Technical Memorandum

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Date: April 23, 2013

Subject: *Otay Ranch Resort Village: Safety Zone Boundaries for John Nichol's Field*

1.0 Introduction

The Otay Ranch Resort Village project is proposed to consist of a combination of residential, mixed-use, recreational, resort, public service, and open space uses within the County of San Diego's land use jurisdiction. Portions of the project site are situated within an area where they could be affected by safety-related concerns associated with the nearby John Nichol's Field, a restricted, private-use airport.

The purpose of this Technical Memorandum is to examine and, as appropriate, delineate adjustments to "generic" safety zones indicated in California state guidelines so as to more accurately reflect the physical and operational characteristics of the airport and its environs.

2.0 Approach

In California, the basic source of guidance regarding compatibility between proposed land use development and the activity from a nearby airport is provided by the California Department of Transportation Division of Aeronautics (Caltrans Aeronautics) in its *California Airport Land Use Planning Handbook (Handbook)*, dated October 2011. State law requires that the *Handbook* be used as a "technical resource" for assessing airport-related safety hazards and noise problems as part of the preparation of environmental documents for projects near public-use airports (Public Resources Code Section 21096).

With regard to safety, *Handbook* Figure 3A: Safety Compatibility Zone Examples – General Aviation Runways, provides several generic example sets of airport safety zones associated with different length runways. The zones reflect the patterns of where aircraft accidents typically occur relative to airport runways. Zones closest to the ends of runways have the highest degree of risk and, correspondingly, the greatest need for restrictions on land use development in order to assure the safety of people and property on the ground.

The intent of the generic zones is to serve as a starting place for the evaluation of the risks at any particular airport. As noted in the *Handbook*, it is essential that the generic zones be examined and adjusted as appropriate to fit the conditions of an individual airport (see pp. 3-16 to 3.25). Table 3A : Safety Zone Adjustment Factors (Airport Operational Variables) lists many of the specific factors that should be considered in making these adjustments. The topography and other geographic features of the airport environs are also appropriate factors to consider (*Handbook*, p. 3-21).

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[a] See "Attachment A" to this Technical Memorandum for information on the qualifications of Mead & Hunt. As documented in the attachment, Mead & Hunt co-authored the 2011 edition of Caltrans Aeronautics' *California Airport Land Use Planning Handbook*. The analysis and conclusions in this memo are based on Mead & Hunt's experience and expertise in airport land use compatibility planning and knowledge about the state's guidance.

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John Nichol's Field is known to have unique operating characteristics that warrant a closer look at the applicability of the *Handbook*'s generic safety zones.

3.0 Analysis

The Mead & Hunt analysis began by contacting the airport operator for information about the characteristics of the airport operations. (The airport operator, Mr. Alan Fink, President/Owner of Tactical Air Operations, Inc., dba Skydive San Diego, was reached by telephone on January 10, 2013. —Attachment B" to this technical memorandum contains written documentation summarizing Mead & Hunt's communications with Mr. Fink.)

3.1 John Nichol's Field Physical and Operational Characteristics

John Nichol's Field is a private- and restricted-use airport situated near the southeastern edge of the San Diego metropolitan area at the end of the eastern arm of Lower Otay Lake. The airport is located on land owned by the City of San Diego and leased to the operator. The airport has been in use for more than 40 years. Its primary purpose is to serve as a base of operations for Skydive San Diego—a commercial skydiving/parachute training center. Skydive San Diego utilizes the airport as a training facility for contract Navy Seal parachute training. The airport's other major function is as a base for ultra-light/light sport aircraft activity. Ultralights are very small, light-weight (less than 254 pounds empty weight), single-seat, recreational aircraft. As a restricted-use facility, the airport is generally closed to transient aircraft or aircraft not based there. Non-based aircraft must obtain prior permission to land.

All aircraft currently based at the airport are associated with either skydiving or ultralight activity. Specifically, there are two Cessna Grand Caravan jump planes (single-engine Blackhawk-conversion turboprops carrying up to 21 people each), three Twin Otter jump planes (twin-engine turboprops carrying up to 23 people each), and approximately 20 ultralight/light sport aircraft. There are no other powered airplanes or any sailplanes or helicopters based at the airport.

Jump plane activity at the airport varies significantly and is highly dependent upon the day of the week, the training mission being conducted, and the weather/wind. According to the airport operator, on a busy day, there can be between 30 and 50 jump plane departures. Weekends and periods when Navy Seal training is being conducted constitute the busiest operational periods. Annual jump plane activity is estimated at 7,500 departures (15,000 total operations), all flown by professional pilots. The ultralight/light sport aircraft are usually operated in the vicinity of the airport and typically only during low-wind conditions (i.e., mornings and late afternoons). Ultralight aircraft activity is estimated at approximately 3,000 annual departures (6,000 total operations).

