AIR TRAFFIC HAZARDS ANALYSIS

Air Traffic Hazards Analysis for the Campo Verde Solar Project Gen-Tie Line Alternatives

Prepared for:

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AIR TRAFFIC HAZARD ANALYSIS

CAMPO VERDE SOLAR PROJECT

Gen-Tie Structures

PROJECT OVERVIEW

The Campo Verde Solar Project is a proposed photovoltaic (PV) solar generating facility located in Imperial County approximately 7 miles southwest of the community of El Centro. This analysis evaluates the potential for the transmission structures associated with the gen-tie line that will transmit the energy generated at the Campo Verde Solar Project to impact air traffic in the area.

The gen-tie would be a double-circuit 230 kV transmission line. The solar project will be located on private lands and will build one of three gen-tie options being considered for the project to access the Imperial Valley Substation. Two of the gen-tie options would cross federal lands managed by the Bureau of Land Management (BLM) and one is located exclusively on private land. **Figure 1** shows the location of the solar project and the three gen-tie options being considered and they are described below:

- **Gen-Tie Route across BLM Land** - This Gen-Tie option would originate at the project substation/switchyard at the southern end of the project site and would cross BLM land south to the Imperial Valley Substation. The Gen-Tie would be built as a double-circuit 230 kV line and parallel follow existing roads. The Gen-Tie would cross portions of the proposed solar site and approximately 0.9 miles of BLM land.
- **Alternative Gen-Tie across BLM Land** - This alternative Gen-Tie would follow the existing IID S-line and associated access road south from the solar site to the Imperial Valley Substation. This Gen-Tie would cross portions of the solar site, approximately 0.4 miles of BLM land, and 0.4 miles of private land off the solar site.
- **Private Land Gen-Tie Alternative -** This alternative Gen-Tie would originate from the western side of the project site and cross approximately 1.75 miles of private lands to the west. The Gen-Tie would follow existing field roads and ditches to the Imperial Solar Energy Center West site. From this point, the proposed project would use available capacity on Imperial Solar Energy Center West's gen-tie line that has an approved right-of-way to the Imperial Valley Substation.

These options are described further below.

Proposed Gen-Tie Across BLM Land

The proposed Gen-Tie on BLM land would be a double-circuit 230 kV gen-tie line that would provide the interconnection for the Campo Verde Solar Project. After leaving the

solar site, this gen-tie line would be approximately 1.0 miles long with about 0.9 miles located on BLM-managed land.

This alternative gen-tie route would exit the southern portions of the solar site where it would cross IID's Westside Main Canal onto BLM managed land. On BLM managed land it would proceed south approximately 0.2 miles, southeast for approximately 0.6 miles and south for approximately 0.1 miles to the Imperial Valley Substation.

Approximately four structures would be located on the solar site and ten structures would be located on BLM land. **Figure 2** shows the proposed location of this gen-tie route and the associated structures.

Alternative Gen-Tie Across BLM Land

The Alternative Gen-Tie across BLM land would also involve developing a double-circuit 230 kV line that would provide the interconnection for the Campo Verde Solar Project. It would parallel the existing IID S-line and would be approximately 0.8 miles long off the solar site with about 0.4 miles located on BLM land and 0.4 miles located on private lands off the solar site.

This alternative would begin on the southern portion of the solar site where it would cross IID's Westside Main Canal and proceed south approximately 0.4 miles on private land where it would enter BLM land and continue south for approximately 0.4 more miles to the Imperial Valley Substation.

The structures and facilities for this alternative would be the same as that described for the proposed gen-tie. Approximately four structures are proposed to be located on BLM land for this alternative and three would be located on private lands off the solar sites.

Figure 3 shows the proposed location of this gen-tie route and associated structures.

Private Land Gen-Tie Alternative

The Private Land (non-BLM ROW) Alternative would be approximately 1.75 miles long and located completely on private lands. This alternative would commence at the western portion of the Campo Verde Solar Project site where it would cross approximately 1.75 miles of privately-owned agricultural lands, cross IID's Westside Main Canal, and enter the Imperial Solar Energy Center West site. From the Imperial Solar Energy Center West site, it would utilize available capacity on the Imperial Solar Energy Center's gen-tie line that has an approved right-of-way to the Imperial Valley Substation.

