Technical Memorandum

To: Michael Johnson
From: Nick Johnson, Johnson Aviation, Inc.
Date: February 19, 2024

Subject: Airport Land Use Compatibility Analysis – SPR2022-0003 Lake Creek Logistics Center, Apple Valley Airport, Apple Valley, CA

A. Introduction

This airport land use compatibility analysis, as required by Section 9.65.030 of the Development Code, evaluates a proposed industrial building development bounded by Gustine Road to the north, Corwin Road to the south, Central Road to the east, and the Apple Valley Airport (APV or Airport) to the west, in the Town of Apple Valley, CA (Project). The Project consists of three buildings on five parcels: 0463-373-01, -03, -04, -05, and -06.

The project is located within the North Apple Valley Industrial Specific Plan (NAVISP), is subject to the Apple Valley Comprehensive Land Use Plan (CLUP), and coordination is required with the Town of Apple Valley since the County of San Bernardino disbanded its airport land use commission. The CLUP was adopted in 1995 and the NAVISP was adopted in 2006.

The Project is also subject to height restrictions by the Federal Aviation Administration (FAA) and other development restrictions by the Town of Apple Valley. The FAA is required under 14 Code of Federal Regulations (CFR) Part 77[1] to protect navigable airspace by studying proposed developments and issuing determinations that a project would not be a hazard to air navigation.

Rooftop solar photovoltaic (PV) arrays are proposed for the Project to generate electricity. The Airport does not have an air traffic control tower and the Project is not located on Airport property. As such, the FAA does not require a solar glare study under the 2021 FAA solar glare policy[2]. A solar glare study is included herein as additional disclosure information.

B. Purpose and Project Description

This airport land use compatibility analysis for the Project addresses aviation safety, aircraft noise impacts, aircraft overflight, airspace protection, and the operational risk to people and property in vicinity of the Project site. This assessment is based on a review of relevant documents, local knowledge, and publicly available information.

The Project is comprised of five parcels that total 226.75 acres, three industrial warehouse buildings that would total 3,480,736 square feet in size, on a site that is currently unimproved. The Project is mostly warehousing space with some office space. The Project would have a total of 548 dock doors, 2,984 automobile parking stalls and 1,420 trailer parking stalls. The Project includes construction of Central Road, Gustine Road, Corwin Road to their full street classifications, along with curb, gutter, and sidewalk. Fernandez Avenue and Somis Avenue would be abandoned and revert to interior property lines and replaced with a 30-foot-wide public utilities easement in favor of Apple Valley. A 10-foot-wide easement for sewer purposes in favor of Apple Valley would extend westerly from the terminus of Corwin Road. As

[1] 14 CFR Part 77 – *Safe, Efficient Use, and Preservation of the Navigable Airspace*, https://www.ecfr.gov/current/title-14/chapter-I/subchapter-E/part-77

[2] https://www.federalregister.gov/documents/2021/05/11/2021-09862/federal-aviation-administration-policy-review-of-solar-energy-system-projects-on-federally-obligated

part of the Project, the sewer line will be extended as a jack and bore construction under the airport runway to connect to the sewer located west of the Airport. The Proposed Project would also provide on-site and off-site water, sewer, electricity, and gas infrastructure improvements.

The Project is adjacent to the east side of Apple Valley Airport, which has two runways. Runway 18/36 is 6,498 feet in length and 150 feet wide. Runway 8/26 is 4,099 feet in length and 60 feet wide. Figure 1 shows the Project site in relation to the Airport. Figure 2 shows the site plan for the Project.

Figure 1 - Project Site Relative to Apple Valley Airport

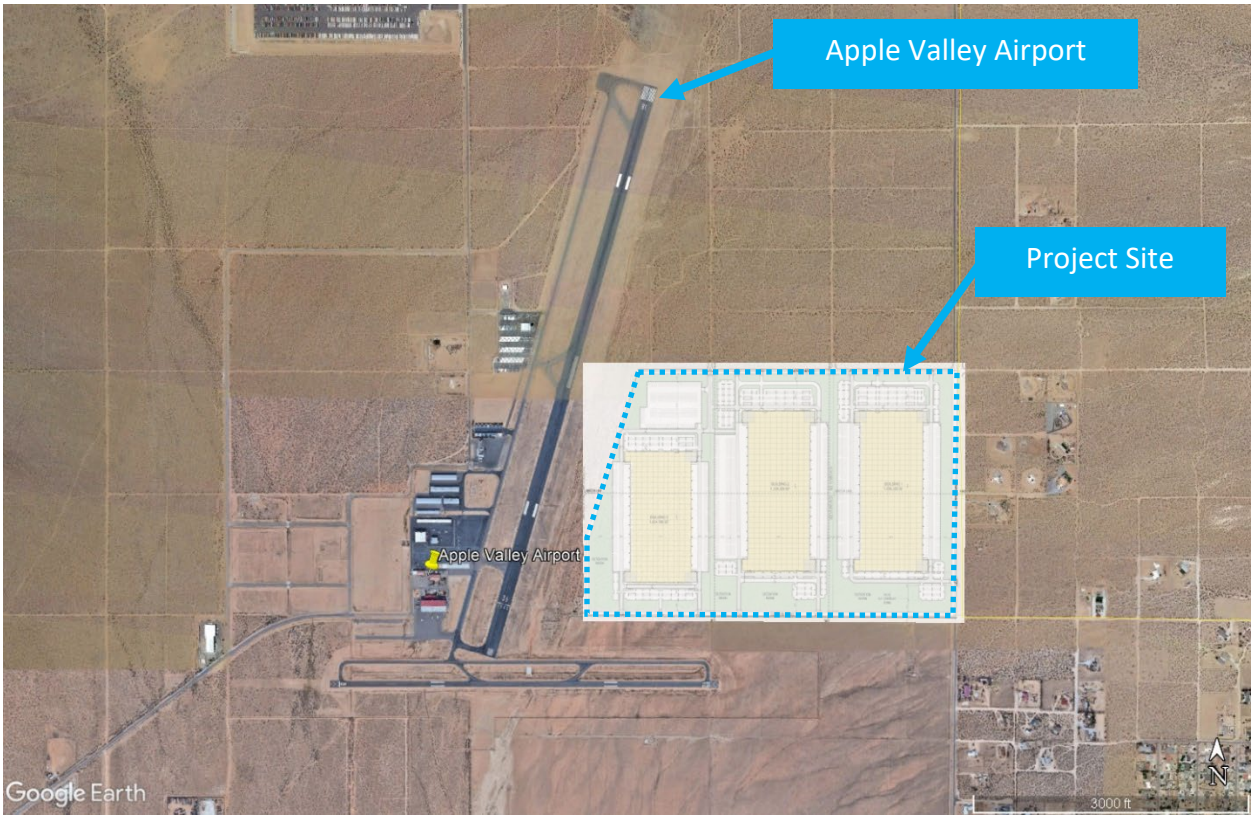
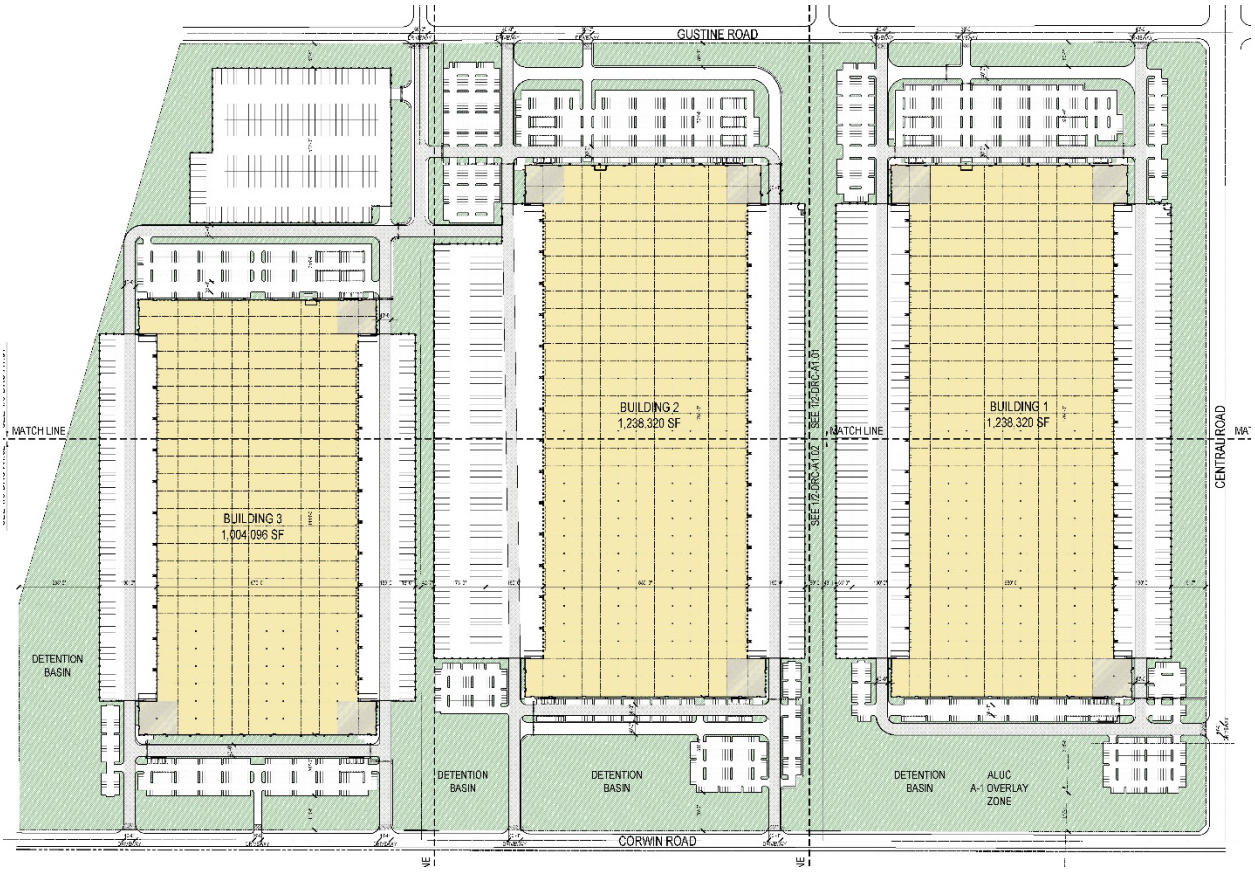


Figure 2 – Project Site Plan



C. Land Use Jurisdiction and Compatibility

The Project Site is within the North Apple Valley Industrial Specific Plan (Figure 3). Four of the five parcels are zoned Industrial - Specific Plan (I-SP) and the southeast parcel (APN 0463-373- 06) is zoned General Commercial (C-G). The property has remained undeveloped since at least 1952. Surrounding properties to the north, west and south are also located within the North Apple Valley Industrial Specific Plan and zoned Airport Industrial (I-A) and Industrial – Specific Plan (I-SP). The properties to the east are within San Bernardino County and zoned Apple Valley/Rural Living.

Surrounding uses include undeveloped land to the north, undeveloped land and single- family residences to the east, undeveloped land and an Apple Valley Airport runway to the south, and undeveloped land and the Apple Valley Airport to the west. As part of the Project, a Specific Plan Amendment is requested to rezone APN 0463-373-06 from C-G to I-SP, consolidate five parcels into three parcels, abandon portions of Gustine Street and Corwin Road, and abandon Fernandez and Somis Avenues.

All new development shall comply with Section 9.65 – Airport Overlay Districts, of the Apple Valley Development Code

Industrial - Specific Plan (I-SP):

This designation allows for a broad range of clean manufacturing and warehousing uses, ranging from furniture manufacture to warehouse distribution facilities. Key features of this designation include: 1) Outdoor storage must be completely screened from view, 2) All uses must be conducted within enclosed buildings, 3) Perimeter landscaping must be complementary with that of surrounding projects to provide a unified, cohesive streetscape.

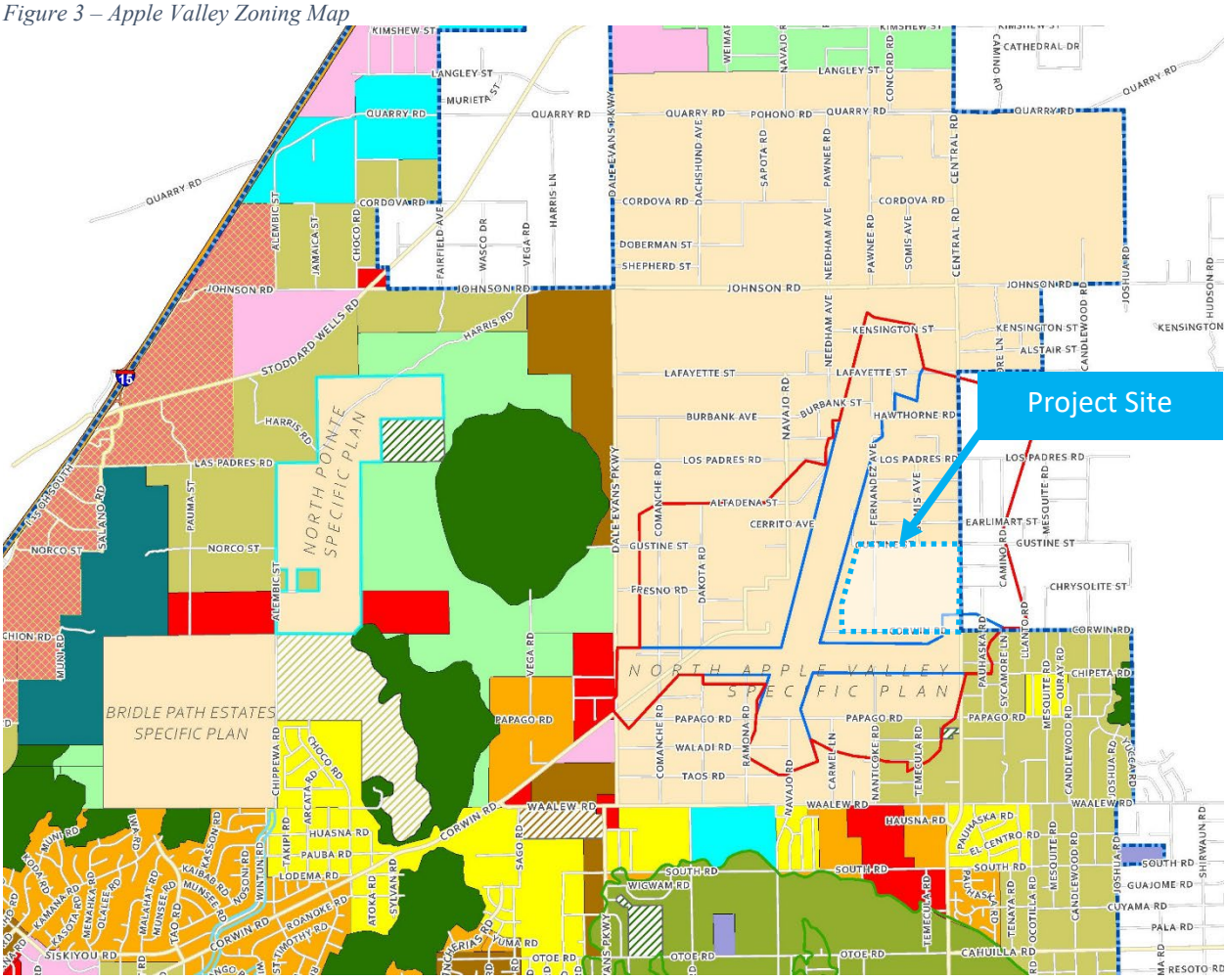
Appropriate land uses in this designation include manufacturing facilities with showrooms and offices, regional warehousing facilities, and support services for manufacturing and warehousing.

General Commercial (C-G):

This designation provides for a wide range of commercial uses intended to support the industrial development in the Specific Plan area. Key features of this designation include: 1) Commercial services which provide activity centers for the industrial development, 2) Services and offices are encouraged, 3) Perimeter landscaping must be complementary with that of surrounding projects to provide a unified, cohesive streetscape.

Appropriate land uses in this designation include hotels and motels, professional services, retail commercial land uses, in the form of both free-standing businesses and retail centers. Heavier commercial land uses, including vehicle repair, and vehicle storage may also be appropriate, particularly if related to the industrial development adjacent.

Figure 3 – Apple Valley Zoning Map



Apple Valley CLUP

The project is subject to the Apple Valley Comprehensive Land Use Plan (CLUP) adopted in 1995 and coordination is required with the Town of Apple Valley. The CLUP provides specific airport land use guidance and is used to evaluate land use compatibility and development proposals in the vicinity of the Airport. The primary compatibility concerns are aircraft noise, the safety of people and property on the ground and in aircraft, the protection of airspace, and concerns related to overflights. The CLUP has established an Airport Master Plan Area and Airport Overlay Districts to promote the development of compatible land uses near the Airport.