The airport officially has two runways, one paved and one unpaved, with both oriented roughly east/west. The paved primary runway—Runway 9-27—was unpaved until about 10 years ago. It now has approximately 1,800 feet of pavement, 50 feet wide, plus 200 feet of paved safety area on the east end and 600 feet of dirt overrun on the western end that are not considered part of the runway length. The secondary runway—Runway 5-23—is a 600-foot, dirt strip used occasionally by ultralights when the wind dictates. Neither runway is lighted; thus all activity is during daylight hours only. There are no published instrument procedures serving the airport.

All takeoffs and landings are made from the east to the west (i.e., on Runway 27). This is due to the predominant winds (98% of the time) being from the west. Jump planes and ultralight/light sport aircraft taking off from Runway 27 turn slightly to the left upon lift-off to climb-out over the eastern arm of Lower Otay

Lake. The departing jump planes then make a 180-degree left turn to proceed back to the south of the airport with a subsequent 180-degree left turn at altitude to release the jumpers. All jump runs are made from the east to the west with the jumpers targeting the drop zone located near the center of the airport. When the jump planes have completed their run, they begin a high rate-of-descent return to the airport generally entering a standard left pattern for Runway 27 to the south of the airport below 2,000 feet MSL, approximately 1,500 feet above the airport's 490-foot elevation.

3.2 Safety Zones

The proposed Otay Ranch Resort Village is affected only by aircraft activity at the western end of the primary runway. Given the almost exclusively east-to-west direction of operations, only takeoffs are at issue. Also, only the jump planes represent a significant safety concern to people and property on the ground. Because of their very light weight and very slow flying speed, ultralights are highly unlikely to pose a significant threat to anyone on the ground and thus have been set aside for purposes of refining the generic safety zones.

The *Handbook*'s generic safety zones assume that aircraft are normally landing straight in or taking off straight out when near the ends of a runway. However, because aircraft departing from Runway 27 at John Nichol's Field normally turn approximately 30 degrees left above or slightly past the runway end, an adjustment to the generic safety zones is appropriate. The *Handbook* does not provide an exact formula or methodology by which to adjust the safety zones; it only notes some of the factors that should be taken into account.

Among the general aeronautical factors considered in developing the adjusted safety zones are these:

- The *Handbook*'s generic safety zones for a short runway (runway length less than 4,000 feet) are the appropriate starting point for the analysis of John Nichol's Field where the runway length is only 1,800 feet.
- The accident data on which the *Handbook*'s safety zones are based shows that departure accidents tend to be spread widely, but close to the runway end. In contrast, arrival accidents are extended linearly along the extended runway centerline. Because the western end of the runway is rarely used for landings, the chief concern is departure accidents.
- Lastly, an important point to recognize when evaluating where aircraft accidents might occur near an airport is that the route an aircraft normally flies may not be where it goes under emergency circumstances. While the risks are greatest along the flight path, they also exist to either side.

Based upon our interpretation of the information obtained from the airport operator together with our experience as pilots and specialists in airport land use compatibility, Mead & Hunt adjusted the generic safety zones delineated in the *Handbook*. The resulting adjusted safety zones are depicted in two accompanying illustrations: Figure 1: Comparison of Generic and Adjusted Safety Zones; and, Figure 2: Adjusted Safety Zones With Tract Map Overlay.

Specific adjustments to the individual safety zones were based on the following:

- *Safety Zone 1* encompasses the runway protection zone (RPZ), the dimensions and position of which are set by Federal Aviation Administration and Caltrans standards. This is the area of greatest risk to uses on the ground. An aircraft aborting a takeoff while still on or just barely off the ground would likely come to rest in the RPZ. Also, an aircraft that lands long at the opposite end of the runway could overshoot and end up in the far RPZ. No adjustment to Safety Zone 1 is suggested.