Figure 4 shows the proposed location of this gen-tie route and associated structures.

STRUCTURES

The proposed Gen-Tie line would be designed for two 230kV circuits with three conductors per circuit. The line would also have two shield wires with either one composed of extra high strength (EHS) steel wire and one or both including an OPGW (Optical Ground Wire) constructed of aluminum and steel core which may carry glass fibers within its core for communications. Single steel pole structures with the span

length between structures ranging from 400 to 800 feet would be used. Assemblies of insulators would be used to position and support each of the conductor bundles while maintaining electrical design clearances between the conductors and the towers.

The project would use self-supporting single steel poles made of self–weathering or galvanized steel to better blend into the surrounding environment. An illustration of the double-circuit 230 kV steel pole structures that would be used for this project is provided in **Figure 5a** and **5b**. Structure heights would vary from approximately 100 to 135 feet depending on terrain. The standard height is expected to be approximately 120 feet. Span lengths would range from approximately 400 to 800 feet.

AIR HAZARD ANALYSIS

As mentioned above, only one of the three gen-tie options being considered would be built to provide the needed interconnection for the Campo Verde Solar Project. Also, the gen-tie structures are expected to average about 120 feet in height.

Until final design is completed, it is currently not known which of the individual structures would need to be designed with a height greater than 120 feet in order to meet required clearances. Therefore, a height of up to 135 feet for each of the structures associated with the gen-tie alternatives was used in this analysis in order to be conservative.

FAA Notice Criteria Tool

The requirements for filing with the Federal Aviation Administration (FAA) for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. You must file with the FAA at least 45 days prior to construction if:

- A structure will exceed 200ft above ground level
- A structure will be in proximity to an airport and will exceed the slope ratio
- A structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...)
- A structure will be in an instrument approach area and might exceed part 77 Subpart C
- A structure will be on an airport or heliport

More details are provided in the Code of Federal Regulations CFR Title 14 Part 77.9.

The FAA has an online Notice Criteria Tool to determine whether a structure would potentially create a hazard and would require notice to the FAA.

Data for a representative structure from each of the three gen-tie alternatives was entered into the FAA Notice Criteria Tool. The structures entered into the Tool were selected to reflect worst-case conditions – closest proximity to local airports or highest ground elevation.

The results from the screening tool indicate that notice to the FAA would not be required for the structures associated with any of the three gen-tie alternatives. The notice tool results are shown in Appendix A.

DoD Preliminary Screening Tool

The DoD Preliminary Screening Tool provides a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool produces a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool provides a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. For this project, this tool was used to determine whether there would be potential impacts to military airspace.

The results from this screening tool show that neither of the two gen-tie options on BLM land would have potential impacts to military airspace. The results for the private land gen-tie suggested additional consultation with the local military installation to determine whether impacts could occur. They have been contacted but have not yet provided additional information. The screening tool results are shown in Appendix B.

APPENDIX A

FAA NOTICE TOOL RESULTS

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your structure will be on an airport or heliport

