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SoCalGas

January 26, 2026

California Public Utilities Commission

Energy Division

Attn: John Forsythe

Dear Mr. Forsythe:

Please see attached SoCalGas's Risk Analysis of Alternative Sites for the Ventura Compressor Station Modernization Project.

Should you have any questions, please feel free to contact me at agarcia6@socalgas.com.

Albert Garcia

Director - Environmental Services

Southern California Gas Company

Enclosure:

RISK ANALYSIS OF ALTERNATIVE SITES FOR THE VENTURA COMPRESSOR STATION MODERNIZATION PROJECT

RISK ANALYSIS OF ALTERNATIVE SITES FOR THE VENTURA COMPRESSOR STATION MODERNIZATION PROJECT

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January 9, 2026

RISK ANALYSIS OF ALTERNATIVE SITES FOR THE VENTURA COMPRESSOR STATION MODERNIZATION PROJECT

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RISK ANALYSIS OF ALTERNATIVE SITES FOR THE VENTURA COMPRESSOR STATION MODERNIZATION PROJECT

EXECUTIVE SUMMARY

Southern California Gas Company (SoCalGas) retained Quest Consultants Inc.® (Quest) to identify and assess the potential hazards and risks associated with the Ventura Compressor Station. The initial study evaluated the hazards and risks associated with accidental releases of natural gas at the existing Ventura Compressor Station, as well as for the Ventura Compressor Station Modernization Project (Proposed Project). A quantitative risk analysis (QRA) was used to analyze the risk of potentially life-threatening events occurring, due to accidental releases of natural gas from the compressor station. The scope of the QRA includes compressors and associated equipment that contain natural gas, excluding gas transmission pipeline assets.

With respect to the alternative sites to the Proposed Project[1], a qualitative assessment of risk was initially performed in response to the PEA Completeness Review Letter. The studies described in this report evaluate the three alternative sites using a QRA methodology:

- Avocado Site
- Devil's Canyon Road Site
- Ventura Steel Site

For each site, the expected compressor station was assumed to have the same operational conditions as were assumed for the Proposed Project, although each site layout was different than that for the Proposed Project due to unique site features and different locations. The QRA studies were limited to development of risk in the form of location-specific individual risk (LSIR) contours, for non-pipeline aspects of the alternative sites.

Assessment of the results from the QRA studies of alternative sites to the Proposed Project finds the following:

- Risks beyond the facility boundaries for the alternative sites are similar to those for the Proposed Project.
- Risks beyond the facility boundaries for the alternative sites are similar to those for the Proposed Project.

[1] A QRA report for the Supplemental Electric-Driven Compressor Alternative was addressed in CPUC Data Request 2, submitted on December 8, 2025.

- When evaluated according to international risk criteria standards, each of the three alternative sites would be found acceptable, similar to the Proposed Project.
- The results of a vapor cloud explosion evaluation show minimal offsite impacts for the Proposed Project, as well as its three alternative sites.
- The results of this evaluation are consistent with the qualitative evaluation previously provided for the three alternative sites.

1.0 INTRODUCTION

Southern California Gas Company (SoCalGas) retained Quest Consultants Inc.® (Quest) to identify and assess the potential hazards and risks associated with the Ventura Compressor Station. The existing Ventura Compressor Station is located at 1555 North Olive Street in Ventura, California. Quest's original study, dated July 2024[2], evaluated the hazards and risks associated with accidental releases of natural gas at the existing Ventura Compressor Station, as well as for the Ventura Compressor Station Modernization Project (Proposed Project). The Proposed Project seeks to replace aging infrastructure and compensate for the loss of local California producer supply in a discrete and targeted manner, without increasing SoCalGas's footprint or seeking to extend its pipeline system. The approach taken for that study was a quantitative risk analysis (QRA). Risk is based on the combination of both the severity and likelihood of a life-threatening event occurring. The risk analysis serves to evaluate the Proposed Project in comparison to existing site conditions.

The Proposed Project is subject to a Certificate of Public Convenience and Necessity (CPCN) from the California Public Utilities Commission (CPUC) and California Environmental Quality Act (CEQA) review. The QRA studies were prepared as part of the Proponent's Environmental Assessment (PEA), submitted in accordance with the CPUC Guidelines for Energy Project Applications Requiring CEQA Compliance: Pre-Filing and Proponent's Environmental Assessments. Those assessments included an evaluation of the frequency and consequence of potential loss of containment scenarios, as well as identification of risk from such scenarios, accomplished by a QRA.

The original study also provided a qualitative risk assessment for alternatives to the Proposed Project identified in the PEA. The studies described in this report extend the evaluation of the three alternative sites using QRA methodology, for comparison to the Proposed Project.

1.1 Basis of the QRA

The QRA studies analyze the potential risk of fatality due to accidental releases of natural gas from a proposed compressor station. The scope of the QRA studies included compression systems that contain (or will contain) natural gas, which excludes gas transmission pipeline assets. The methodology used in this study includes five primary steps:

Step 1: Identify the hazards inherent with the system being evaluated.
Step 2: Determine the potential equipment failure cases that could result in life-threatening conditions in and around the facility.
Step 3: For each failure case defined in Step 2, calculate the set of potential hazard zones associated with a range of unique release events.
Step 4: For each unique release event identified in Step 3, derive the annual probability of

[2] https://www.socalgas.com/sites/default/files/Public_PEA_Appendix_S_Risk%20Assessment_July_2024.pdf

the event, based on failure rates and conditional probabilities.

Step 5: Using a consistent and accepted methodology, combine the consequence from Step 3 with the corresponding event probabilities from Step 4 to arrive at measures of the risk posed by the facility. Compare the risk results to applicable criteria to develop an assessment of the overall risk.

This methodology is explained further in Section 2, as well as in the July 2024 QRA report.

1.2 Alternative Site Assessment Overview

For the Proposed Project alternatives, a hazard identification and risk assessment approach was originally implemented. This qualitative assessment, which covered the viable alternatives to the Proposed Project, was separate and independent of the original QRA; the results of the qualitative assessment were presented in Quest's July 2024 report. The studies presented in this report expand that work to provide quantitative measures of risk for the three alternative sites.

1.3 Description of the Facilities

The existing Ventura Compressor Station is situated on 8.42 acres in the City of Ventura at 1555 North Olive Street. The facility supports SoCalGas's delivery of natural gas for two distinct yet interrelated purposes: (a) to serve core and non-core customer demand in the North Coastal System; and (b) to supply gas to the La Goleta Storage Field for injection and storage, which, in turn, supports future customer demand and reliability both in the North Coastal System and across the entirety of SoCalGas's system. The compressor station pulls natural gas from lower pressure pipelines to provide a source of higher pressure natural gas to the North Costal System and the La Goleta Storage Field. The Proposed Project would replace the existing compressor station equipment with new equipment — consisting of two inlet filters, a compressor building with four compressors (two fueled by gas and two electrically driven), four fan-cooled heat exchangers, and an outlet scrubber. The new equipment will provide a gas throughput capacity of up to 160 MMSCFD.

For the alternative sites, it was assumed that the compression equipment at each alternative site would be equal in size, throughput, and function, when compared to the Proposed Project. The scope of each alternative site began and ended at the connection to gas pipelines (near pig launchers/receivers). While each alternative site required a different equipment and utilities layout, all other variables were held constant with the Proposed Project, to the extent possible. The layout of the three alternative sites: Avocado, Devil's Canyon Road, and Ventura Steel are shown in Figures 1-1, 1-2, and 1-3, respectively.

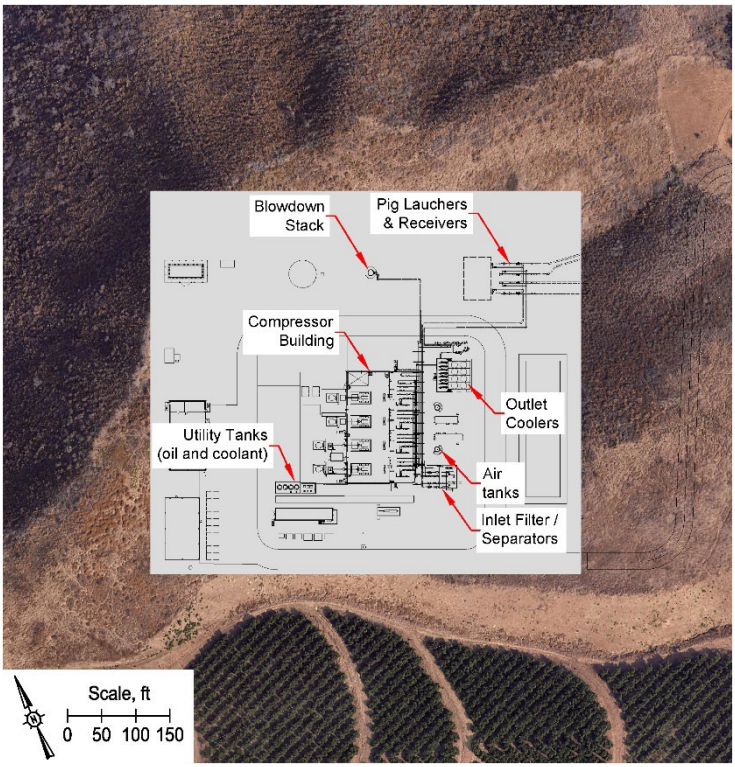

Figure 1-1
Layout of the Avocado Alternative Site

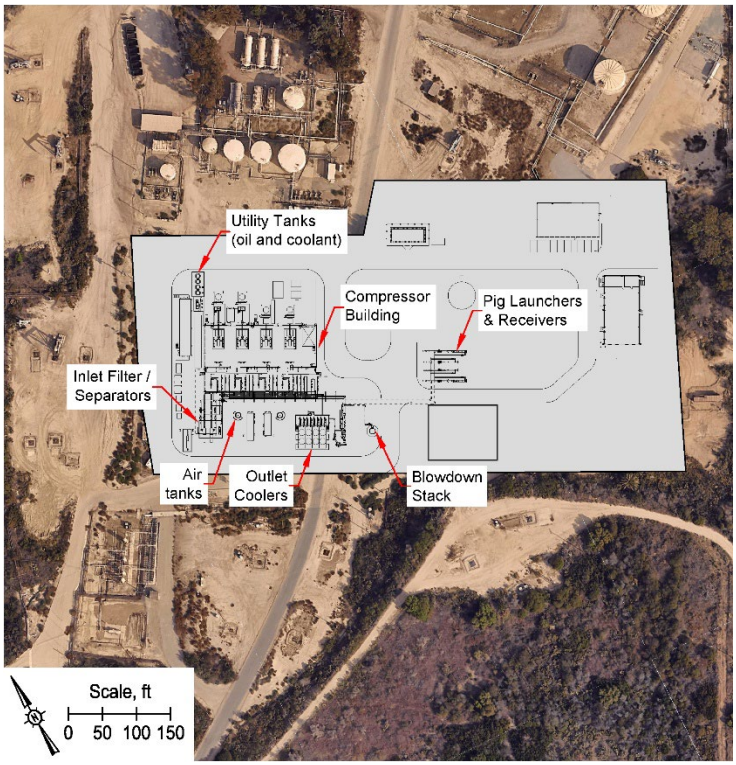

Figure 1-2
Layout of the Devil's Canyon Road Alternative Site

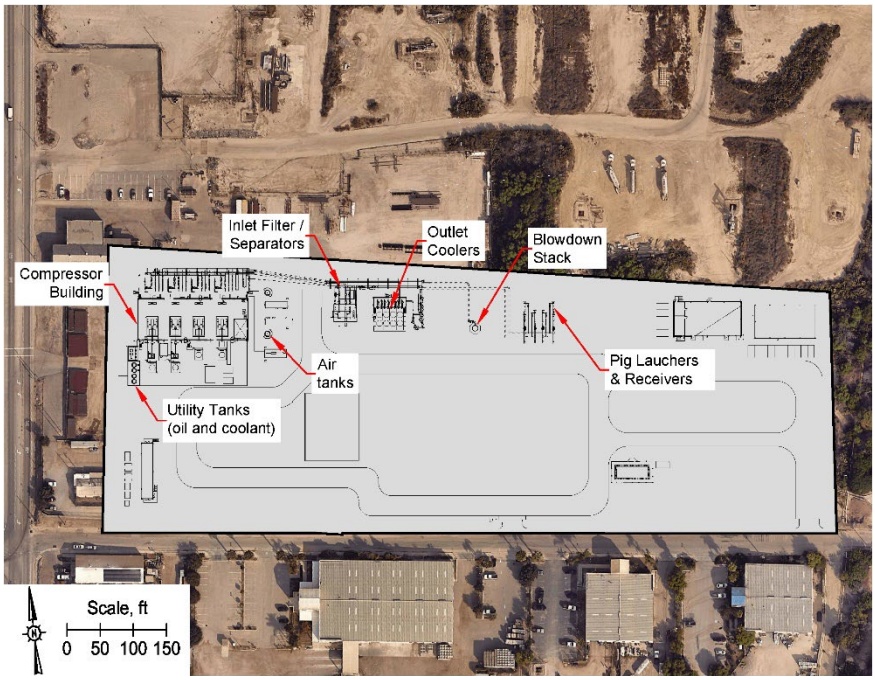

Figure 1-3
Layout of the Ventura Steel Alternative Site

1.4 Acronyms and Abbreviations

A set of acronyms and abbreviations, and their meanings, are provided in Table 1-1.

Table 1-1
Acronyms and Abbreviations

Acronym or Abbreviation	Meaning
AIChE	American Institute of Chemical Engineers
Btu/hr-ft^2	British thermal units per hour per square foot (thermal radiation measurement)
CBC	California Building Code
CCPS	Center for Chemical Process Safety
CEQA	California Environmental Quality Act
49 CFR 192	Title 49 of the Code of Federal Regulations, Part 192
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
CSA	Canadian Standards Association
CSChE	Canadian Society for Chemical Engineering
HSE	Health and Safety Executive (United Kingdom)
kW/m^2	Kilowatts per square meter (thermal radiation measurement)
LFL	Lower flammable limit
LOC	Loss of containment
LSIR	Location-specific individual risk
MMSCFD	Million standard cubic feet per day (gas flow rate)
NFPA	National Fire Protection Association
Proposed Project	the Ventura Compressor Station Modernization Project
psi	Pounds per square inch
PEA	Proponent's Environmental Assessment
PES	Potential explosion site
PHA	Process hazards analysis
QRA	Quantitative risk analysis
SEDC	Supplemental electric-driven compression
VCAPCD	Ventura County Air Pollution Control District
VCE	Vapor cloud explosion

2.0 QRA RESULTS AND ASSESSMENT

2.1 Location-Specific Individual Risk (LSIR)

Risk results for the Proposed Project, as well as its alternative sites, were developed for two scenarios, based on the facility throughputs (details provided in Quest's July 2024 report):

- High flow mode (100% compression capacity), assumed to be active 100% of the year; and
- "Combined" mode, where high flow, low flow (a reduced compression capacity), and standby (no compression) modes are combined.

LSIR contours were constructed for the two scenarios listed above. As a basis for comparison, the LSIR contours for the Proposed Project are provided here: Figure 2-1 illustrates the annual fatality risk from all hazards associated with LOC events for outdoor persons for the high flow mode, while Figure 2-2 shows the annual fatality risk from all hazards associated with LOC events for outdoor persons for the combined mode.

