

Appendix F

Aircraft Hazard and Land Use Risk Assessment



**AIRCRAFT HAZARD
AND LAND USE RISK ASSESSMENT (REVISED)**
for
**Teal Club Specific Plan
And Nearby Parcels
Oxnard, California**

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Introduction and Project Description

The Teal Club Specific Plan proposes multiple land uses on property proposed for incorporation into Oxnard's city limits. The proposed development lies within the Oxnard Airport Sphere of Influence as defined by the City of Oxnard and illustrated on Exhibit 1. Oxnard Zoning Ordinance 2132, Part 6, Section 36-5.13.0 (Airport Hazard Overlay Zone) subjects projects proposed within the Sphere of Influence to an assessment of potential risk from aviation activities. This study identifies pertinent airport land use compatibility standards and determines the extent to which the proposal complies with those standards, per city requirements.

Heliplanners was originally retained by Impact Sciences to prepare this Aircraft Hazard and Land Use Risk Assessment in 2007. We have recently been retained again by Rincon Associates to bring that previous study up to date incorporating more recent data pertaining to Oxnard Airport and changes in the Specific Plan area.

The Specific Plan area is shown on Exhibit 1. The property includes approximately 174.3 acres and is generally bounded on the north by Doris Avenue and by Teal Club Road on the south. Ventura Road borders the property on the east and Patterson Road on the west.

The project area also includes nine additional parcels totaling 11.42 acres on the southern side of Teal Club Road, north and west of Little Farms Road and bisected by Mallard Way. These parcels are also proposed to be annexed into the City's boundaries. These parcels are currently characterized by light industrial and residential uses and vacant land. Some of the residences may have been converted to office and/or shop uses. The City's Oxnard General Plan Land Use Map designates these nine parcels for airport compatible land uses. Once they are incorporated within city boundaries, they are proposed to be included in the Light Manufacturing (M-1) zoning district.

In addition to residences, the Specific Plan area would include a business park, commercial development, a fire station, an elementary school, and parks and greenbelts. Structures associated with these uses have not been identified and are therefore covered in this report only in general terms. The main 174.3 acres would be broken down approximately as follows:

- Up to 990 residential units in a variety of densities and product types on approximately 91 acres
- Up to 132,000 square feet of business park development on approximately 10 acres
- Up to 60,000 square feet of retail commercial uses on approximately 6 acres
- Approximately 8 acres for a school site
- Potential development of an approximately 14,000 square-foot YMCA facility
- Approximately 21 acres of community park space and 4 acres of pocket parks and greenbelts
- A City fire station on approximately one acre

The maximum height of any structures (including non-residential) is not expected to exceed 40 feet above grade.

Agencies

A number of agencies have either regulatory authority or provide guidelines regarding land uses near airports:

- At the federal level, the Federal Aviation Administration (FAA) controls air traffic in the vicinity of certain “controlled airports.” Oxnard is a controlled airport by virtue of its FAA-run air traffic control tower. The FAA also publishes various “advisory circulars” that address airport planning and design issues. In general, compliance with these circulars is required for airports that accept federal funding under the Airport Improvement Program. Oxnard Airport has been the recipient of federal grants for planning and construction projects. The FAA also reviews projects proposed on or near airports for compliance with airspace obstruction-clearance criteria published in 14 CFR, Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, of the Federal Aviation Regulations (FARs).
- At the state level, Caltrans’ Division of Aeronautics (DOA) is charged with granting permits for construction of airports and heliports in California. Toward that effort, DOA ensures that such facilities meet its design standards prior to licensing and continues to meet them during annual inspections. Oxnard Airport holds an Airport Permit issued by DOA.
- The County of Ventura owns Oxnard Airport and the Ventura County Department of Airports manages it for the County. The Oxnard Airport Authority, which includes elected representatives of the City of Oxnard and the County of Ventura, sets airport policy.
- The Ventura County Transportation Commission (VCTC) acts as the Airport Land Use Commission (ALUC) for Ventura County per state law. The Commission is charged with reviewing land use proposals within certain planning boundaries. The goal is to promote compatibility between airport operations and nearby land uses. Those boundaries are defined in the Commission’s *Airports Comprehensive Land Use Plan (CLUP) Update for Ventura County (P&D Aviation, November 1991)*. That report was updated and adopted July 7, 2000 (*Airport Comprehensive Land Use Plan Update for Ventura County, Coffman and Associates*). The 2000 CLUP made virtually no change to the findings of the 1991 CLUP when it comes to Oxnard Airport. This is primarily because at the time when the 2000 CLUP was being prepared, the *Oxnard Airport Master Plan* had not been adopted. Consequently, the preparers did not update noise and activity levels that were contained in the 1991 CLUP. Therefore, we reference the 1991 CLUP in this document except where the discussion specifically indicates a reference to the 2000 CLUP.

Influence of Airport Operations and Traffic Patterns

Oxnard Airport is owned and operated by the County of Ventura and administered by the County’s Aviation Department. The Airport has one runway. Its western and eastern ends are designated Runway 7 and Runway 25, indicating magnetic bearings of approximately 070 and 250 degrees, respectively. Runway numbers represent approximate magnetic headings. The paved area is 5,953 feet long and 100 feet wide. Each end of the runway is served by electronic instrument approach aids and by published instrument approach procedures. Runway 7 has a “nonprecision approach”, which provides pilots with horizontal guidance to the runway end. It is based on the Camarillo very high frequency omnirange (VOR) facility six miles east of the airport. Runway 25 is served by a “precision approach”, providing both horizontal *and* vertical guidance. It is based on the airport’s instrument landing system (ILS).

Aircraft safety and performance are enhanced by landing and taking off into the wind. Therefore, with prevailing winds from the ocean, Runway 25 is used the majority of the time. Runway 7 is used occasionally (about seven percent of all operations), particularly during calm wind conditions, and during

times when winds are blowing from the east. It may also be used on occasion when fog to the west precludes visual operations in that direction.