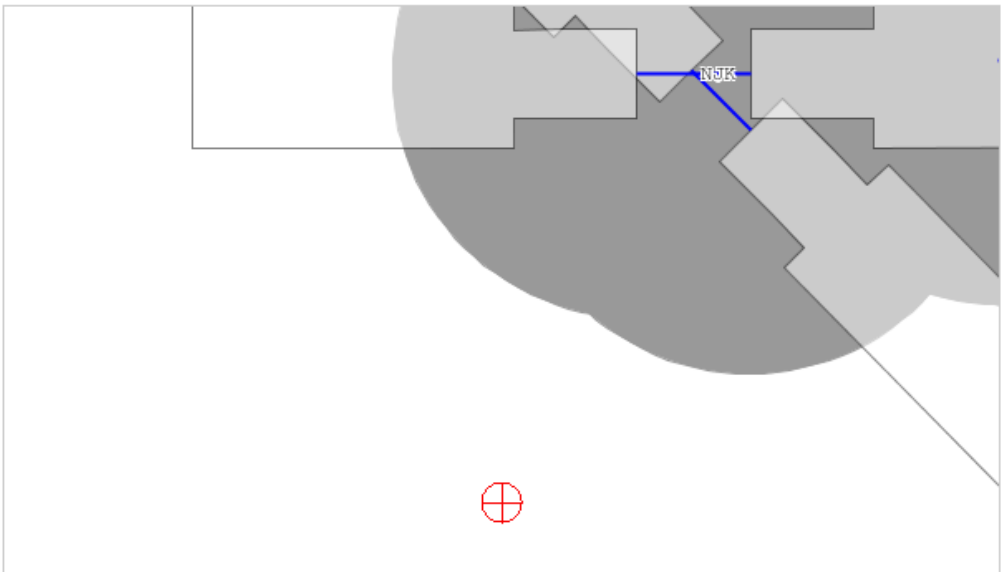
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	32 Deg 43 M 55 S N
Longitude:	115 Deg 43 M 23 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	-25 (nearest foot)
Structure Height (AGL):	135 (nearest foot)
Traverseway:	No Traverseway (Additional height is added to certain structures under 77.9(c))
Is structure on airport:	(•) No ( ) Yes
	Submit

Results

You do not exceed Notice Criteria.



FAA NOTICE CRITERIA TOOL RESULTS

Structure Location on BLM Land - West Route

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your structure will be on an airport or heliport

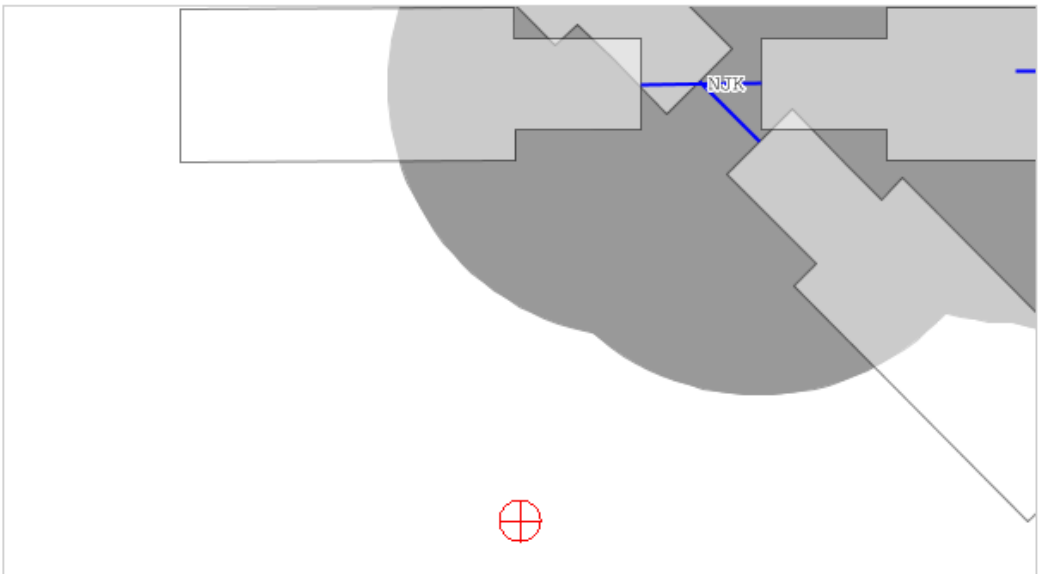
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	32 Deg 44 M 01 S N
Longitude:	115 Deg 43 M 6 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	-25 (nearest foot)
Structure Height (AGL):	135 (nearest foot)
Traverseway:	No Traverseway (Additional height is added to certain structures under 77.9(c))
Is structure on airport:	(•) No ( ) Yes
	Submit

Results

You do not exceed Notice Criteria.



