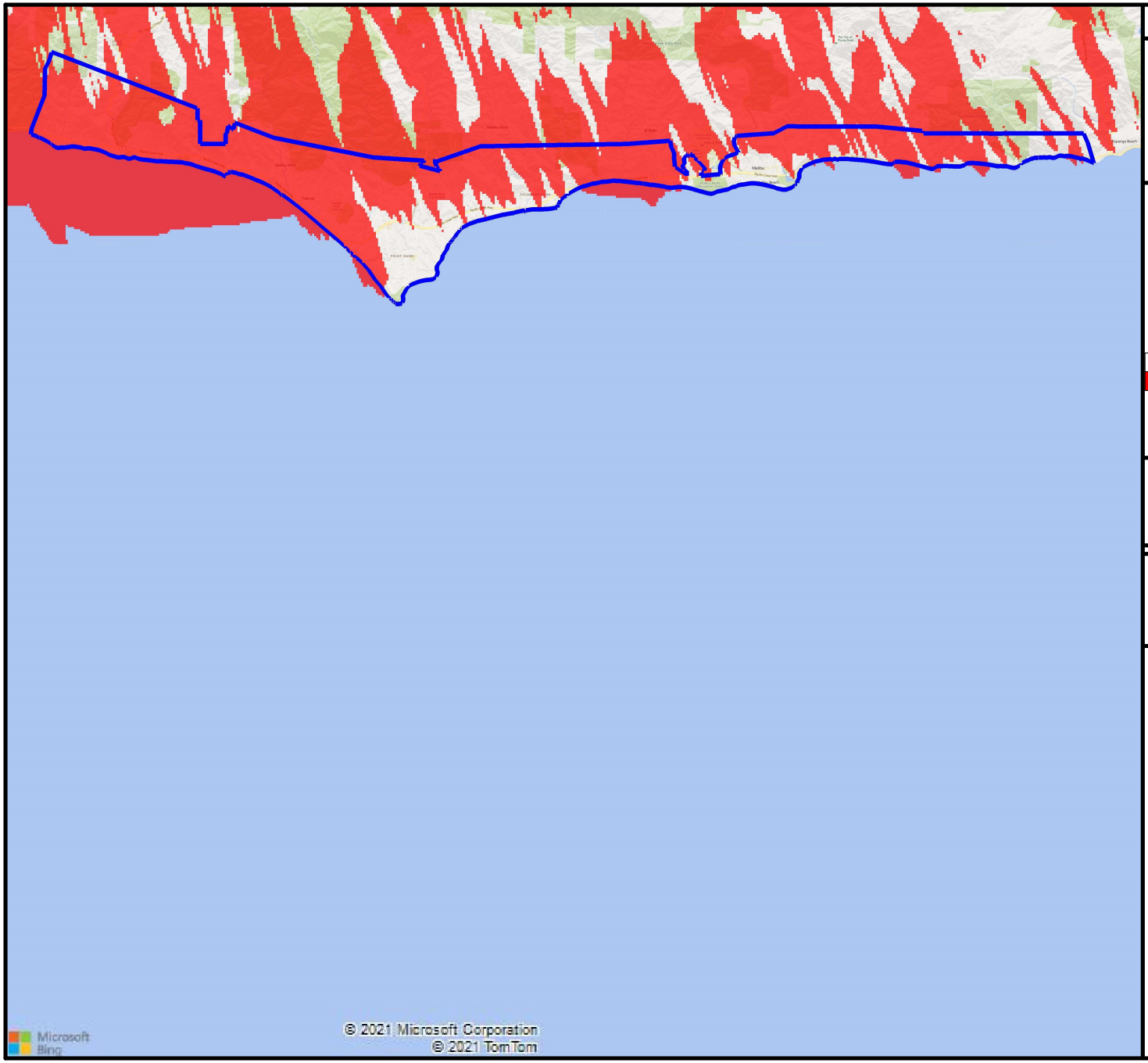
MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Fri Apr 30 18:08:01 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KCBS
N34°13'55.00" W118°04'21.20" 5656.2 ft
KCBS Tx.Ht.AGL: 820.0 ft Total ERPd: 27500.00 W
Model: 1 Isotropic-vertical/0.0° 93.1000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