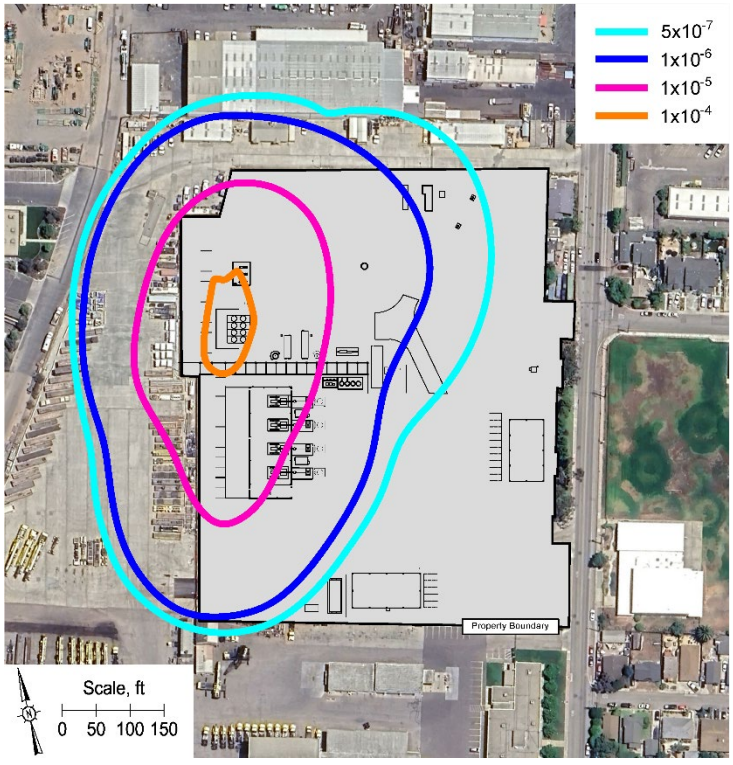

Figure 2-1
Location-Specific Risk for Outdoor Persons – Proposed Project, High Flow Mode

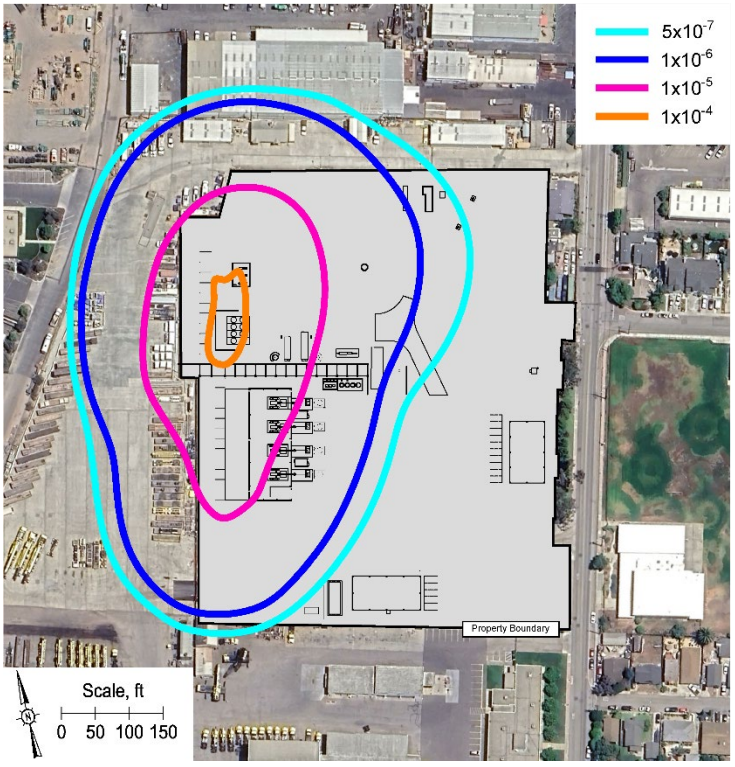

Figure 2-2
Location-Specific Risk for Outdoor Persons – Proposed Project, Combined Flow Mode

The LSIR contours in Figures 2-3 through 2-5 illustrate the annual fatality risk from all hazards associated with LOC events for outdoor persons in or near the Avocado, Devil's Canyon Road, and Ventura Steel alternative sites (respectively), for the high flow mode. Corresponding results in the combined mode are shown for the three sites in Figures 2-6 through 2-8.

Each risk contour shown in Figures 2-1 through 2-8 represents a specific level of risk, where risk is defined by either potentially fatal exposure to any of the hazards associated with the failure cases modeled for this facility. Because the risk contours are based on annual data, this level of risk is dependent on an individual being at the location where a contour is shown for 24 hours a day, 365 days per year. (This applies equally to all presented LSIR contours.) For example, the contours labeled 10^{-5} in the figures (the magenta contours) represent one chance in one hundred thousand per year of being exposed to a fatal hazard due to a flash fire, **OR** jet fire radiation, **OR** a vapor cloud explosion, assuming continuous occupancy at a location where the contour is shown. Any location with individual occupancy less than a full year (i.e., not continuous occupancy) would result in lower risk to persons in that area than is shown in the contours.

2.2 Exposure to Explosion Overpressure

These QRA studies also evaluated the potential for exposure to damaging overpressure following a vapor cloud explosion (which is one component of the hazards evaluated in the QRA). An overpressure level of 1.0 psi, capable of damaging ordinary buildings (and therefore threatening any building occupants) was used as the measure of impact.

Figures 2-9 through 2-12 show the risk-based results, for exposure to 1.0 psi overpressure following vapor cloud explosions in the compressor station, for the Proposed Project and each of the three alternative sites, in the form of location-specific individual risk (LSIR) contours. As can be seen in these figures, the risk of experiencing an overpressure of 1.0 psi offsite is less than 1.0×10^{-5} per year at all sites, and less than 1.0×10^{-6} per year at all sites except Ventura Steel, where the 1.0×10^{-6} per year contour extends into an industrial office area.