Airport Master Plan - Safety Area: The FAA-defined Runway Protection Zone, Runway Object Free Zone, Inner Safety Zone and Emergency Touch Down Zone areas should be dear of objects and structures in conformance with the building restriction line as shown in the Airport Master Plan. Development within this area will occur in conformance with the County's adopted Airport Master Plan, EIR/EAR and Mitigation Monitoring Plan.

Airport Overlay District A-1: This overlay district includes the outer safety zone with the runway approach surface which conforms with the adopted Airport Master Plan flight paths that extend along the runway centerline from the ends of each of the runway surfaces.

Airport Overlay District A-2: This zone is based upon the traffic pattern/overflight zone adopted in the Apple Valley Airport Master Plan. The basic shape of the zone was based on a 1,000-foot-wide flight path, which was extended from the center line of the runway ends. To limit conflicts generated from airport facilities and air operations and the adjacent privately owned properties, the outer edge of the flight tracks defines the exterior boundaries of Airport Overlay District A-2.

As shown in Figure 4, the majority of the Project is within Airport Overlay District A-2. A small portion of the Project auto parking and landscape area would be within the southwest corner of Airport Overlay District A-1. As per the CLUP, “All new non-residential uses or significant expansions of non-residential use shall be subject to the Land Use Compatibility Guidelines for Airport Overlay Zoning Districts, (Table 1), and shall also be subject to an airport compatibility review as described in Section 9.65.030 of the Development Code.” Industrial warehouse buildings are permitted in both Airport Overlay Districts.

The Project is also located in the Planned Industrial (I-P) district, which is intended to provide for light industrial uses, research and development, and multi-tenant industrial buildings, as well as certain supporting administrative and professional offices and commercial activities on a limited basis in an attractive and pleasant working environment.

Land uses impeding the pilot’s ability to see the airfield, which would cause electrical interference with navigational aids and communications equipment, which attract large numbers of birds, or involve the manufacture, storage or distribution of explosives or hazardous materials, are prohibited in all airport safety and overlay zones. All new development shall comply with Section 9.65 – Airport Overlay Districts, of the Apple Valley Development Code.

All exterior lighting shall have sharp cut-off reflectors in which no light leaves the fixture above an angle of 70 degrees, as measured straight down. A deed notice shall be recorded on all properties for which projects are approved within Airport Overlay Districts.

Figure 4 – APV CLUP Airport Overlay Districts

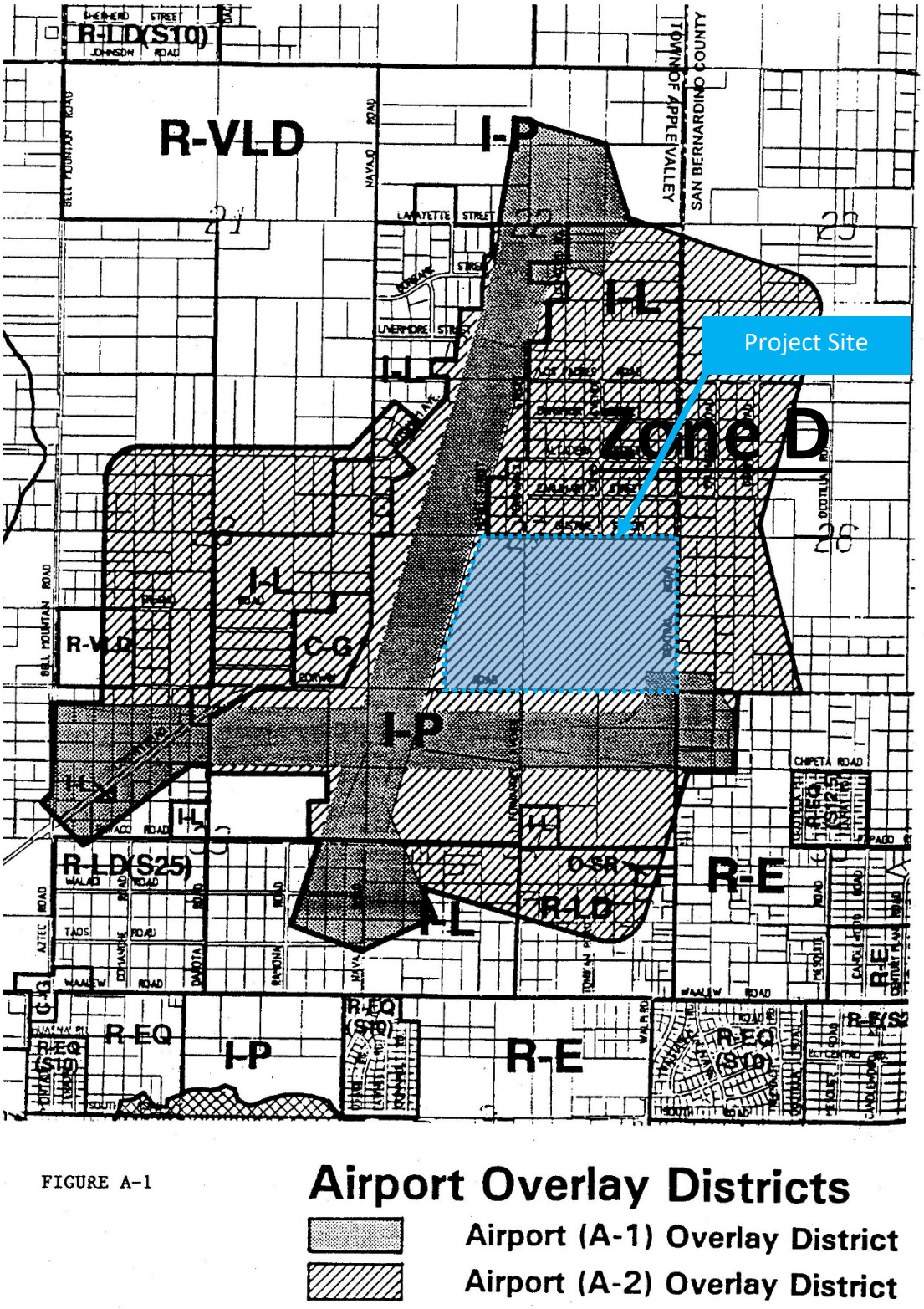


Table 1 – CLUP Compatibility Guidelines

TABLE 8-1
LAND USE COMPATIBILITY GUIDELINES FOR AIRPORT OVERLAY ZONE DISTRICTS[1]

Safety Zone	Recommended Minimum Population Density		Maximum Coverage by Structures	Land Use
	Residential	Non-Residential		
Airport Master Plan Safety Area (included in Airport Overlay District A-1)	O[2]	10 persons per acre	O[2]	No significant obstructions[3] No petroleum or explosives No above-grade powerlines All development must comply with the adopted Airport Master Plan
Airport Overlay District A-1	1 dwelling unit per 2 acres	25 persons per acre[4]	25% of net area	No hotels, motels No restaurants, bars No schools, preschools, day care centers No hospitals, or community, congregate or residential care facilities No concert halls, auditoriums, churches No stadiums, arenas No public utility stations, plants No public communications facilities
Airport Overlay District A-2	4 dwelling units per 1 acre	150 persons per acre[4]	Building envelope and lot coverage must comply with the underlying zoning district	No schools, preschools, day care centers (not including trade schools) No hospitals, or community, congregate or residential care facilities No concert halls, auditoriums, churches No stadiums, arenas

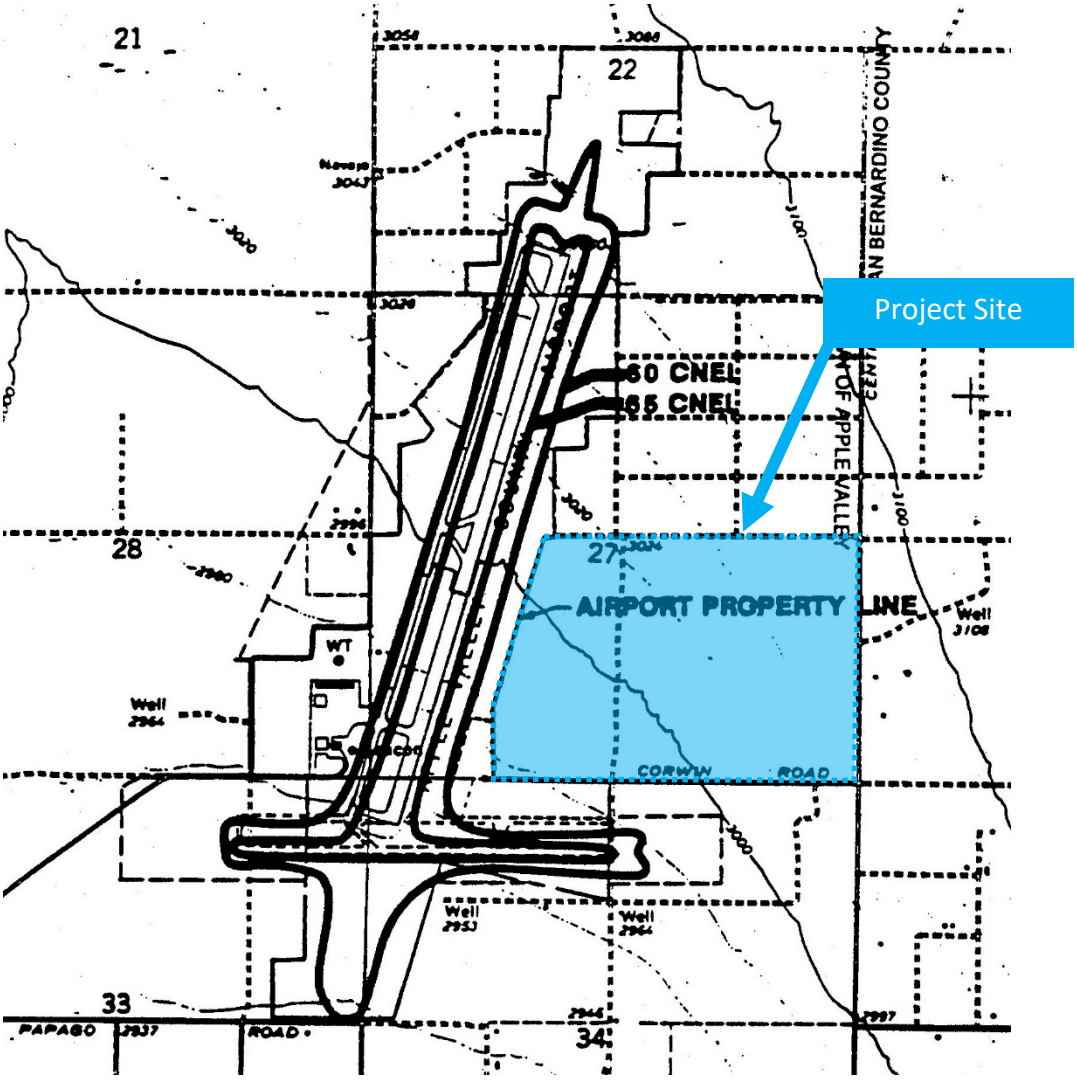
1. The following uses shall be prohibited in all airport overlay zones:
   a. Any use which would direct a steady light or flashing light of red, white, green, or amber colors associated with airport operations toward an aircraft engaged in an initial straight climb following takeoff or toward an aircraft engaged in a straight final approach toward a landing at an airport, other than an FAA-approved navigational signal light or visual approach slope indicator.
   b. Any use which would cause sunlight to be reflected towards an aircraft engaged in an initial straight climb following takeoff or towards an aircraft engaged in a straight final approach towards a landing at an airport.
   c. Any use which would generate smoke or water vapor or which would attract large concentrations of birds or which may otherwise affect safe air navigation within the area.
   d. Any use which would generate electrical interference that may be detrimental to the operation of aircraft and/or aircraft instrumentation.
   e. Any land use outside the Airport Master Plan Safety Area involving, as the primary activity, the manufacture, storage or distribution of explosives or flammable or hazardous materials.
   f. Any outdoor, above-ground storage of flammable or hazardous materials.
2. No structures permitted in emergency touchdown zones or inner safety zones. These areas are completely contained on Apple Valley Airport property.
3. Significant obstructions include but are not limited to large trees, heavy fences and walls, tall and steep berms and retaining walls, non-frangible street light and sign standards, billboards.
4. A "structure" includes fully enclosed buildings and other facilities involving fixed seating and enclosures limiting the mobility of people, such as sports stadiums, outdoor arenas, and amphitheaters.

D. Aircraft Noise Impacts

Federal and state regulations set 65 decibels (dB) Community Noise Equivalent Level (CNEL) as the normally acceptable limit for aircraft noise. The aircraft noise contours provided in the CLUP were adopted in 1989. The CLUP notes that there are no incompatible land uses within the 65 CNEL contour for the "future year 2010", and that neither the 60 CNEL or 65 CNEL contours are projected to extend past the future Airport property line. At the time the CLUP was adopted, the total operations for future year 2010 were 151,000 and include Runway 8-26 (the noise contour for 1989 does not include Runway 8-26). The most recent FAA terminal area forecast (TAF) for APV notes 37,500 total operations for 2023 through 2050.

The CLUP notes that factories, warehouses, storage yards and open farmland are relatively insensitive to noise, and that the permitted land uses and densities allowed within the aircraft safety overlay zones are consistent with noise land use compatibility standards established by Caltrans Division of Aeronautics and the FAA. As shown in Figure 5, the Project site is outside any noise contours. No aircraft noise impacts are anticipated for the proposed Project land uses.

Figure 5 – APV CLUP Noise Contours



E. Airspace Protection/Height Zoning/Hazards to Air Navigation

The FAA is responsible for protecting and preserving airspace from hazards to air navigation. Title 14 of the United States Code of Federal Regulations Part 77 defines the regulations and process for providing these protections. 14 CFR § 77.19 establishes civil airport imaginary surfaces around each runway to ensure that proposed temporary and permanent structures and activities near airports will be studied by the FAA for their effects on the safe and efficient use of navigable airspace. It is stated in the CLUP that "Objects including terrain penetrating these surfaces must be reviewed by the FAA to determine if they constitute a hazard to air navigation."

The Project site and proposed buildings would be within the Transitional surfaces and below the overlying Horizontal Surface, as shown in Figure 6. As per the CLUP, construction is permitted up to a maximum height of 35 feet in Airport Overlay Districts A-1 and up to a maximum height of 50 feet in the Airport Overlay District A-2 (this is also noted in the NAVISP). The heights of the proposed building for the Project are planned to be built to a maximum of 51 feet to parapet (Figure 7). The Project was submitted to the FAA for airspace review. A Determination of No Hazard was received from the FAA (Appendix A) for each of the proposed buildings.

Figure 6 – APV CLUP Part 77 Surfaces

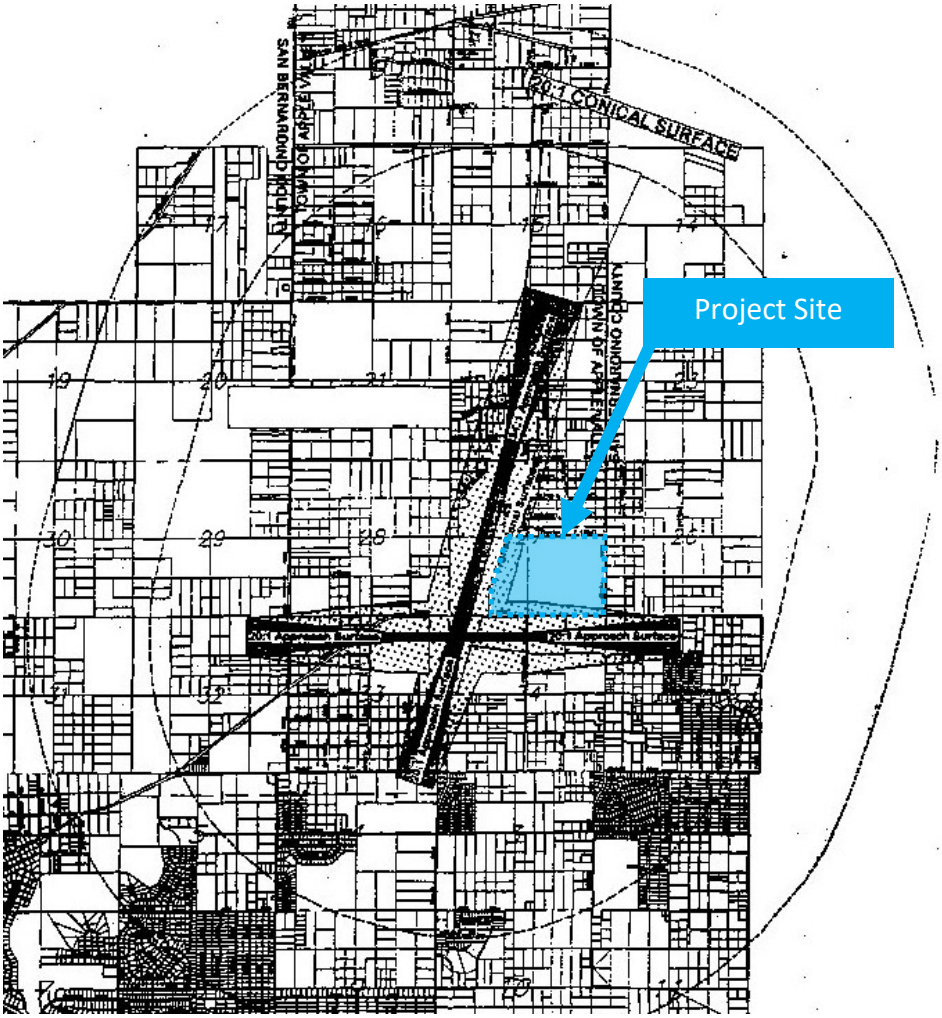


Figure 7 – Project Building Elevation

F. Aircraft Overflight

Apple Valley Airport serves general aviation aircraft and operations. The January 2024 FAA Terminal Area Forecast[3] through 2050 projects that APV total annual aircraft operations will remain flat at 37,500. Of these operations, 12,500 are forecast to be itinerant operations (to and from APV from other airports) and 25,000 are forecast to be local operations (training type operations that remain in the local traffic pattern around the runways for practicing takeoffs and landings). The FAA reports 115 total based aircraft of which 108 are single engine, five are multi-engine and two are helicopters. The Airport has two runways. Its primary Runway 18/36 (generally north/south alignment) is 6,498 feet in length and 150 feet in width, and Runway 8/26 (generally east/west alignment) is 4,100 feet in length and 60 feet in width.