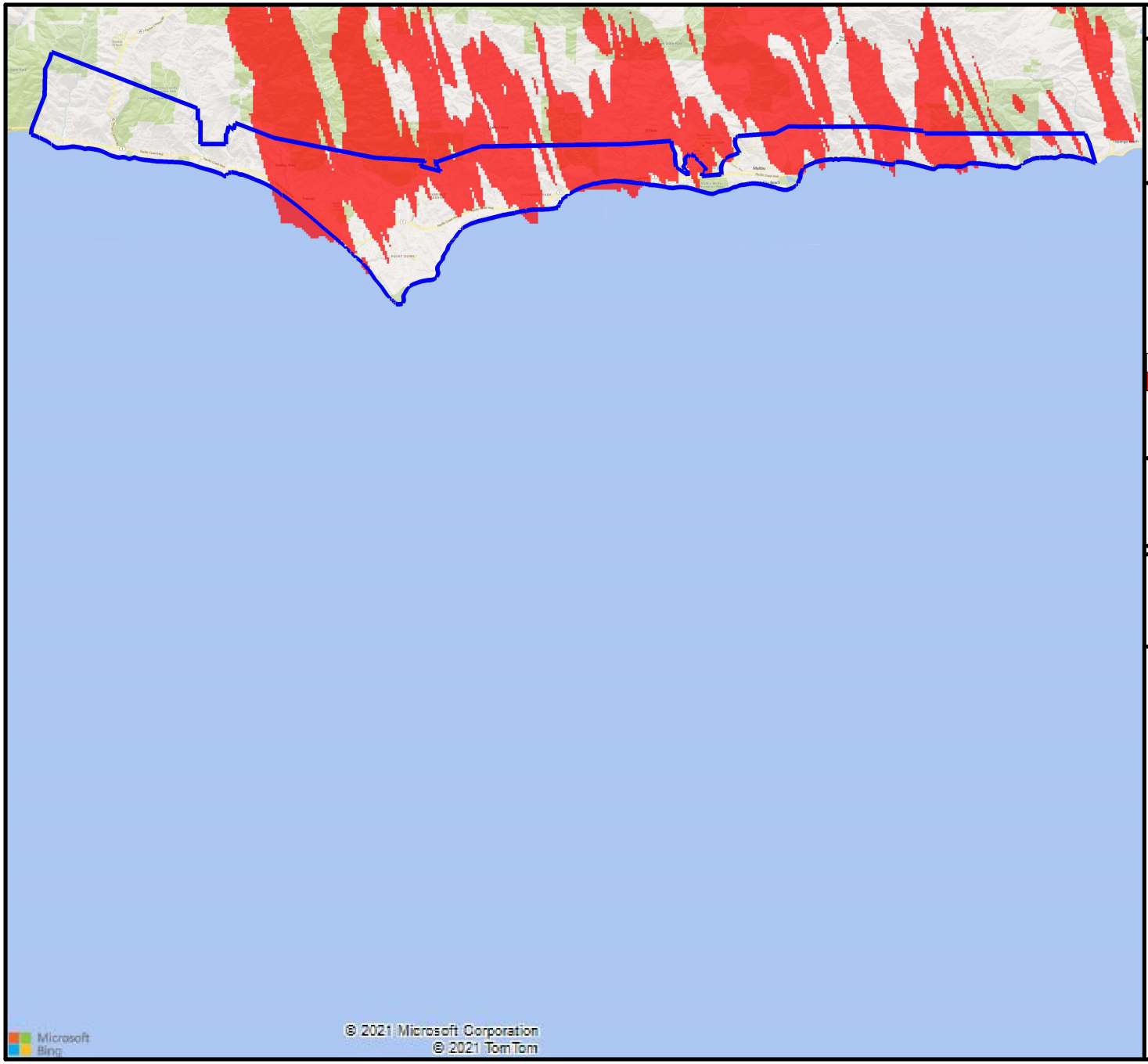
MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Fri Apr 30 18:10:05 2021



EDX® SignalPro®: Malibu_CA_FM Stations

Prop. model 1: Anderson-2D v1.00
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): -None-
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KBIG
N34°13'36.00" W118°04'02.00" 5701.3 ft
KBIG Tx.Ht.AGL: 266.0 ft Total ERPd: 65000.00 W
Model: 1 Isotropic-horizontal/0.0° 104.3000 MHz

FM

>= -65.0 dBmW FM with 30 db building los
< -65.0 dBmW

Display threshold level: -250.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 3.0 ft AGL Gain: 0.00 dBd

MILES

-1 0 4

Malibu _CA

VHF

PTO_with 30dB building loss Fri Apr 30 18:11:50 2021