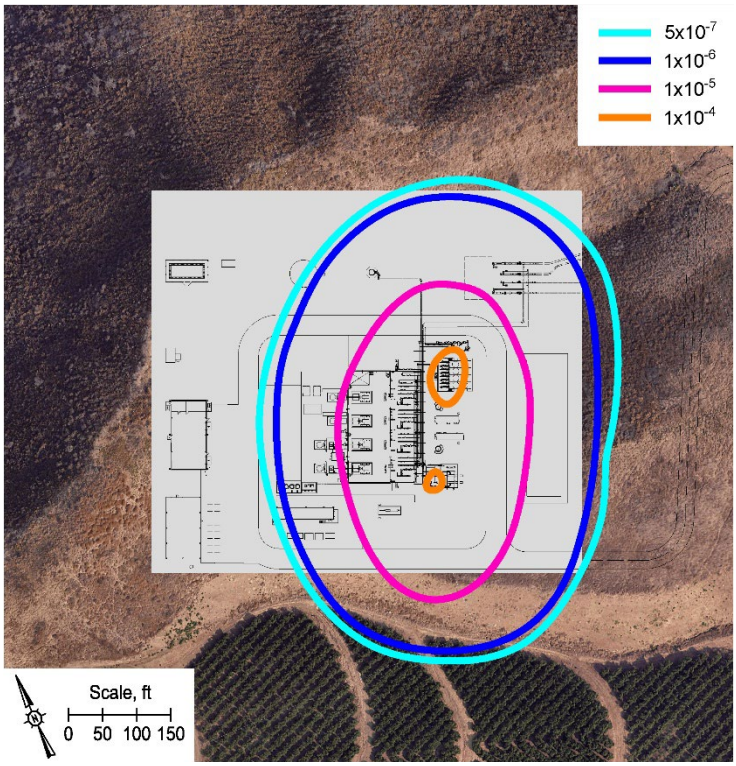

Figure 2-3
Outdoor LSIR for Avocado Site – High Flow Mode

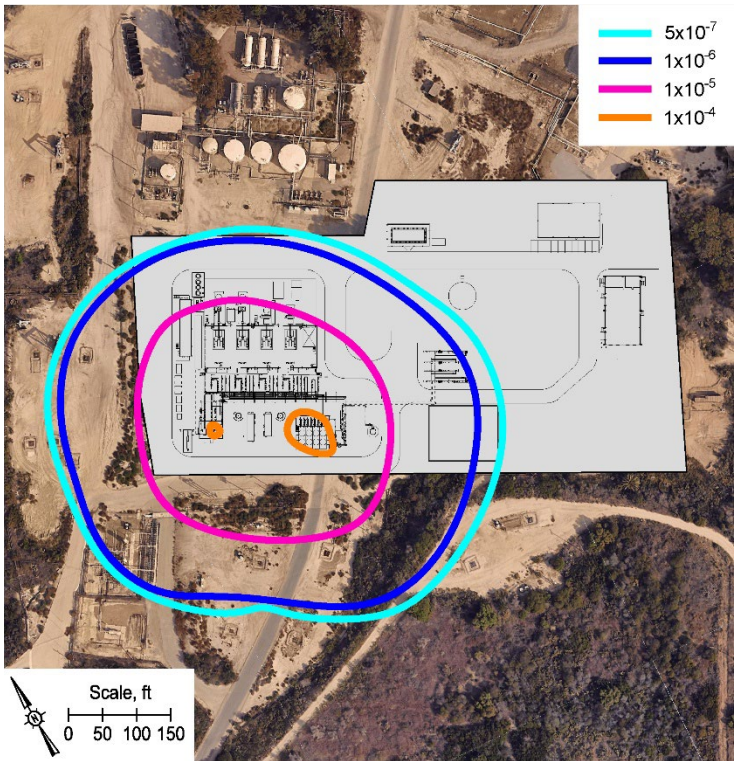

Figure 2-4
Outdoor LSIR for Devils Canyon Road Site – High Flow Mode

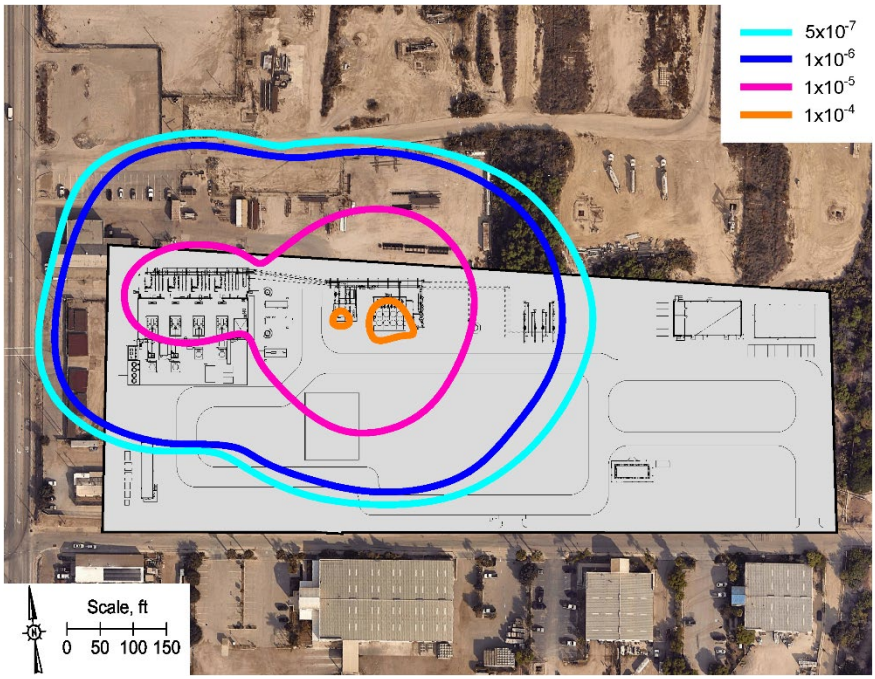

Figure 2-5
Outdoor LSIR for Ventura Steel Site – High Flow Mode

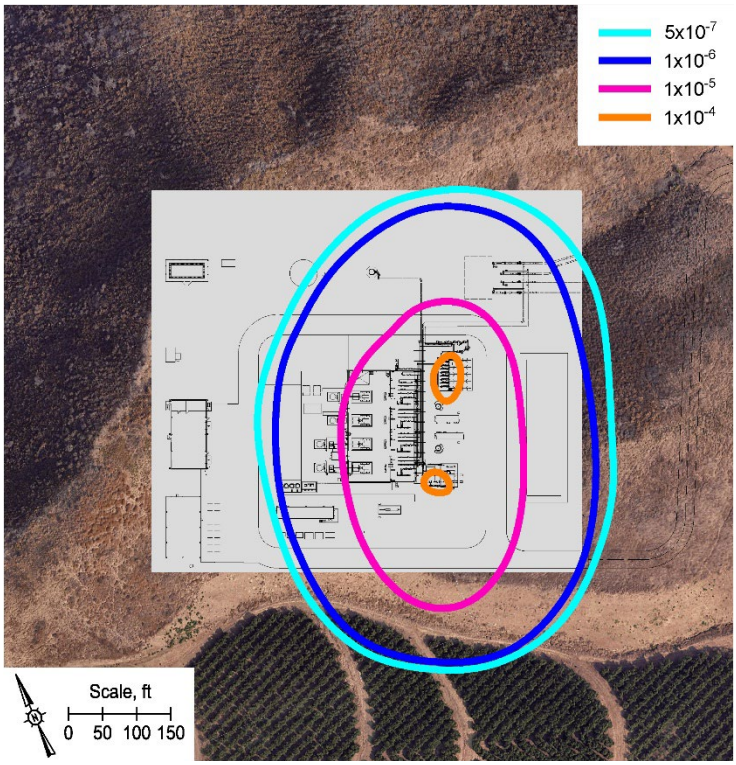

Figure 2-6
Outdoor LSIR for Avocado Site – Combined Flow Mode

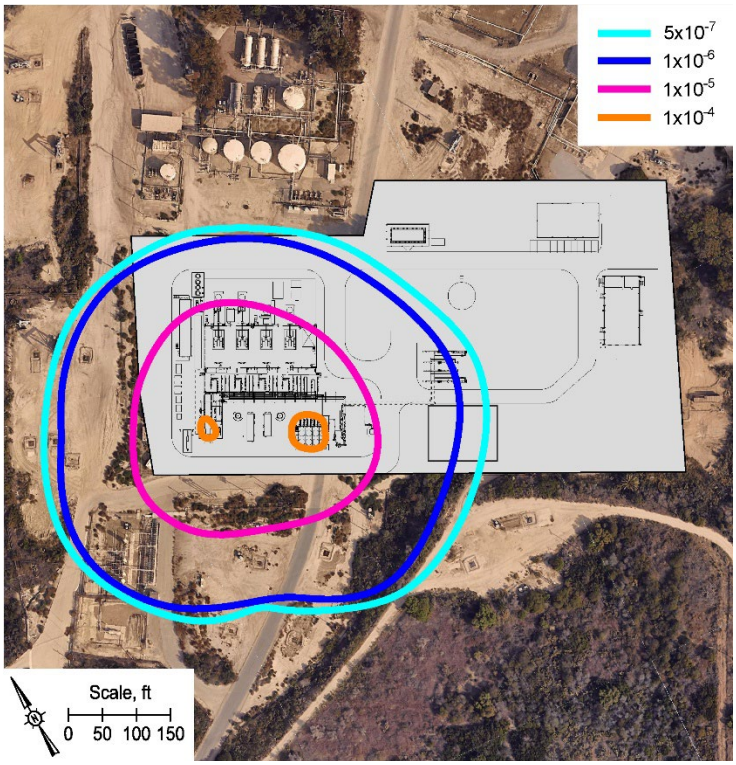

Figure 2-7
Outdoor LSIR for Devils Canyon Road Site – Combined Flow Mode

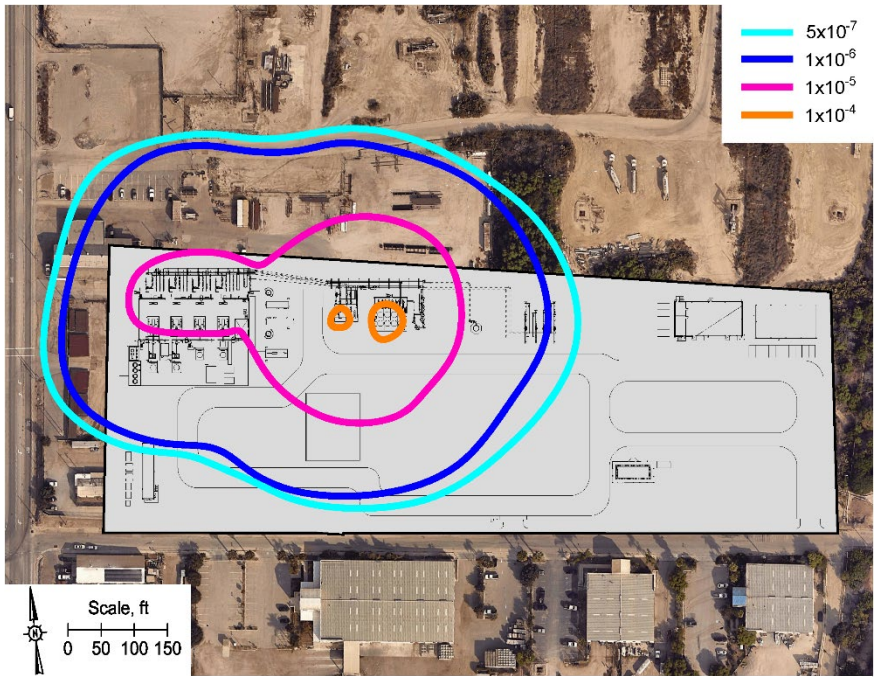

Figure 2-8
Outdoor LSIR for Ventura Steel Site – Combined Flow Mode

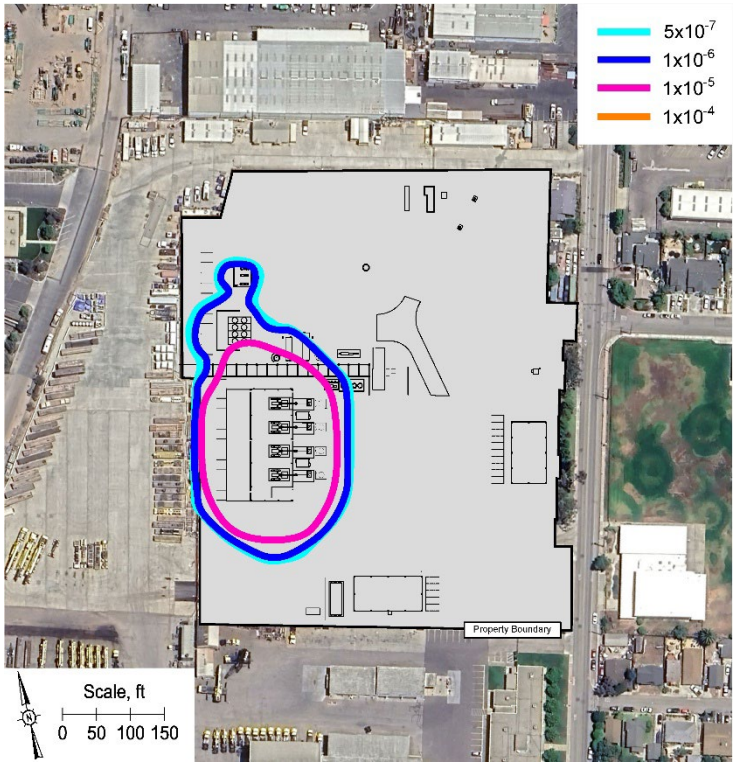

Figure 2-9
Proposed Project LSIR –
Exposure to 1.0 psi Overpressure

2.3 Risk Assessment

The results of the risk analysis presented above require some level of professional interpretation, typically called an assessment. The assessment for the alternative sites involves two parts: comparison to the Proposed Project and comparison to various published criteria. For all three sites, a comparison to the Proposed Project finds the following.

- The risk predicted for each of the alternative sites is similar to that predicted for the Proposed Project; in all cases risk for the high flow mode is also similar to the combined flow mode.
- Onsite risk on the order of 1.0×10^{-4} per year is created by the compressor station, at each of the alternative sites.
- Offsite risk is less than 1.0×10^{-4} per year but greater than 1.0×10^{-5} per year in a small area offsite, for each of the alternative sites.
- Offsite risk between 1.0×10^{-5} per year and 5.0×10^{-7} per year affects a larger area offsite, for each of the alternatives.
- The results of a vapor cloud explosion evaluation, based on 1.0 psi overpressure, show minimal (or no) offsite impacts for the Proposed Project, as well as its three alternative sites.

Figure 2-10
Avocado Site LSIR –
Exposure to 1.0 psi Overpressure

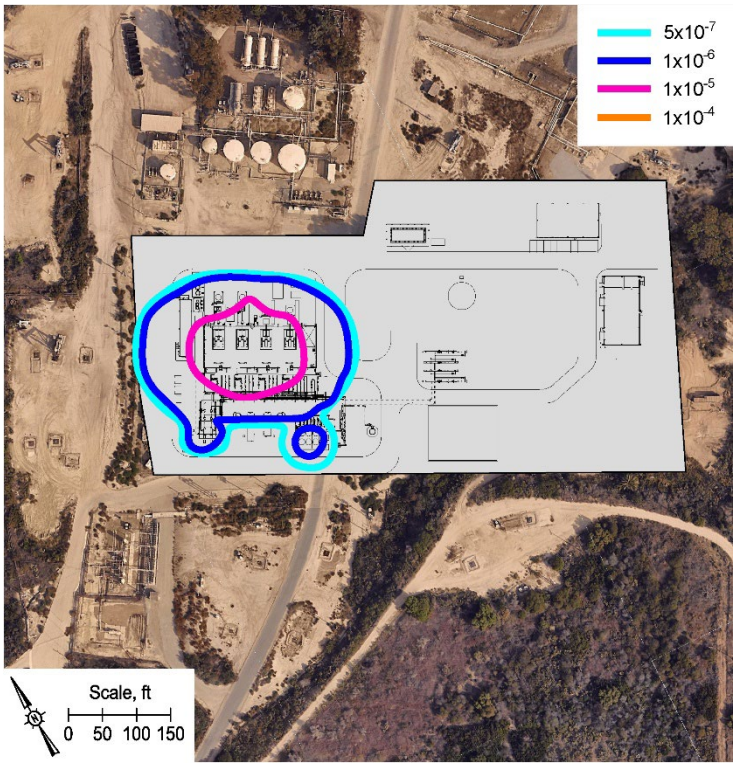

Figure 2-11
Devil's Canyon Road Site LSIR –
Exposure to 1.0 psi Overpressure

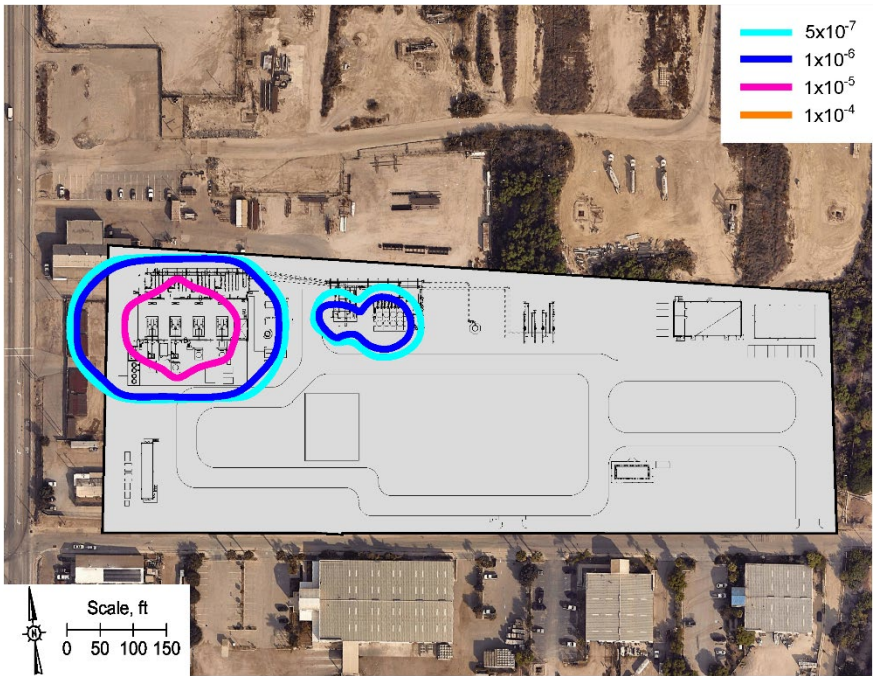

Figure 2-12
Ventura Steel Site LSIR – Exposure to 1.0 psi Overpressure

It is worth considering that the risk contours in Figures 2-1 through 2-8, when combined with non-continuous occupancy, result in actual risk being less than predicted. Similar to the existing compressor station, the Proposed Project is predicted to create offsite risk greater than 1.0×10^{-6} per year, but only in industrial or undeveloped areas.

For all three alternative sites, there are no nearby outdoor offsite areas where people would be expected to remain for extended periods of time, nor any residential or commercial use areas. Thus, risk of potential impacts to persons outside a compressor station, at any of the three alternatives, will be low, similar to that for the Proposed Project.

When compared to a set of international risk criteria (see Quest's July 2024 QRA report), the result for all three alternative site is similar to that assessed for the Proposed project: offsite risk does not exceed the unacceptable risk level for any of the listed criteria.

Lastly, the results of this evaluation are found to be largely consistent with the qualitative evaluation previously provided for the three alternative sites: the onsite and offsite risk impacts are similar when comparing alternative sites to the Proposed Project. The remaining factors evaluated in the original qualitative analysis are factors that could not be evaluated in the QRA studies.

3.0 CONCLUSIONS

This study was focused on risk to persons in the vicinity of a natural gas compressor station that would be installed at one of three alternative sites. The risk impacts at alternative sites serve as comparison to the risk predicted for the Proposed Project, which would be located at the current Ventura Compressor Station operated by SoCalGas.

The QRA studies calculated the consequences of (1) jet fires, (2) flash fires, and (3) explosions following accidental releases of natural gas, over a wide range of potential conditions for each of the three alternative sites. The sites each had a unique equipment layout, but the equipment, its function, and its operating parameters were held to be identical to those for the Proposed Project.

For each site, the consequences and frequencies were combined to develop a measure of risk – location specific individual risk (LSIR) – that is used to evaluate the potential impacts to persons in the area. This measure of risk incorporates several conservative assumptions (that will make the predicted risk higher). The main factor among these assumptions is the continuous occupancy assumption that is inherent in the LSIR contours. To the extent that people are not continuously present within and around a compressor station, an individual's actual risk will be lower than predicted in this analysis.

For each alternative site, the onsite and offsite risk were found to be similar to that predicted for the Proposed Project. Each alternative site results in risk greater than 1.0×10^{-6} per year offsite, but only in industrial, rural, or undeveloped areas. Vapor cloud explosion analysis found that offsite impacts (as defined by the 1.0 psi overpressure endpoint) were minimal for the Proposed Project and the three alternatives evaluated in this study. Lastly, comparison to international risk criteria concludes, as it did for the Proposed Project, that the offsite risk would be acceptable for each alternative site.

APPENDIX A
STUDY BASIS

A-1 Analysis Basis and Assumptions

The information presented in this appendix represents that set of information that departs from the bases and assumptions that were applied in the July 2024 QRA report. To the extent that study variables, methodology, and assumptions do not appear in this report, they can be assumed to be properly represented as presented in the July 2024 report.

A-2 Meteorological Data

The weather conditions at the time of an accidental release (an LOC event) can influence the extents of the resulting hazards. For the purposes of a risk-based study, a set of site-specific weather conditions (meteorological data) were collected at the Ventura site was provided by SoCalGas and used in this evaluation. This is the same data set that was approved by the VCAPCD and used in the dispersion modeling for the health risk assessment which was part of the air permit application package submitted to the VCAPCD in March 2020. The weather data was analyzed to develop a probabilistic set of atmospheric stability, wind speed, and wind direction. The meteorological data indicates 21 wind speed and stability class combinations.

For the purposes of evaluation of the alternative sites, each QRA study was based on plant coordinates. Because of this, the weather data was rotated to match true north for each alternative site, as it related to the site's (plant) coordinates, and applied to the QRA study.

A-3 Potential Explosion Sites (PESs)

Locations within and around each alternative site that could provide confinement for flammable vapors or include congestion (repeated small obstacles) are referred to as potential explosion sites, or PESs. As the amount of confinement or degree of obstruction increases, so does the potential strength of the blast wave that could be created by a vapor cloud explosion within that area.

The selection of specific volumes to model as explosion sources is based on the principles outlined in Quest's July 2024 report. The selected PESs for each of the alternative sites are listed in Tables A-1 through A-3 and demonstrated on each site's plot plan by the orange highlighted zones in Figures A-1 through A-3.