FAA NOTICE CRITERIA TOOL RESULTS

Structure Location on Private Land – At Project Switchyard

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your structure will be on an airport or heliport

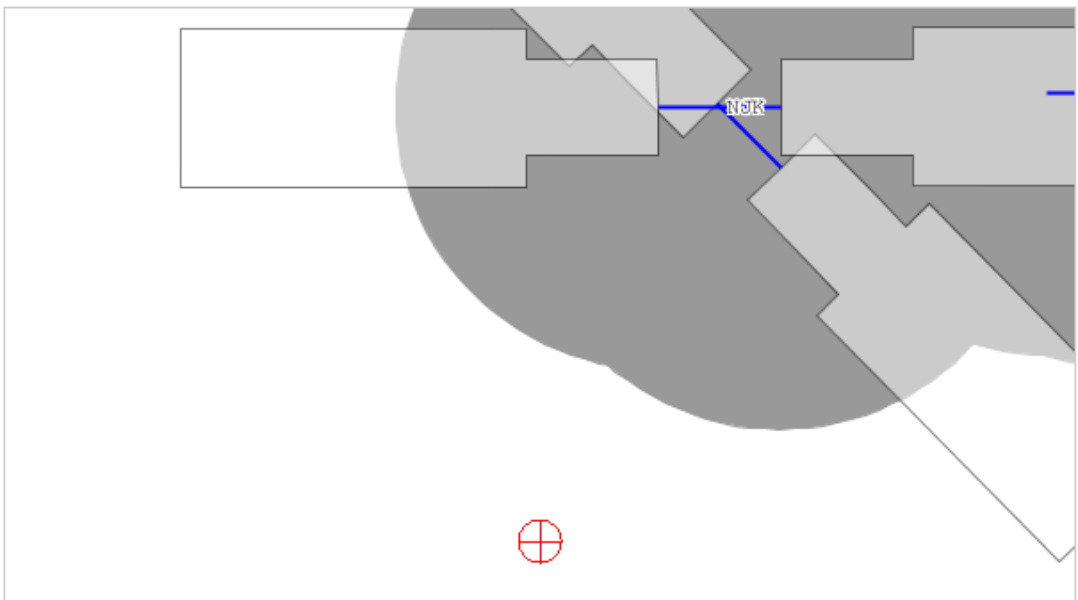
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	32 Deg 44 M 15 S N
Longitude:	115 Deg 42 M 59 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	5 (nearest foot)
Structure Height (AGL):	135 (nearest foot)
Traverseway:	No Traverseway (Additional height is added to certain structures under 77.9(c))
Is structure on airport:	(•) No ( ) Yes
	Submit

Results

You do not exceed Notice Criteria.



FAA NOTICE CRITERIA TOOL RESULTS

Structure location on BLM Land – At Imperial Valley Substation

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your structure will be on an airport or heliport

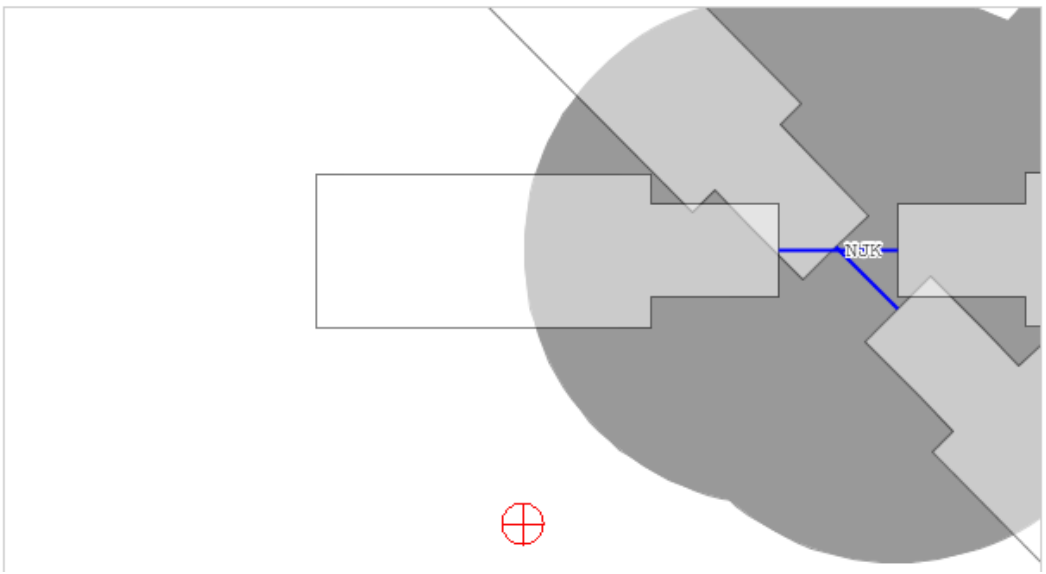
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	32 Deg 46 M 10 S N
Longitude:	115 Deg 45 M 10 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	-38 (nearest foot)
Structure Height (AGL):	135 (nearest foot)
Traverseway:	No Traverseway (Additional height is added to certain structures under 77.9(c))
Is structure on airport:	(•) No ( ) Yes
	Submit