Planned land uses surrounding the Airport are primarily industrial. All property within the airport influence area (AIA) is subject to regular aircraft overflight. The Project is an industrial warehouse use with some office operations. This use is compatible from an overflight perspective and is located outside the projected aircraft noise contours provided in the CLUP.

G. Findings

The following airport land use compatibility findings for the Project are provided for consideration during the review process.

Findings of Fact

- The Project is comprised of five parcels that total 226.75 gross acres, three industrial warehouse buildings that would total 3,480,736 square feet, on a site that is currently unimproved.
- The Project Site is within the North Apple Valley Industrial Specific Plan (Figure 3). Four of the five parcels are zoned Industrial - Specific Plan (I-SP) and the southeast parcel (APN 0463-373- 06) is zoned General Commercial (C-G). A Specific Plan Amendment is requested to rezone APN 0463-373-06 from C-G to I-SP.
- The CLUP has established an Airport Master Plan Area and Airport Overlay Districts to promote the development of compatible land uses near the airport proper. The majority of the Project is within A-2. A small portion of the Project in the southwest corner is in A-1. Industrial warehouse buildings are permitted in both Airport Overlay Districts. The Project is also located in the Planned Industrial (I-P) district, which is compatible with the intended use of the Project.
- Factories, warehouses, storage yards and open farmland are relatively insensitive to aircraft noise. The Project site is outside of projected noise contours, and while all property within the airport influence area (AIA) is subject to aircraft overflight, no significant noise impacts are anticipated.
- Construction is permitted up to a maximum height of 35 feet in Airport Overlay Districts A-1 and up to a maximum height of 50 feet in the Airport Overlay District A-2. The heights of the proposed building for the Project are planned to be built to a maximum of 51 feet to parapet. The Project was submitted to the FAA for airspace review. A Determination of No Hazard was received from the FAA (Appendix A).

[3] Federal Aviation Administration, Terminal Area Forecast, https://www.faa.gov/data_research/aviation/taf, Last Updated January 22. 2024.

APPENDIX A

FAA Determinations of No Hazard to Air Navigation

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14592-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 1-1
Location:	Apple Valley, CA
Latitude:	34-34-40.02N NAD 83
Longitude:	117-10-30.55W
Heights:	3046 feet site elevation (SE)
	56 feet above ground level (AGL)
	3102 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14592-OE.

Signature Control No: 599410171-600913406 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14592-OE

Sectional Map for ASN 2023-AWP-14592-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14593-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 1-2
Location:	Apple Valley, CA
Latitude:	34-34-40.02N NAD 83
Longitude:	117-10-21.16W
Heights:	3067 feet site elevation (SE)
	35 feet above ground level (AGL)
	3102 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14593-OE.

Signature Control No: 599410172-600913405 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14593-OE

Sectional Map for ASN 2023-AWP-14593-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14594-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 1-3
Location:	Apple Valley, CA
Latitude:	34-34-22.57N NAD 83
Longitude:	117-10-20.98W
Heights:	3044 feet site elevation (SE) 58 feet above ground level (AGL) 3102 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

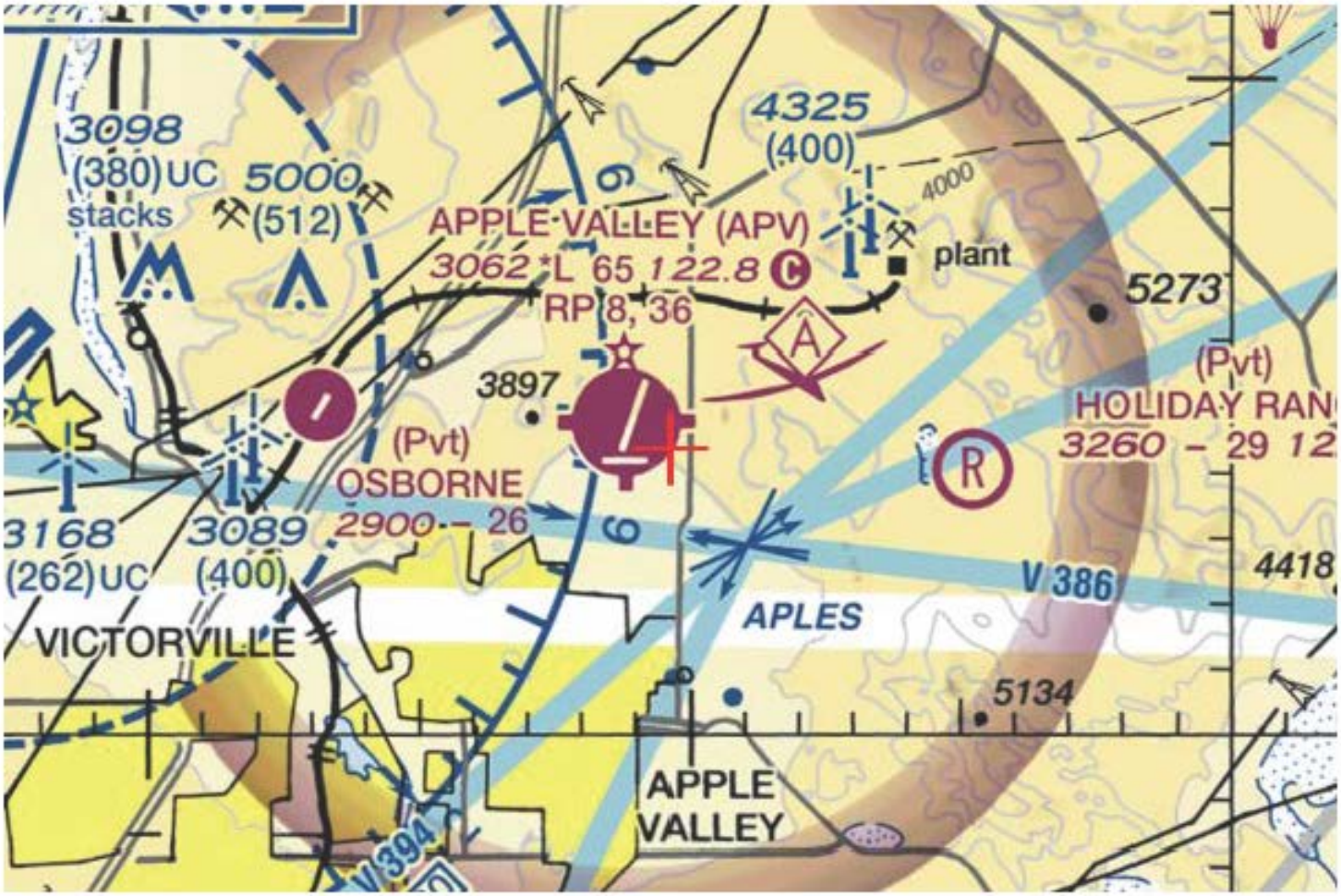
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14594-OE.

Signature Control No: 599410173-600913397 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14594-OE

Sectional Map for ASN 2023-AWP-14594-OE



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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14595-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 1-4
Location:	Apple Valley, CA
Latitude:	34-34-22.57N NAD 83
Longitude:	117-10-30.55W
Heights:	3023 feet site elevation (SE) 79 feet above ground level (AGL) 3102 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

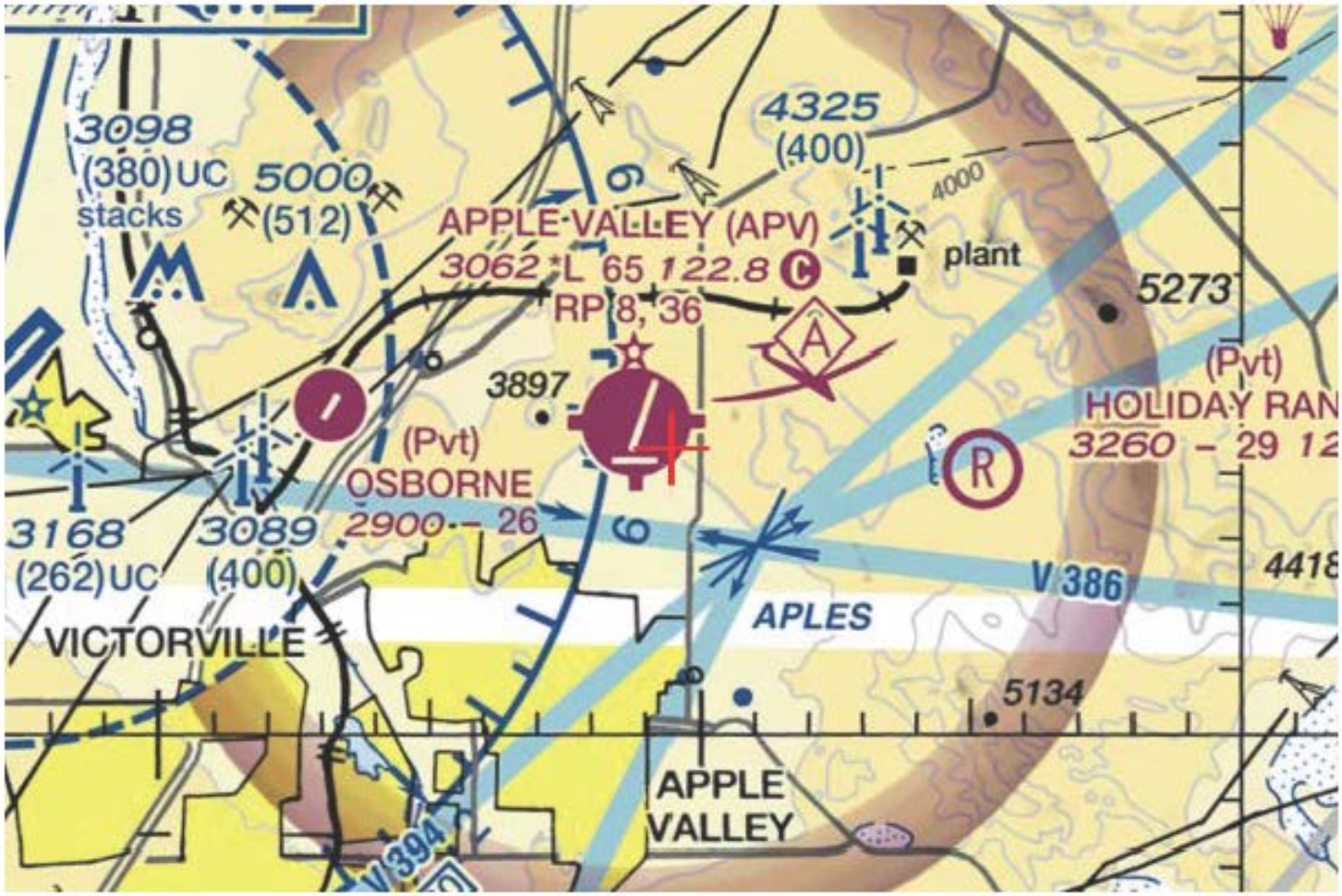
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14595-OE.

Signature Control No: 599410174-600913395 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14595-OE

Sectional Map for ASN 2023-AWP-14595-OE



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Federal Aviation Administration
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Obstruction Evaluation Group
10101 Hillwood Parkway
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Aeronautical Study No.
2023-AWP-14596-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 2-1
Location:	Apple Valley, CA
Latitude:	34-34-40.02N NAD 83
Longitude:	117-10-45.10W
Heights:	3021 feet site elevation (SE)
	46 feet above ground level (AGL)
	3067 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14596-OE.

Signature Control No: 599410175-600913396 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14596-OE

Sectional Map for ASN 2023-AWP-14596-OE

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Aeronautical Study No.
2023-AWP-14597-OE

Issued Date: 10/03/2023

Michael Johnson
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**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 2-2
Location:	Apple Valley, CA
Latitude:	34-34-40.02N NAD 83
Longitude:	117-10-35.71W
Heights:	3035 feet site elevation (SE)
	32 feet above ground level (AGL)
	3067 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

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NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14597-OE.

Signature Control No: 599410176-600913401 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14597-OE

Sectional Map for ASN 2023-AWP-14597-OE

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Aeronautical Study No.
2023-AWP-14598-OE

Issued Date: 10/03/2023

Michael Johnson
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13681 Newport Ave, Suite 8301
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**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 2-3
Location:	Apple Valley, CA
Latitude:	34-34-22.57N NAD 83
Longitude:	117-10-35.52W
Heights:	3012 feet site elevation (SE)
	55 feet above ground level (AGL)
	3067 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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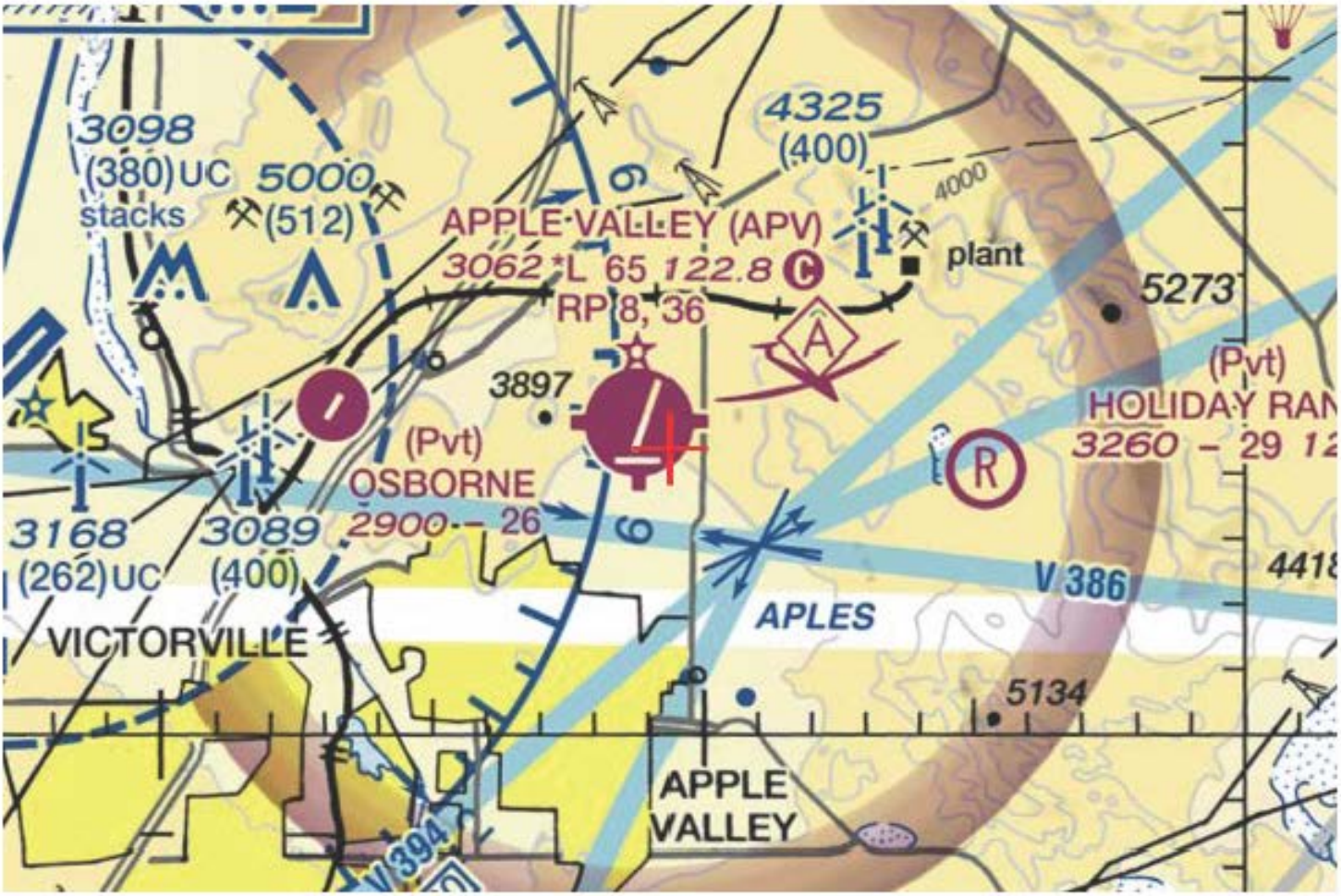
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14598-OE.