Table A-1
Avocado Site: Potential Explosion Sites and Their Modeling Parameters

#	PES Designation	Total PES Volume [ft³]	Average Obstacle Diameter [in]	Number of Confining Planes	Volume Blockage Ratio
1	Inlet Filter Area	10,900	4	1.5	0.030
2	Suction/Discharge Header Area	42,400	4	1	0.030
3	Compressor House	286,000	4	2.5	0.020
4	Air Intake/Exhaust Area	56,400	3	1	0.030
5	Outlet Coolers	16,300	4	2	0.030
6	Utility Tank Area	11,400	2	1	0.030
7	Underneath PDC	8,800	2	2	0.025
8	Inlet Manifold	14,800	4	1	0.020
9	Surrounding Trees	500,000+	2	1	0.040

Table A-2
Devil's Canyon Road Site: Potential Explosion Sites and Their Modeling Parameters

#	PES Designation	Total PES Volume [ft³]	Average Obstacle Diameter [in]	Number of Confining Planes	Volume Blockage Ratio
1	Inlet Filter Area	9,600	4	1.5	0.030
2	Suction/Discharge Header Area	43,200	4	1	0.030
3	Compressor House	308,000	4	2.5	0.020
4	Air Intake/Exhaust Area	60,400	3	1	0.030
5	Outlet Coolers	15,900	4	2	0.030
6	Utility Tank Area	7,600	2	1	0.030
7	Underneath PDC	9,200	2	2	0.025
8	Inlet Manifold	14,800	4	1	0.020
9	Surrounding Trees	250,000	2	1	0.040

Table A-3
Ventura Steel Site: Potential Explosion Sites and Their Modeling Parameters

#	PES Designation	Total PES Volume [ft³]	Average Obstacle Diameter [in]	Number of Confining Planes	Volume Blockage Ratio
1	Inlet Filter Area	11,700	4	1.5	0.030
2	Suction/Discharge Header Area	38,800	4	1	0.030
3	Compressor House	286,000	4	2.5	0.020
4	Air Intake/Exhaust Area	54,900	3	1	0.030
5	Outlet Coolers	15,900	4	2	0.030
6	Utility Tank Area	9,500	2	1	0.030
7	Underneath PDC	8,800	2	2	0.025
8	Inlet Manifold	16,800	4	1	0.020
9	Surrounding Trees	203,000	2	1	0.040

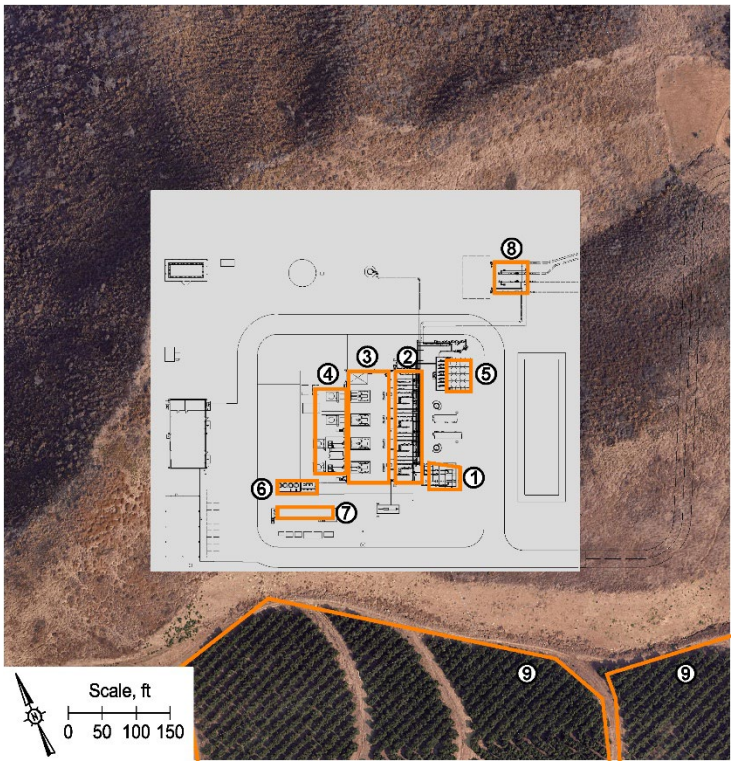

Figure A-1
Avocado Site - Potential Explosion Sites

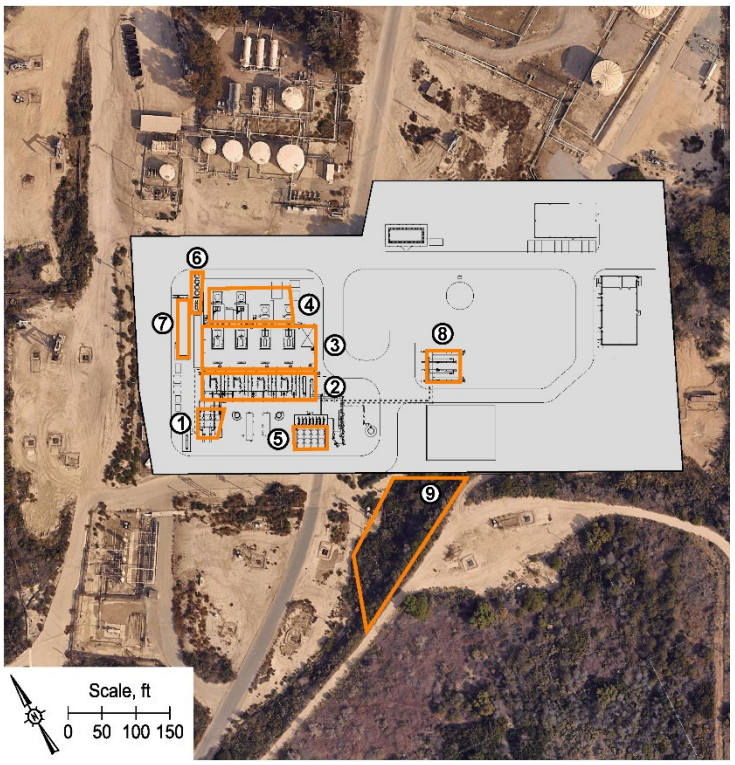

Figure A-2
Devil's Canyon Site - Potential Explosion Sites

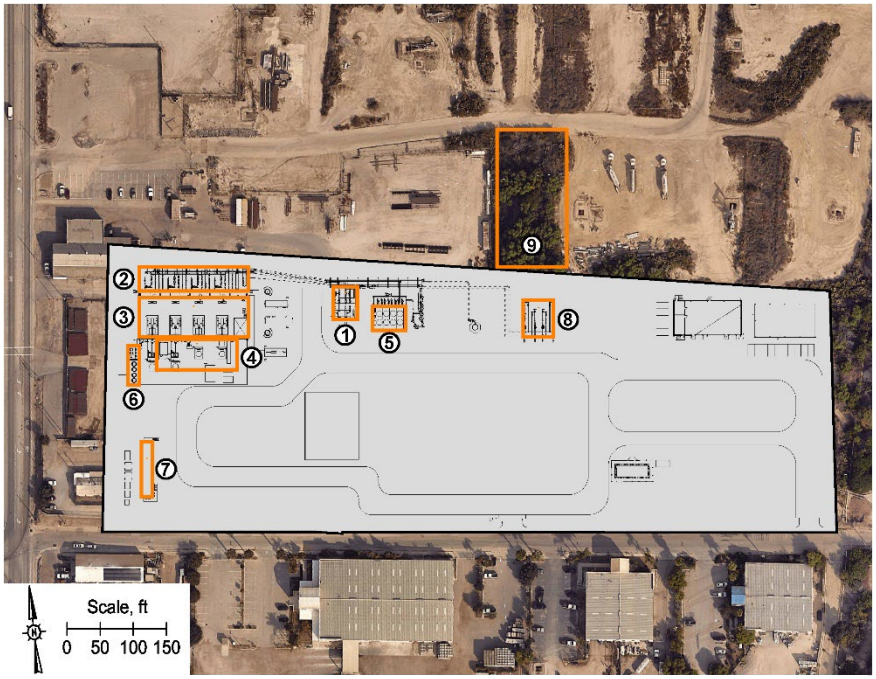

Figure A-3
Ventura Steel Site - Potential Explosion Sites

A-4 Delayed Ignition Probability

The delayed ignition probabilities employed in this study are developed according to the methodology presented in the July 2024 QRA report. For each site, a delayed ignition map of ignition source densities in and around the facility (that could be reached by the flammable cloud) was generated and applied in the QRA calculations.