Runway 25 has a 1,377-foot displaced threshold. The threshold was displaced to provide landing aircraft with acceptable obstruction clearance over a church steeple east of the airport. Such clearance cannot be adequately provided to the physical runway end. The result is that pilots landing on Runway 25 must plan their approach to land beyond the displaced threshold bar painted on the runway. Aircraft using Runway 25 for westbound departures, however, may use the entire runway length for their takeoff roll. Aircraft either landing or departing eastbound along Runway 7 may use the entire pavement length.

Historical operations counts for Oxnard Airport for the past twenty-two years, as provided by the Ventura County Department of Airports, are presented in Table 1. These counts include all aircraft – general aviation, commuter, air taxi and military – using the airport. An operation normally indicates a landing or a takeoff. Therefore, a touch-and-go is normally counted as two operations – one landing and one takeoff.

<u>Year</u>	<u>Number of Operations</u>
1990	152,236
1991	134,935
1992	132,978
1993	137,880
1994	95,424
1995	94,580
1996	110,415
1997	120,333
1998	99,612
1999	90,025
2000	88,277
2001	86,432
2002	88,750
2003	83,458
2004	90,542
2005	101,862
2006	86,213
2007	76,710
2008	84,158
2009	61,627
2010	55,323
2011	56,762

After remaining well above 100,000 annual operations throughout much of the early 1990s, the activity dropped down in the 80,000 range through 2000 and held relatively steady at between approximately 83,500 and 90,500 operations for the eight-year span from 1999 through 2006. The one exception was in 2005, when operations grew to 101,862. The County's Department of Airports undertook an airport master planning process in the mid 1990s that projected an activity level of 176,000 operations by 2015, the planning horizon for that study. However, the study was not adopted and those projections now appear to be overly optimistic. The County adopted an update to its master plan in February 2005. It projected total operations for 2015 at 103,600. Our original report assumed that future activity levels would not grow appreciably over the then-current levels. In fact, with rising fuel prices, recreational flying and flight training levels, we suggested that operations could decrease somewhat. This has been borne

out by the rather significant drop experienced during the 2009-2011 timeframe, likely due to the current recession brought on by the banking crisis and higher than normal unemployment—factors not foreseen during the master plan process. While activity may yet return to the 80,000 to 90,000 level, economic forecasts appear to indicate that recovery from the recession will be slow. Therefore, activity levels may stay in the 60,000 range for a while.

We have shown nominal aircraft flight paths in Exhibit 1 as they are depicted in the 1991 CLUP. They are shown as 1,000-foot wide bands over the ground rather than as defined centerlines. The actual track over the ground for a particular flight varies with the type of aircraft, its performance characteristics, piloting techniques, air traffic control instructions, other aircraft activity, weather conditions, etc. Since individual flights may vary from the depicted paths for any number of reasons, they should be viewed as averages rather than specific paths over the ground.

As shown on Exhibit 1, the project site lies approximately 750 to 1950 feet north of Runway 7-25 and inside (not under) its northern traffic pattern. Therefore, the site should be relatively free of direct overflights by fixed-wing aircraft. However, there may be occasional overflights by pilots who fly a relatively tight traffic pattern.

FAA's Oxnard Air Traffic Control Tower has also entered into agreements with local helicopter operators that establish specific helicopter arrival and departure routes for Oxnard Airport. One of the routes goes east and west between Teal Club Road and the runway. As with variations in the fixed-wing traffic patterns, helicopters using this flight path may vary somewhat in their distance from the runway. Therefore, helicopters could occasionally affect the project site to some extent although they should normally stay south of Teal Club Road.

Another route provides for helicopters to take off from the southern side of the runway; cross over the runway to a point at approximately Teal Club Road and Patterson Avenue; and then turn in a northeasterly direction to depart the area. This route would take helicopters directly over the project site. Utilization of this site depends on being able to fit helicopters crossing the runway into the flow of fixed wing traffic using the runway. This could be a factor for incoming helicopters using the route in reverse (approaching the airport from the northeast.) In such cases, helicopters may occasionally need to hold northeast of the runway (over or near the project site) for clearance from the tower to cross the runway and land on the southern side.

Other routes generally follow the Fifth Street corridor east and west of the airport. Since Fifth Street is south of the airport, away from the project, it should not significantly affect the project site.

There are other helicopter routes. However, procedures have been established so that those going northbound primarily use the Victoria Road alignment at the western end of the airport to enter and leave the area. This normally keeps them from overflying the project area.

There do not appear to be any historical counts of helicopter flights that might help to distribute percentages of flights among the various flight paths described above. Therefore, in lieu of specific data, it is reasonable to assume that less than 25 percent of all helicopter flights using Oxnard Airport (those passing northeast/southwest over the site and those heading east/west along Teal Club Road) might affect the project site.

By agreement with the Oxnard Control Tower, all helicopter routes are to be flown at or below 500 feet above ground level to separate them from fixed-wing routes above.

The County of Ventura has requested via correspondence dated June 4, 2012 from Todd McNamee, Director of Airports, to Brian Foote, City of Oxnard Planning Division, that an aviation easement be granted to the County. Typically, an aviation easement indicates that property owner(s) acknowledge that their properties are in an area subject to frequent aircraft overflights and that such overflights may result in noise, exhaust emissions and vibrations.

FAR Part 77 Considerations

FAR Part 77 specifies a series of "imaginary surfaces" in the airspace surrounding runways and helicopter landing areas. These surfaces are designed to provide unobstructed maneuvering room for aircraft landing and taking off from an airport or heliport. The standards serve a two-fold purpose in minimizing hazards to aircraft as well as helping to prevent injury or damage to persons or property on the ground. Ideally, no object, either natural or man-made, should penetrate any imaginary surface. The surfaces are described below and depicted on Exhibit 1.

The "primary surface" serves as the basis for all other imaginary surfaces specified in Part 77. The primary surface is a 1,000-foot wide rectangle at runway elevation, extending 200 feet beyond each end of the runway pavement. The elevation of any point on the primary surface is equal to the elevation of the closest point on the runway. The elevation at the eastern runway end is 45 feet above mean sea level (MSL); the elevation at the western end is 34 feet MSL. Since the runway slopes down from east to west, the primary surface does likewise.