- *Safety Zone 2*, the inner approach/departure zone, is the area of next greatest risk and generally should surround Safety Zone 1. Using the *Handbook*'s generic length of 2,000 feet from the runway end extends the zone to the top edge of a small plateau. This plateau, about 100 feet above the runway end elevation, is a logical geographic break point. Although aircraft operating at the airport normally turn to avoid this terrain, they can easily climb above it. Thus, some probably fly over at least the edge of this area rather than execute a low-altitude turn closer to the runway end. Therefore, while most of the zone should be angled southward to reflect the usual close-in left turns on departure, also to be considered is the prospect that some aircraft, particularly if in distress, might not turn as quickly or would continue straight ahead along the edge of the lake. A portion of the straight-out generic zone thus remains. *Safety Zone 3*, the inner turning zone, can be reduced in size on the north because of the lack of typical turns in that direction. To the south, though, it should be widened in recognition of the aircraft turns in that direction.
- In the generic set of zones, *Safety Zone 4*, the outer approach/departure zone, runs along the extended runway centerline beyond Safety Zone 2. For John Nichol's Field, some amount of Safety Zone 4 should remain in that location, but it should be shifted to the south to follow the typical flight path.
- *Safety Zone 5*, the sideline zone, lies adjacent to the runway and no adjustments are recommended.
- *Safety Zone 6*, the traffic pattern zone, is intended to encompass an airport's traffic pattern. For John Nichol's Field, most of the northern portion of the zone can be eliminated due to the operational attributes of the airport's air traffic.