APPENDIX B
FULL-SCALE GRAPHICS

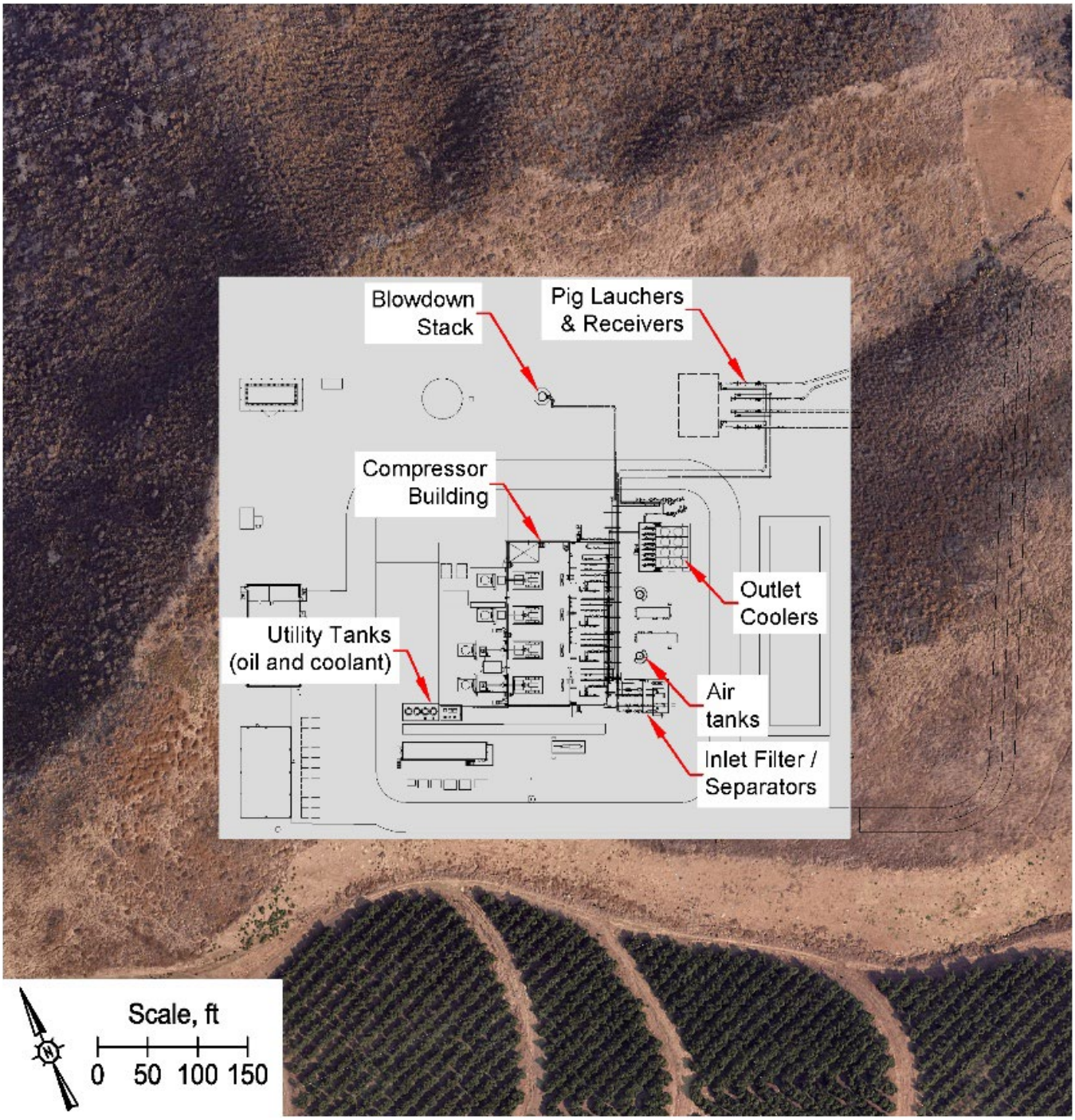

Figure B-1
Layout of the Avocado Alternative Site

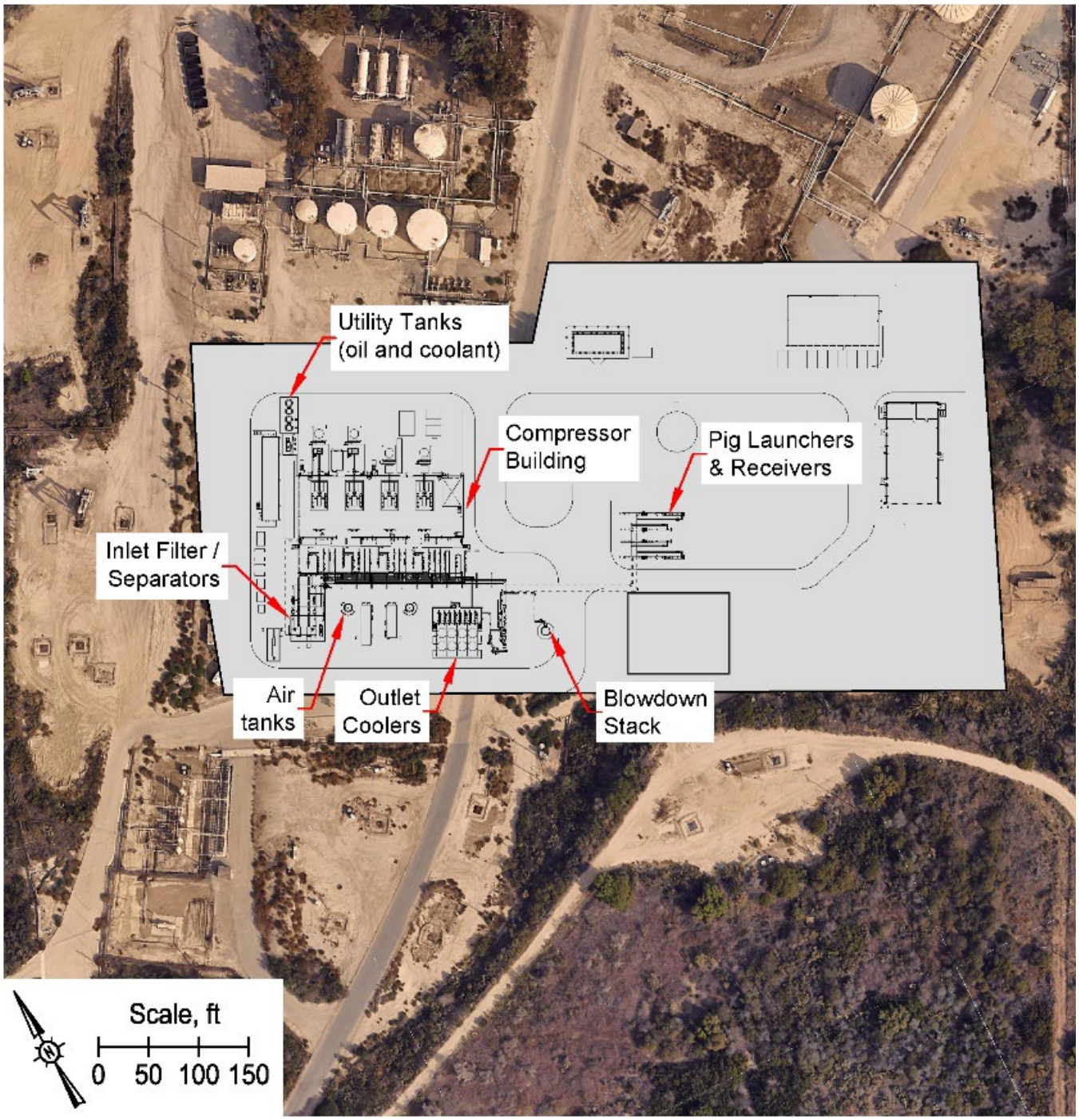

Figure B-2
Layout of the Devil's Canyon Road Alternative Site

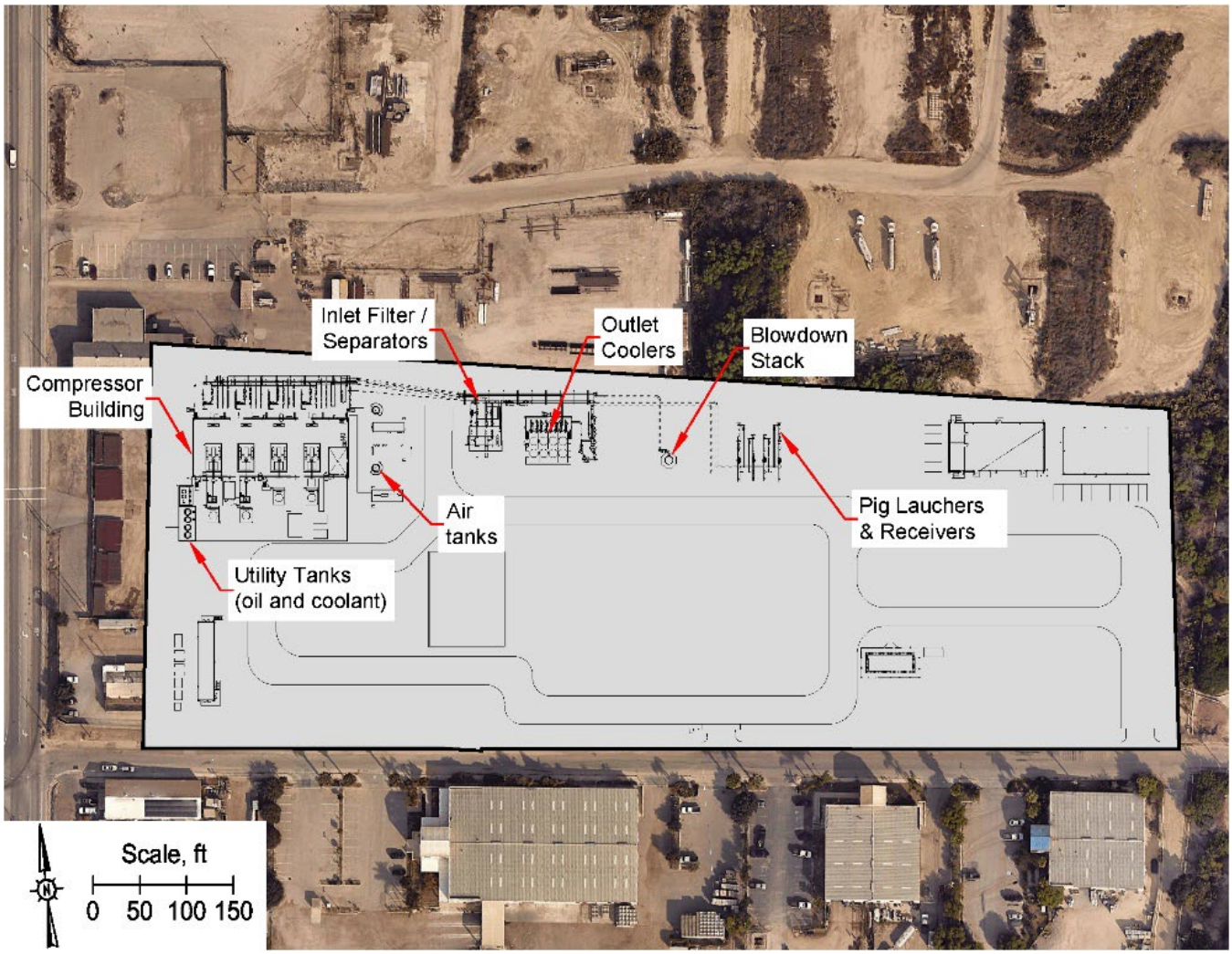

Figure B-3
Layout of the Ventura Steel Alternative Site

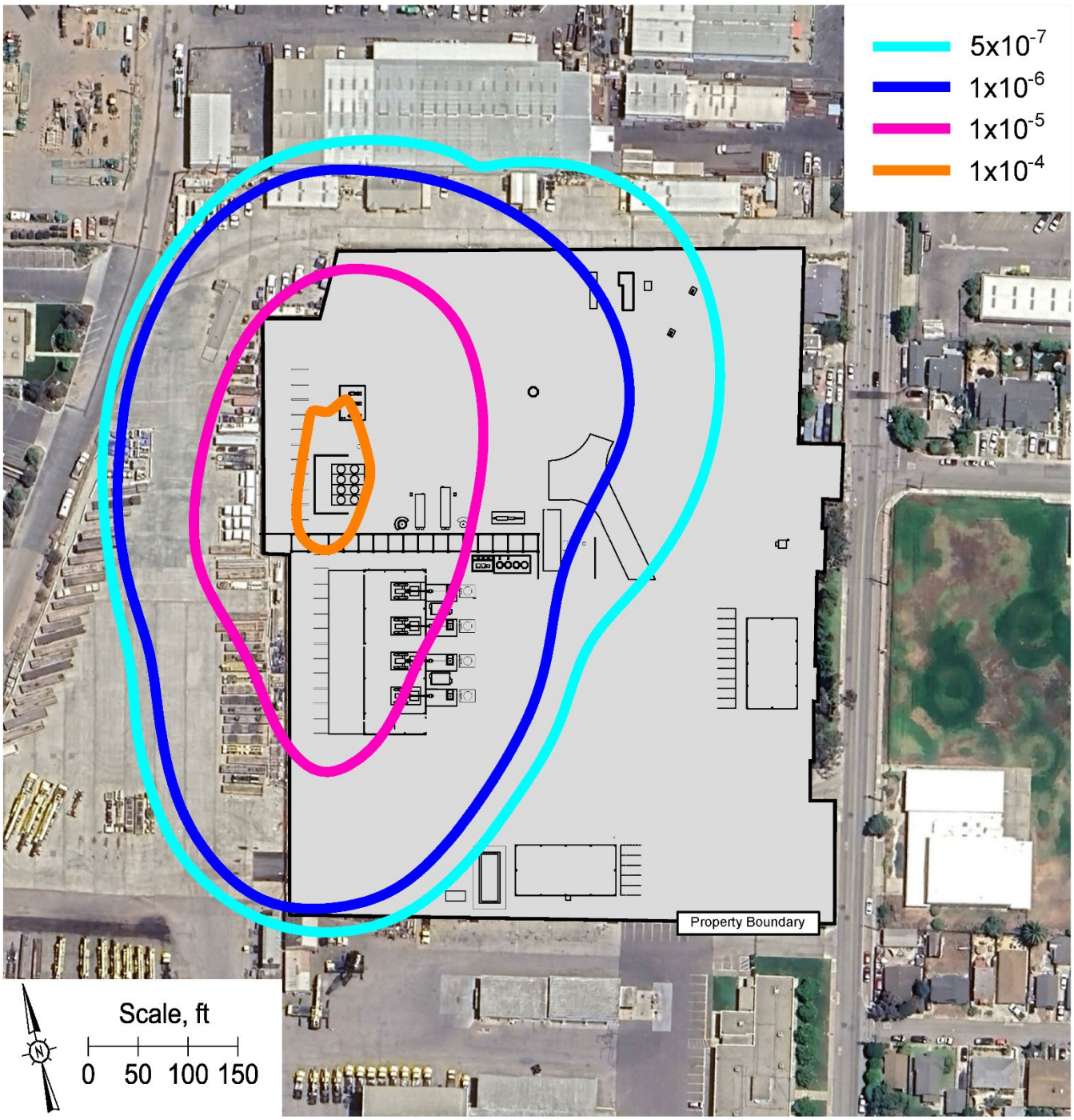

Figure B-4
Location-Specific Risk for Outdoor Persons – Proposed Project, High Flow Mode

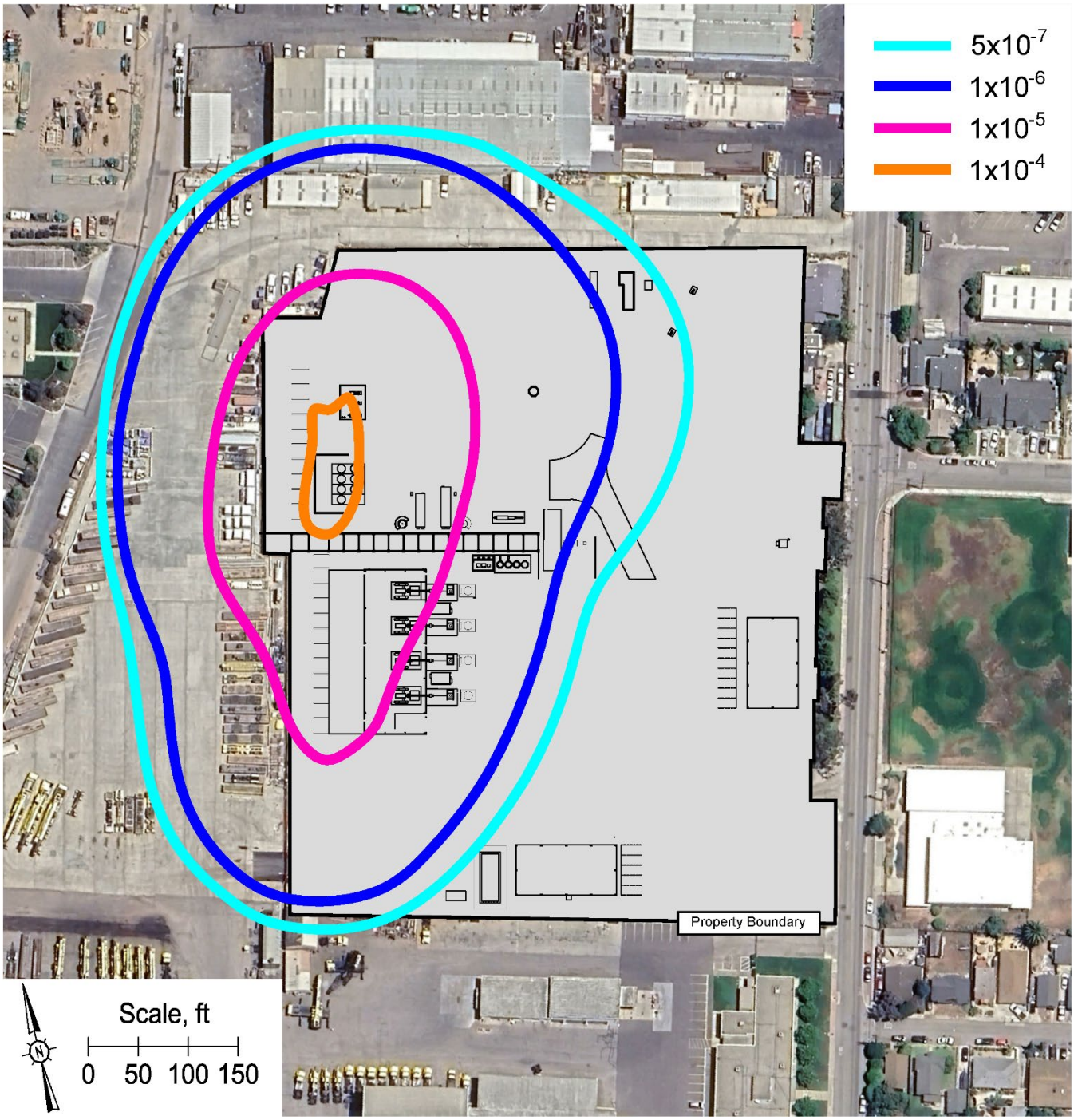

Figure B-5
Location-Specific Risk for Outdoor Persons – Proposed Project, Combined Flow Mode