The "horizontal surface" is established at 150 feet above the official airport elevation of 45 feet MSL (high point of the runway). Therefore, the horizontal surface's elevation is 195 feet MSL.

"Approach surfaces" extend up and out from the primary surface ends (with different slopes at each end due to the different categories of instrument approaches available).

"Transitional surfaces" extend up and out from the primary and approach surface edges. They rise at a 7:1 slope (seven feet horizontal to one foot vertical) until reaching the horizontal surface at 195 feet MSL.

As shown on Exhibit 1, the project site underlies both the northern transitional surface and the horizontal surface. Therefore, these are the only imaginary surfaces of interest with respect to this project.

To accurately assess Part 77 impacts on proposed buildings, we must consider changes in ground elevation between the runway and the project site as well as the building heights themselves. Ground elevations at the proposed homes vary from 51.7 feet MSL in the northeastern portion to 37.5 feet in the southwestern portion. Therefore, the highest finish floor elevations would be approximately seven feet above the runway elevation. With an assumed 40-foot height, the maximum top elevation of homes would be about 47 feet above the highest point of the runway or approximately 92 feet MSL. Even the highest structures would underlie the horizontal surface at 195 feet MSL. Their tops would be at least 103 feet beneath the horizontal surface. Therefore, the horizontal surface is not considered to be a significant factor with respect to this project.

However, the southern part of the project area lies under the sloping 7:1 transitional surface. The most critical building parcels are those to the south, nearest Teal Club Road. We use these sites to estimate Part 77 clearance under the transitional surface. The nearest building site to the runway in the southwest part of the project parcel is the most critical. The runway elevation at this location is estimated at 40 feet MSL (precise runway survey information not immediately available). The transitional surface begins at the edge of the primary surface, which is 500 feet north of and parallel to the runway centerline. The nearest structure would likely be about 385 feet north of this point. The transitional surface at this location would probably be about 95 feet MSL (385 divided by 7, plus 40). The maximum ground elevation at this location is estimated to be less than 44 feet MSL. Therefore, the top elevation of a 40-foot high structure in the southwestern corner of the project can be expected to be at most 84 feet, about 11 feet beneath the transitional surface.

At 48 feet MSL, the finished grade in the southeastern corner of the project parcel would be less than three feet higher than the end of Runway 25. The nearest structure to this point would likely be about 250 feet from the edge of the approach surface. Therefore, the transitional surface at this location would

probably be above 90 feet MSL (250 divided by 7, plus 55). On this basis, the minimum clearance of a 40-foot high structure under the transitional surface would be about two feet. Therefore, within the accuracy currently available to us, it appears that none of the proposed structures would violate FAR part 77 criteria and so would not be considered "obstructions" under those criteria.

Other factors must be considered, however in addition to the major structures. For example, street lights, power lines, etc., depending upon their locations and heights, could be of concern. We do not currently have the data needed to analyze such items. However, we recommend that such items be designed to comply with Part 77 criteria. Designers can use Exhibit 1 as a general reference in doing so.

Trees can also violate Part 77 surfaces. Many common streetscape trees do not grow tall enough to be of concern. However, some varieties (certain palms, eucalypti, pines, etc.) can grow quite tall. Again, landscape information is not currently available for analysis. However, tree heights (at maturity rather than at initial planting) should be part of landscape planning. Again, landscape architects can use Exhibit 1 as a reference template to address this issue. The developer, in concert with city planners, can control the initial tree plantings in front yards and public areas. However, there is often less control over what individual homeowners may eventually plant on their own property. It is unreasonable to expect homeowners to be knowledgeable about FAR Part 77 criteria or to request an FAA study of potential trees' mature heights. Therefore, in order to minimize future FAR Part 77 obstructions, the City and developer should consider establishing codes, covenants and restrictions (CC&Rs) that limit the species or heights of trees that could later be installed by individual owners.

Regardless of what our own analysis indicates, FAR Part 77 requires that a project be submitted to the FAA for review if it would penetrate a "notice surface" based on a slope of 100 feet horizontal to 1 foot vertical from the nearest point of the nearest runway. The notice surface simply establishes a threshold for FAA study; it does not suggest that an object that might penetrate it would be an obstruction. The application, made via FAA's <https://oeaaa.faa.gov/oeaaa/external/portal.jsp> website, initiates an "obstruction evaluation" (OE) by FAA staff. The FAA's role in conducting an OE is solely to determine if a proposed structure might constitute an obstruction or, more seriously, a "hazard" to air navigation. Regardless of its findings, FAA cannot approve or prohibit construction; that responsibility lies with the local jurisdiction (City of Oxnard) in exercising its zoning powers. The runway elevation south of the project area varies from 45 feet MSL on the east to approximately 40 feet MSL on the west. In the east, a maximum structure top elevation of 40 feet above ground, or about 92 feet MSL, and an approximately 2,800-foot separation from the runway edge to the *most distant* structures, could penetrate the notice surface by around 10 feet. Because the nearest structures would be only about 750 feet from the runway edge, virtually all of them could penetrate the notice surface. The above analysis indicated that FAA would probably not identify the proposed structures as obstructions. However, because they could penetrate the notice surface, Part 77 does require that the developer submit the project to FAA for study. This can be done as a blanket application for the entire development rather than as individual applications for each building. Based on our own analysis and past experience working with FAA on many similar projects, we anticipate that FAA would find that the buildings would not constitute obstructions under Part 77 and that they would not constitute hazards to aviation.

Special note should be made of the added nine parcels south of Teal Club Road. These are closer to the airport and therefore more critical with respect to the 7:1 transitional surface. The surface would be lower over these parcels. In fact, this area's southern edge is contiguous with the airport property line and the primary surface, which corresponds with runway elevation. Therefore, at the southern edge of this narrow east-west strip, virtually any structure would constitute an "obstruction" under the criteria published in FAR Part 77. It must be clearly understood that, a structure's classification as an "obstruction" per Part 77 criteria does not mean that it would also be classified as a "hazard" to aviation. That determination can only be made by FAA during its obstruction evaluation process. Many structures are technically obstructions without being determined to be hazards. Typically in such cases, FAA may recommend that the structure be marked at night with red obstruction lights to alert pilots to its existence. Remember that FAA does not have the power to approve or prohibit construction of a structure. That power lies solely with the local community (City of Oxnard). However, FAA's recommendations should be taken into

consideration. Again, trees, light standards and power lines would be more critical on these parcels because of their closer proximity to the runway.