Signature Control No: 599410177-600913399 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14598-OE

Sectional Map for ASN 2023-AWP-14598-OE



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Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14599-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 2-4
Location:	Apple Valley, CA
Latitude:	34-34-22.57N NAD 83
Longitude:	117-10-45.09W
Heights:	2996 feet site elevation (SE)
	71 feet above ground level (AGL)
	3067 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

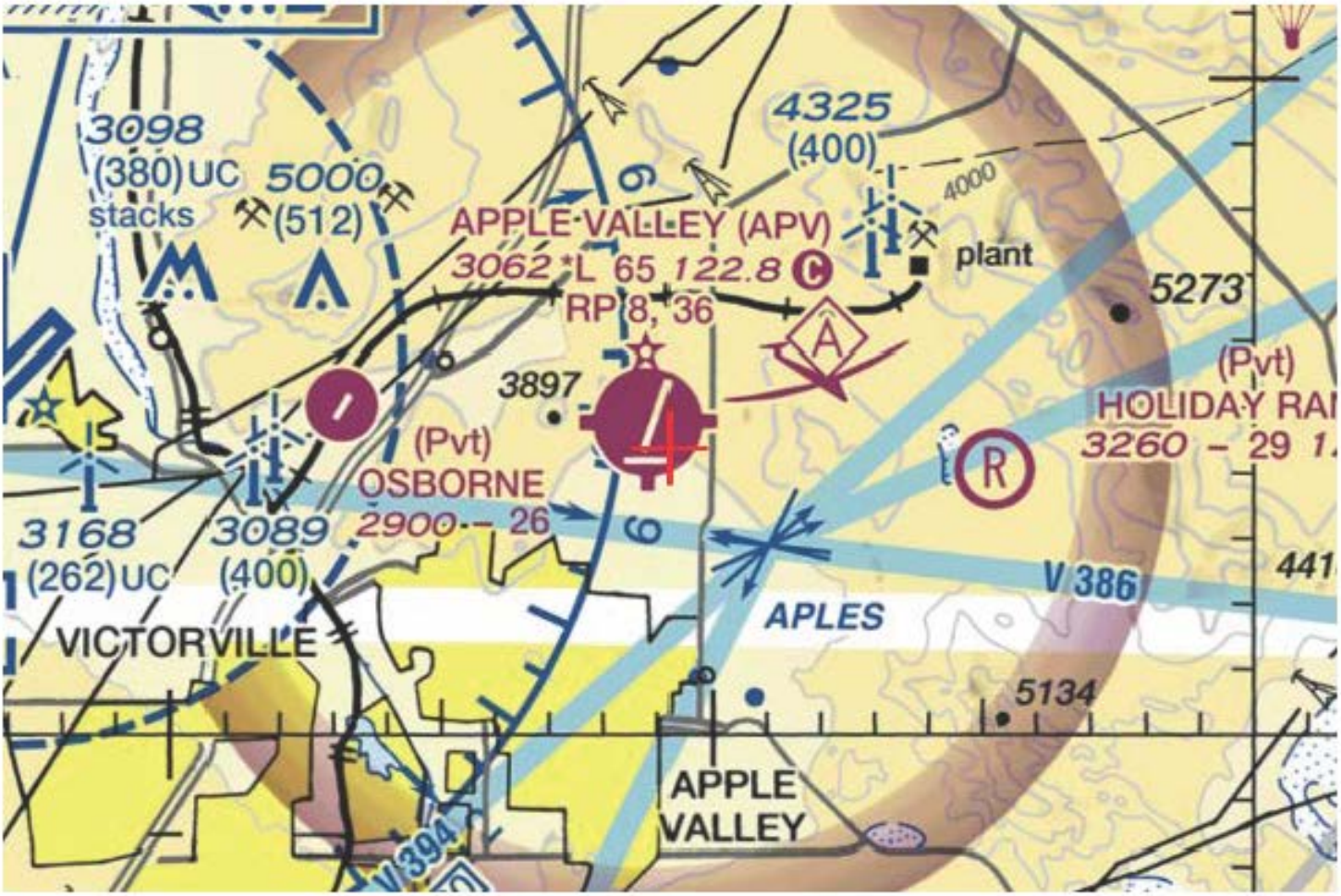
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14599-OE.

Signature Control No: 599410178-600913394 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14599-OE

Sectional Map for ASN 2023-AWP-14599-OE



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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14600-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 3-1
Location:	Apple Valley, CA
Latitude:	34-34-35.59N NAD 83
Longitude:	117-11-00.44W
Heights:	3000 feet site elevation (SE) 47 feet above ground level (AGL) 3047 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

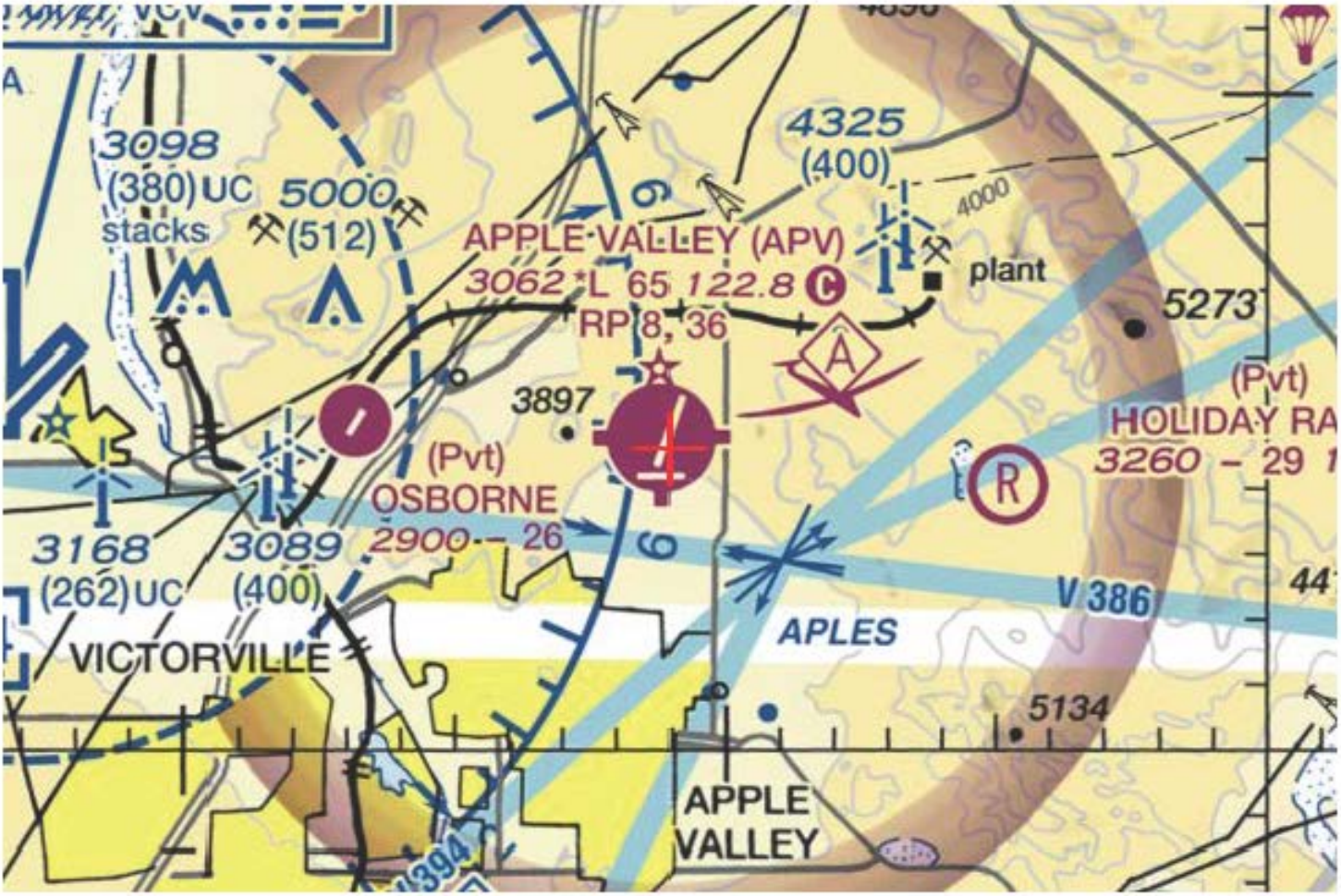
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14600-OE.

Signature Control No: 599410179-600913398 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14600-OE

Sectional Map for ASN 2023-AWP-14600-OE



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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14601-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 3-2
Location:	Apple Valley, CA
Latitude:	34-34-35.60N NAD 83
Longitude:	117-10-50.99W
Heights:	3008 feet site elevation (SE)
	39 feet above ground level (AGL)
	3047 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14601-OE.

Signature Control No: 599410180-600913402 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14601-OE

Sectional Map for ASN 2023-AWP-14601-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14602-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 3-3
Location:	Apple Valley, CA
Latitude:	34-34-21.32N NAD 83
Longitude:	117-10-51.00W
Heights:	2987 feet site elevation (SE) 60 feet above ground level (AGL) 3047 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 04/03/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

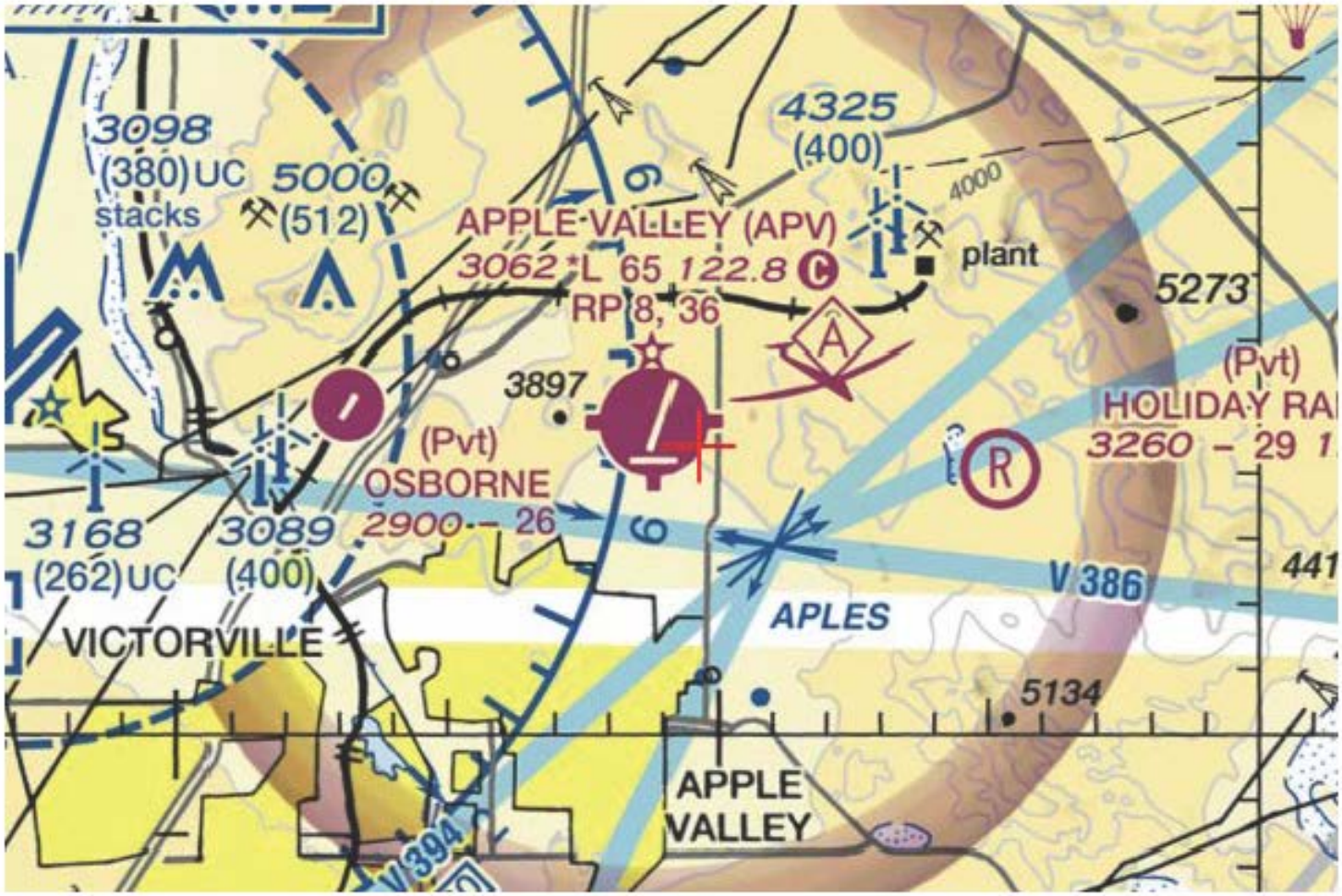
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14602-OE.

Signature Control No: 599410181-600913393 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14602-OE

Sectional Map for ASN 2023-AWP-14602-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2023-AWP-14603-OE

Issued Date: 10/03/2023

Michael Johnson
Lake Creek Industrial LLC
13681 Newport Ave, Suite 8301
Tustin, CA 92780

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building APVI 3-4
Location:	Apple Valley, CA
Latitude:	34-34-21.32N NAD 83
Longitude:	117-11-00.44W
Heights:	2980 feet site elevation (SE) 67 feet above ground level (AGL) 3047 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

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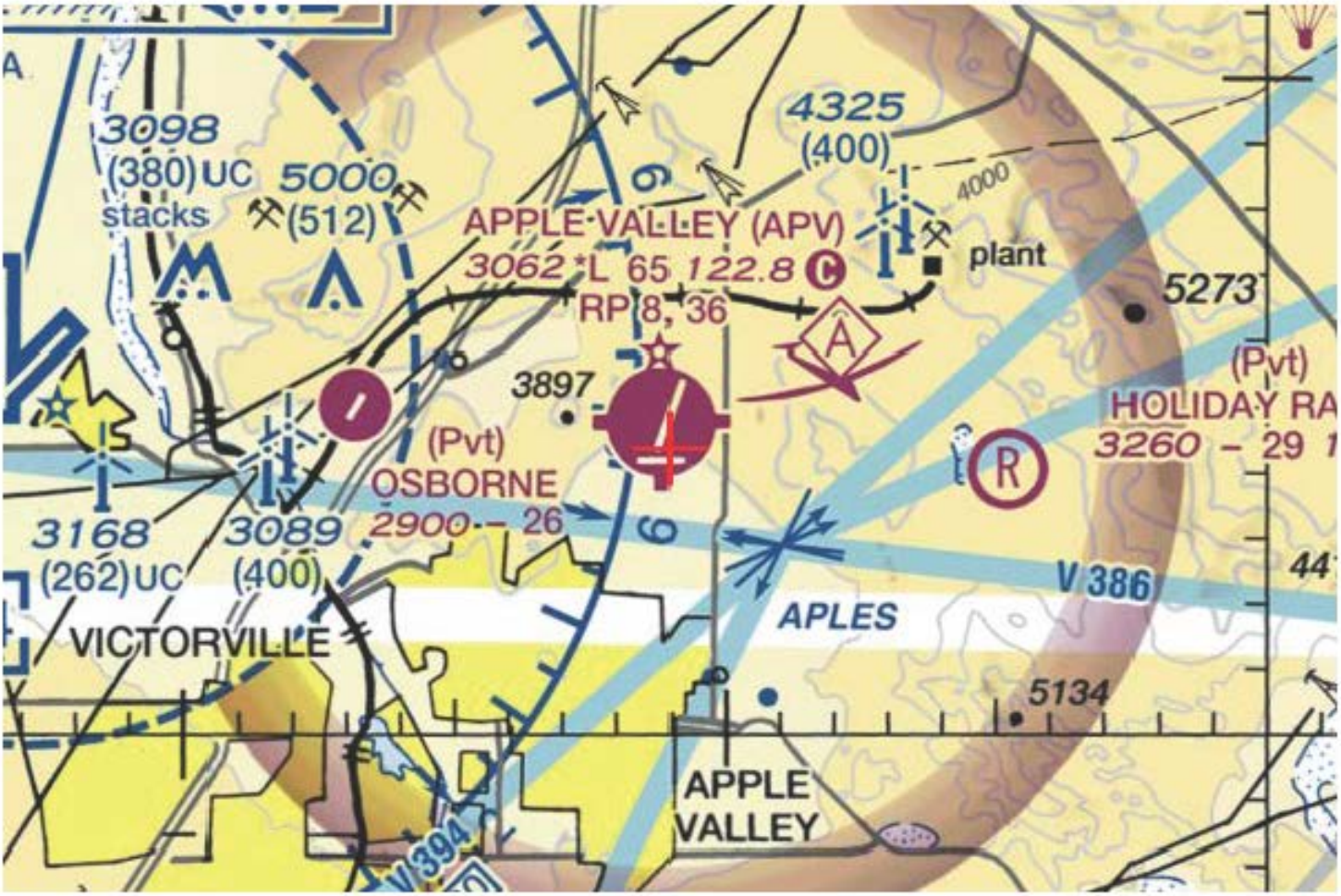
If we can be of further assistance, please contact our office at (847) 294-7575, or vivian.vilaro@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-AWP-14603-OE.