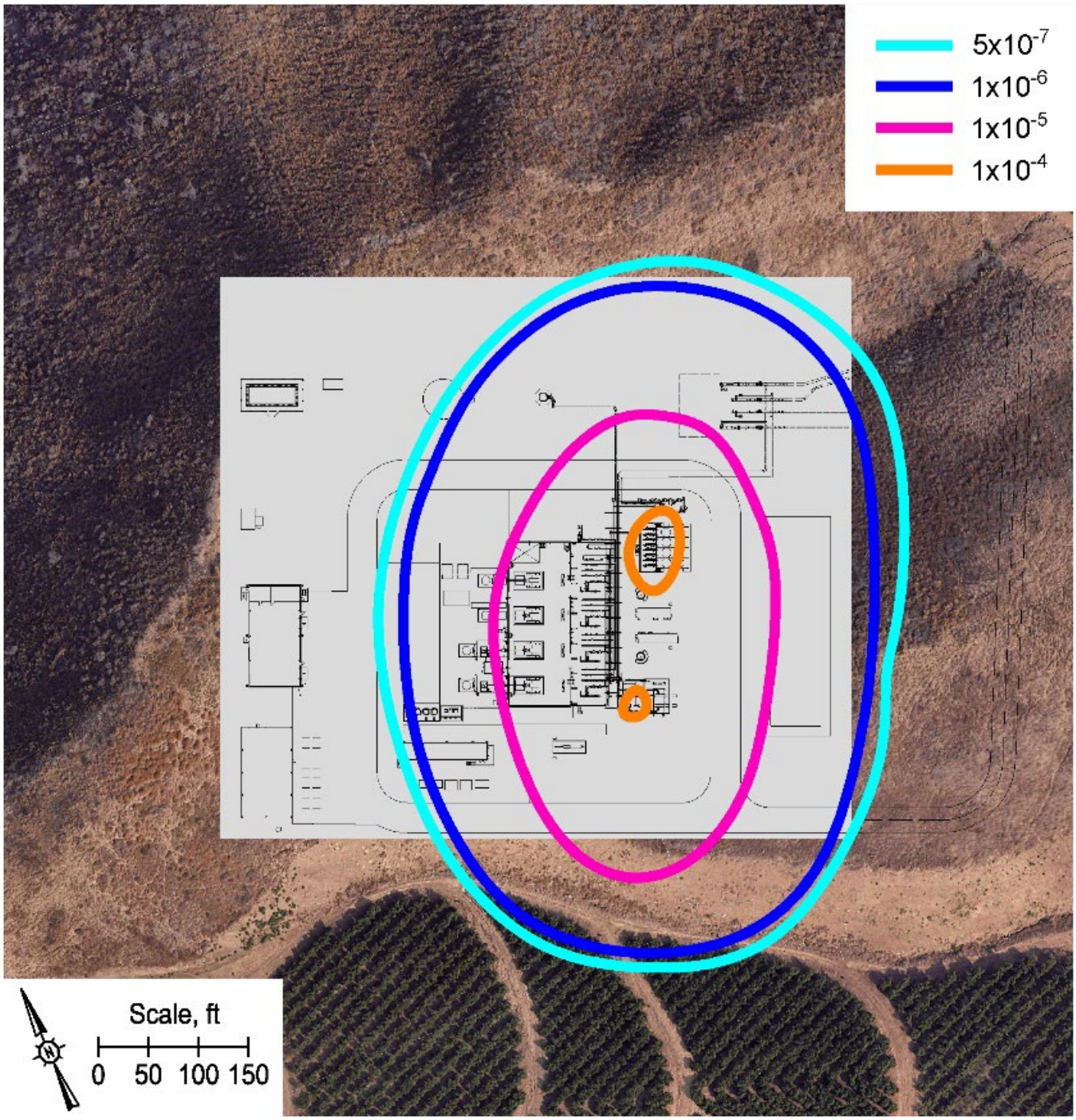

Figure B-6
Outdoor LSIR for Avocado Site – High Flow Mode

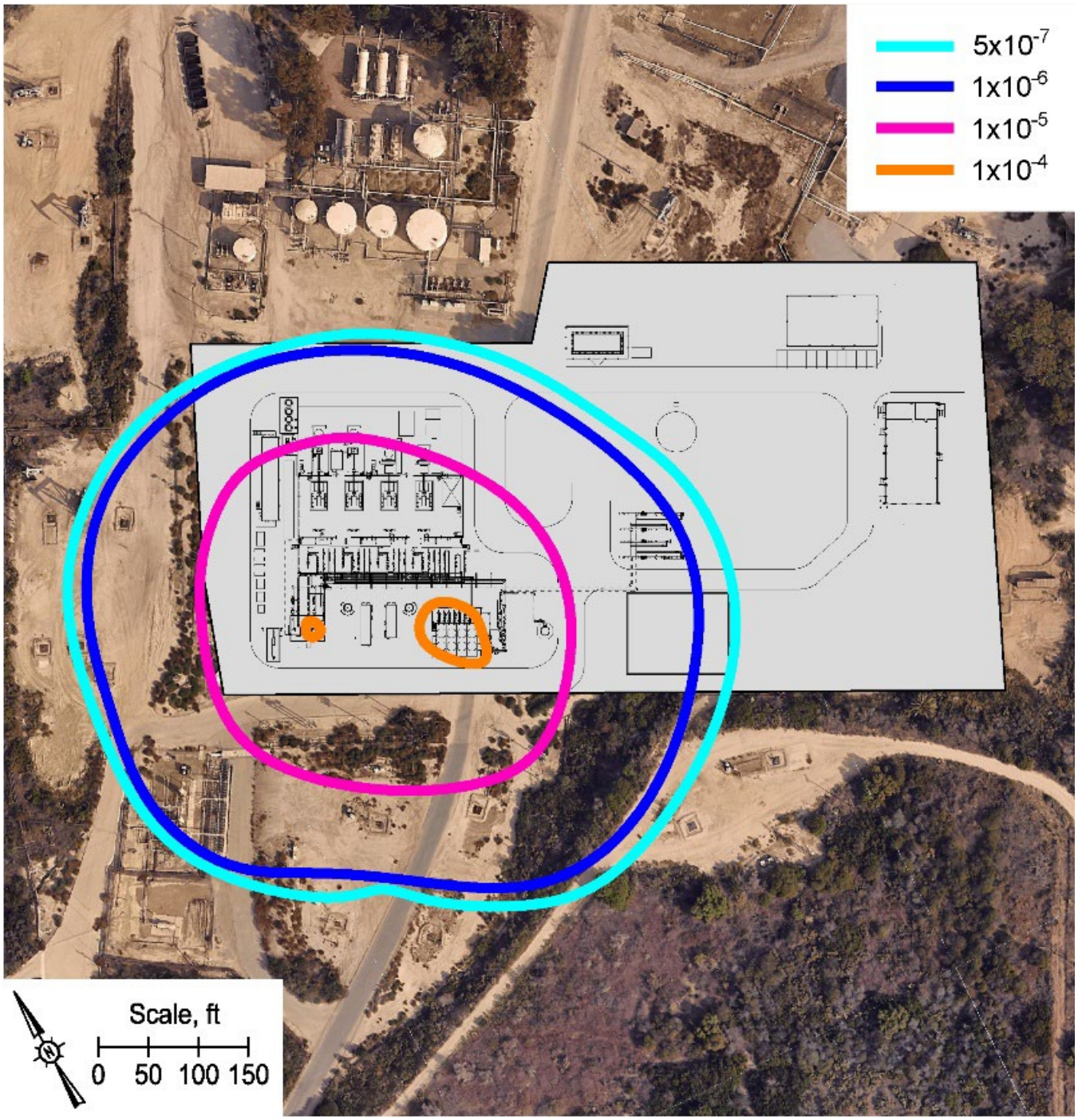

Figure B-7
Outdoor LSIR for Devils Canyon Road Site – High Flow Mode

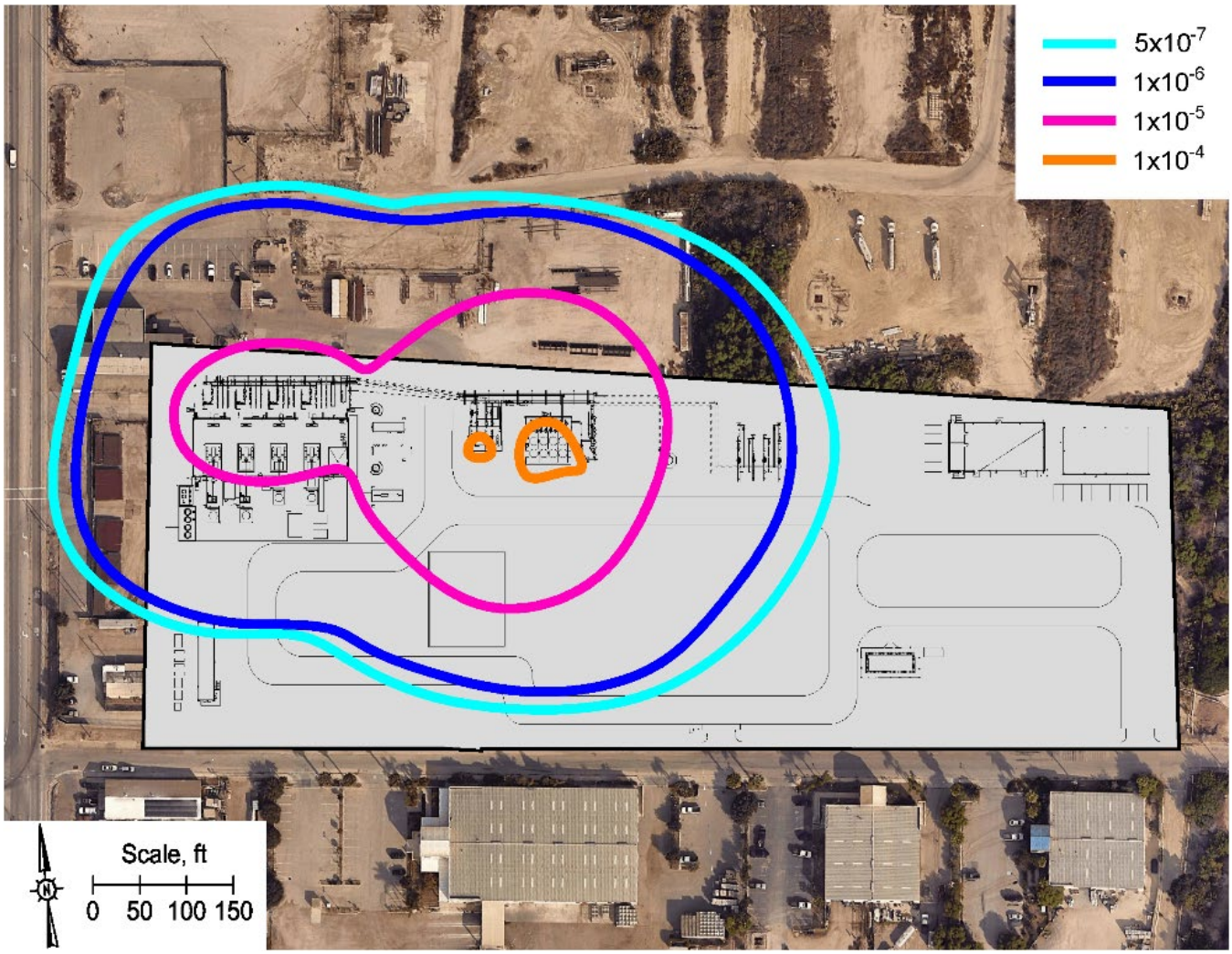

Figure B-8
Outdoor LSIR for Ventura Steel Site – High Flow Mode

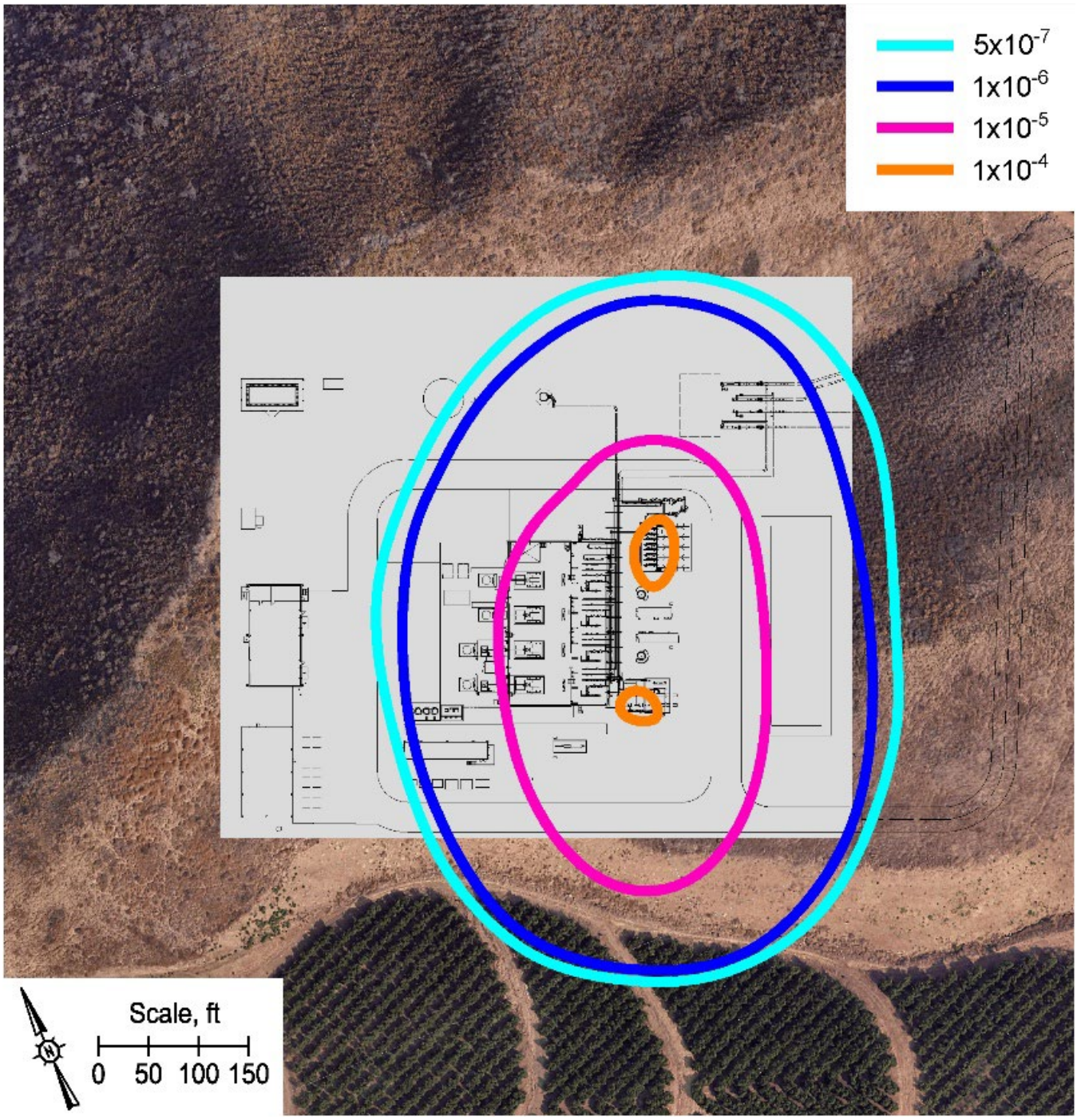

Figure B-9
Outdoor LSIR for Avocado Site – Combined Flow Mode

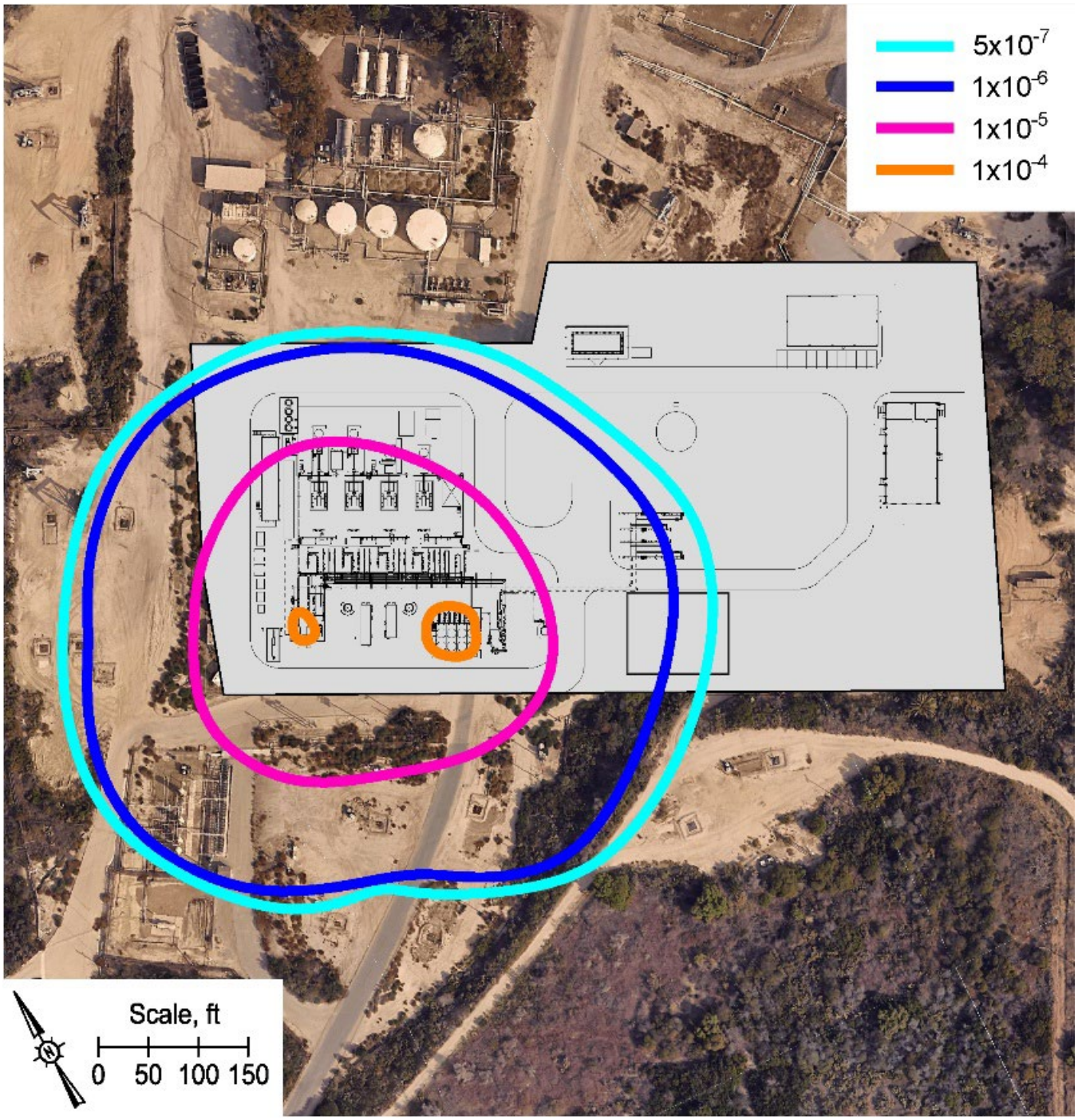