The proposed school site's southern boundary is *approximately* 2,000 feet north of the runway centerline and near the western end of the Specific Plan area. Assumed existing ground elevation at this location is *approximately* 41 feet (will vary somewhat over the site). It lies entirely beneath the horizontal surface (195 feet MSL). Therefore, building heights up to about 154 feet would be allowable on this particular parcel without violating FAR Part 77 airspace obstruction-clearance criteria. (See School Site section.)

Note that our FAR Part 77 analysis has been based on estimates of the distances of the planned structures from the runway centerline and estimates of building heights. Maps, grading information, etc. available at this early stage are not sufficient to provide precise analyses. Therefore, some indeterminate margin of error can be assumed in our estimates. We recommend that an accurate survey of existing and projected grades, building locations and heights, etc. be conducted prior to submitting FAA applications.

Airport Design Advisory Circular Considerations

In addition to FAR Part 77 standards, FAA has developed a series of airport planning criteria, published in Advisory Circular AC 150/5300-13, Airport Design. While several criteria affect placement of fixed or moveable objects near a runway, they apply primarily to construction near runway ends. None directly affect the subject property, which is approximately 750 feet north of the runway centerline.

CLUP Considerations

Several "safety zones" surrounding civilian airports in Ventura County are defined in the CLUP. These zones are generally established to provide a method of assessing the compatibility of various types of land uses with respect to aircraft operations. The document states "Land use and density criteria contained in these guidelines were developed to reduce the risk from an off-airport aircraft accident to an acceptable level" (page 18). The three classifications are the "inner safety zone", the "outer safety zone" and the "traffic pattern zone". The inner and outer safety zones lie beneath the approach surfaces shown on Exhibit 1 and do not affect the proposed development. The subject property lies entirely within the traffic pattern zone (TPZ), also depicted on Exhibit 1.

Much of the information in the CLUP is based on guidance provided by the Airport Land Use Planning Handbook, California Department of Transportation, Division of Aeronautics, July 1983. This document was replaced with a newer publication dated December 1993, again in 2002 and then again in 2011. We reviewed the 2002 edition of the Handbook to determine to what effect the revision would affect the subject property. Essentially, the new edition presents a compendium of different types of safety zones developed by various airport land use commissions (ALUCs) but does not suggest that they broadly be applied to all airports. It contains the statement that:

"It must be emphasized that the safety zone shapes and sizes described here are merely presented to illustrate the concepts discussed. Although they may serve as a useful starting point for individual compatibility plan development, these particular safety zones are not intended to represent Caltrans' recommendations, guidelines or standards. Most compatibility plans do not now include all of the zones shown here, nor is it required for them to do so. Many ALUCs likely will find it appropriate to continue to use the safety zones they have already established."

And, in the 2011 edition:

"This edition of the handbook does not change the safety zone guidance provided in the 2002 edition."

The intent is therefore that safety zones adopted by local airport land use commissions remain in effect unless the local ALUC should update its CLUP to revise its zone shapes and dimensions. Therefore, the safety zone definitions and dimensions contained in the current Ventura County CLUP are the ones relevant to this project.

The CLUP contains a listing of acceptable, conditionally acceptable and unacceptable land uses within each safety zone category. Single-family residential development is listed as conditionally acceptable within the TPZ provided that maximum structural coverage of the land is no greater than 25 percent. Although we cannot accurately sum the footprints of all proposed housing at this early stage, we made conservative estimates based on the maximum square footage and numbers of proposed units of each type in the product mix for the previously proposed project at this site. We estimated that the structural coverage for that project would have been less than 20 percent. Accordingly, the residential development would be expected to comply with this condition.

In addition to the specific land use compatibility criteria listed in the CLUP for each type of safety zone, it lists four types of land uses that are considered incompatible within all air safety zones. They are quoted below, verbatim from the CLUP:

- 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.
- Any use which would cause sunlight to be reflected 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.
- Any use which would generate smoke or which would attract large concentrations of birds, or which may otherwise affect safe air navigation within this area.
- Any use which would generate electrical interference that may be detrimental to the operation of aircraft and/or aircraft instrumentation.

We have no information that would indicate that the proposed development would be likely to produce any of these uses although there may be a slightly greater potential at the nine parcels south of Teal Club Road that would be designated as M-1 zoning. Developers should be made aware of these issues and efforts should be taken to ensure that none of these uses are included in development plans.

Based on the above factors, it appears that the proposed residential uses would be consistent with the guidelines contained in the CLUP. We anticipate that the Ventura County Transportation Commission, acting in its role as the Airport Land Use Commission for Ventura County would reach similar findings.

It is important to note that the CLUP classifies school sites as “unacceptable” within the TPZ (see School Site section).

Violations by Aircraft within the Oxnard Control Tower Air Traffic Area

The City's ordinance requires that this report include a list of airspace violations by aircraft under the authority of the Oxnard control tower for the six- to eighteen-month period preceding consideration by the Planning Commission. We have requested such information from FAA during the preparation of similar studies for past projects in the Oxnard Airport area. FAA has informed us that the information is not readily available, as the agency does not catalog violation records by airport or by air traffic area. We have stated this finding in past studies and City staff has not pursued it further. However, the following

section does catalog local aircraft accidents based on information provided by the Ventura County Aviation Department.

Aircraft Accident Risk - Airport Sphere of Influence

For a historical perspective of safety at Oxnard Airport, we have reviewed its accident history. Airports sometimes experience on-airport incidents (hard landings, gear-up landings, taxiing accidents, etc.). While these may damage aircraft or injure occupants, they do not affect off-airport land uses and are not considered significant in the context of this study. Consequently, we have not attempted to identify or record such incidents in this report.