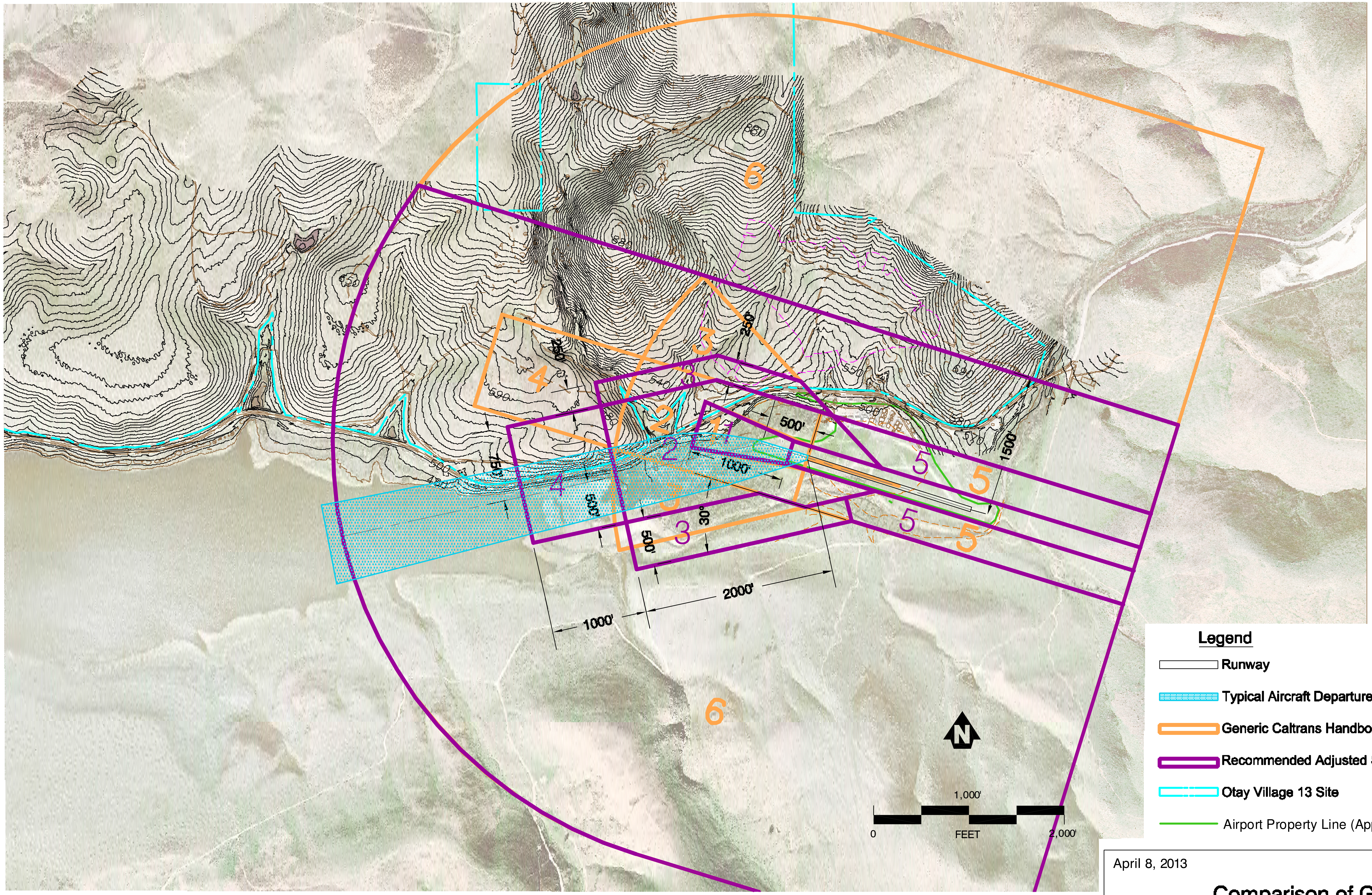

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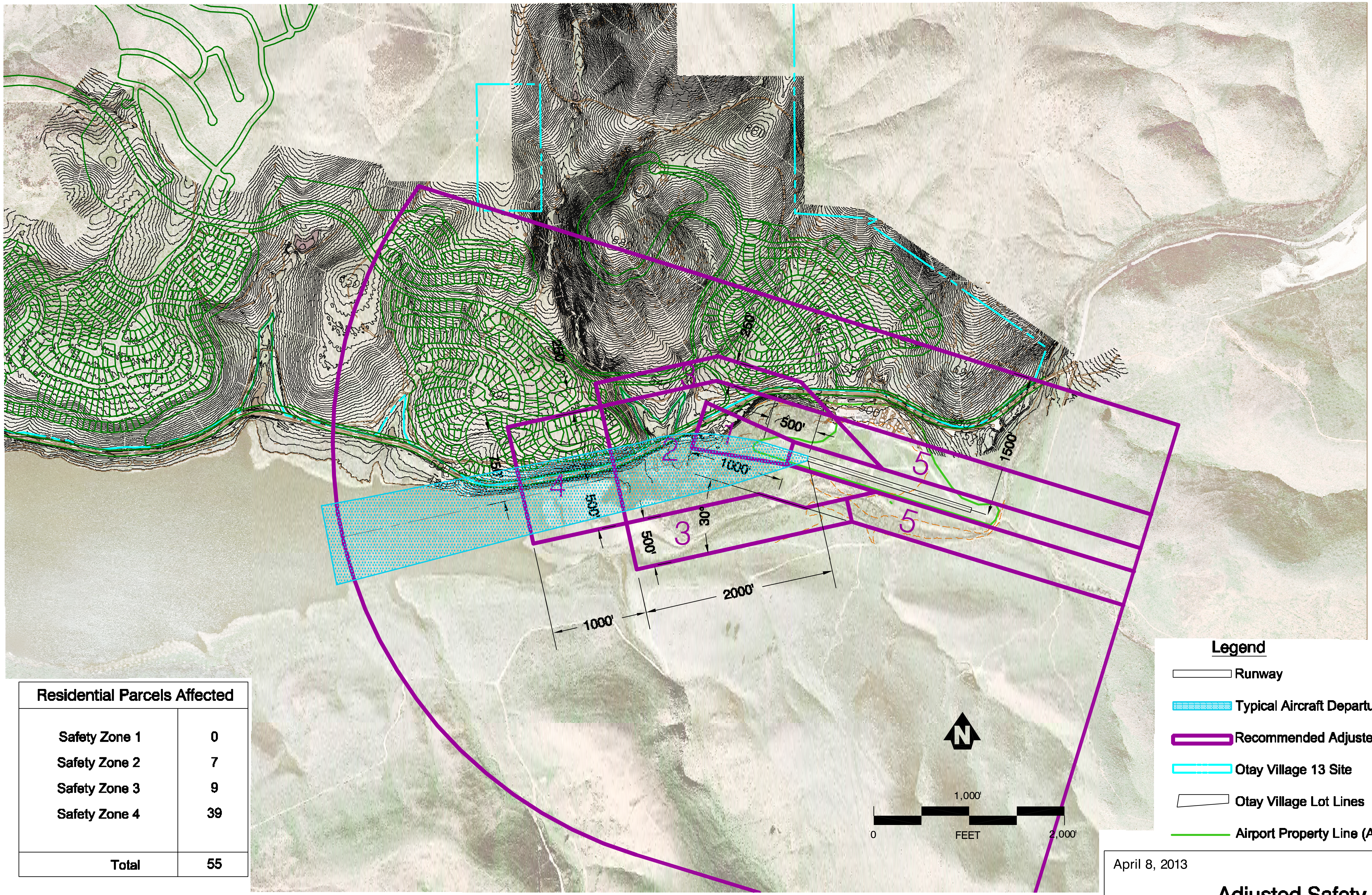
Figure 1

Comparison of Generic and Adjusted Safety Zones

John Nichol's Field



Residential Parcels Affected	
Safety Zone 1	0
Safety Zone 2	7
Safety Zone 3	9
Safety Zone 4	39
Total	55

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Figure 2

Adjusted Safety Zones with Track Map Overlay

John Nichol's Field