Signature Control No: 599410182-600913400 (DNE)
Vivian Vilaro
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2023-AWP-14603-OE

Sectional Map for ASN 2023-AWP-14603-OE



APPENDIX B
Solar Glare Analysis

Technical Memorandum

To: Michael Johnson
From: Nick Johnson, Johnson Aviation, Inc.
Date: October 30, 2023

Subject: Solar Glare Analysis – Solar Photovoltaic (PV) Installation, SPR2022-0003 Lake Creek Logistics Center, Apple Valley Airport

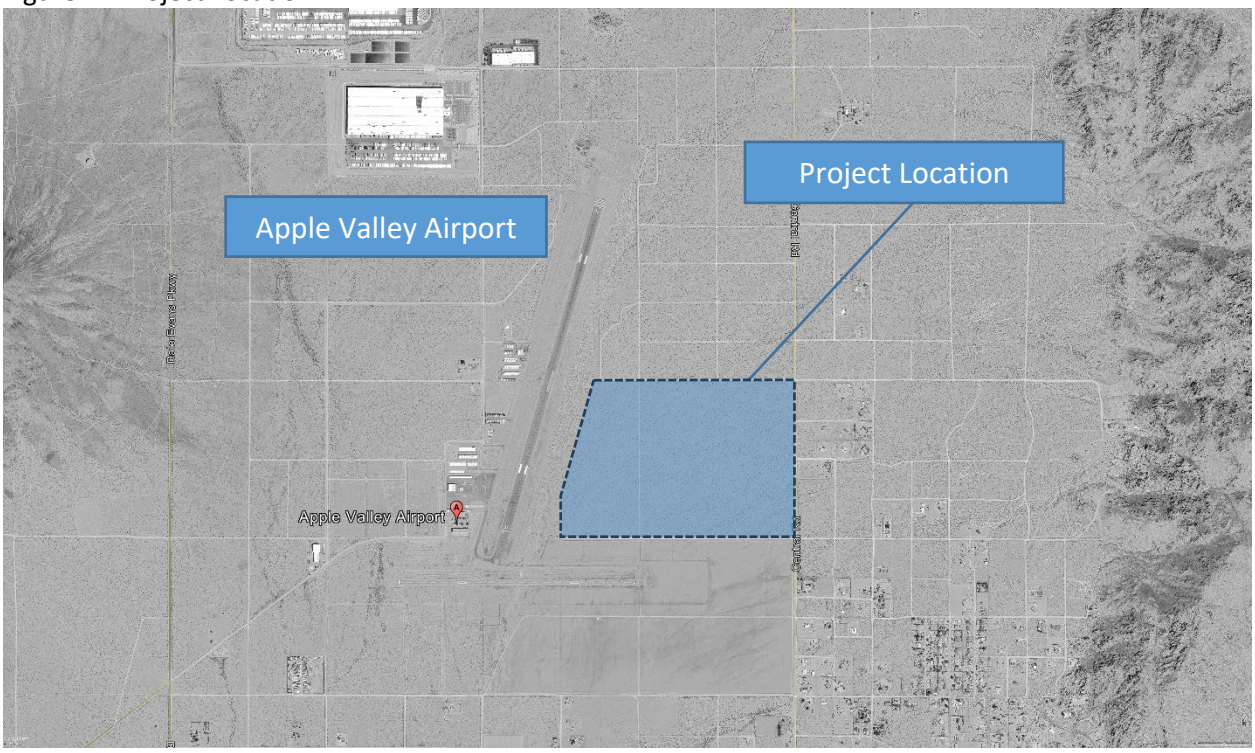
A. Findings

The findings of this Solar Glare Analysis are that the Proposed Project **PASSES** the FAA's recommended solar glare tests. This Technical Memorandum outlines the study of the potential solar PV Project and substantiates these findings.

B. Introduction

The purpose of this technical memorandum is to assess the airport compatibility of a potential solar PV installation on the roof of three industrial buildings on the Lake Creek Logistics Center Project (Project). The Project site is located south of Gustine Road, north of Corwin Road, west of Central Road and east of the Apple Valley Airport in the Town of Apple Valley, California (Town) and within the Apple Valley Airport (APV or "Airport") airport influence area (AIA) (See Figure 1). The analysis and findings of this memo are intended for review and acceptance by the Town and San Bernardino County Airports staff.

Figure 1: Project Location

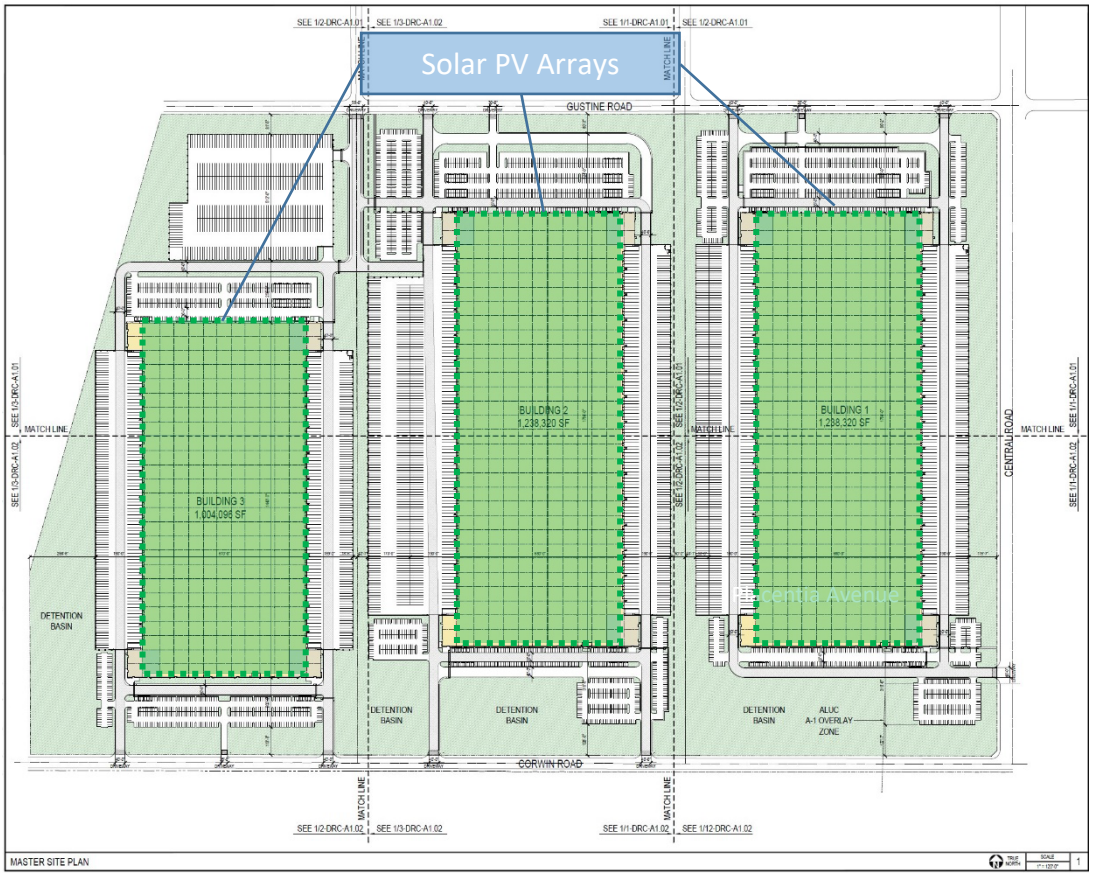


C. Project Description

LCI Apple Valley, LLC, the Project developer, is planning to develop a roof-top solar PV installation on each of the three Project buildings associated with the Project site. The three industrial buildings would total 3,480,736 square feet within the North Apple Valley Industrial Specific Plan area. The solar PV array

installations are studied to cover the entire roof area of each building to provide a conservative analysis of the potential solar glare and to provide flexibility in the final solar PV array configuration on each building (See Figure 2).

Figure 2: Lake Creek Logistics Center Project –Solar PV Installations



D. Standard of Review

This study and its findings have been prepared consistent with the Federal Aviation Administration's (FAA) policy to eliminate hazards to air navigation that may arise as the result of implementing solar energy facilities on and near airports. The FAA adopted an Interim Policy[1] for Solar PV project review in 2013 and completed a final solar glare policy in 2021[2]. In both the 2013 Interim Policy and the 2021 Final Policy, off-airport solar arrays are not required to meet the FAA's policies, but they are strongly encouraged to consider the requirements of this policy guidance when siting systems. The FAA does not control land use off airport property. The FAA encourages collaboration with local land use jurisdictions like the Town and the San Bernardino County Airports Department.

[1] Background on the Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports, Federal Register, October 23, 2013.

[2] Federal Aviation Administration Policy: Review of Solar Energy System Projects on Federally-Obligated Airports, 86 Fed. Reg. 25801 (May 11, 2021), https://www.federalregister.gov/documents/2021/05/11/2021-09862/federal-aviation-administration-policy-review-of-solar-energy-system-projects-on-federally-obligated

As solar PV was being implemented on and near airports in recent years, the FAA was finding that solar PV reflections of sunlight glint and glare were affecting pilots' vision, particularly on final approach to runways, and was also impacting some air traffic controllers' vision when controlling aircraft near airports. In conjunction with Sandia National Laboratories, the FAA developed a computer analysis tool to measure the potential impact of reflected glint and glare from Solar PV installations. The analysis of this impact is achieved through use of the Solar Glare Hazard Assessment Tool (SGHAT). At the time of the Interim Policy, Sandia Labs produced the tool to meet the analysis requirement. Since then, Sandia Labs has licensed the tool to other providers to sell commercially for solar glare analysis. ForgeSolar licensed the SGHAT tool and incorporated its software into their Glare Analysis tool. Johnson Aviation, Inc. uses the ForgeSolar Glare Analysis tool under subscription license from Sims Industries d/b/a ForgeSolar.

The following is the Standard for Measuring Ocular Impact from the FAA's 2013 Interim Policy:

> Standard for Measuring Ocular Impact
> FAA adopts the Solar Glare Hazard Analysis Plot as the standard for measuring the ocular impact of any proposed solar energy system on a federally obligated airport. To obtain FAA approval to revise an airport layout plan to depict a solar installation and/or a "no objection" to a Notice of Proposed Construction Form 7460-1, the airport sponsor will be required to demonstrate that the proposed solar energy system meets the following standards:
>
> 1. No potential for glint or glare in the existing or planned Airport Traffic Control Tower (ATCT) cab; and
> 2. No potential for glare or "low potential for after-image" along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as two (2) miles from fifty (50) feet above the landing threshold using a standard three (3) degree glidepath.
> 3. Ocular impact must be analyzed over the entire calendar year in one (1) minute intervals from when the sun rises above the horizon until the sun sets below the horizon.

After significant additional study of the issue, the FAA concluded in its final 2021 Policy that less restrictive analysis can achieve the same goals for limiting solar PV glare. The following are the revised FAA 2021 Policy limitations:

> This policy does not apply to:
>
> 1. Solar energy systems on airports that do not have an ATCT,
>
> 2. Airports that are not federally-obligated, or
>
> 3. Solar energy systems not located on airport property.
>
> Though this policy does not apply to proponents of solar energy systems located off airport property, they are encouraged to consider ocular impact for proposed systems in proximity to airports with ATCTs. In these cases, solar energy system proponents should coordinate with the local airport sponsor.

The FAA found that glint and glare from solar PV panels is similar to the glint and glare off of sand, snow and water near airports that pilots adjust to all of the time and can protect their vision with normal use of sunglasses. As such, no solar glare requirements remain for final approach areas within 2 miles of each runway end.

Apple Valley Airport does not have an ATCT and one is not planned by the FAA for the Airport. This solar glare analysis is prepared as full disclosure for the Project but is not required by the FAA for Apple Valley Airport or the Project.

E. Solar Glare Analysis Reports

The following pages of this Technical Memorandum provide the solar glare analysis reports for each of the suggested studies. The FAA standard study of the final approach paths to the runway ends and the Air Traffic Control Tower analysis is included in each individual report.

- 2021 FAA Policy Review (See Attachment A)
- Full Solar Glare Analysis Report (See Attachment B)

Attachment A
2021 FAA Policy Review

FORGESOLAR GLARE ANALYSIS

Project: **Apple Valley Airport Industrial (Lake Creek)**
Site configuration: **Apple Valley-Lake Creek-All Final Approaches B123**

Created 30 Oct, 2023
Updated 30 Oct, 2023
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Site ID 104280.18135

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Glare Policy Adherence

The following table estimates the policy adherence of this glare analysis according to the **2021** U.S. Federal Aviation Administration Policy:

Review of Solar Energy System Projects on Federally-Obligated Airports

This policy may require the following criteria be met for solar energy systems on airport property:

- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics, including 1-minute time step.

ForgeSolar is not affiliated with the U.S. FAA and does not represent or speak officially for the U.S. FAA. ForgeSolar cannot approve or deny projects - results are informational only. Contact the relevant airport and FAA district office for information on policy and requirements.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
ATCT(s)	N/A	No ATCT receptors assessed

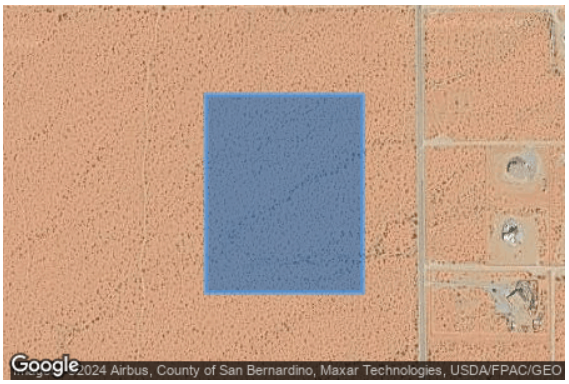
The referenced policy can be read at https://www.federalregister.gov/d/2021-09862

Component Data

This report includes results for PV arrays and Observation Point ("OP") receptors marked as ATCTs. Components that are not pertinent to the policy, such as routes, flight paths, and vertical surfaces, are excluded.