During the past 33 years, there have been six significant accidents involving aircraft approaching or departing Oxnard Airport within its sphere of influence, an area of approximately 3.6 square miles.

1. In June 1979, an accident resulting from engine failure occurred on undeveloped land west of Victoria Avenue while the aircraft was approaching Runway 7. There were two fatalities and two serious injuries to its occupants. According to records of the National Transportation Safety Board (NTSB), the crash occurred between one and two miles west of the airport.
2. In June 1987, a Cessna 150 lost power during a night takeoff from Runway 25. It crashed into the Abex Corporation parking lot north of Fifth Avenue and adjacent to the airport. The accident resulted in minor injuries to the pilot and passenger, but there were no injuries to persons on the ground.
3. In August 1997, A Cessna 210 hit a home on Ivanhoe Avenue, approximately 3,000 feet north of the runway, just beyond the Sphere of Influence. It sheared off part of a chimney and some roof tiles. It then hit a light standard, tearing off one wing, before coming to rest in a bean field south of Doris Avenue, within the Sphere of Influence. The aircraft had lost power after departing Camarillo Airport. Its intended destination was Burbank. After losing power, the pilot was trying to reach Oxnard Airport for an emergency landing when the accident occurred. Of the three occupants on board, two were injured seriously. No one on the ground was hurt.
4. On April 22, 2001, a single engine Piper lost power, clipped the top of a eucalyptus tree and some power lines, and crashed in a celery field within the Sphere of Influence near the southwest corner of Fifth Street and Victoria Avenue shortly after departing Runway 25. The aircraft was demolished. No other structures were damaged. The pilot and his passenger sustained only minor injuries and declined treatment. No one on the ground was injured.
5. On May 26, 2006, a single engine Piper PA-28-151 impacted terrain and then struck a moving vehicle following a loss of engine power after an afternoon takeoff from Runway 25. The pilot attempted to turn back toward the airport to land on Runway 7. The airplane struck the vehicle, which was traveling southbound on Victoria Avenue about a quarter mile west of the airport. The pilot (sole occupant of the aircraft) was seriously injured. The two occupants of the vehicle received minor injuries. The accident occurred during visual meteorological conditions.
6. On August 7, 2008, a single engine Stewart S-51 (scaled down kit-built replica of a North American P-51 Mustang) crashed into the bus barn on the former Oxnard High School property after an engine failure during approach to Oxnard Airport's Runway 25. The crash site was about 7/10 of a mile east of the runway's displaced threshold. The aircraft was totaled and the sole occupant (pilot) was injured.

Two other accidents have occurred near but *outside* of the Sphere of Influence. We consider them to have been close enough to the airport to be of interest to decision makers in assessing the project's risk implications. We therefore include them in this discussion.

1. On November 19, 1995, a Beechcraft Bonanza crashed after apparently developing engine trouble while approaching Runway 7 in heavy fog. The aircraft came to rest approximately two and a half miles west of Oxnard Airport. The accident location appears to have been in the sand dunes west of Harbor Boulevard. The sole occupant died while undergoing surgery about three hours after the accident.
2. In 1981, an aircraft crashed about six miles east of the airport while on approach, resulting in one fatality to an aircraft occupant. This accident, attributed to improper instrument operations, occurred well outside of the sphere of influence but is included for this analysis.

Therefore, during the past 26 years, there have been eight significant accidents associated with Oxnard Airport, averaging about one every 3.9 years.

As with any other transportation mode, it is impossible to predict when or where a future accident might occur. An accident can obviously happen anywhere at any time and can endanger persons and property on the ground as well as occupants of the aircraft involved. To assess the probability of an accident occurring within the project area, we consulted research presented in California's Airport Land Use Planning Handbook (ALUP Handbook). It was prepared for Caltrans' Division of Aeronautics and published in January 2002. The Institute of Transportation Studies at the University of California, Berkeley, one of the participants in the ALUP Handbook effort, compiled data from 873 aircraft accident records (445 arrival accidents and 428 departure accidents) as inventoried by the NTSB. The database included accidents from 43 states for the ten-year period from 1983 through 1992, and addressed only "accidents," not "incidents." (The NTSB defines an accident as an occurrence where people on board or on the ground sustain serious or fatal injuries or where the aircraft incurs damage substantial enough that it is no longer considered airworthy). It included all general aviation airplanes but not helicopters or other aircraft types (ultralights, blimps, etc.). It also did not include commercial air carrier or military aircraft. The vast majority of operations at Oxnard fit within this profile. Therefore, we believe the study sufficiently representative from which to draw conclusions for this report.

According to figures contained in the 1991 CLUP, a three-year study period from 1986 to 1988 resulted in a national average of 0.36 off-airport accidents per 100,000 operations. At this rate, Oxnard should experience a probability of about 0.31 off-airport accidents per year at its current activity level of about 86,000 annual operations. This equates to one off-airport accident somewhere in the airport vicinity every 3.23 years. Projecting this to the ALUP study, it would take 2,820 years for all 873 accidents to occur at Oxnard. (The actual recent accident rate at Oxnard has been somewhat lower than this projection, at about one accident every 3.9 years.)

Aircraft Accident Risk - Project Vicinity

The above discussion addressed accident risk in the general vicinity of Oxnard Airport. In order to address accident risk in the immediate vicinity of the subject property, a much smaller "target," we again consult the ALUP study. Of the 873 accidents included in that study's database, nine arrival accidents and 17 departure accidents would have occurred within or adjacent to the project boundaries if they had occurred at Oxnard. This is based on an analysis of arrivals and departures along Runway 25 (see Exhibits F-1 and F-2 – exhibit numbers from Appendix F of the ALUP study) since the vast majority of operations occur on this runway rather than Runway 7. This represents 26 (2.98 percent) of the 873 accidents in the national database. Therefore, the probability of an accident at or near the project site can be seen as 2.98 percent of the probability of an accident somewhere in the airport vicinity. Multiplying Oxnard's projected rate of 0.31 off-airport accidents per year by 0.0298, we obtain a

probability of 0.0092 accidents per year, or about one accident every 109 years within or near the project boundaries.