Figure B-10
Outdoor LSIR for Devils Canyon Road Site – Combined Flow Mode

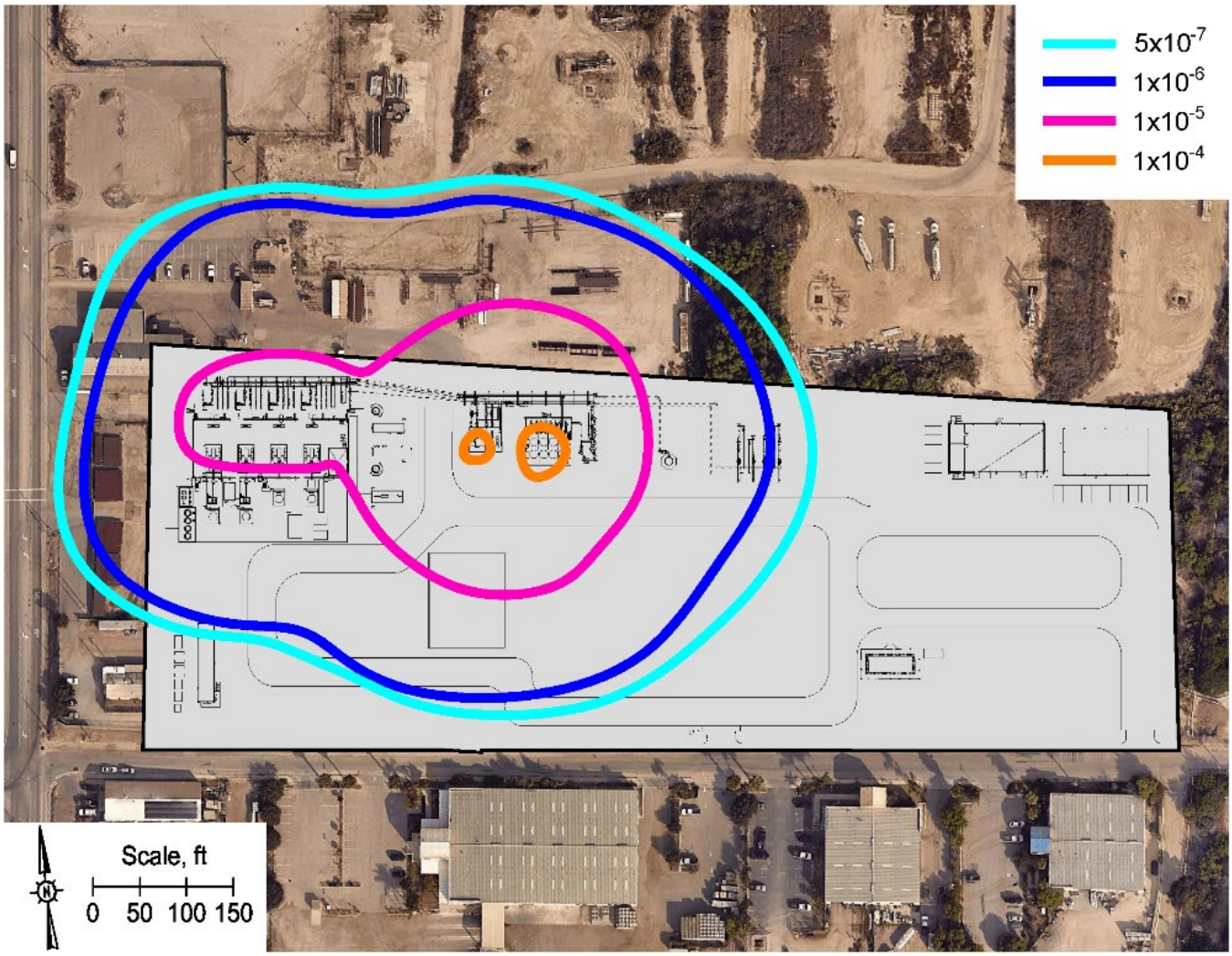

Figure B-11
Outdoor LSIR for Ventura Steel Site – Combined Flow Mode

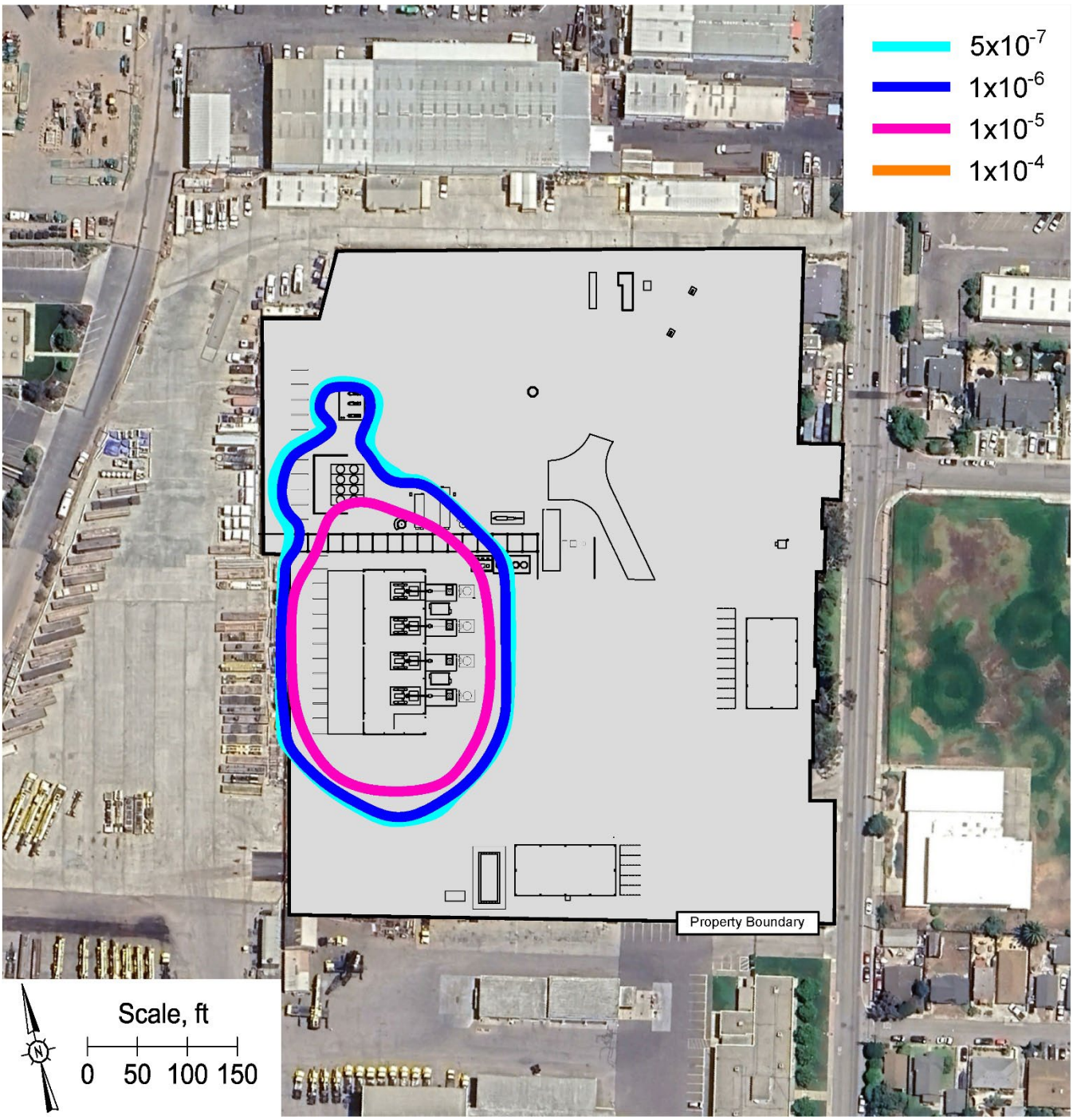

Figure B-12
Proposed Project LSIR – Exposure to 1.0 psi Overpressure

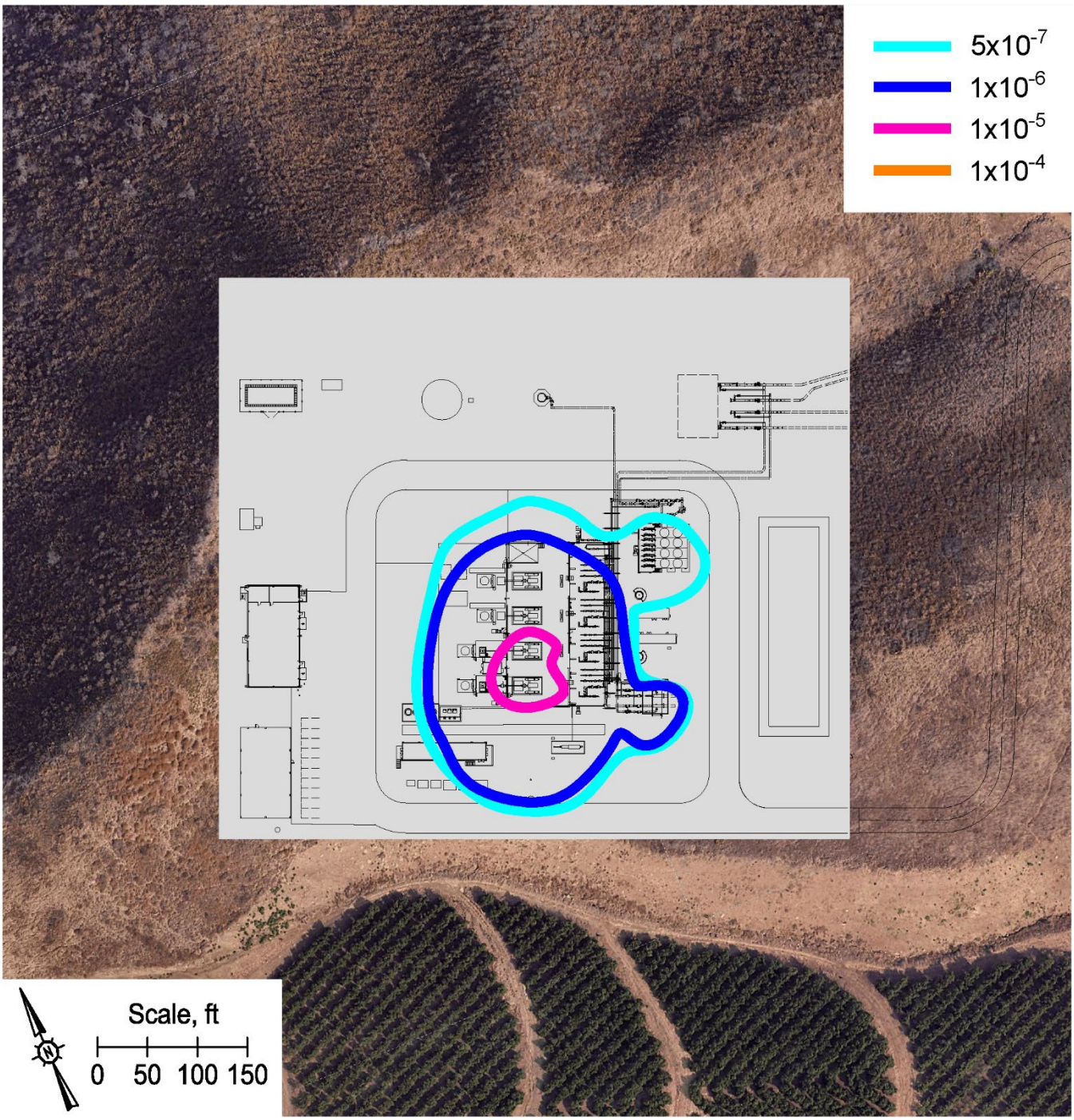

Figure B-13
Avocado Site LSIR – Exposure to 1.0 psi Overpressure

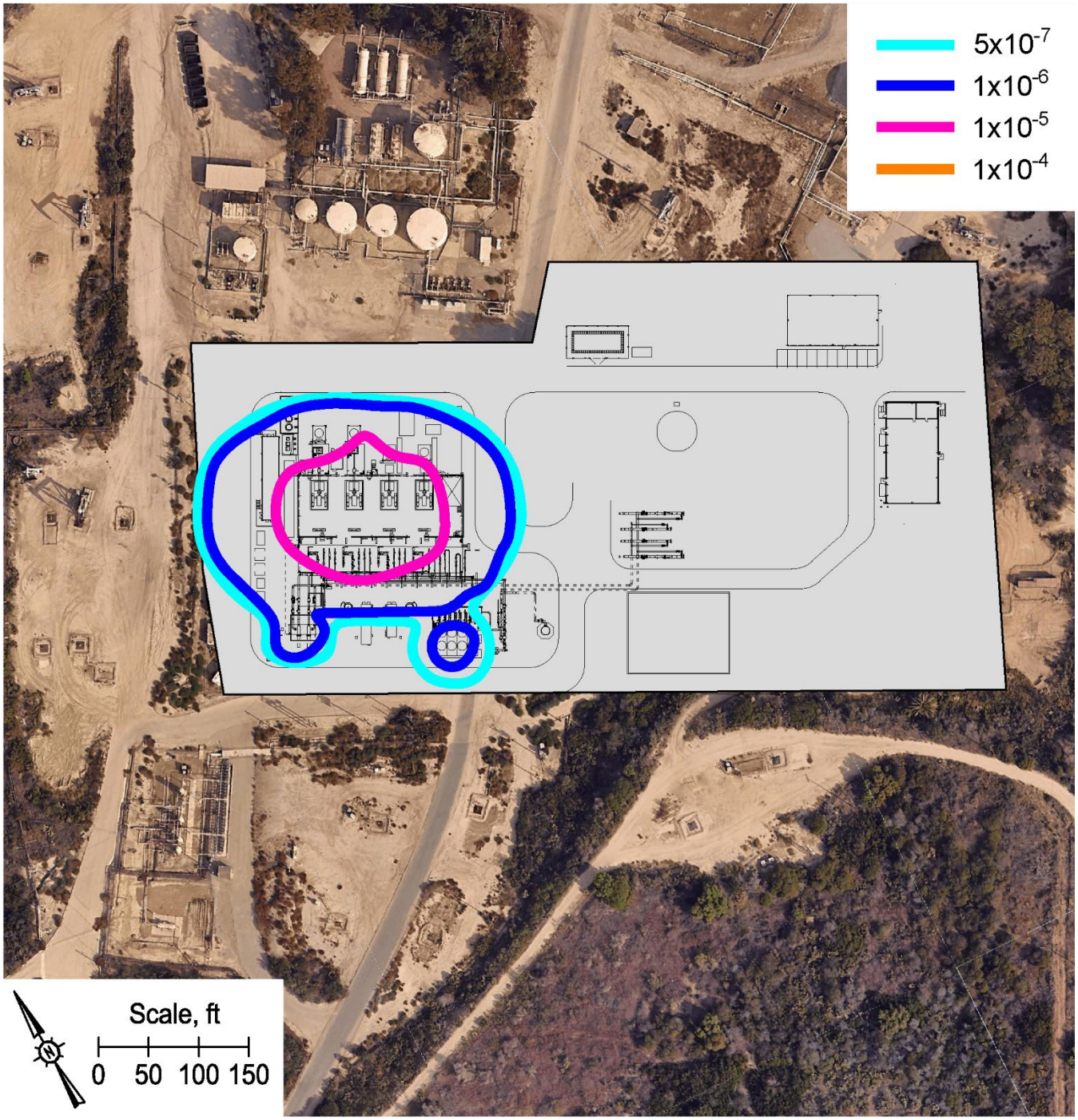

Figure B-14
Devil's Canyon Road Site LSIR – Exposure to 1.0 psi Overpressure

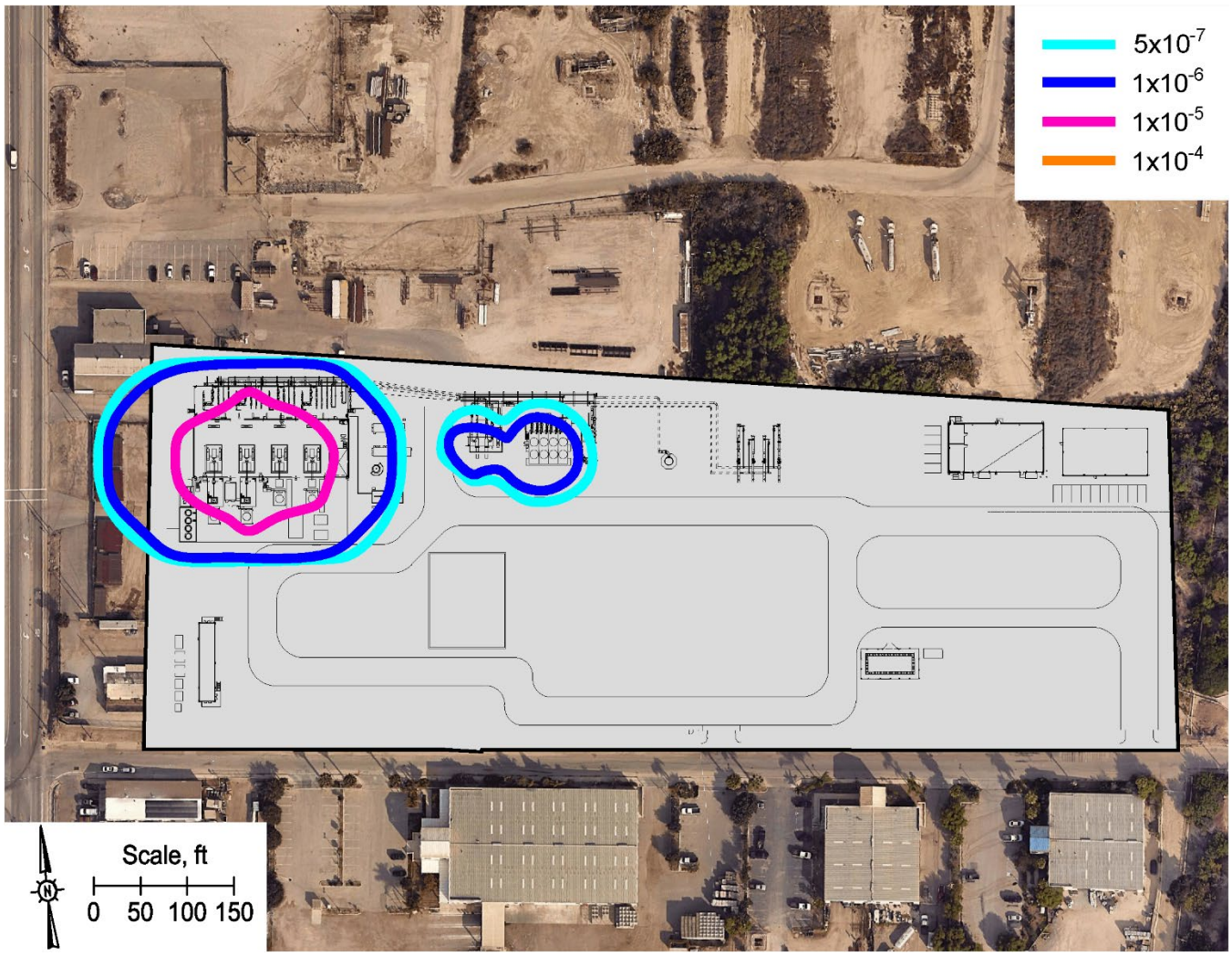

Figure B-15
Ventura Steel Site LSIR – Exposure to 1.0 psi Overpressure

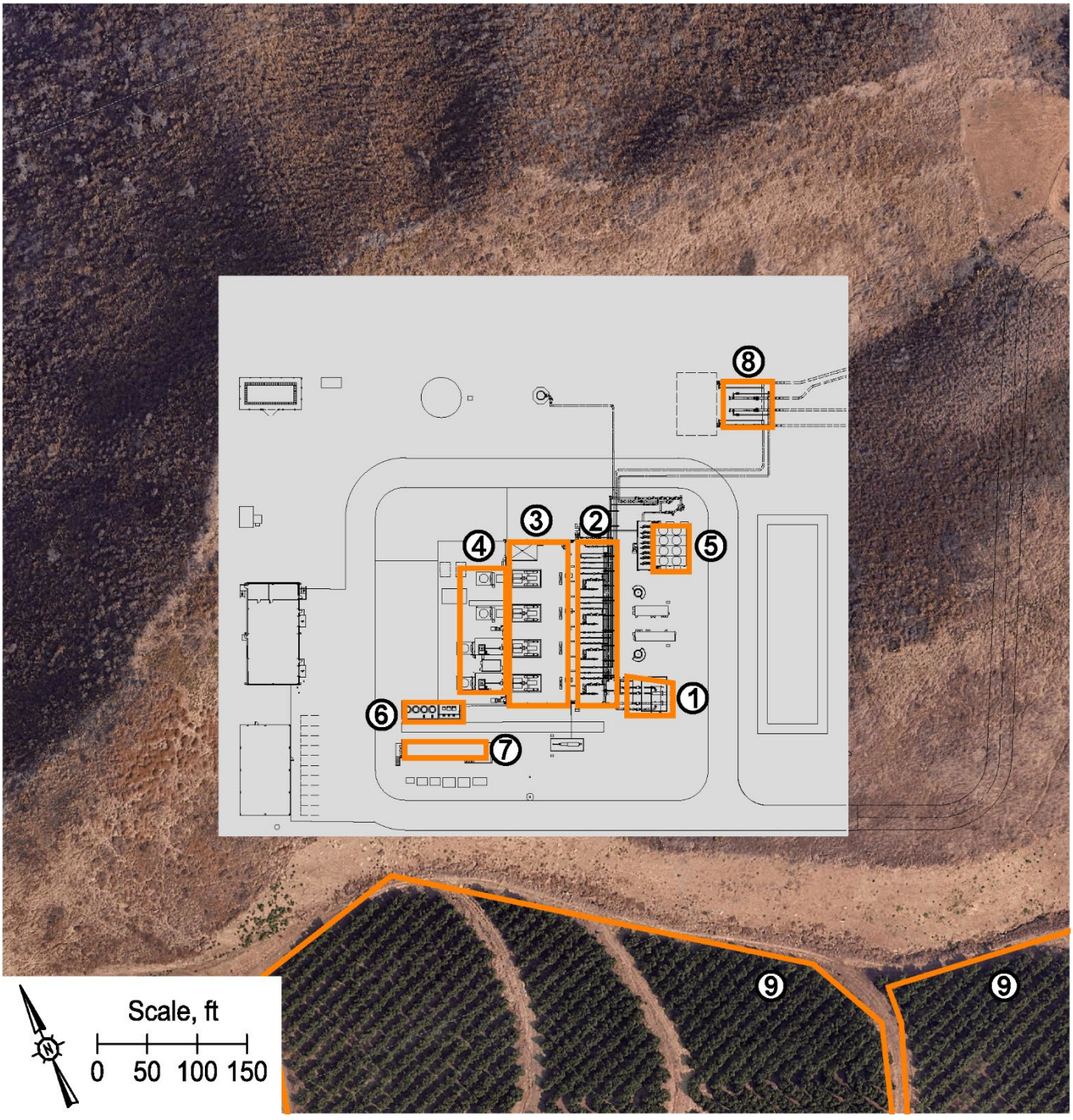

Figure B-16
Avocado Site - Potential Explosion Sites

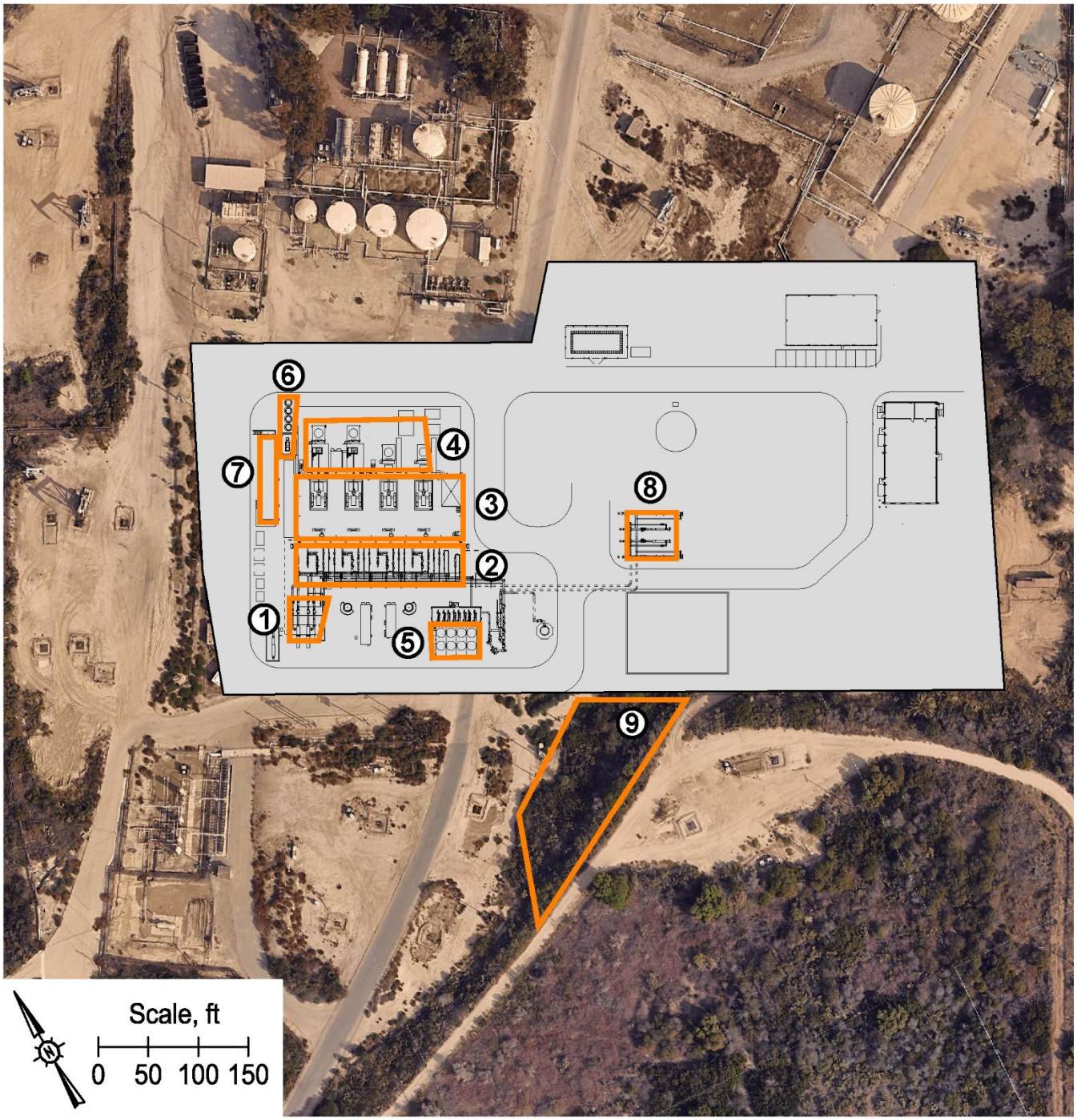

Figure B-17
Devil's Canyon Site - Potential Explosion Sites

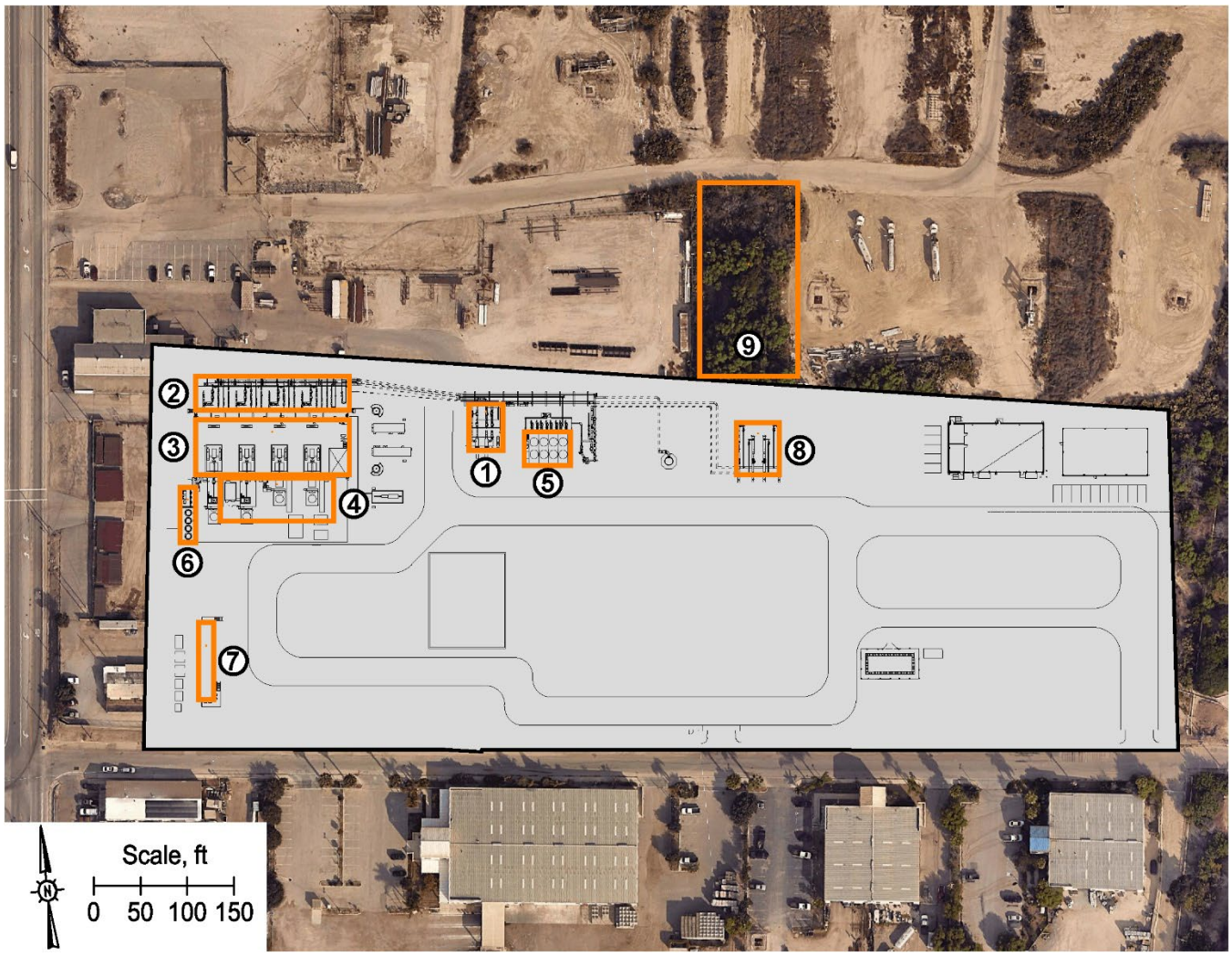

Figure B-18
Ventura Steel Site - Potential Explosion Sites