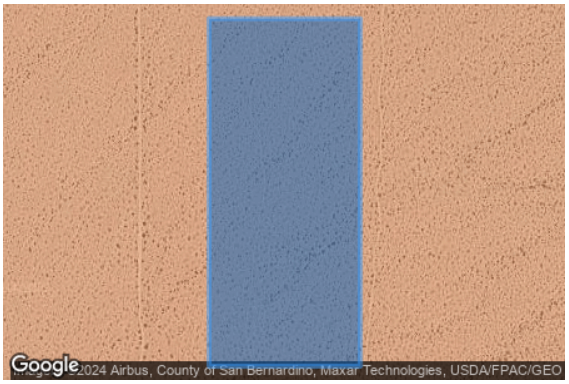
PV Arrays

Name: Rooftop Solar PV1 B1-2
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



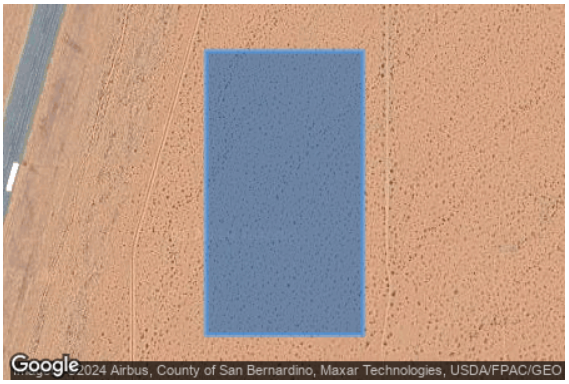
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.577800	-117.175200	3046.00	56.00	3102.00
2	34.577800	-117.172500	3067.00	35.00	3102.00
3	34.575000	-117.172500	3051.00	51.00	3102.00
4	34.575000	-117.175200	3051.00	51.00	3102.00

Name: Rooftop Solar PV2 B2
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.577800	-117.179200	3021.00	46.00	3067.00
2	34.577800	-117.176600	3035.00	32.00	3067.00
3	34.572900	-117.176600	3012.00	55.00	3067.00
4	34.572900	-117.179200	2996.00	71.00	3067.00

Name: Rooftop Solar PV3 B3
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



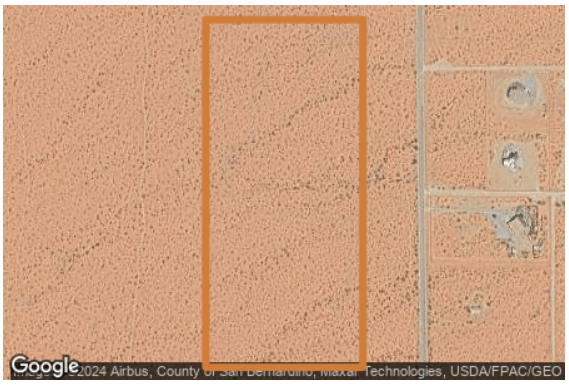
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.576600	-117.183500	3000.00	47.00	3047.00
2	34.576600	-117.180800	3008.00	39.00	3047.00
3	34.572600	-117.180800	2987.00	60.00	3047.00
4	34.572600	-117.183500	2980.00	67.00	3047.00

Observation Point ATCT Receptors

No ATCT receptors were included in the analysis.

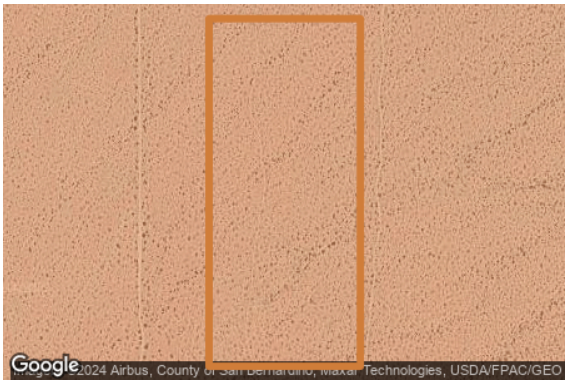
Obstruction Components

Name: Obstruction 1
Top height: 55.0 ft



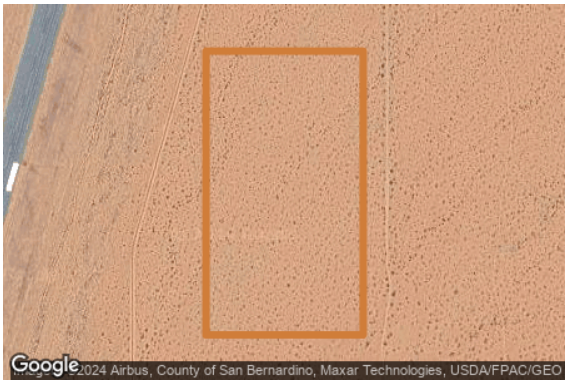
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.577800	-117.175200	3050.80
2	34.577800	-117.172500	3050.80
3	34.572900	-117.172500	3050.80
4	34.572900	-117.175200	3050.80
5	34.577800	-117.175200	3050.80

Name: Obstruction 2
Top height: 55.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.577800	-117.179200	3015.43
2	34.577800	-117.176600	3015.43
3	34.572900	-117.176600	3015.43
4	34.572900	-117.179200	3015.43
5	34.577800	-117.179200	3015.43

Name: Obstruction 3
Top height: 55.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.576600	-117.183500	2995.22
2	34.576600	-117.180800	2995.22
3	34.572600	-117.180800	2995.22
4	34.572600	-117.183500	2995.22
5	34.576600	-117.183500	2995.22

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
Rooftop Solar PV1 B1-2	10.0	180.0	0	0.0	0	0.0	-
Rooftop Solar PV2 B2	10.0	180.0	0	0.0	0	0.0	-
Rooftop Solar PV3 B3	10.0	180.0	0	0.0	0	0.0	-

No ATCT receptors were included in the analysis.

PV: Rooftop Solar PV1 B1-2

No ATCT receptors assessed.

PV: Rooftop Solar PV2 B2

No ATCT receptors assessed.

PV: Rooftop Solar PV3 B3

No ATCT receptors assessed.

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

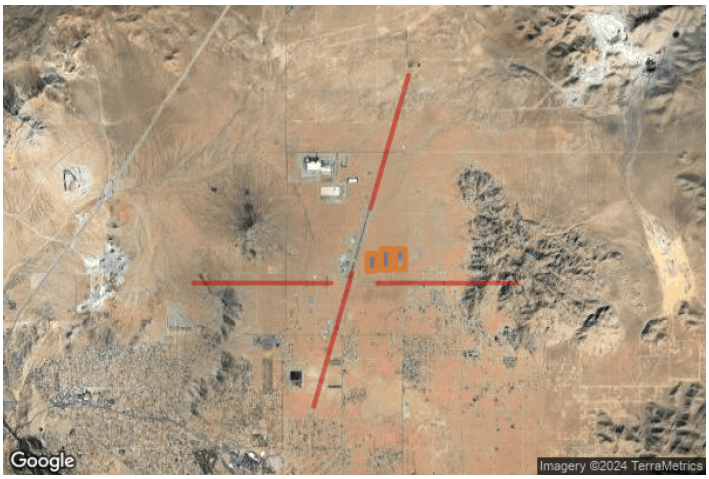
Attachment B
Full Solar Glare Analysis Report

FORGESOLAR GLARE ANALYSIS

Project: **Apple Valley Airport Industrial (Lake Creek)**
Site configuration: **Apple Valley-Lake Creek-All Final Approaches B123**

Created 30 Oct, 2023
Updated 30 Oct, 2023
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 1 MW to 5 MW
Site ID 104280.18135

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2



Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
Rooftop Solar PV1 B1-2	10.0	180.0	1,921	32.0	0	0.0	-
Rooftop Solar PV2 B2	10.0	180.0	2,057	34.3	226	3.8	-
Rooftop Solar PV3 B3	10.0	180.0	1,902	31.7	598	10.0	-

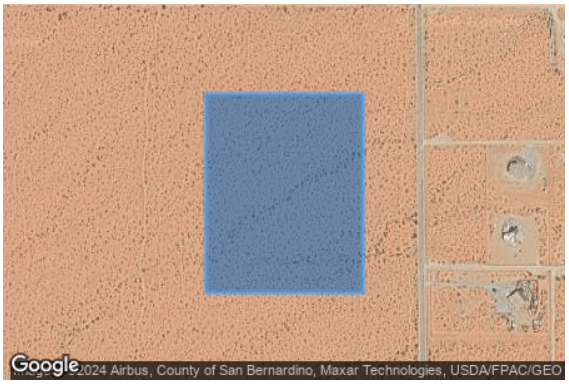
Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RWY 08 Final	1,770	29.5	0	0.0
RWY 18 Final	0	0.0	0	0.0
RWY 26 Final	4,110	68.5	824	13.7
RWY 36 Final	0	0.0	0	0.0

Component Data

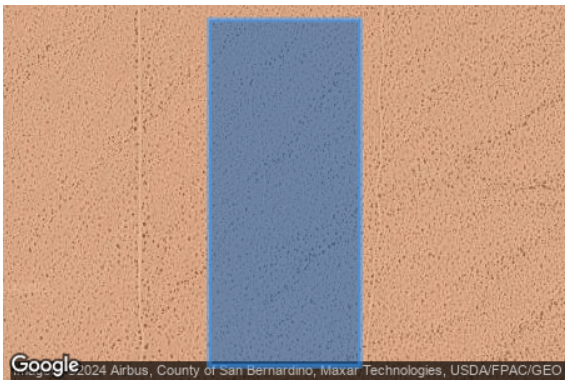
PV Arrays

Name: Rooftop Solar PV1 B1-2
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



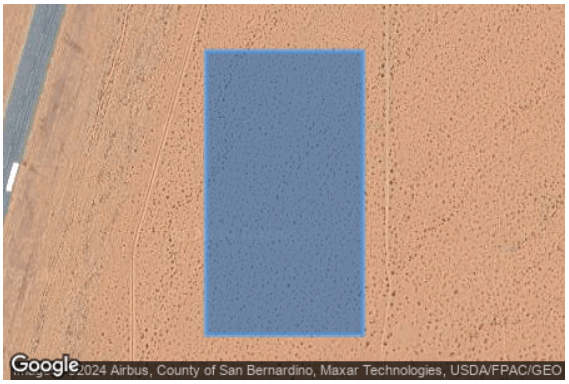
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.577800	-117.175200	3046.00	56.00	3102.00
2	34.577800	-117.172500	3067.00	35.00	3102.00
3	34.575000	-117.172500	3051.00	51.00	3102.00
4	34.575000	-117.175200	3051.00	51.00	3102.00

Name: Rooftop Solar PV2 B2
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.577800	-117.179200	3021.00	46.00	3067.00
2	34.577800	-117.176600	3035.00	32.00	3067.00
3	34.572900	-117.176600	3012.00	55.00	3067.00
4	34.572900	-117.179200	2996.00	71.00	3067.00

Name: Rooftop Solar PV3 B3
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.576600	-117.183500	3000.00	47.00	3047.00
2	34.576600	-117.180800	3008.00	39.00	3047.00
3	34.572600	-117.180800	2987.00	60.00	3047.00
4	34.572600	-117.183500	2980.00	67.00	3047.00

Flight Path Receptors

Name: RWY 08 Final
Description: None
Threshold height: 50 ft
Direction: 90.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.569569	-117.194029	2961.00	50.00	3011.00
Two-mile	34.569574	-117.234393	2961.00	636.85	3597.85

Name: RWY 18 Final
Description: None
Threshold height: 49 ft
Direction: 196.0°
Glide slope: 3.5°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.587537	-117.182559	3062.00	49.00	3111.00
Two-mile	34.619622	-117.171385	3062.00	743.24	3805.24

Name: RWY 26 Final
Description: None
Threshold height: 50 ft
Direction: 270.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

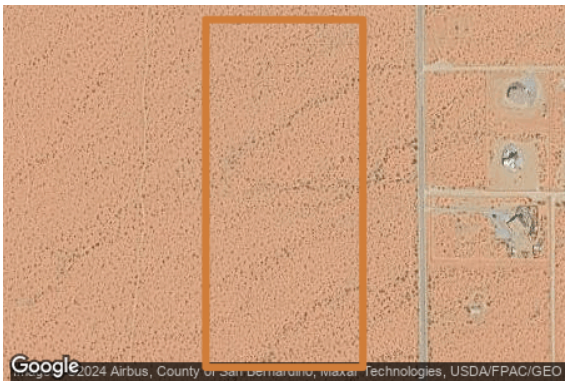
Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.569568	-117.180434	2979.00	50.00	3029.00
Two-mile	34.569577	-117.139738	2979.00	636.85	3615.85

Name: RWY 36 Final
Description: None
Threshold height: 50 ft
Direction: 16.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.571985	-117.187967	2977.00	50.00	3027.00
Two-mile	34.539900	-117.199141	2977.00	636.85	3613.85

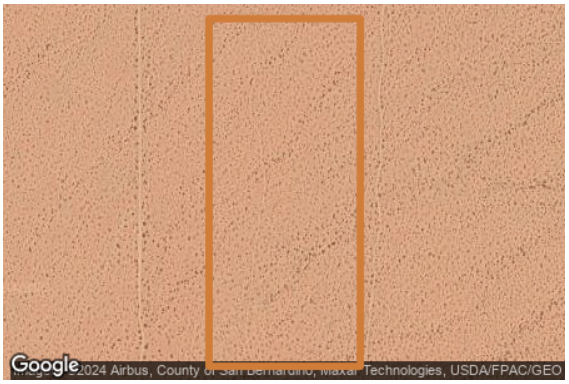
Obstruction Components

Name: Obstruction 1
Top height: 55.0 ft



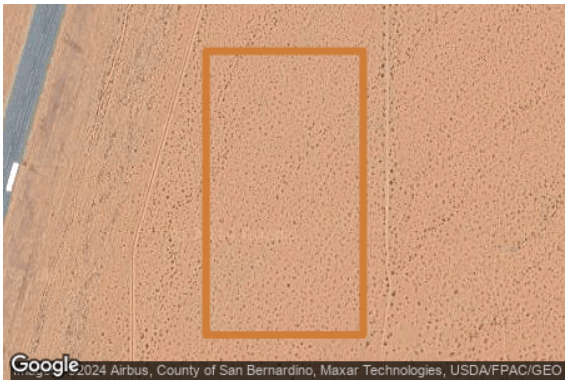
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.577800	-117.175200	3050.80
2	34.577800	-117.172500	3050.80
3	34.572900	-117.172500	3050.80
4	34.572900	-117.175200	3050.80
5	34.577800	-117.175200	3050.80

Name: Obstruction 2
Top height: 55.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.577800	-117.179200	3015.43
2	34.577800	-117.176600	3015.43
3	34.572900	-117.176600	3015.43
4	34.572900	-117.179200	3015.43
5	34.577800	-117.179200	3015.43

Name: Obstruction 3
Top height: 55.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	34.576600	-117.183500	2995.22
2	34.576600	-117.180800	2995.22
3	34.572600	-117.180800	2995.22
4	34.572600	-117.183500	2995.22
5	34.576600	-117.183500	2995.22

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
Rooftop Solar PV1 B1-2	10.0	180.0	1,921	32.0	0	0.0	-
Rooftop Solar PV2 B2	10.0	180.0	2,057	34.3	226	3.8	-
Rooftop Solar PV3 B3	10.0	180.0	1,902	31.7	598	10.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RWY 08 Final	1,770	29.5	0	0.0
RWY 18 Final	0	0.0	0	0.0
RWY 26 Final	4,110	68.5	824	13.7
RWY 36 Final	0	0.0	0	0.0

PV: Rooftop Solar PV1 B1-2

low potential for temporary after-image

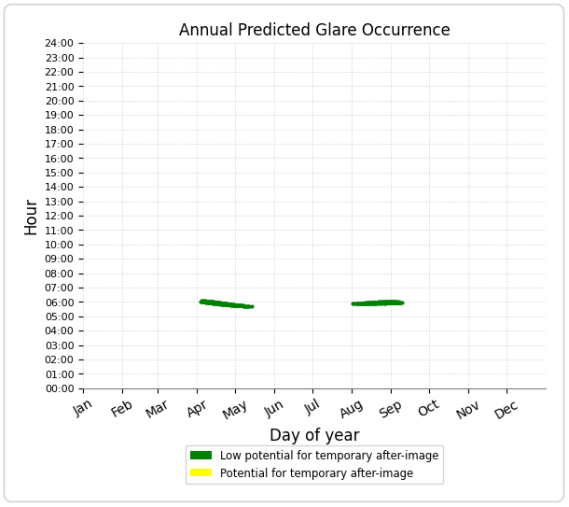
Receptor results ordered by category of glare

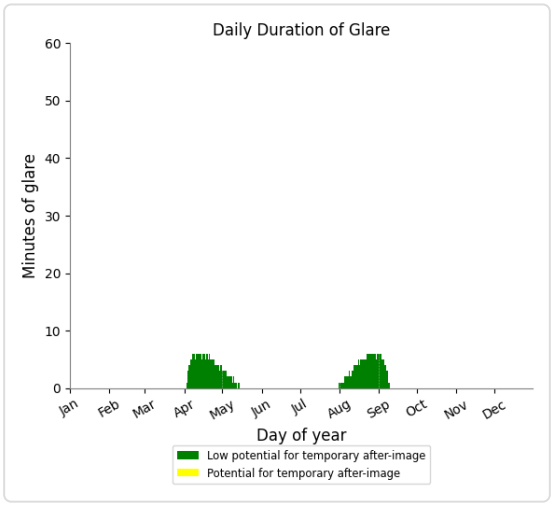
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RWY 08 Final	323	5.4	0	0.0
RWY 26 Final	1,598	26.6	0	0.0
RWY 18 Final	0	0.0	0	0.0
RWY 36 Final	0	0.0	0	0.0