Note that the proposed school site represents approximately five percent of the overall Specific Plan development area. Therefore, without going into extreme detail, it can logically be assumed that the school site represents a much smaller “target” for an aircraft in distress. The probability of an accident on the school site would be appropriately lower—a probability of an accident on or near the school site about every 2,000 years.

We must exercise caution in placing undue emphasis on these probability figures. A certain amount of randomness should be assigned to actual accident locations. Therefore, while other accidents in the database may have occurred outside the project boundaries, they should not be completely disregarded. Any specific accident can happen within or near the project boundaries at any time. Should an aircraft strike an occupied structure, the result could be tragic.

As with all modes of transportation, aviation carries some degree of risk. The above discussion attempted to quantify that risk with respect to the proposed Teal Club Specific Plan project. We leave it to local decision-makers to determine if the projected probability of one accident every 109 years represents an acceptable level of risk for the Oxnard community.

Emergency Landing Areas

In the event of an in-flight emergency, a pilot may need to land an aircraft at other than a prepared runway. As long as adequate emergency landing areas exist, the potential for an aircraft impacting a building is minimized and the chance of surviving a forced landing is enhanced. Recent nearby development has gradually eliminated some of the land previously available for emergency use. The proposed project would add to the cumulative effect of diminishing land areas available for emergency landings.

While recent development has occurred near Oxnard Airport, there is still a large amount of land devoted to agricultural and greenbelt uses. In fact, the San Buenaventura-Oxnard Greenbelt Agreement specifies that much of the land west and north of the airport be designated for permanent agriculture and open space in accordance with a proposal made in the Open Space/Conservation Element of the Oxnard General Plan (City of Oxnard 1990). This land is depicted in Exhibit 2. These areas may yet be able to serve as emergency landing areas, depending upon the location and nature of an in-flight emergency.

School Site

The Specific Plan includes a proposed school site. Section 3570 of the California Code of Regulations, pursuant to the Education Code, requires Caltrans DOA to evaluate proposed school sites within two miles of a runway upon the request of local authorities “in order to promote the safety of pupils, comprehensive community planning, and a greater educational usefulness of schoolsites”. Therefore, before acquiring title to the site, the Oxnard School District should apply to Caltrans DOA for its review in compliance with the Education Code.

The FAR Part 77 analysis showed that buildings on the proposed school site parcel could be as tall as (approximately) 154 feet above ground without penetrating the horizontal surface associated with Oxnard Airport. Obviously, school buildings would not be that tall, so from an obstruction-clearance standpoint, the site would be acceptable for school site development.

However, as stated above, the CLUP lists schools as “unacceptable” within the traffic pattern zone. This classification is from a land use perspective.

Conclusions

Decisions regarding development projects near airports should not be taken lightly as aircraft accidents can obviously have disastrous implications. Consequently, agencies at federal, state and local levels have developed various criteria to help guide local planning agencies in their decision-making. This report has attempted to objectively review existing airport land use compatibility standards with the goal of determining the degree to which the proposed project complies.

The County of Ventura Department of Airports has requested that an aviation easement be granted to the County. Such easements typically indicate that property owners are aware of frequent aircraft overflights that may result in noise, exhaust emissions and vibrations.

An analysis of imaginary surfaces defined in FAR Part 77 indicates that the proposed structures within the Specific Plan area would likely comply with all relevant criteria and would not be considered obstructions or hazards to aviation. However, many if not all of the structures must be submitted to the FAA for an obstruction evaluation prior to construction because they would penetrate the FAR Part 77-specified "notice surface", which represents a threshold level for FAA review. This can normally be done as a blanket application covering the entire proposed development as long as structural heights are known (or covered from a conservative "worst case" perspective). Particular attention should be given to locations and heights of light standards, power lines and tree (heights at maturity) once that information is available. Proactive measures can normally be taken to ensure that these items will not violate FAR Part 77 criteria.

It is likely that FAA might find manufacturing development in the nine parcels south of Teal Club Road to be "obstructions" under FAR Part 77 criteria. However, there is a much lower likelihood that FAA would find proposed structures to be "hazards" to aviation. FAA may recommend red obstruction lights to mark them for pilots at night.

The project area does not lie within the areas addressed by planning standards published by the FAA in its *Airport Design* advisory circular.