Results

You do not exceed Notice Criteria.



FAA NOTICE CRITERIA TOOL RESULTS

Structure location on Private Land – Non-BLM Gen-Tie Option

(Northernmost Structure)

APPENDIX B

DoD SCREENING TOOL RESULTS

DoD Preliminary Screening Tool

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Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
  -Air Defense and Homeland Security radars(Long Range Radar)
  -Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
  -Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Military Operations **Geometry Type:** Single Point

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	32	43	55	N	115	43	23	W

Horizontal Datum: NAD83

Submit

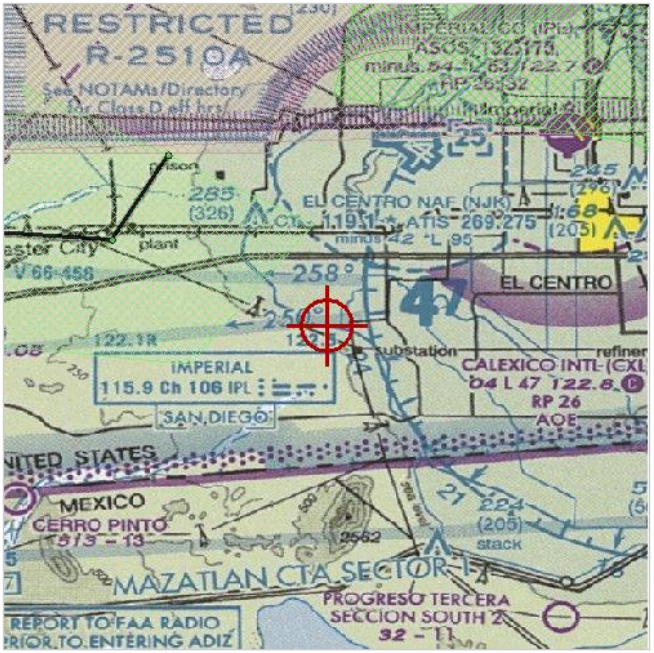
The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Gary Munsterman at the USAF Regional Enviromental Coordinator at (415)977-8884 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Navy Representative, FAA Western Service Area at the USN Regional Enviromental Coordinator at (425) 227-2740 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact LTC Thomas C. Petty at the USA Regional Enviromental Coordinator at (425) 227-2955 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Marine Corps Representative, FAA Western Service Area at the USMC Regional Enviromental Coordinator at (425) 227-2665 for confirmation and documentation.

This is a preliminary review of your proposal and does not preclude official FAA processes.
Your search data is not retained and the privacy of all your searches is assured.



Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

DoD PRELIMINARY SCREENING TOOL RESULTS

Structure Location on BLM Land - West Route

DoD Preliminary Screening Tool

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  -Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
  -Military Operations
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- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Military Operations Geometry Type: Single Point

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	32	44	01	N	115	43	6	W

Horizontal Datum: NAD83

Submit

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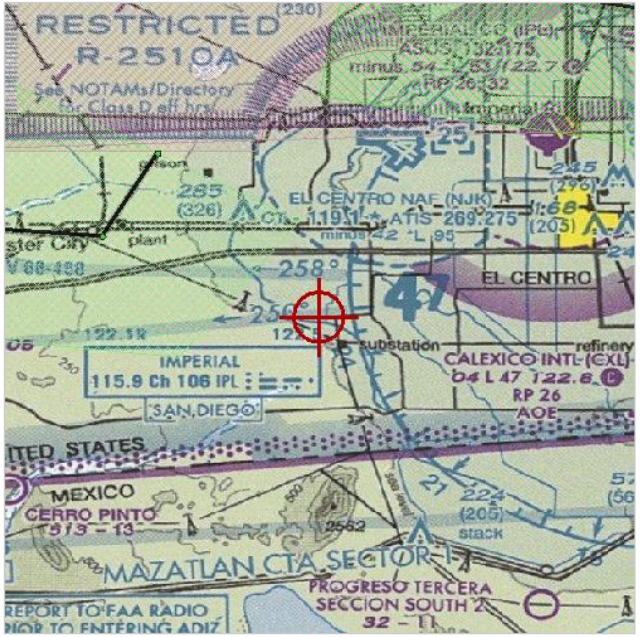

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DoD PRELIMINARY SCREENING TOOL RESULTS

Structure Location on Private Land – At Project Switchyard

DoD Preliminary Screening Tool

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  -Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
  -Military Operations
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- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Military Operations **Geometry Type:** Single Point

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	32	44	15	N	115	42	59	W

Horizontal Datum: NAD83

Submit

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The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Navy Representative, FAA Western Service Area at the USN Regional Enviromental Coordinator at (425) 227-2740 for confirmation and documentation.

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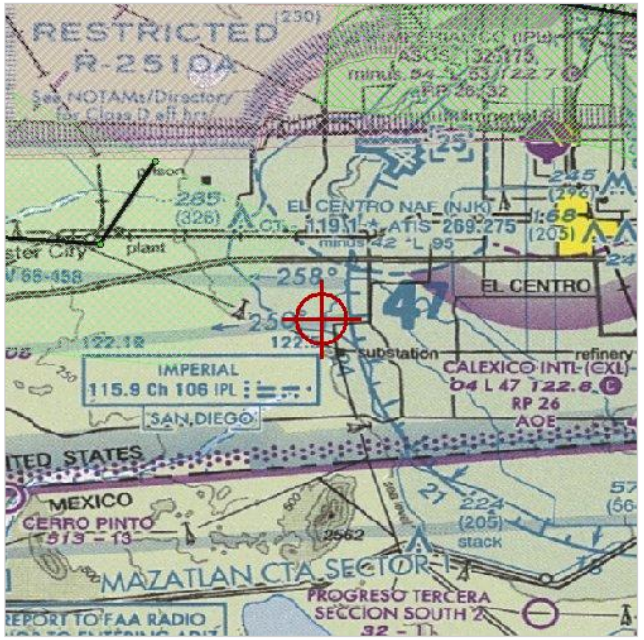

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DoD PRELIMINARY SCREENING TOOL RESULTS

Structure location on BLM Land – At Imperial Valley Substation

DoD Preliminary Screening Tool

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- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Military Operations Geometry Type: Single Point

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	32	46	10	N	115	45	10	W

Horizontal Datum: NAD83

Submit

Your structure falls within the confines of VR288, and may have an impact on military operations. For a more detailed review, please contact Scott Hall at (951)655-4849. This POC will review the analysis and identify any additional areas of concern. Upon completion of this process, the POC will provide you a letter stating the results of the review.

This is a preliminary review of your proposal and does not preclude official FAA processes.
Your search data is not retained and the privacy of all your searches is assured.

Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

DoD PRELIMINARY SCREENING TOOL RESULTS

Structure location on Private Land – Non-BLM Gen-Tie Option

(Northernmost Structure)