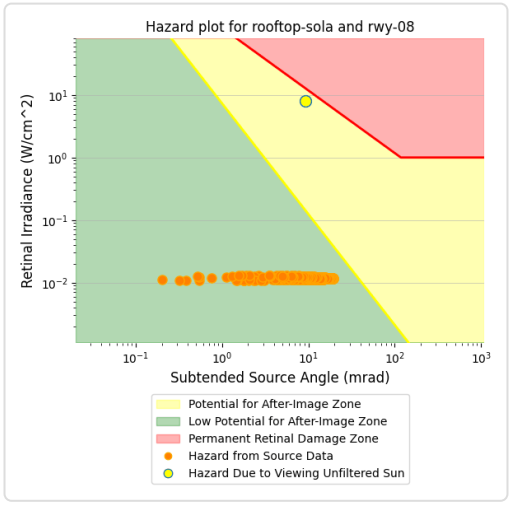
Rooftop Solar PV1 B1-2 and FP: RWY 08 Final

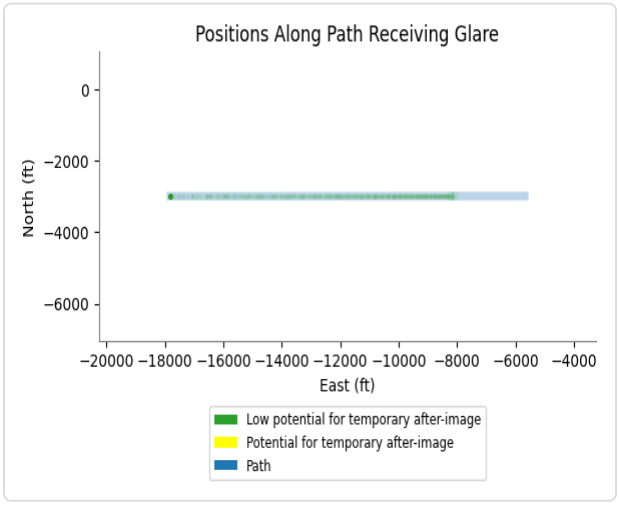
Yellow glare: none

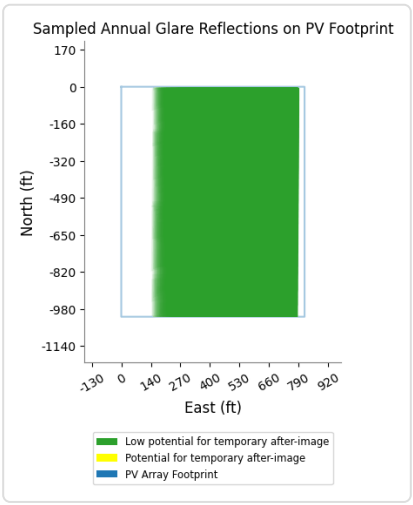
Green glare: 323 min.

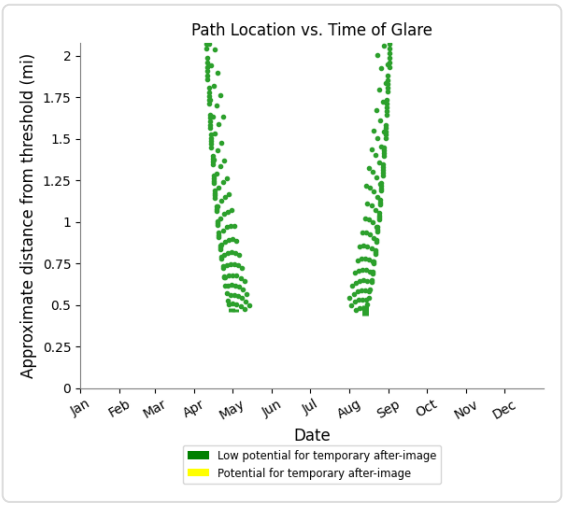








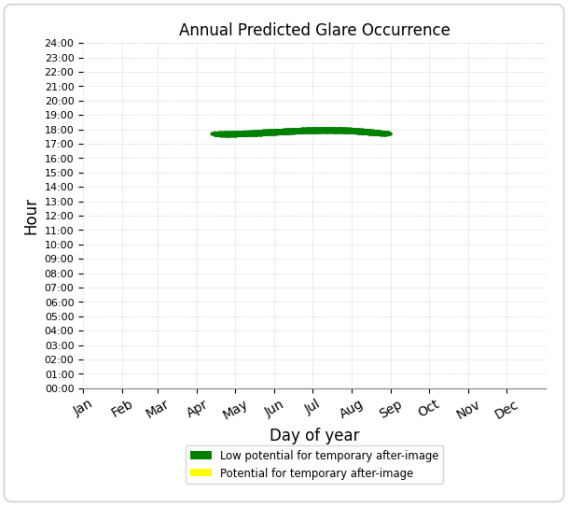


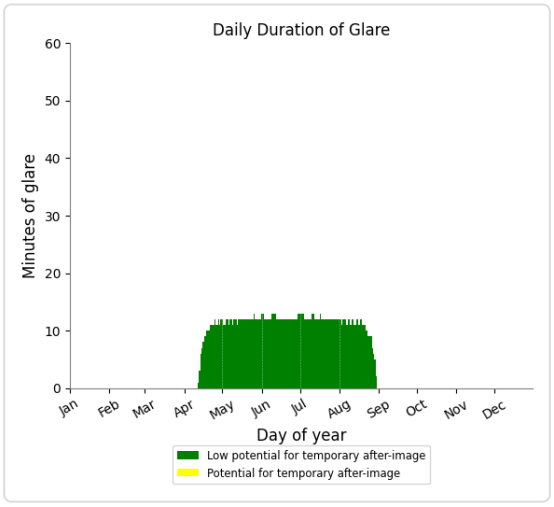


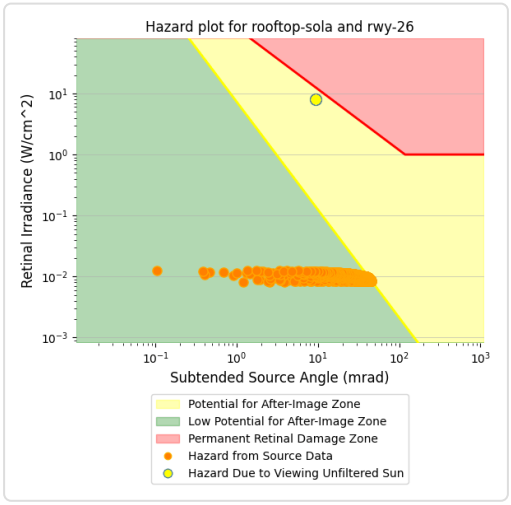
Rooftop Solar PV1 B1-2 and FP: RWY 26 Final

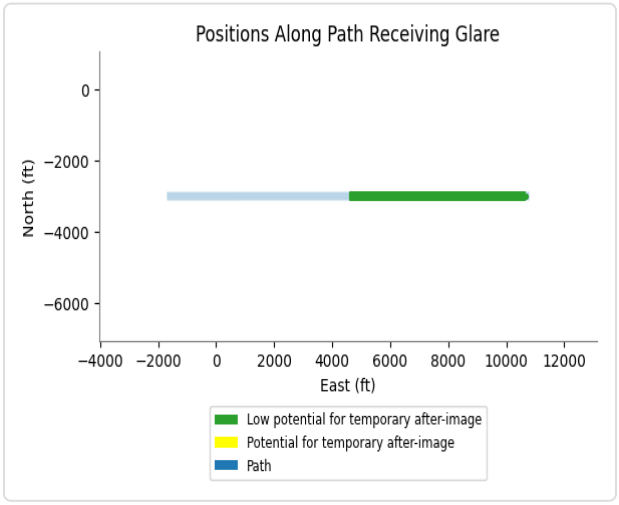
Yellow glare: none

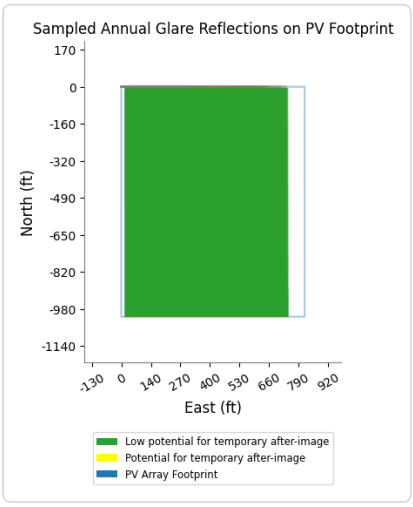
Green glare: 1,598 min.

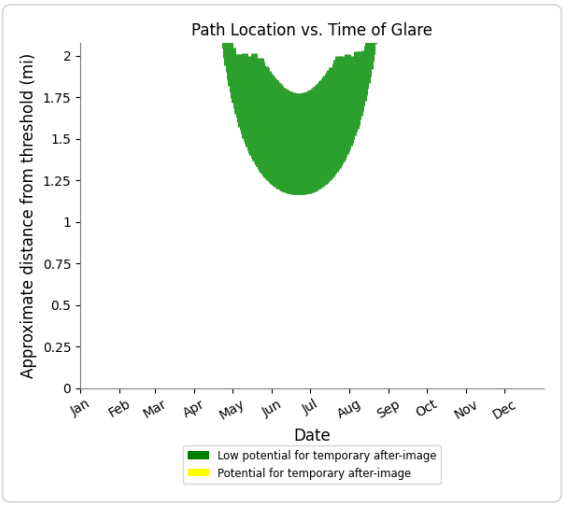












Rooftop Solar PV1 B1-2 and FP: RWY 18 Final

No glare found

Rooftop Solar PV1 B1-2 and FP: RWY 36 Final

No glare found

PV: Rooftop Solar PV2 B2 potential temporary after-image

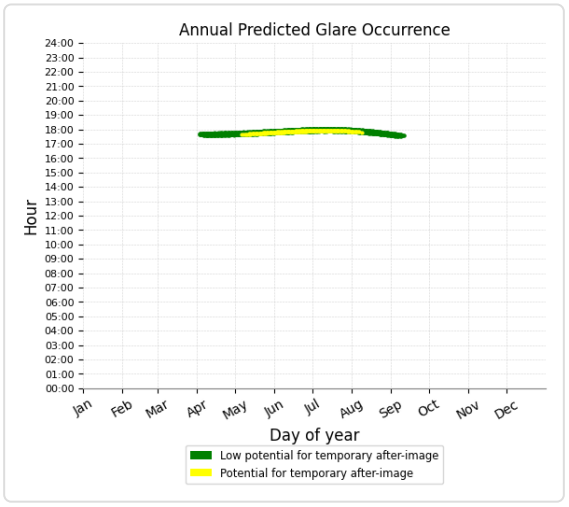
Receptor results ordered by category of glare

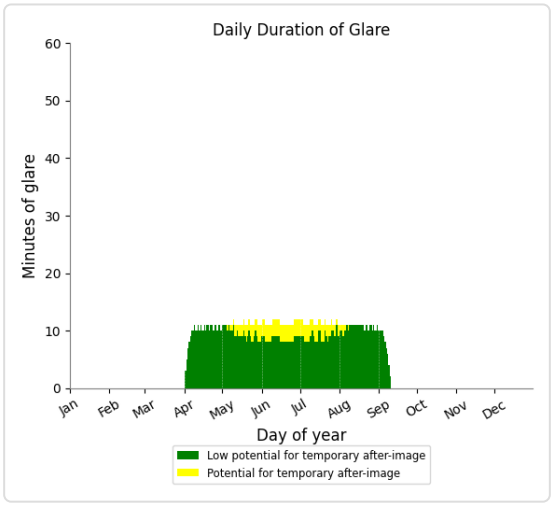
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RWY 26 Final	1,510	25.2	226	3.8
RWY 08 Final	547	9.1	0	0.0
RWY 18 Final	0	0.0	0	0.0
RWY 36 Final	0	0.0	0	0.0

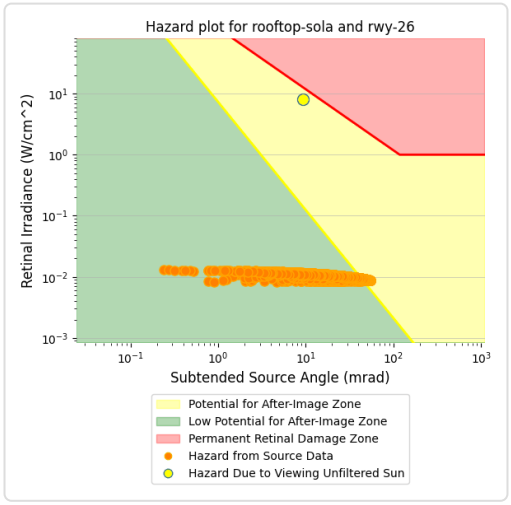
Rooftop Solar PV2 B2 and FP: RWY 26 Final

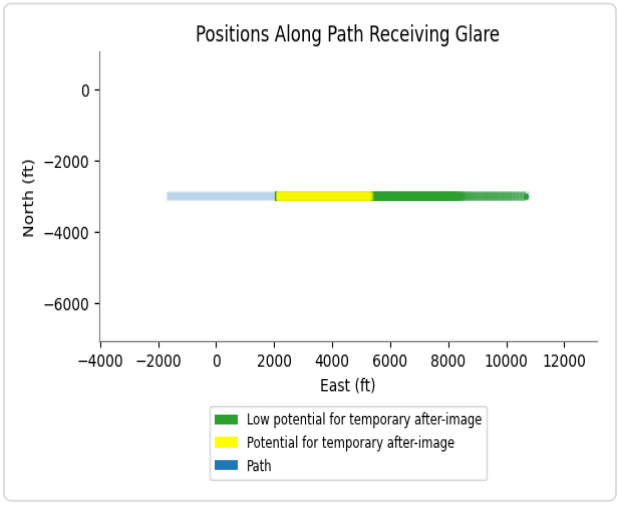
Yellow glare: 226 min.

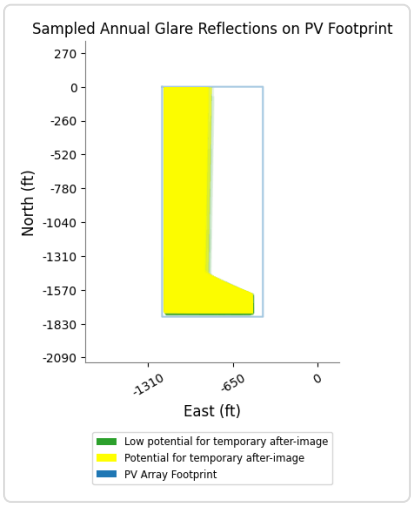
Green glare: 1,510 min.