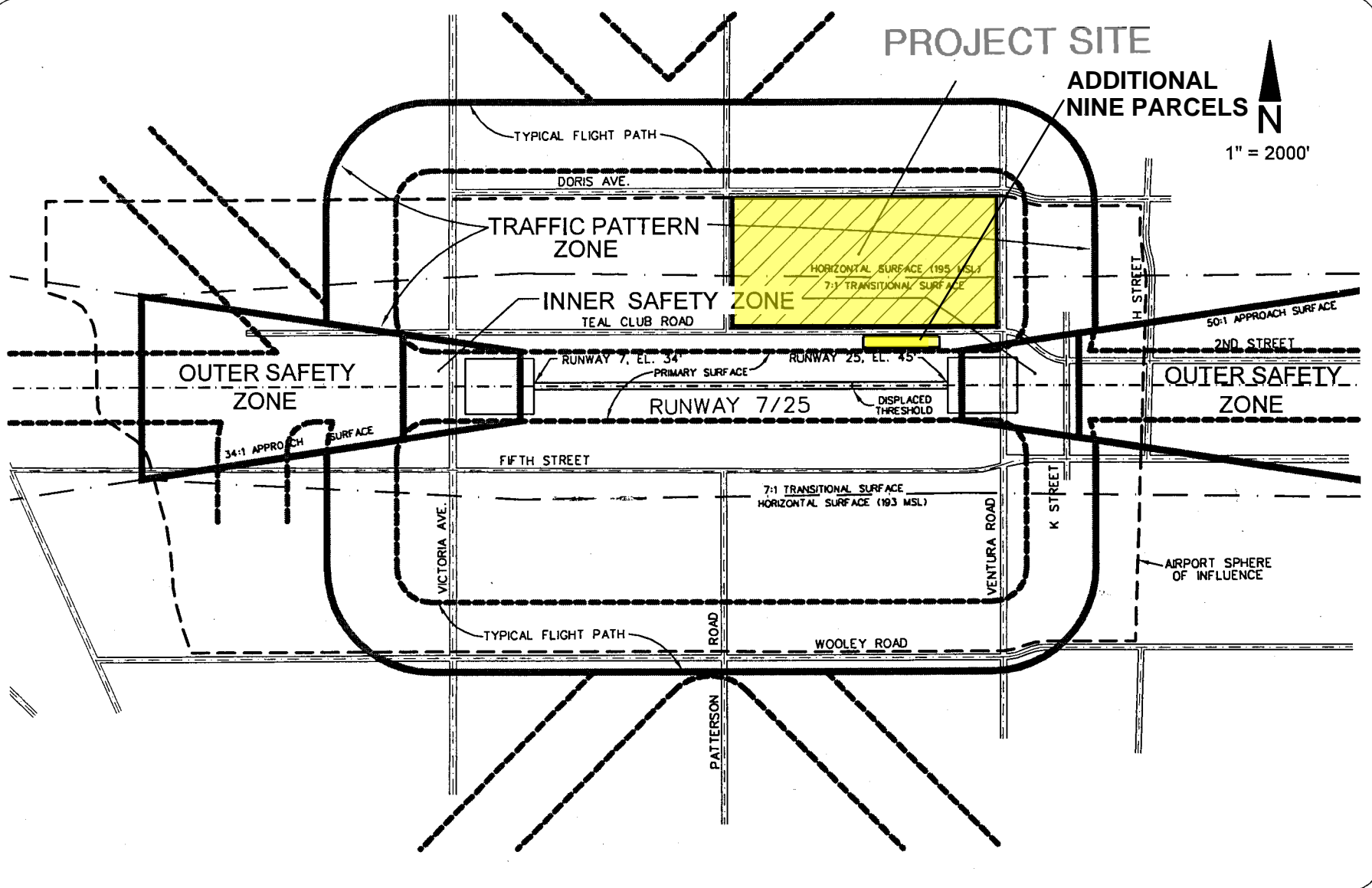
The project area lies within the traffic pattern zone defined by the CLUP and appears to be consistent with CLUP guidelines. However, the Ventura County Transportation Commission, acting as the Airport Land Use Commission for Ventura County has the responsibility of making an official finding of consistency or inconsistency.

The project will contribute to the cumulative effect of reduction in potential emergency landing areas surrounding Oxnard Airport. However, lands north and west of the airport are devoted to agricultural or open space uses within the San Buenaventura-Oxnard Greenbelt, which is protected from future development. Those lands would therefore remain available for emergency landings if needed. The proposed project would convert about 175 acres currently in agricultural use north of the airport to residential and other uses.

An aircraft accident can occur at any time and at any place within or near the project site. An accident could involve an aircraft taking off from or landing at Oxnard Airport or it could involve an aircraft enroute between two other airports, with no connection to Oxnard Airport. There is no way to completely guard against such occurrences. We can, however, assess the relative probability of an accident occurring within a specific area. One method of estimating aircraft accident potential within or immediately adjacent to the project area resulted in a probability of an occurrence every 109 years. However, there are no "standards" that specifically address this issue. Only local decision-makers can determine if this level of probability is acceptable to the Oxnard community.

The School District must submit the proposed school site to Caltrans Division of Aeronautics for review in accordance with Section 3570 of the California Code of Regulations before acquiring title to the property. The school site is acceptable from an airspace obstruction-clearance perspective but the CLUP deems

school sites to be "unacceptable" within the traffic pattern zone from a land use perspective. The accident probability is much lower for just the school site than for the overall Specific Plan development area.



PROJECT SITE

**ADDITIONAL
NINE PARCELS**



1" = 2000'

Note: FAA Runway Protection Zone Boundary and CLUP Inner Safety Zone Boundary are identical.

**Project: Teal Club Specific Plan
And Nearby Parcels**

Exhibit 1: Aviation Safety Criteria

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OXNARD / VENTURA GREENBELT AGREEMENT



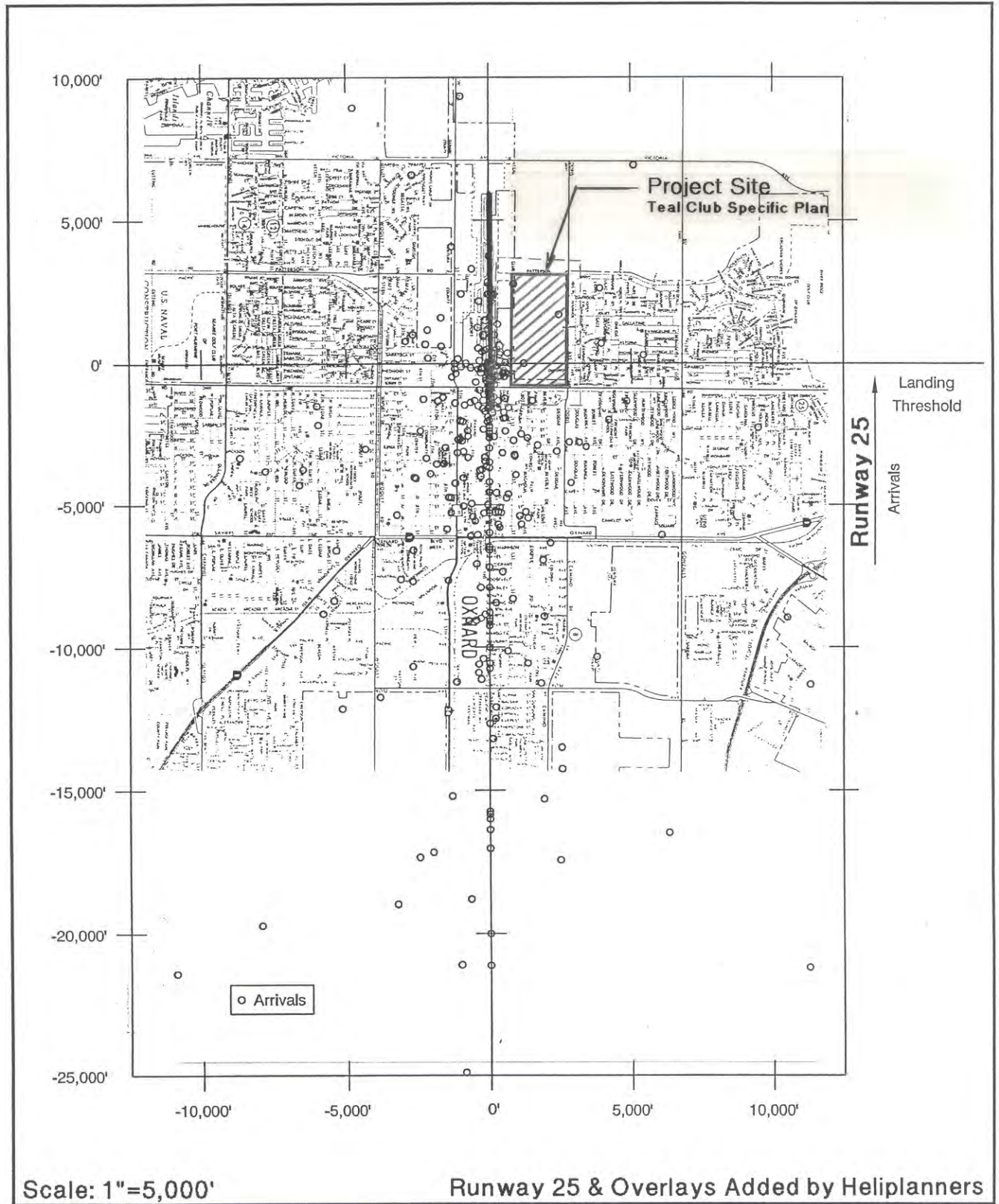


EXHIBIT F-1

Arrival Accidents

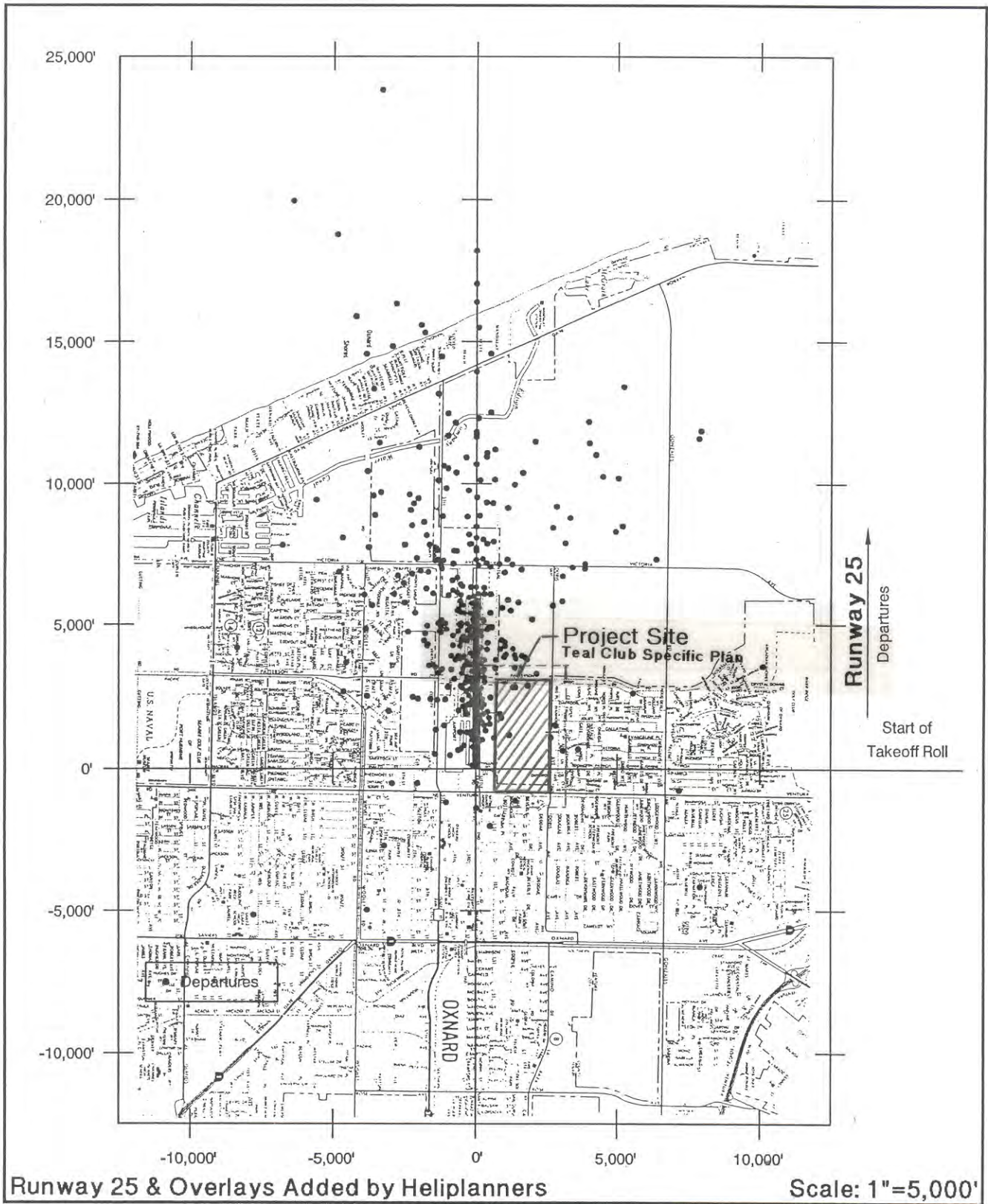


EXHIBIT F-2

Departure Accidents