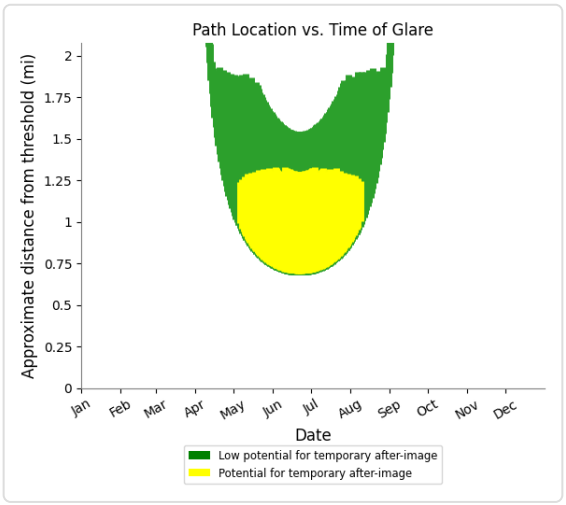








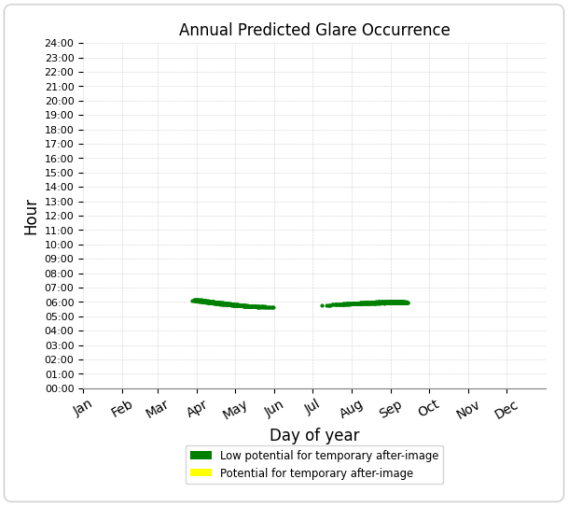


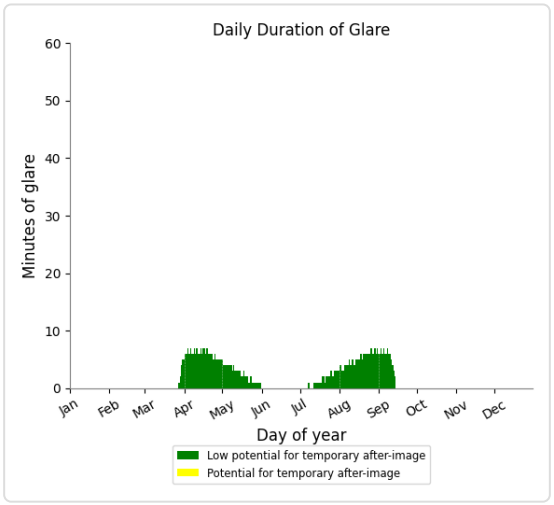


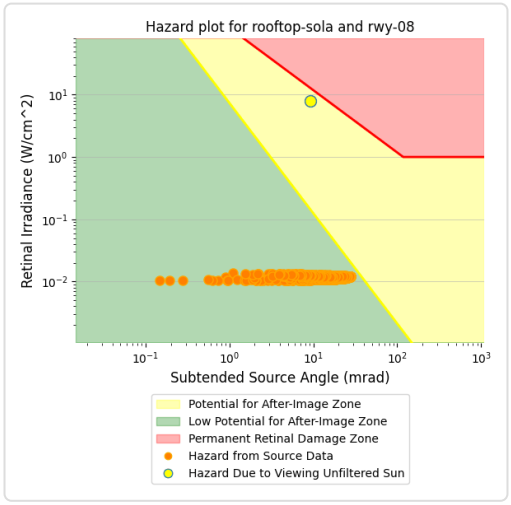
Rooftop Solar PV2 B2 and FP: RWY 08 Final

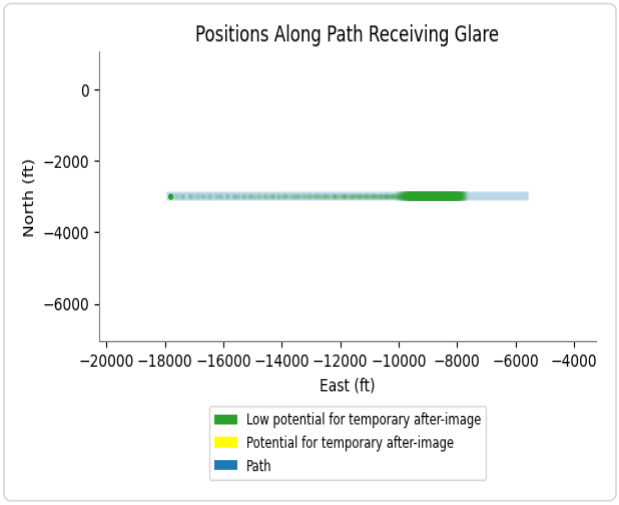
Yellow glare: none

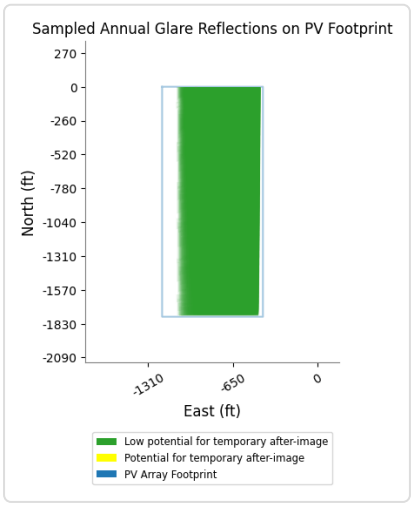
Green glare: 547 min.

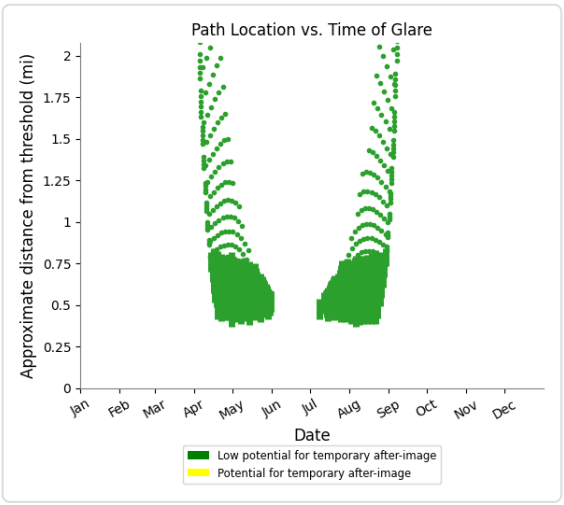












Rooftop Solar PV2 B2 and FP: RWY 18 Final

No glare found

Rooftop Solar PV2 B2 and FP: RWY 36 Final

No glare found

PV: Rooftop Solar PV3 B3 potential temporary after-image

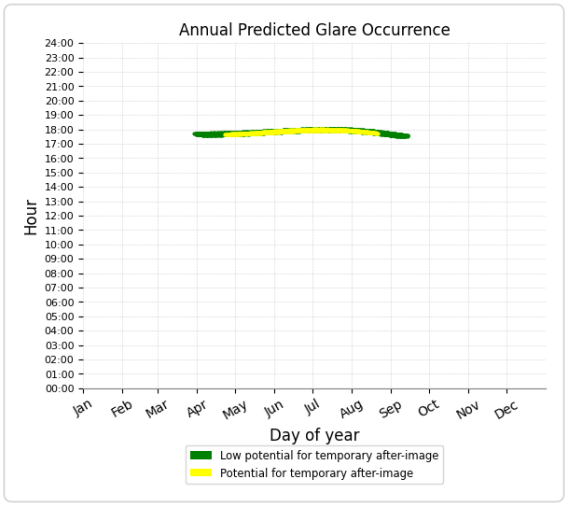
Receptor results ordered by category of glare

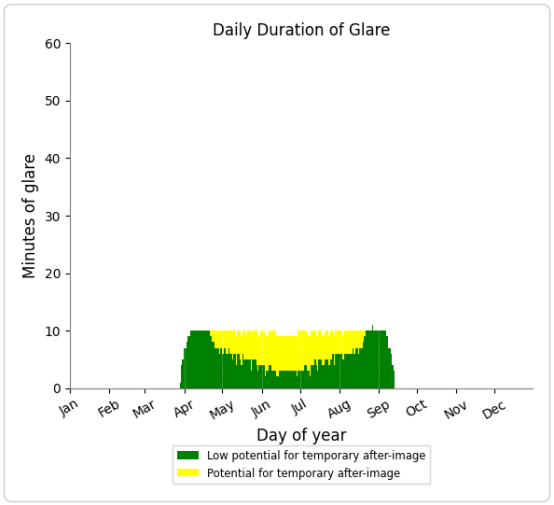
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RWY 26 Final	1,002	16.7	598	10.0
RWY 08 Final	900	15.0	0	0.0
RWY 18 Final	0	0.0	0	0.0
RWY 36 Final	0	0.0	0	0.0

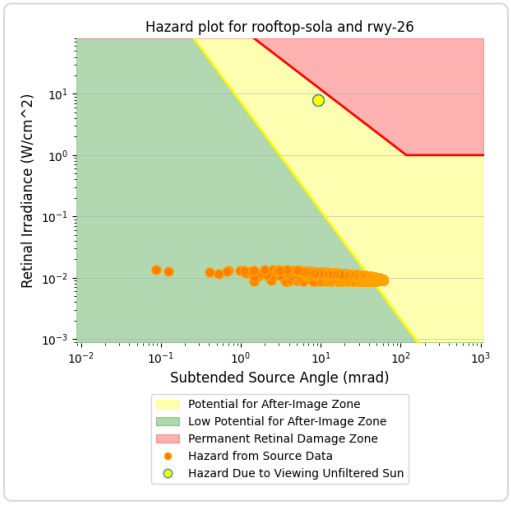
Rooftop Solar PV3 B3 and FP: RWY 26 Final

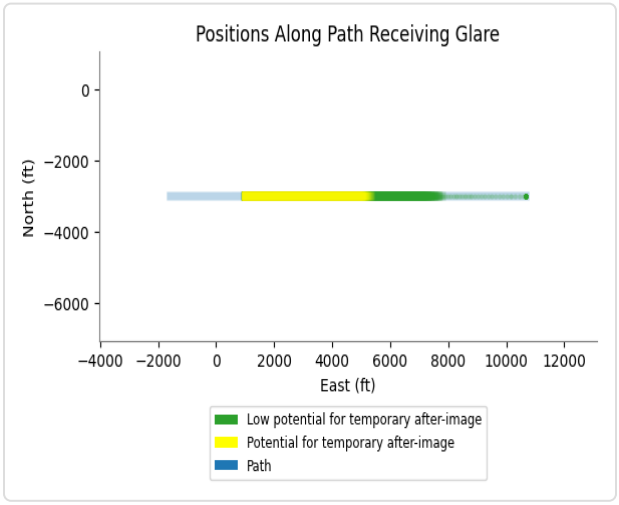
Yellow glare: 598 min.

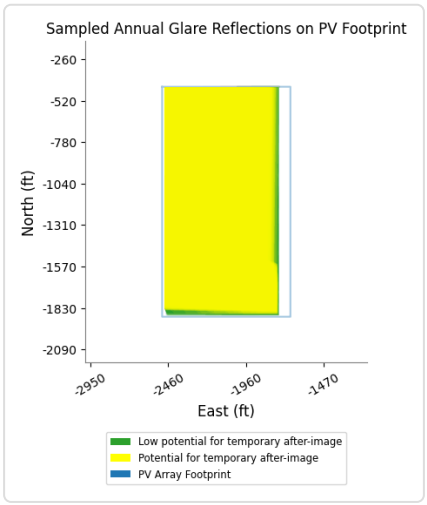
Green glare: 1,002 min.

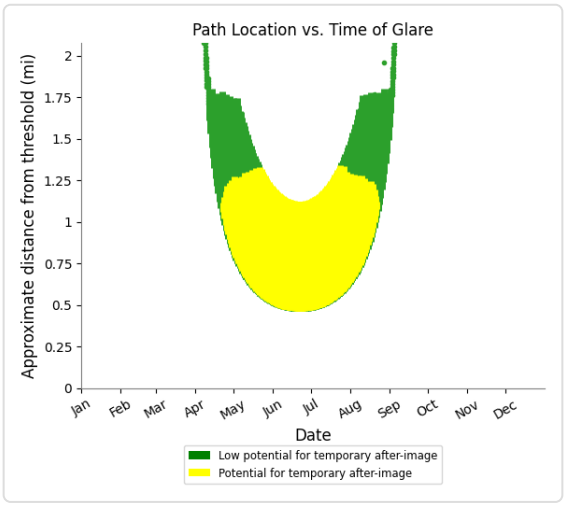








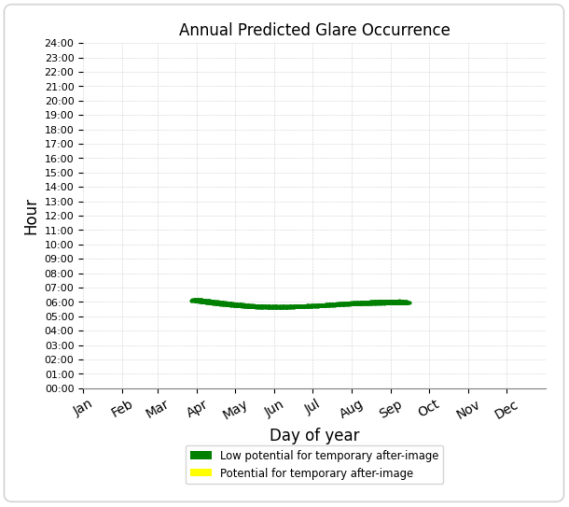


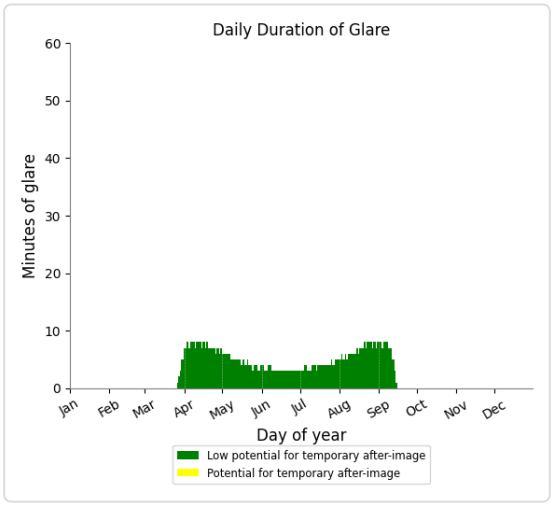


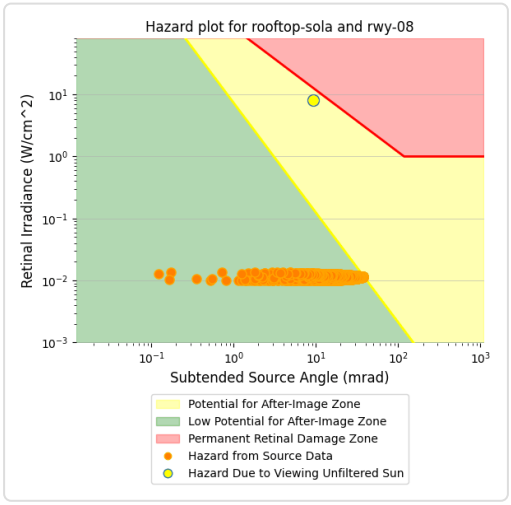
Rooftop Solar PV3 B3 and FP: RWY 08 Final

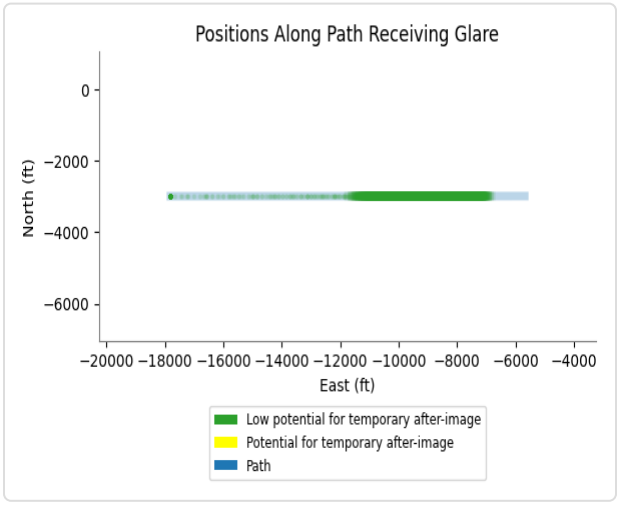
Yellow glare: none

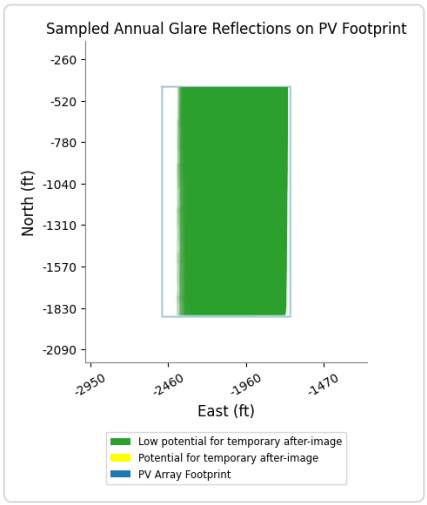
Green glare: 900 min.

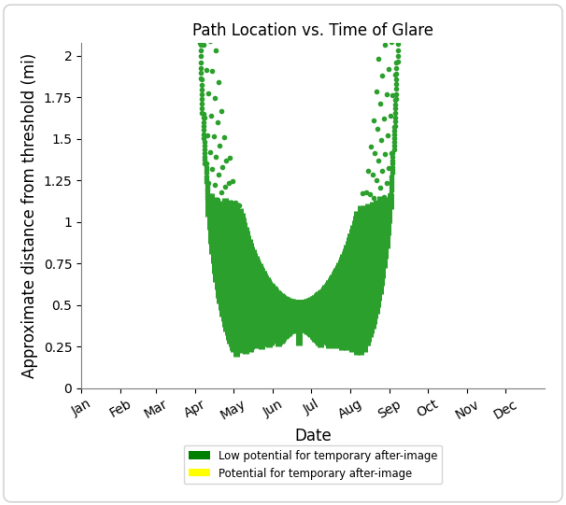












Rooftop Solar PV3 B3 and FP: RWY 18 Final

No glare found

Rooftop Solar PV3 B3 and FP: RWY 36 Final

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians