

# *Appendix I*

## Airspace Protection Analysis and Policy Review

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# Appendix I

## Airspace Protection Analysis and Policy Review

### I.1 INTRODUCTION

In the context of airport land use compatibility, airspace protection refers to the need to protect safe and efficient air navigation around San Diego International Airport (SDIA or the Airport). This is accomplished by limiting the heights of new structures and objects to ensure that they do not become hazards to air navigation or further degrade the airfield's operational capability.

Four common terms used in this Appendix have specific technical meanings with respect to airspace:

- Object — An element of natural growth, terrain, or fabricated structure.
- Obstacle — "An existing object ... at a fixed geographical location or which may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation."<sup>1</sup> An obstacle is known as a "controlling obstacle" when a flight procedure is designed around that obstacle as the limiting factor.
- Obstruction — "Any object/obstacle exceeding the obstruction standards specified by 14 CFR [Title 14 Code of Federal Regulations] Part 77, Subpart C."<sup>2</sup> An obstruction may or may not be an obstacle. Upon evaluation, obstructions may be determined by the Federal Aviation Administration (FAA) to require proper marking, lighting, and identification in aeronautical publications so that pilots may easily recognize them.
- Hazard — An object exceeding an obstruction standard and creating adverse aeronautical effects, that the FAA has determined would have a "substantial adverse effect," which includes:
  - electromagnetic interference with aircraft or navigation facility signals, or
  - an "adverse effect" to a "significant volume of aeronautical operations."<sup>3</sup>

### I.2 FEDERAL AIRPORT IMPROVEMENT PROGRAM GRANT ASSURANCES

Airports that have received grants through the federal Airport Improvement Program must abide by assurances to comply with certain federal laws and regulations and to effectively manage and maintain airport property and improvements. Grant Assurance 20, quoted below, requires airport sponsors to protect airspace and to promote land use compatibility in the airport environs. At SDIA, the grant assurances apply to the San Diego County Regional Airport Authority.

**20. Hazard Removal and Mitigation.** It [the airport sponsor] will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating

<sup>1</sup> US Department of Transportation, Federal Aviation Administration, *Pilot/Controller Glossary*, [https://www.faa.gov/air\\_traffic/publications/atpubs/pcg\\_html/glossary-o.html](https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-o.html) (accessed November 28, 2023).

<sup>2</sup> US Department of Transportation, Federal Aviation Administration, *Pilot/Controller Glossary*, [https://www.faa.gov/air\\_traffic/publications/atpubs/pcg\\_html/glossary-o.html](https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-o.html) (accessed November 28, 2023).

<sup>3</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraph 6-3-5, April 20, 2023.

existing airport hazards and by preventing the establishment or creation of future airport hazards.<sup>4</sup>

### I.3 FEDERAL REGULATIONS AND GUIDANCE

The FAA has standards for assessing airspace obstructions and potential hazards to flight. The federal airspace regulatory framework is provided in 14 CFR Part 77 which describes:

- When notice of construction or alteration must be provided to the FAA (Part 77, Subpart B)
- Standards to determine obstructions to navigable airspace (Part 77, Subpart C)
- FAA's process to determine the effect of proposed construction or alteration on navigable airspace (Part 77, Subpart D)

The objectives of the FAA are to promote air safety and the efficient use of navigable airspace. However, the FAA has no authority to restrict or limit proposed construction. If potentially hazardous airspace encroachments are permitted by local authorities, the FAA will adjust flight procedures and airspace to reestablish safe obstacle clearance, even if those adjustments diminish the utility and capacity of the airspace and affected airports. Thus, local land use regulations are necessary to limit the construction of obstacles and hazards to protect the operation of airports.

#### I.3.1 Federal Reporting Requirements

14 CFR 77.9 requires project sponsors to notify the FAA of any proposal to build or alter a structure or object that is:

- Taller than 200 feet above ground level (AGL)<sup>5</sup>
- Taller than the height of an imaginary surface extending outward and upward from the runway at a slope of 100 to 1 within 20,000 feet of any runway at an airport with at least one runway longer than 3,200 feet (such as the runway at SDIA), as depicted on Exhibit I-1.<sup>6</sup>

The notification requirement applies to both permanent and temporary structures and objects, including construction equipment such as cranes and derricks. Project sponsors may also be required to notify the FAA of proposed projects that do not exceed these heights because of potential effects on navigational aids or for other reasons specified by the FAA. In instrument approach areas, for example, the FAA defines a notification surface that is lower than the 100 to 1 surface depicted on Exhibit I-1. The approach area notification surface varies in width from 1.2 to 2 nautical miles (NM) and extends 6 NM from the runway end, with a maximum height of 100 feet above the runway threshold elevation.<sup>7</sup> This is depicted on Exhibit I-2.

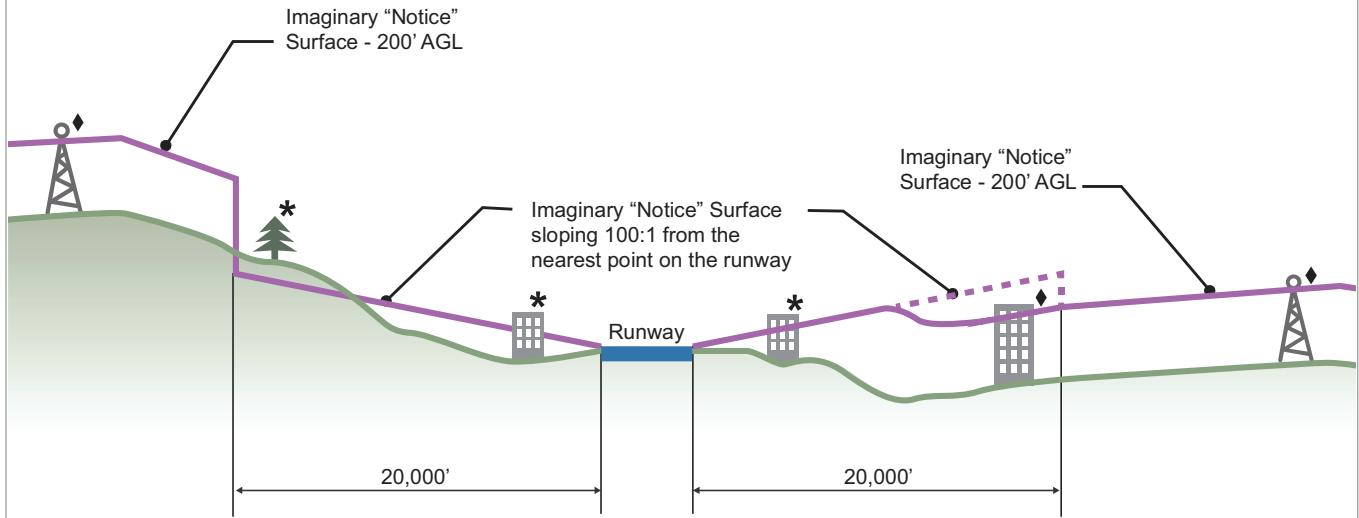
<sup>4</sup> US Department of Transportation, Federal Aviation Administration, FAA Airports, *Assurances - Airport Sponsors*, May 2022, Section C, Sponsor Certification.

<sup>5</sup> 14 CFR 77.9(a).

<sup>6</sup> 14 CFR 77.9(b).

<sup>7</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400,2P, *Procedures for Handling Airspace Matters*, Paragraph 5-2-1, April 20, 2023.

Federal law requires sponsors of certain proposed projects to file with the FAA a Notice of Proposed Construction or Alteration (FAA Form 7460-1).<sup>1</sup> This applies to proposed objects taller than 200 feet above the ground anywhere in the United States and shorter objects within 20,000 feet of runways longer than 3,200 feet or within 10,000 feet of shorter runways. This requirement applies to all proposed objects including structures, antennas, trees, mobile objects, and temporary objects, such as construction cranes.

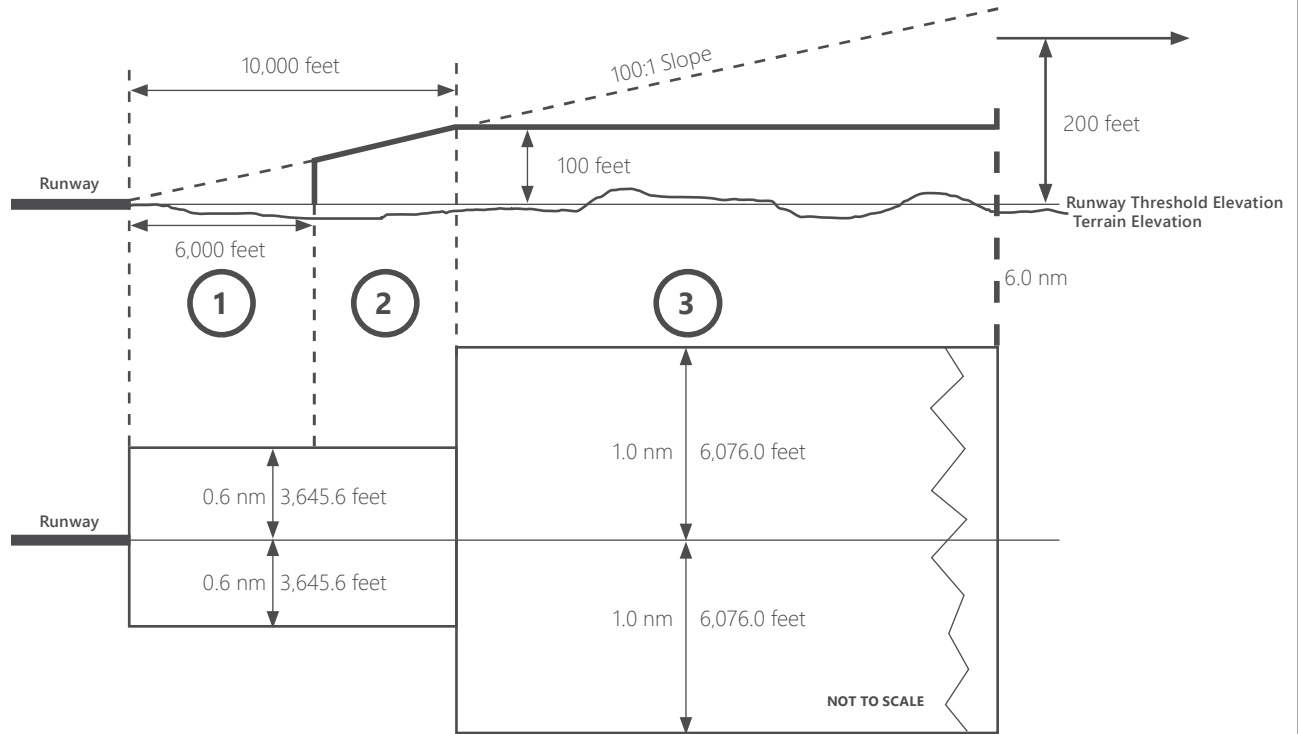


**LEGEND**

- ◆ 14 CFR 77.9(a) Any proposed construction or alteration more than 200 feet in height above ground level (AGL) at its site requires notice.
- \* 14 CFR 77.9(b) Any proposed construction or alteration penetrating imaginary surfaces in proximity to runways or heliports requires notice.

**NOTES:**

1. 14 CFR 77.9(a) and 77.9(b). Proposed construction or alteration that is lower than 200 feet AGL and is lower than the 100:1 notification surfaces may require notification under other requirements. Please see 14 CFR 77.9(c) and 77.9(d)



<b>1</b>	Runway threshold to 6,000 feet	Notice required for any structure above the runway threshold elevation within 3,645.6 feet perpendicular to runway centerline.
<b>2</b>	6,000 to 10,000 feet	Notice required for any structure exceeding 100:1 slope from runway threshold elevation within 3,645.6 feet perpendicular to runway centerline.
<b>3</b>	10,000 to 36,457 feet	Notice required for any structure greater than 100 feet above the runway threshold within 6,076 feet perpendicular to runway centerline.
	Beyond 36,457 feet (6 nm)	Notice required for any structure 200 feet or more above ground level (AGL).

SOURCE: Ricondo & Associates, Inc., October 2023, adapted from FAA Order JO 7400.2P, *Procedures for Handling Airspace Matters*, April 20, 2023, Figure 5-2-5.

NOTES:

nm - nautical mile

Notification area defined by the FAA under the authority of 14 CFR 77.9, Construction or alteration requiring notice.

Sponsors of proposed projects need not file a Notice of Proposed Construction or Alteration with the FAA if the proposed object “will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation.”<sup>8</sup> The FAA has developed guidance for determining whether proposed objects near airports are shielded.<sup>9</sup>

If a project sponsor is required to notify the FAA of a proposal to build or alter a structure or object per 14 CFR 77.9, the sponsor must submit to the FAA a completed FAA Form 7460-1 “Notice of Proposed Construction or Alteration”.<sup>10</sup> This is a requirement of federal law that applies whether state or local laws acknowledge it. The FAA has developed an [online tool](#) to assist project sponsors in determining if they are required to notify the FAA.<sup>11</sup>

Exhibit I-3 depicts the 14 CFR Part 77, Subpart B, height notification area at SDIA.

### I.3.2 Part 77 Obstruction Standards

An obstruction to air navigation is an object that exceeds any of the following federal obstruction standards:

- a height of 499 feet AGL
- a height of 200 feet AGL or 200 feet above the airport elevation, whichever is higher, within 3 NM of the airport
- a height that encroaches into the required obstacle clearance areas separating designated flight altitudes from obstacles
- a height that increases a minimum obstacle clearance under enroute criteria (14 CFR 77.17(a)(4))
- the surface of a takeoff and landing area of an airport or any imaginary surface defined around the airport in accordance with Part 77, Subpart C [14 CFR 77.17(a)]

The airport-vicinity surfaces defined in 14 CFR 77.17(a) constitute airport obstruction standards. While any object penetrating these surfaces is an “obstruction,” it is not necessarily an “obstacle” or a hazard to air navigation. Exhibit I-4 describes the 14 CFR Part 77 imaginary airspace surface criteria and depicts the surfaces in plan and isometric views. As indicated in the table on the exhibit, the sizes of the various surfaces vary depending on the classification of the runway and the nature of the runway approach.

Exhibit I-5 depicts the imaginary surfaces at SDIA defined according to 14 CFR Part 77, Subpart C. Extensive areas of terrain north and east of the runway and smaller areas southwest of the runway penetrate the imaginary surfaces associated with SDIA.

<sup>8</sup> 14 CFR 77.9(e)(1).

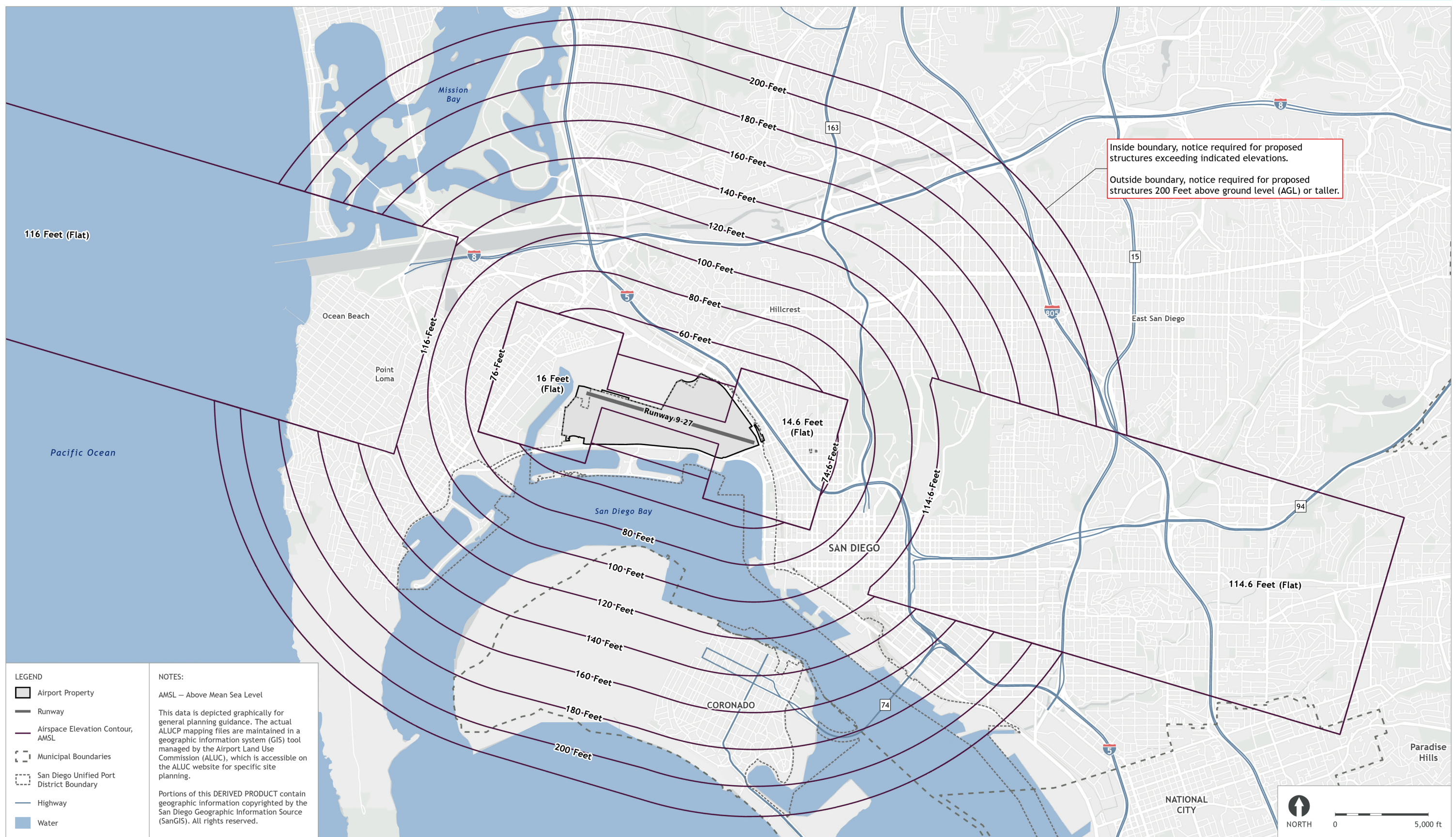
<sup>9</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraphs 6-3-13 and 6-3-14, April 20, 2023.

<sup>10</sup> 14 CFR 77.7.

<sup>11</sup> US Department of Transportation, Federal Aviation Administration, Notice Criteria Tool webpage, <https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm> (accessed September 22, 2023).

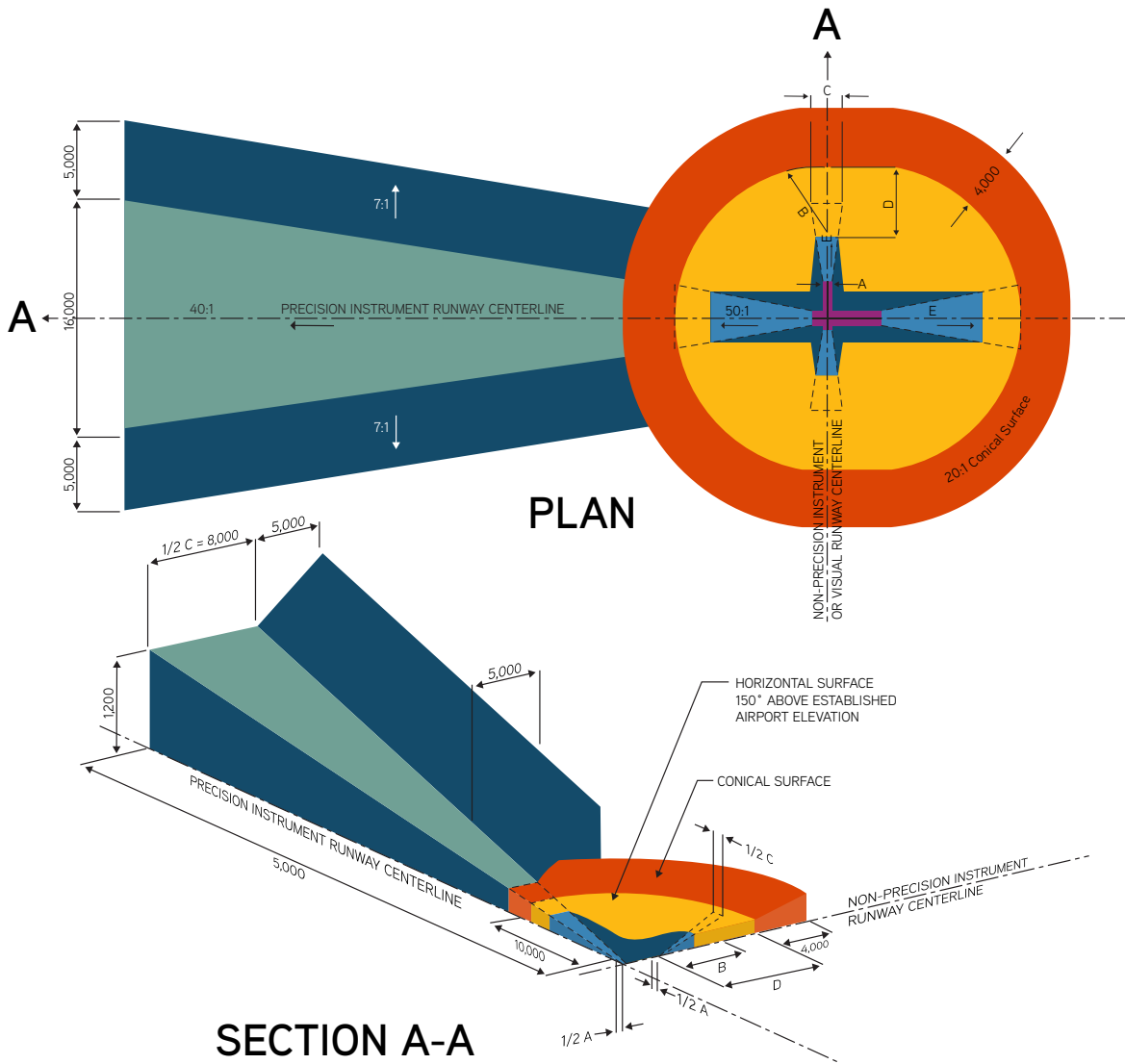
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**SURFACE KEY**

- Primary Surface - ground level
- Horizontal Surface - flat
- Conical Surface - 20:1
- Transitional Surface - 7:1
- Approach Surface - varies (see "E" value in table)
- Outer Approach Surface - 40:1 (precision instrument runway only)

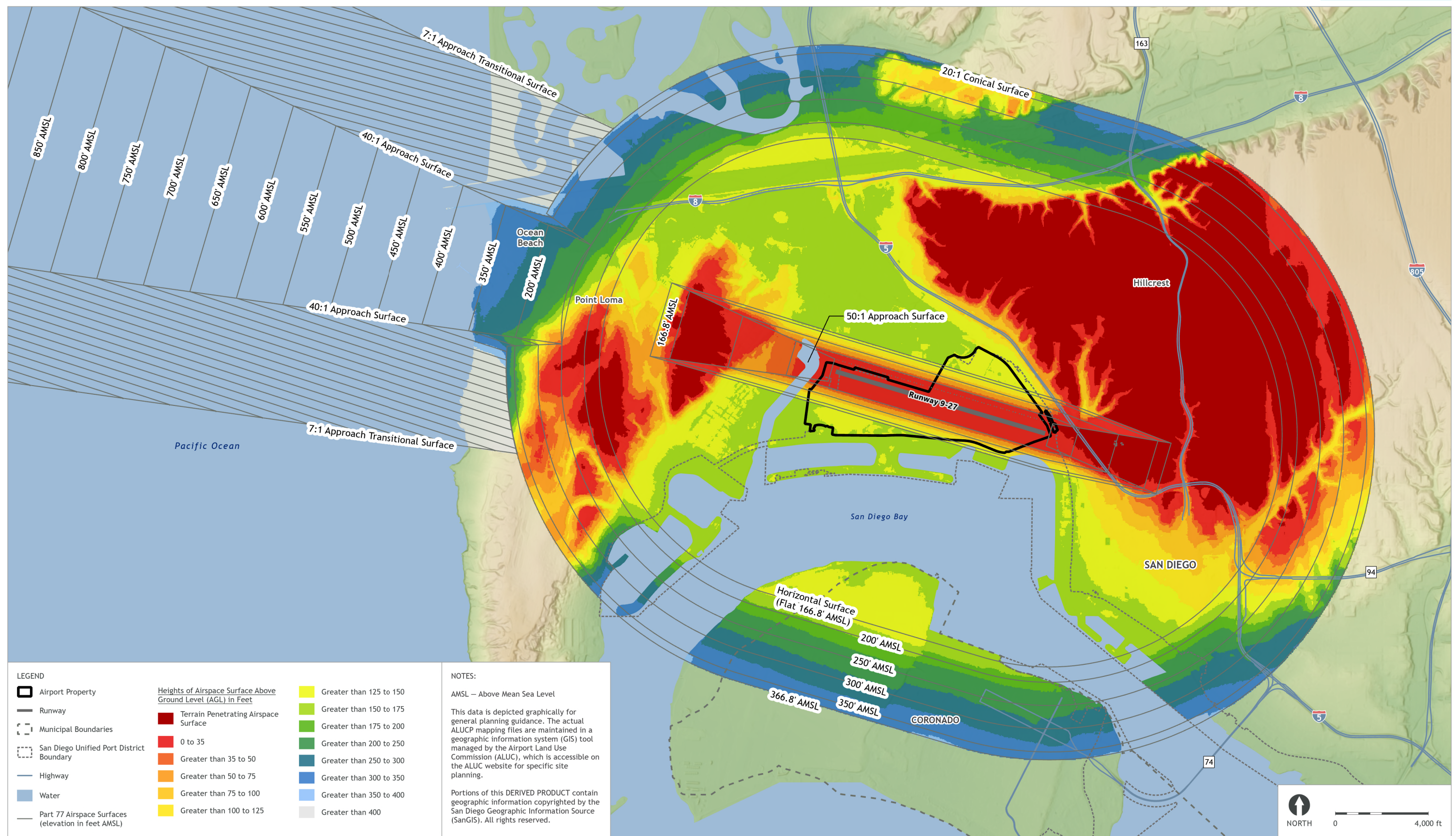
**TABLE KEY**

- X Visibility minimums greater than 3/4 mile
- Y Visibility minimums as low as 3/4 mile
- \* Precision instrument approach slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet

DIM.	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY		PRECISION INSTRUMENT RUNWAY	
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
				X	Y		
A	Width of primary surface and approach surface width at inner end	250	500	500	500	1,000	1,000
B	Radius of horizontal surface	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH		PRECISION INSTRUMENT RUNWAY	
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
					X	Y	
C	Approach surface width at outer end	1,250	1,500	2,000	3,500	4,000	16,000
D	Approach surface length	5,000	5,000	5,000	10,000	10,000	*
E	Approach slope (horizontal to vertical distances)	20:1, 34:1	20:1, 34:1	20:1, 34:1	20:1, 34:1	20:1, 34:1	*

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### I.3.3 United States Standard for Terminal Instrument Procedures Required Obstacle Clearance Surfaces

The Part 77 obstruction standards refer to obstacle clearance areas and minimum obstruction clearance criteria defined in FAA Order 8260.3F, *United States Standard for Terminal Instrument Procedures (TERPS)* and FAA Order 8260.58C, *United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design*.<sup>12</sup> These FAA Orders include criteria for the protection of airspace needed for the safe execution of instrument approach and departure procedures.

Instrument procedures are vital for commercial service airports. Passenger and cargo carriers depend on access to airports even in adverse weather conditions. The loss of access to a major airport for even limited times of the year can be costly to the carriers, their customers, and the local economy. Protection of this airspace is essential to ensure that the procedures can continue to be used, which, in turn, helps to ensure the continued viability of SDIA.

Unlike Part 77 obstruction surfaces, which can be penetrated without necessarily creating a hazard to air navigation, TERPS surfaces are specifically defined to create a buffer between aircraft and permanent objects on the ground.<sup>13</sup> This buffer is referred to as Required Obstacle Clearance (ROC). The mapped TERPS approach surfaces represent obstacle clearance surfaces (OCSs), which incorporate the ROC for each instrument procedure. Objects penetrating TERPS approach surfaces can create new obstacles requiring adjustment of the flight procedures, including increasing the visibility minimums, threshold crossing height (TCH), decision altitude (DA), and/or minimum descent altitude (MDA), resulting in an adverse aeronautical effect. If this would affect a significant volume of operations, it would be considered a “substantial aeronautical effect,” justifying a Determination of Hazard by the FAA, as discussed in Section I.3.6 of this Appendix.<sup>14</sup>

#### I.3.3.1 Obstacle Clearance Surfaces for Approaches

Exhibit I-6 illustrates each of the TERPS final approach OCSs mapped for the SDIA Airport Land Use Compatibility Plan (ALUCP) Update. These surfaces reflect the existing instrument approach procedures published for the Airport, which include:

- ILS Y or LOC Y Runway 9
- ILS Z or LOC Z Runway 9 (same surfaces as above)
- RNAV (RNP) Runway 27
- RNAV (GPS) Runway 9
- RNAV (GPS) Runway 27
- LOC Runway 27<sup>15, 16</sup>

<sup>12</sup> 14 CFR 77.29; US Department of Transportation, Federal Aviation Administration, Order 8260.3F, *United States Standard for Terminal Instrument Procedures (TERPS)*, September 7, 2023; US Department of Transportation, Federal Aviation Administration, Order 8260.58C, *United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design*, September 15, 2022.

<sup>13</sup> The FAA designs some departure procedures in recognition of existing obstacles, which are described in published obstacle departure procedures. The TERPS surfaces corresponding to these departures may be penetrated by those existing obstacles. The construction of additional obstacles may render those obstacle departures unusable.

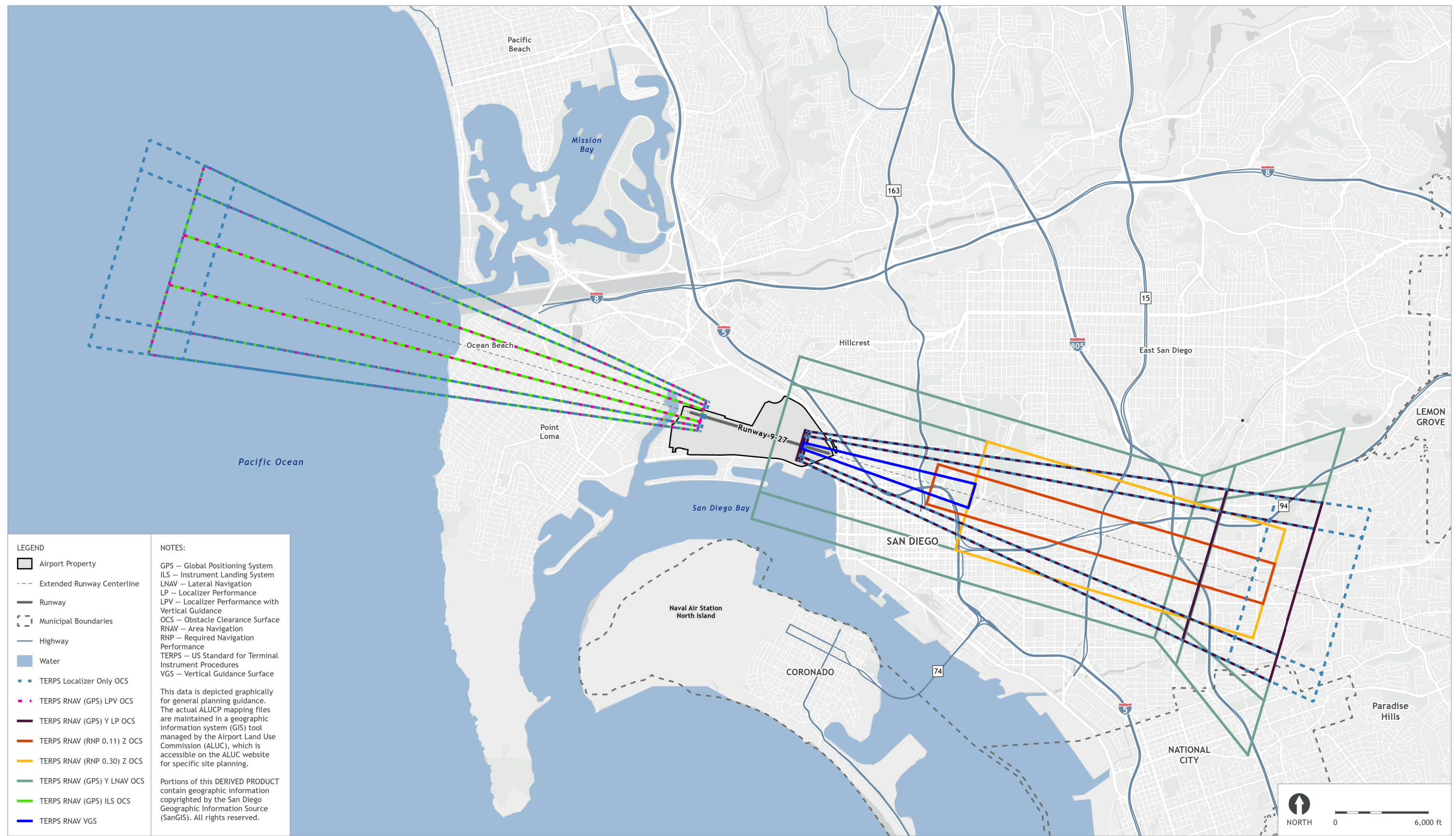
<sup>14</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraphs 6-3-5, 7-1-3.e, April 20, 2023.

<sup>15</sup> US Department of Transportation, Federal Aviation Administration, *U.S. Terminal Procedures Publication, Southwest (SW) Vol 3 of 4*, effective January 25, 2024, to March 21, 2024.

<sup>16</sup> ILS = Instrument Landing System; LOC = Localizer Only Approach; RNAV = Area Navigation; RNP = Required Navigation Performance; GPS = Global Positioning System.

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The mapped approach surfaces represent only the final approach segment of each procedure, which typically extends 5 NM or more from the landing threshold. All instrument approaches also describe missed approach procedures which apply when pilots are unable to see the visual elements of the approach (e.g., approach lighting) by the time they reach the DA or missed approach point (MAP). Those surfaces extend over and beyond the Airport and are generally higher than the TERPS final approach and departure surfaces. However, the OCSs associated with missed approach procedures can extend laterally beyond the limits of the OCSs associated with the TERPS final approach and departure surfaces. While missed approach surfaces are not mapped for this ALUCP update, the FAA considers those surfaces in its analysis of proposed construction. In some areas, missed approach surfaces could be lower than other airspace surfaces mapped in this Appendix.

In addition to the final approach OCS, each runway that is equipped with either a precision approach (PA) or an Approach with Vertical Guidance includes an associated Vertical Guidance Surface (VGS). At SDIA, the VGS is associated with each ILS, Localizer Performance with Vertical Guidance (LPV), Lateral Navigation/Vertical Navigation (LNAV/VNAV) and RNP approach. The VGS begins at the landing threshold and extends to the missed approach point, which correlates with the highest DA published for the approach.

If the VGS surface is penetrated by an existing obstacle, the penetration can be mitigated by increasing the glide path angle (GPA) and/or TCH of the approach. Due to the presence of existing obstacles within the final approach segment of the PA and Approach with Vertical Guidance (APV) approaches at SDIA, both the GPA and TCH have been increased above the standard. For Runway 9, the glide path angle and threshold crossing height have been increased to 3.1 degrees and 55 feet, respectively. For Runway 27, the glide path angle and threshold crossing height have been increased to 3.5 degrees and 65 feet, respectively. Further increases to the TCH and/or GPA should be avoided for both runway ends.

### 1.3.3.2 Obstacle Clearance Surfaces for Departures

OCSs are also defined for instrument departure procedures in TERPS. TERPS departure surfaces may be lower than approach surfaces at any given distance from the Airport. Unlike most final approach surfaces, which are typically aligned with the extended runway centerline, TERPS departure surfaces account for turns after takeoff. Thus, TERPS departure OCSs often extend beyond the lateral boundaries of TERPS approach OCSs.

The TERPS OCSs associated with instrument departure procedures can vary significantly for each runway. Many runways, such as those at SDIA, have a variety of Standard Instrument Departure procedures (SIDs) that are published for each runway. Each SID contains a predefined departure route and minimum climb gradient, each with a unique OCS configuration. Currently there are nine SIDs published for SDIA, including:

- BORDER SEVEN
- CWARD TWO
- ECHHO TWO
- FALCC ONE
- MMOTO TWO
- PADRZ TWO
- PEBLE SIX
- SAYOW TWO
- ZZOOO THREE

In addition to the SIDs, many airports have obstacle departure procedures (ODPs) and/or diverse vector area (radar) departures. “The ODPs assist pilots in avoiding obstacles during climb to the minimum enroute altitude, should the operator of that aircraft not want to follow a prescribed SID. At some locations where an ODP has been established, a diverse vector area (DVA) may also be created to allow Air Traffic Control to assign RADAR vectors in lieu of an ODP.”<sup>17</sup> SDIA currently has published ODPs and DVA procedures established through local Air Traffic Control orders. For the DVA, air traffic control assigns specific headings for aircraft to fly throughout the departure.

When designing instrument departure procedures, the FAA establishes the OCS slopes on a standard climb gradient of 200 feet per NM. If it is determined that the OCSs are not penetrated by obstacles, aircraft with more than two engines may depart with reported visibility as low as ½ mile or, for aircraft with one or two engines, 1 mile, regardless of the reported cloud ceiling heights. If the OCS is penetrated by existing obstacles that cannot be mitigated, the departure procedures can be modified by either requiring an increase to the visibility minimums and minimum cloud ceiling height and/or requiring a nonstandard climb gradient that exceeds 200 feet per NM. Due to the presence of obstacles within the departure areas associated with Runways 9 and 27 at SDIA, each departure procedure serving Runways 9 and 27 requires a nonstandard climb gradient and nonstandard departure minimums.

Both ODPs for Runways 9 and 27 require a minimum climb gradient of 290 feet per NM. However, the cloud ceiling height must be reported at 400 feet or greater. Further, the minimum visibility requirement for departing Runways 9 and 27 at SDIA is 1 ¾ miles and 2 ½ miles, respectively. In comparison, the minimum climb gradients to allow aircraft departures with standard departure minimums for the SIDs prescribed for Runway 9 is 610 feet per NM. For the SIDs associated with Runway 27 departures, the minimum climb gradients range from 353 feet per NM to 500 feet per NM to allow aircraft to depart with standard departure minimums. Because the ODPs have a lower required climb gradient than the SIDs, the ODP OCS is more stringent extending from the departure ends of the runways.

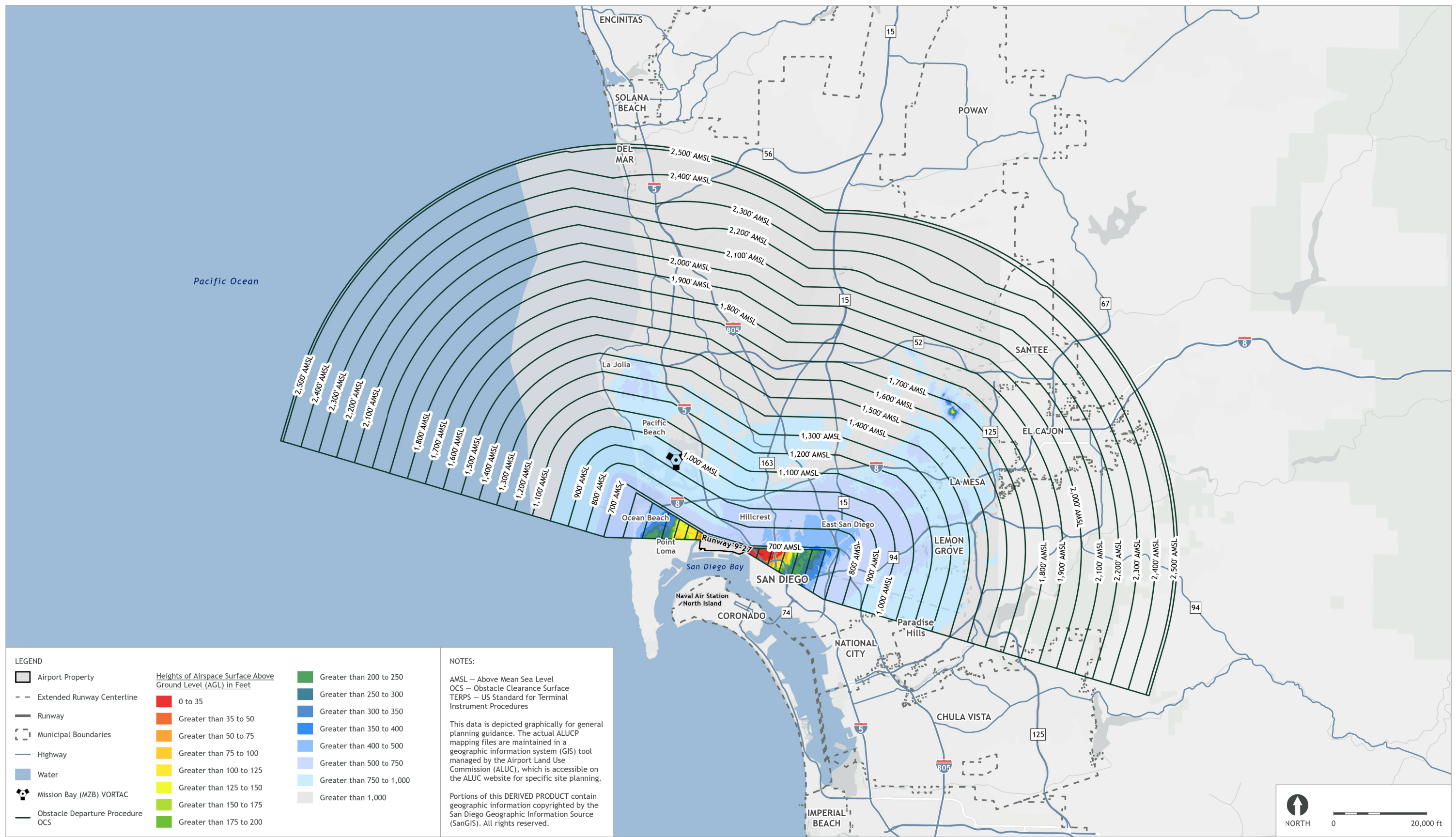
Exhibit I-7 illustrates the resulting OCSs associated with the ODPs for both Runways 9 and 27 at SDIA. As shown, both ODPs include a turn to the north to allow the aircraft to fly direct to the Mission Bay VORTAC,<sup>18</sup> which is approximately 3.5 NM north of SDIA.

For Runway 9 departures, the OCS associated with the ODP results is more restrictive than any of the currently published SIDs within the immediate vicinity of SDIA. This is due to these SIDs requiring a minimum climb gradient of 610 feet per NM for departure at standard departure minimums. Furthermore, the SIDs for Runway 9 require a straight climb to 4,000 feet above runway elevation prior to commencing a turn, whereas the ODP permits a turn when reaching an altitude of 900 feet above the runway elevation.

For Runway 27 departures, the OCSs associated with the various SIDs include turns that could result in a more restrictive OCS than the ODP. This is because these departure procedures allow for a turn to commence sooner than is allowed with the ODP. These SIDs allow turns to commence as low as 400 feet above the runway elevation, whereas the ODP prohibits turns until 900 feet above the runway elevation.

<sup>17</sup> US Department of Transportation, Federal Aviation Administration, *U.S. Terminal Procedures Publication, Southwest (SW) Vol 3 of 4*, effective January 25, 2024, to March 21, 2024, Takeoff Minimums, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors).

<sup>18</sup> A navigation aid providing VOR azimuth, tactical air navigation (TACAN) azimuth, and TACAN distance measuring equipment (DME) at one site.



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Of the eight SIDs published for Runway 27, PADRZ TWO, FALCC ONE, and PEBLE SIX SIDs include turns that could result in a more restrictive OCS than the ODP for Runway 27. Exhibit I-8 illustrates a composite of the resulting OCSs associated with Runway 27 departures that utilize these three SIDs.

Exhibit I-9 depicts the profiles of the TERPS approach OCSs for Runway 27 and the nonstandard departure OCS for Runway 9 (off the east end of the runway) in relation to the terrain along the extended centerline. The 14 CFR Part 77 obstruction surfaces are also provided for comparison. With the exception of the RNP Approach, all instrument approaches to Runway 27 are non-precision, lacking vertical guidance, so they do not extend all the way down to the runway threshold. As previously discussed, a VGS is associated with the RNP Approach for Runway 27. The nonstandard departure surface is lower than the approach surfaces between approximately 7,200 to 11,000 feet off the east end of the runway.

Exhibit I-10 depicts the OCSs for approaches to Runway 9 and departures on Runway 27 (off the west end of the runway) and 14 CFR Part 77 surfaces. The OCS associated with the precision ILS and RNAV LPV approaches extends down to the runway threshold, in contrast to the OCS associated with the nonprecision approaches. The departure OCS is the lowest surface for approximately 1,800 feet west of the runway end. From that point, the RNAV (GPS) LPV and ILS OCS are the lowest surfaces to approximately 7,600 feet west of the runway end. The OCS for the LOC approach is the lowest surface from that point west to the ocean.

### I.3.4 Airport Design Approach Surfaces

FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, provides planning and design standards for siting runway ends to ensure the safe clearance of objects by aircraft approaching the runway.<sup>19</sup> The approach surface criteria provide varying slope and dimensional standards depending on the visibility minimums and level of precision of the approach. These runway end siting surfaces (RESS)<sup>20</sup> are distinct from the surfaces defined in accordance with 14 CFR Part 77, Subpart C. In planning and designing runway extensions and new runways, the runway thresholds are established to ensure that the RESS is free of any penetrations by objects. Penetrations of the RESS can ultimately lead to the further displacement of runway ends, shortening the distance for landing, and/or modifying the instrument approach procedures.

Exhibit I-11 depicts the RESS for both runway ends at SDIA based on the current displaced runway thresholds and the applicable FAA criteria. At both ends of the runway, the RESS is the same as the threshold siting surface (TSS) in the 2014 ALUCP.<sup>21</sup> The exhibit also indicates the height of the surfaces above the underlying terrain.

- Runway 9: The RESS for Runway 9 (on the west side of the Airport) has a slope of 34 to 1, based on the precision ILS approach to the runway. The RESS extends west from a point 200 feet west of the 1,000-foot displaced landing threshold. The Runway 9 RESS is more than 50 feet above the underlying terrain in most of the area. The RESS ranges from 35 to 50 feet above the terrain over the highest elevations near Chatsworth Boulevard.

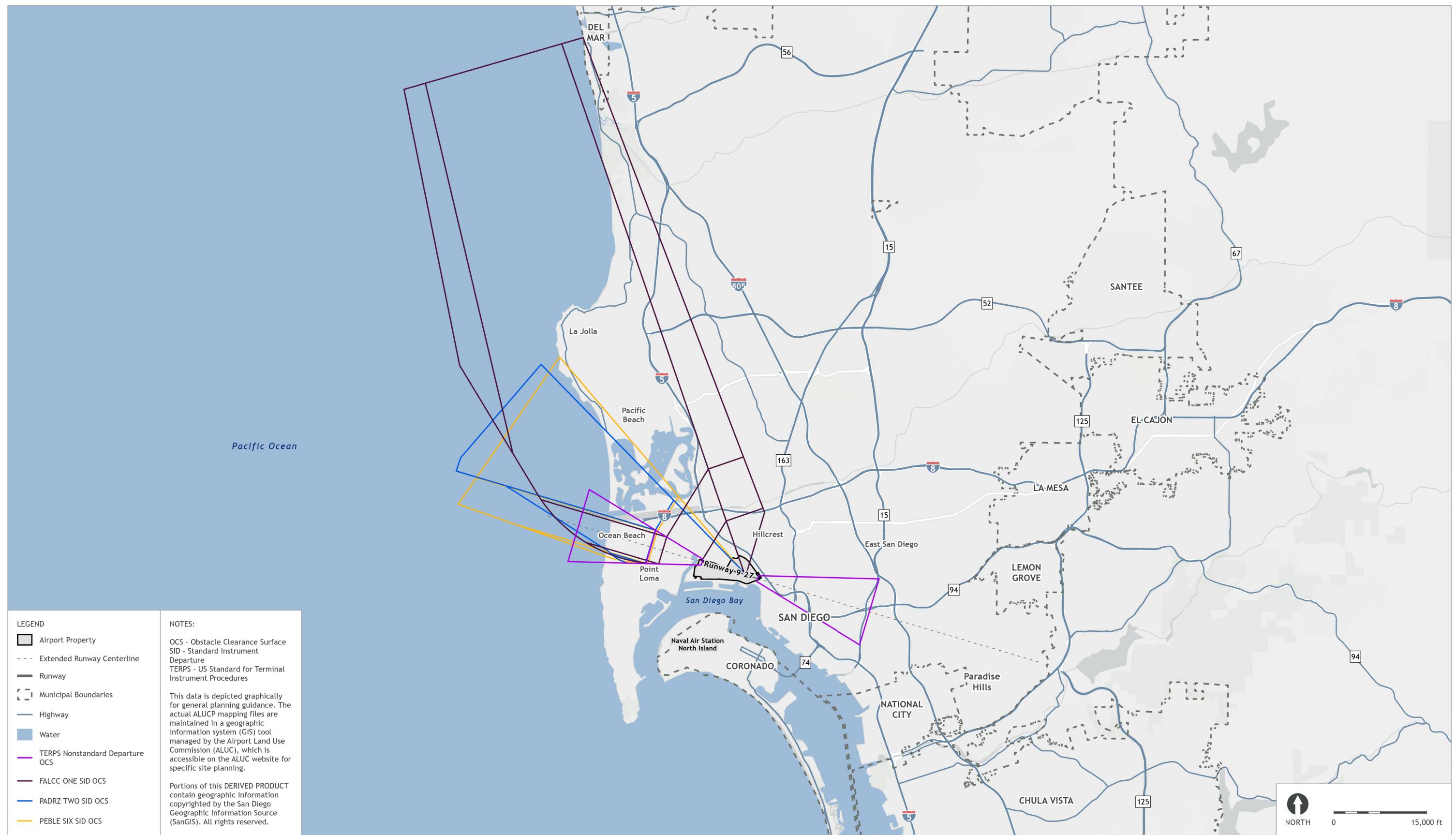
<sup>19</sup> US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022, Section 3.6, Table 3-4.

<sup>20</sup> The RESS was formerly known as the threshold siting surfaces (TSS), the term used in the 2014 ALUCP. The new RESS and the old TSS are the same at SDIA.

<sup>21</sup> Airport Land Use Commission, San Diego County Regional Airport Authority, *San Diego International Airport Land Use Compatibility Plan*, Amended May 2014, Exhibit 4-3.

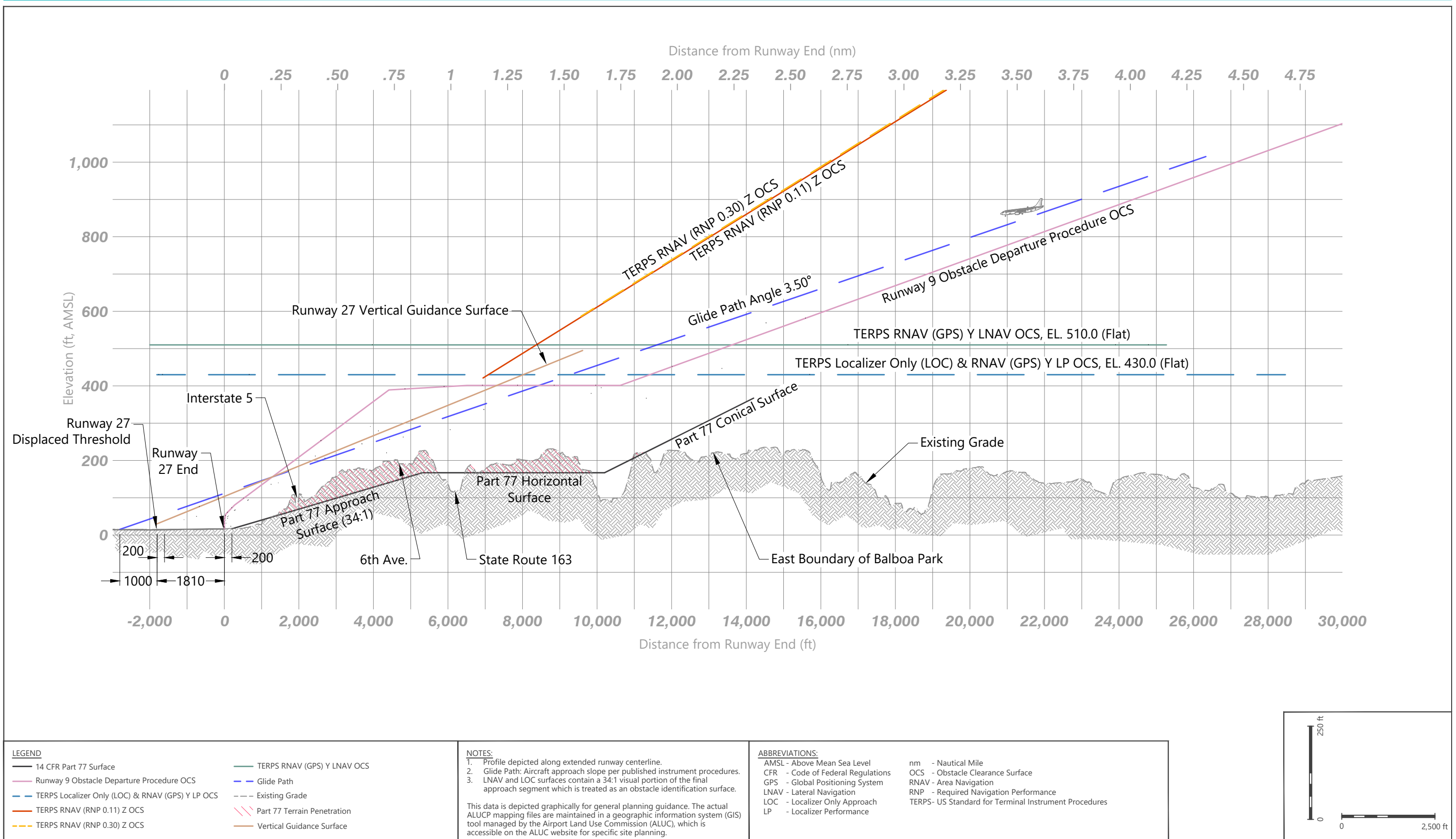
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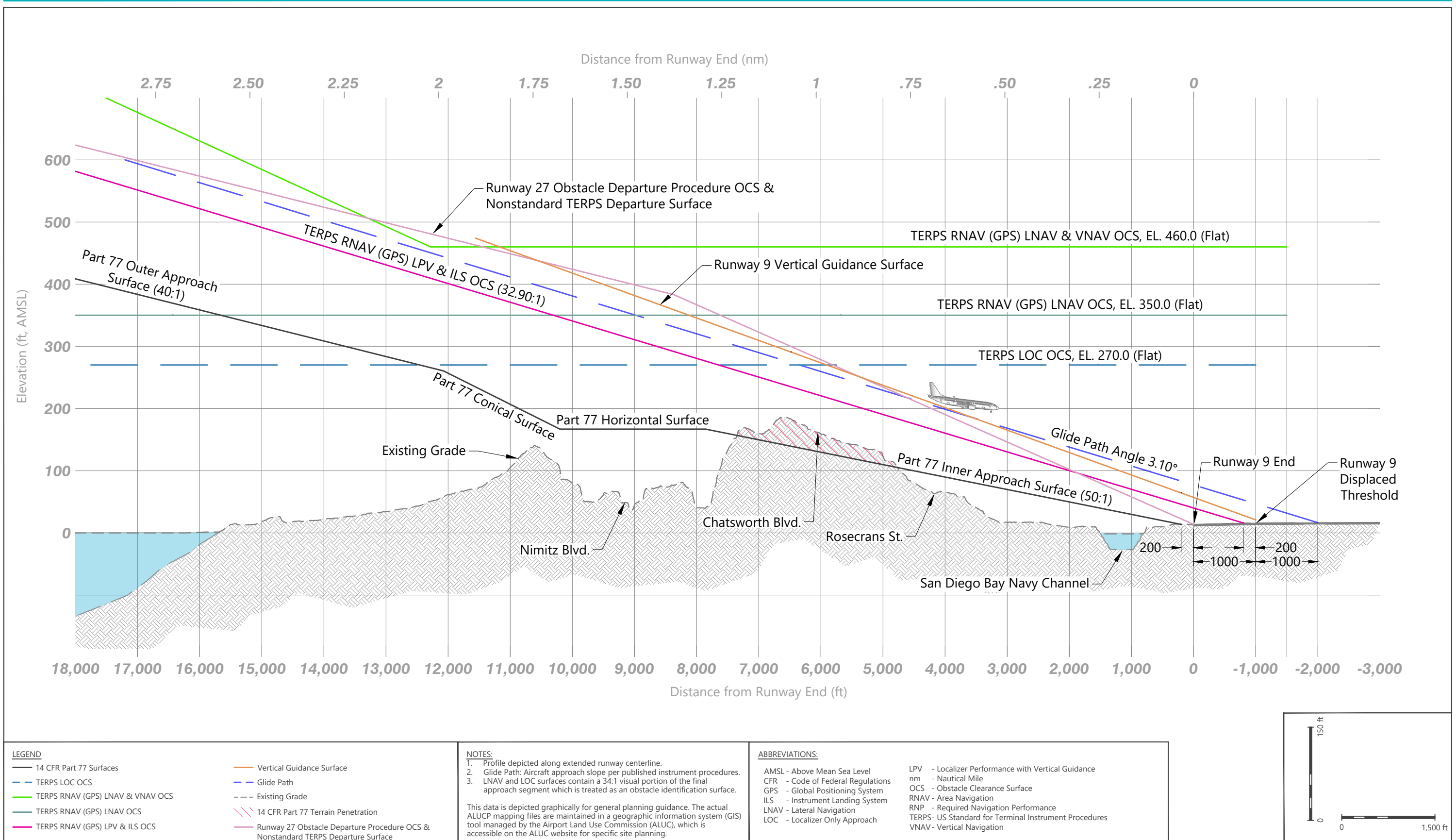


LEGEND	NOTES:
Airport Property	OCS - Obstacle Clearance Surface
Extended Runway Centerline	SID - Standard Instrument Departure
Runway	TERPS - US Standard for Terminal Instrument Procedures
Municipal Boundaries	This data is depicted graphically for general planning guidance. The actual ALUCP mapping files are maintained in a geographic information system (GIS) tool managed by the Airport Land Use Commission (ALUC), which is accessible on the ALUC website for specific site planning.
Highway	Portions of this DERIVED PRODUCT contain geographic information copyrighted by the San Diego Geographic Information Source (SanGIS). All rights reserved.
Water	
TERPS Nonstandard Departure OCS	
FALCC ONE SID OCS	
PADRZ TWO SID OCS	
PEBLE SIX SID OCS	

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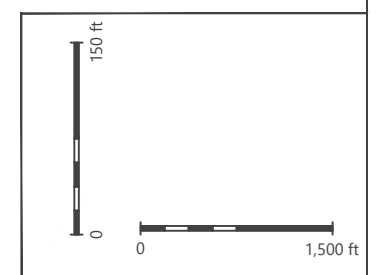
LEGEND	
— 14 CFR Part 77 Surfaces	— Vertical Guidance Surface
— TERPS LOC OCS	— Glide Path
— TERPS RNAV (GPS) LNAV & VNAV OCS	— Existing Grade
— TERPS RNAV (GPS) LNAV OCS	— 14 CFR Part 77 Terrain Penetration
— TERPS RNAV (GPS) LPV & ILS OCS	— Runway 27 Obstacle Departure Procedure OCS & Nonstandard TERPS Departure Surface

**NOTES:**

- Profile depicted along extended runway centerline.
- Glide Path: Aircraft approach slope per published instrument procedures.
- LNAV and LOC surfaces contain a 34:1 visual portion of the final approach segment which is treated as an obstacle identification surface.

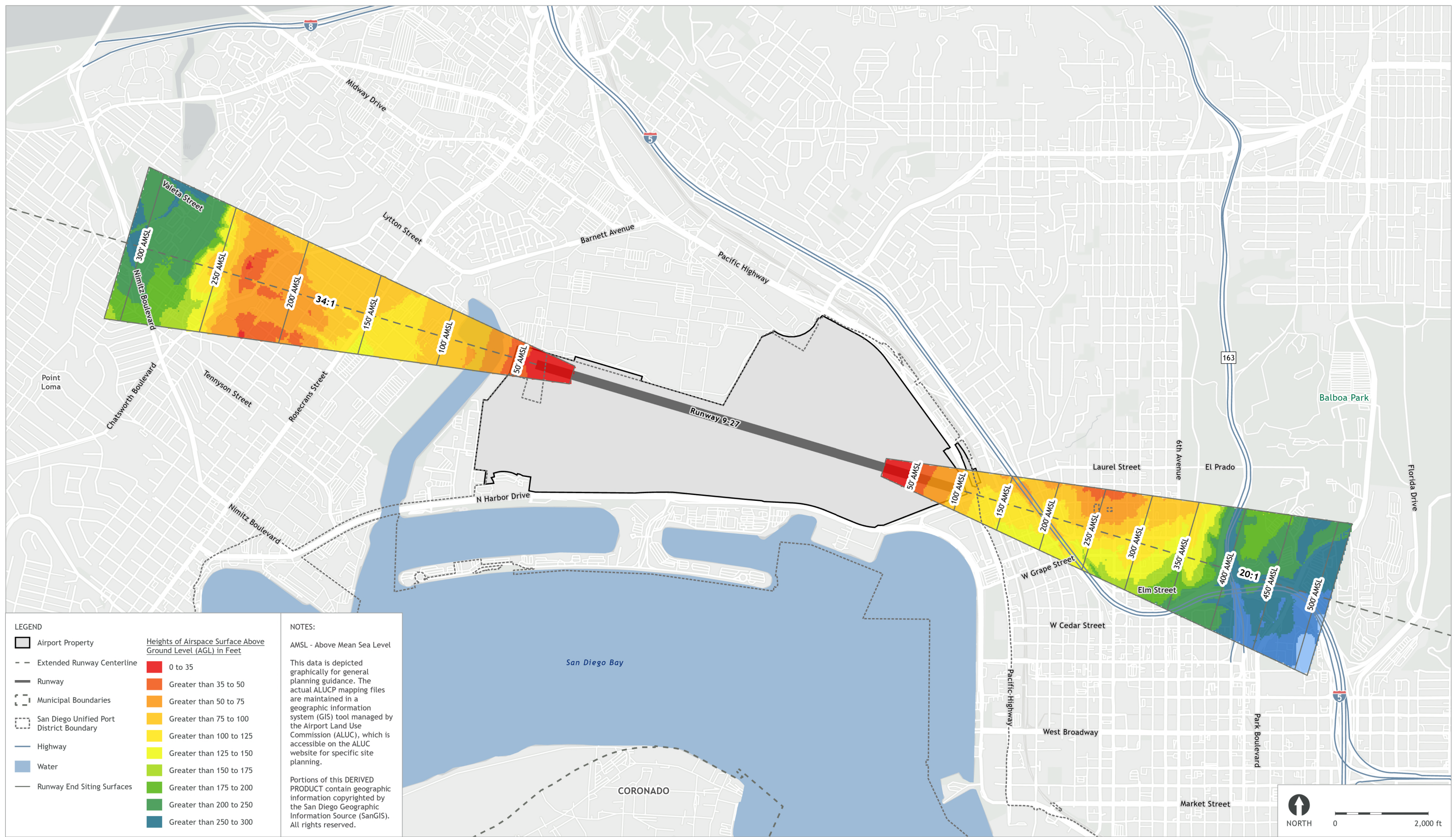
This data is depicted graphically for general planning guidance. The actual ALUCP mapping files are maintained in a geographic information system (GIS) tool managed by the Airport Land Use Commission (ALUC), which is accessible on the ALUC website for specific site planning.

ABBREVIATIONS:	
AMSL - Above Mean Sea Level	LPV - Localizer Performance with Vertical Guidance
CFR - Code of Federal Regulations	nm - Nautical Mile
GPS - Global Positioning System	OCS - Obstacle Clearance Surface
ILS - Instrument Landing System	RNAV - Area Navigation
LNAV - Lateral Navigation	RNP - Required Navigation Performance
LOC - Localizer Only Approach	TERPS - US Standard for Terminal Instrument Procedures
	VNAV - Vertical Navigation



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LEGEND	
	Airport Property
	Extended Runway Centerline
	Runway
	Municipal Boundaries
	San Diego Unified Port District Boundary
	Highway
	Water
	Runway End Siting Surfaces
	Heights of Airspace Surface Above Ground Level (AGL) in Feet
	0 to 35
	Greater than 35 to 50
	Greater than 50 to 75
	Greater than 75 to 100
	Greater than 100 to 125
	Greater than 125 to 150
	Greater than 150 to 175
	Greater than 175 to 200
	Greater than 200 to 250
	Greater than 250 to 300

**NOTES:**  
 AMSL - Above Mean Sea Level  
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- Runway 27: The RESS for Runway 27 (on the east side) has a slope of 20 to 1, extending eastward from a point 200 feet east of the 1,810-foot displaced threshold. The Runway 27 RESS is greater than 75 feet or more above the ground through most of the area. The RESS ranges from 35 to 75 feet above the highest elevations in the Uptown Community Planning Area (CPA), just south of Laurel Street.

The RESS can differ from the TERPS OCS for any given runway approach, as the operational glideslope is sometimes greater than the glideslope assumed under the airport design planning criteria (a standard 3 degrees).<sup>22</sup> When this situation occurs, as it does at SDIA, use of the RESS surface as an airspace protection surface for airport compatibility planning can be a conservative way to protect for the possibility of long-range improvements in the runway approaches, while providing a buffer between aircraft on approach and the nearest underlying buildings.

### I.3.5 One Engine Inoperative Obstacle Clearance Surfaces

Federal law requires air carrier and commercial aircraft operators to maintain operational specifications that require, among other things, a description of the limitations (including obstacles) at all airports at which they operate.<sup>23</sup> Operators must develop aircraft operating criteria for each airport to ensure safe climb performance on departure in case one engine becomes inoperative.<sup>24</sup> Among the required criteria are maximum payload limits permitting aircraft to safely clear obstacles in case of loss of power to one engine during takeoff. Airspace protection zones for the flight paths and climb gradients, as designed in the one engine inoperative (OEI) procedures, can be mapped as three-dimensional surfaces, similar in appearance to TERPS or Part 77 surfaces.<sup>25</sup>

The FAA does not routinely analyze OEI surfaces in its obstruction evaluation / airport airspace analysis (OE/AAA) process, for the following reasons.<sup>26</sup>

1. Complexity - Each airline's OEI procedures differ by aircraft type and runway, and different airlines can have different procedures. Therefore, there are often multiple overlapping procedures off any given runway.
2. Adjustability - Airlines can alter OEI procedures to avoid newly created obstacles, either by requiring lighter takeoff weights or developing turns to avoid the obstacle. Takeoff weight can be lessened by removing fuel, which can limit range, or by removing payload (passengers, baggage, or cargo), which reduces revenue. These economic impacts on carriers can be substantial, potentially endangering their ability to continue offering a flight or serving a distant market. Related economic impacts may, in turn, be suffered by the airport operator and the metropolitan area served by the airport.
3. Economic Effects Not Recognized as within FAA Purview - The FAA considers the economic effect of a proposed structure on an airline as an insufficient basis, in itself, for a hazard determination. Airlines often submit comments during the FAA's aeronautical study process in response to the

<sup>22</sup> Although the slopes of the RESS surfaces are different for each runway end at SDIA, both are designed to accommodate a 3-degree glideslope. The shallower slope for the Runway 9 approach reflects the stricter obstacle clearance standards applying to a precision approach.

<sup>23</sup> 14 CFR 121.97.

<sup>24</sup> 14 CFR 121.181 and 121.191.

<sup>25</sup> The OEI procedure surfaces discussed here are distinct from the "OEI Obstacle Identification Surface (OIS)" within which the FAA formerly advised airport operators to identify penetrating objects (FAA AC 150/5300-13, through Change 15, *Airport Design*, December 31, 2009). This recommendation was not continued under the updated advisory circular, FAA AC 150/5300-13B, *Airport Design*, March 31, 2022.

<sup>26</sup> Airport Cooperative Research Program, *Understanding Airspace, Objects, and Their Effects on Airports*, ACRP Report 38, 2010; pp. 22-23.

public notice of a construction proposal. When airlines raise concerns about adverse impacts on their OEI procedures, the FAA's response is frequently that economic impact to an airline is not, in itself, basis for a hazard determination. However, if multiple airlines submit comments and can demonstrate that the loss of clear airspace needed for OEI procedures would lead to an inability to use a runway or the loss of capability to fly critical routes, the FAA can interpret this as a "substantial adverse effect," grounds for a hazard determination.

While the FAA does not typically consider OEI in its OE/AAA process (discussed in Section I.3.6), it does merit consideration in local airspace protection plans and regulations. Allowing new obstacles within the aircraft's OEI departure corridor can further restrict aircraft takeoff weights, conceivably making it infeasible to serve certain long-distance destinations on a non-stop basis. This deterioration in air service can harm the local economy in several ways. Examples of adverse impacts include:

- Decreasing the attractiveness of the area for businesses requiring superior air service to the East Coast and international destinations;
- Decreasing tourism revenues by increasing the inconvenience and cost of long distance flights; and
- Reducing air cargo service since air cargo flights often have heavier payloads than passenger flights and may be disproportionately affected by OEI surface encroachments.

Neither the FAA nor the International Civil Aviation Organization (ICAO) have firm criteria for establishing OEI surfaces to evaluate obstacles. However, both the FAA and ICAO define an obstacle accountability area (OAA) in which air carrier and commuter aircraft must ensure that the aircraft can meet certain ROC should an engine failure occur upon takeoff.<sup>27</sup> The OAA does not have a defined slope, as the departure climb performance of aircraft can vary significantly. Furthermore, the configuration of the OAA prescribed by the FAA and ICAO differs. The OAA prescribed by the FAA applies to all domestic US flag carriers, while the ICAO criteria apply to foreign-based carriers.

In the absence of a formal obstacle evaluation surface for OEI, it is practical to utilize the configuration of the OAAs prescribed by the FAA and ICAO to establish the horizontal limits of a generic OEI surface. For the purposes of establishing a baseline, a slope of 62.5 to 1 is evaluated. This slope corresponds with the minimum climb gradient that must be demonstrated during departure with one engine inoperative under 14 CFR Part 25, *Airworthiness Standards: Transport Category Airplanes*. Air carrier and commuter aircraft are required to meet or exceed this climb gradient until the aircraft reaches 400 feet above the elevation of the departure end of the runway, the point at which aircraft can retract its flaps and begin turns. Beyond that point, air carriers may base their OEI analyses on different departure routes.

Utilizing the baseline OEI surface with the 62.5 to 1 slope, existing obstacles were evaluated to identify the controlling obstacles within the confines of the FAA and ICAO OAAs. The slopes of the OEI surfaces were then adjusted to ensure that the OEI surface limitations are no more restrictive than existing obstacles that are present in the OAA. This produces a set of customized OEI surfaces for each departure end of the runway.

<sup>27</sup> US Department of Transportation, Federal Aviation Administration, Advisory Circular 120-91A, *Airport Obstacle Analysis*, January 13, 2020; International Civil Aviation Organization, Annex 6, *Operation of Aircraft*, July 2022.

**Exhibit I-12** depicts the initial OEI surfaces for the Runway 9 departure (to the east). The OEI surface based on the ICAO criteria is wider than the surface based on FAA criteria. The ICAO OEI surface is also steeper than the FAA surface because of the higher terrain that must be cleared along the north edge of the ICAO surface, outside the boundary of the FAA OEI surface.

Between Pacific Highway and Interstate 5, the FAA OEI surface ranges from approximately 50 to 100 feet above the ground. In the same area, the ICAO OEI surface is slightly higher, ranging from approximately 50 to 125 feet above the ground. From Interstate 5 east to Balboa Park, the FAA OEI surface ranges from approximately 35 to 100 feet above the ground, and the ICAO OEI surface from 50 to 150 feet above the ground. East of Balboa Park, the FAA OEI surface ranges from approximately 150 to 250 feet above the ground, while the ICAO OEI surface ranges from 175 to 350 feet above the ground.

**Exhibit I-13** depicts the initial OEI surfaces for the Runway 27 departure (to the west). Both the FAA and the ICAO OEI surfaces in this area have the same slopes. From Navy Channel west to Rosecrans Street, the OEI surfaces range from approximately 50 to 125 feet above the ground. From Rosecrans Street west to Chatsworth Boulevard, the terrain rises, and the distance between the OEI surfaces and the ground diminishes to approximately 50 to 75 feet. In the areas of highest terrain, immediately west of Chatsworth Boulevard, the OEI surfaces range from 35 to 50 feet above the ground. From that area to the west, the OEI surface clearances rise, ranging from approximately 100 to 400 feet above the ground.

### I.3.6 FAA Review Process and Determinations

For projects meeting the notification provisions described in Section I.3.1, project sponsors must file Form 7460-1, "Notice of Proposed Construction or Alteration," with the FAA. The FAA Obstruction Evaluation Group coordinates the review of the Form 7460-1 submittal, circulating the form to various FAA offices and divisions for comment, in compliance with 14 CFR 77.25 - 77.35. The FAA review process, known as obstruction evaluation / airport area airspace (OE/AAA) analysis, is described in FAA Joint Order (JO) 7400.2P, *Procedures for Handling Airspace Matters*.

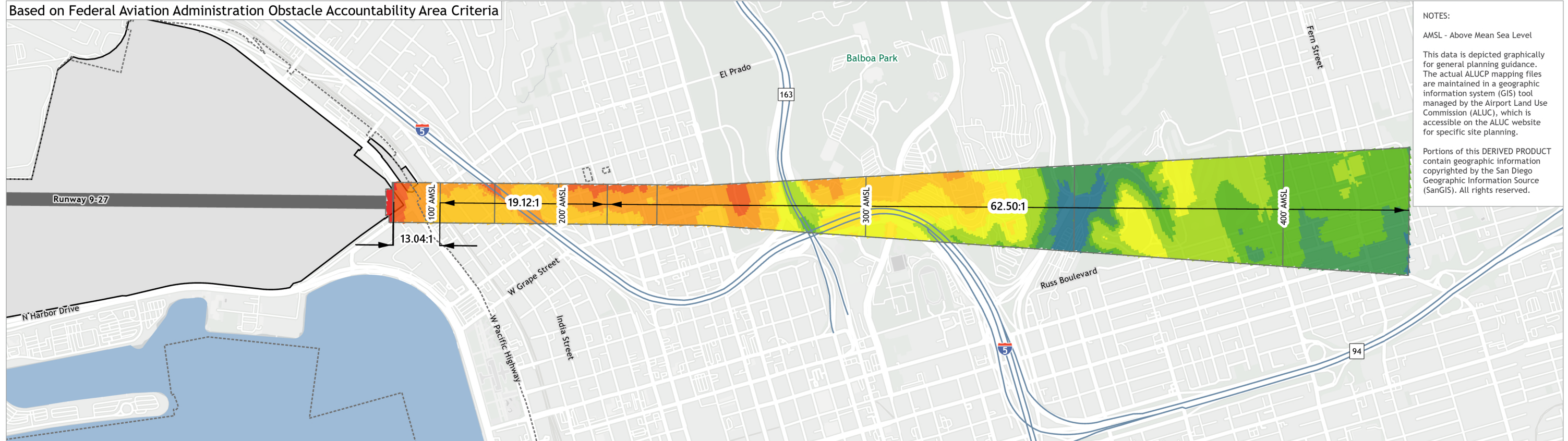
Most often the FAA OE/AAA process focuses on the effect of proposed tall structures on navigable airspace. However, the FAA has the authority to assess other potentially adverse impacts, including electromagnetic and ocular impacts associated with proposed construction and alteration. The FAA must rely on information provided by the project sponsor on Form 7460-1. Instructions on Form 7460-1 request the project sponsor to provide all relevant information about the proposed project, which includes building features that could have non-height-related effects on air navigation.<sup>28</sup>

<sup>28</sup> Appendix J, Potential Hazards to Flight - Policy Considerations, of this ALUCP update, discusses the FAA role in assessing potential non-height-related hazards associated with construction or alteration of buildings and other structures.

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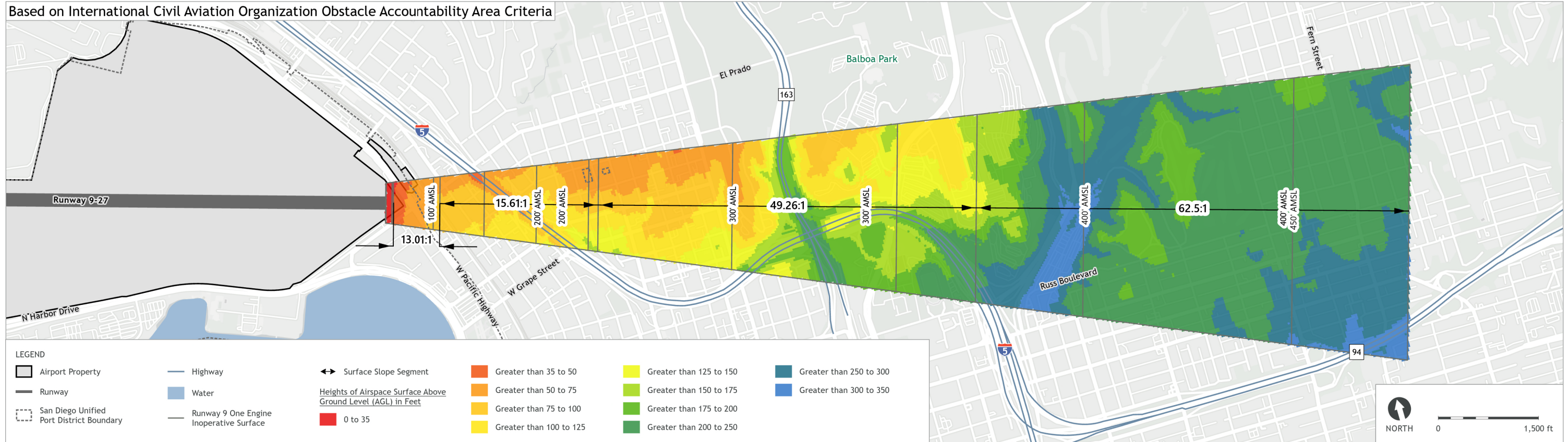


Based on Federal Aviation Administration Obstacle Accountability Area Criteria



NOTES:  
 AMSL - Above Mean Sea Level  
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Based on International Civil Aviation Organization Obstacle Accountability Area Criteria



**LEGEND**

Airport Property	Highway	Surface Slope Segment	Greater than 35 to 50	Greater than 125 to 150	Greater than 250 to 300
Runway	Water	<b>Heights of Airspace Surface Above Ground Level (AGL) in Feet</b>	Greater than 50 to 75	Greater than 150 to 175	Greater than 300 to 350
San Diego Unified Port District Boundary	Runway 9 One Engine Inoperative Surface	0 to 35	Greater than 75 to 100	Greater than 175 to 200	
		Greater than 100 to 125	Greater than 200 to 250		

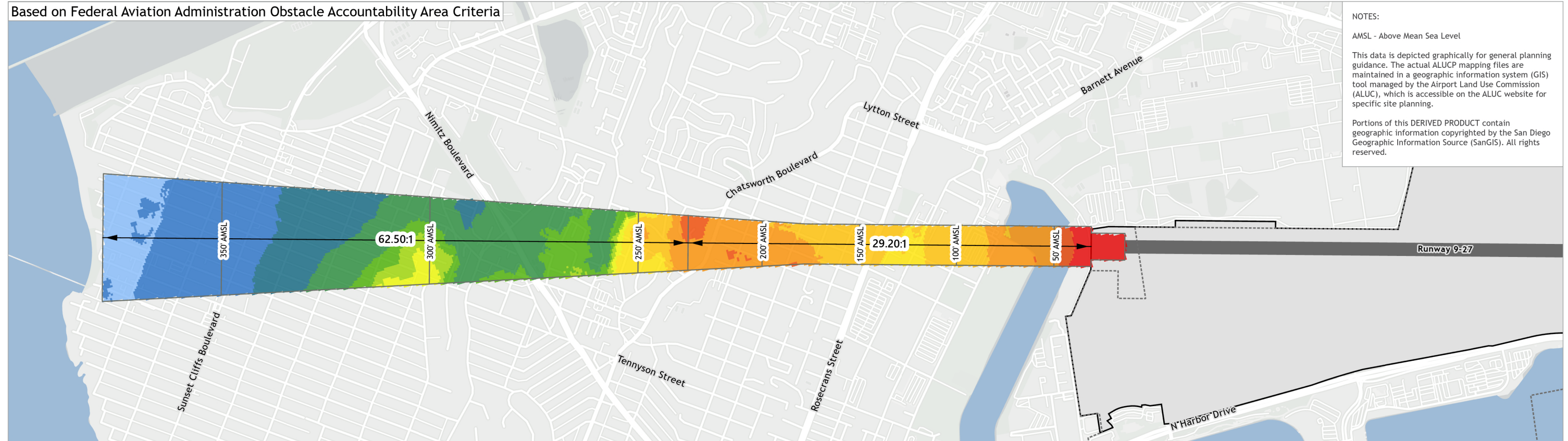
NORTH

0 1,500 ft



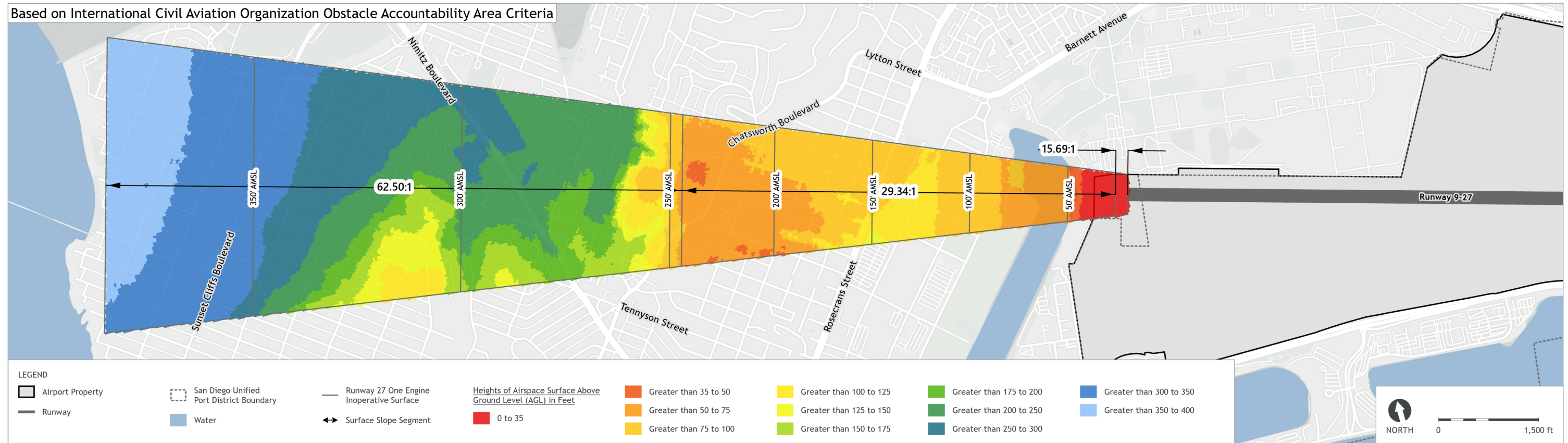
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Based on Federal Aviation Administration Obstacle Accountability Area Criteria



NOTES:  
 AMSL - Above Mean Sea Level  
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Based on International Civil Aviation Organization Obstacle Accountability Area Criteria



**LEGEND**

Airport Property	San Diego Unified Port District Boundary	Runway 27 One Engine Inoperative Surface	Heights of Airspace Surface Above Ground Level (AGL) in Feet	Greater than 35 to 50	Greater than 100 to 125	Greater than 175 to 200	Greater than 300 to 350
Runway	Water	Surface Slope Segment	0 to 35	Greater than 50 to 75	Greater than 125 to 150	Greater than 200 to 250	Greater than 350 to 400
			Greater than 75 to 100	Greater than 150 to 175	Greater than 250 to 300		

NORTH  
 0 1,500 ft

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After completing its initial OE/AAA report, the FAA issues one of four notices or determinations:<sup>29</sup>

- Does Not Exceed (DNE) Determination - for structures that do not exceed obstruction standards and do not have substantial adverse physical or electromagnetic interference effects on navigable airspace or air navigation facilities.
- Exceeds But Okay (EBO) Determination - for certain temporary structures and alterations to existing structures not involving increases in height, where obstruction standards are exceeded but without causing a substantial effect on air navigation.
- Notice of Preliminary Findings (NPF) - for structures that exceed obstruction standards and/or have an adverse effect on navigable airspace or air navigation facilities and further study is necessary to fully determine the extent of the adverse effect. Typically, the FAA initiates further study only after a request by the project sponsor.
- Determination of No Hazard (DNH) - for structures that exceed obstruction standards but would not have a substantial adverse effect on air navigation.<sup>30</sup> This determination applies to structures that would not qualify for an EBO determination. The determination may include marking and lighting recommendations and special conditions.<sup>31</sup> Local governments should incorporate these recommendations and conditions into building and zoning permit approvals to ensure developer compliance. Failure to adhere to these recommendations and conditions can jeopardize safe use of the airspace.

#### 1.3.6.1 Determination of Hazard

If a project sponsor who receives an NPF requests additional study, then the FAA undertakes a detailed aeronautical study, concluding with either a DNH or a Determination of Hazard (DOH) to air navigation. A DOH is issued for proposed construction that would have a “substantial adverse effect” - an adverse effect to a significant volume of operations - and negotiations with the project sponsor have failed to result in alterations to eliminate the substantial adverse effect.<sup>32</sup>

#### 1.3.6.2 FAA Lacks Land Use Regulatory Authority

Issuance of a DOH does not constitute disapproval of the construction. The FAA has no direct land use regulatory or permitting authority through which it can require the project sponsor to alter the proposed object to eliminate the hazard. That power rests with state and local land use regulatory agencies.

The FAA is mandated by Congress to protect navigable airspace and the safety of flight. If structures that the FAA has determined to be hazards are built, the FAA must alter the airspace to eliminate the hazard. This may require, for example, raising approach visibility minimums, degrading use of the runway during periods of limited visibility. Thus, local airspace protection zoning is an important means of safeguarding the navigable airspace as it currently exists, which, in turn, helps to protect the utility of airports.

<sup>29</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraph 7-1-3, April 20, 2023.

<sup>30</sup> 14 CFR 77.31(e)

<sup>31</sup> US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraph 7-1-4.a, April 20, 2023.

<sup>32</sup> 14 CFR 77.31(d): US Department of Transportation, Federal Aviation Administration, Order JO 7400.2P, *Procedures for Handling Airspace Matters*, Paragraphs 6-3-3, 6-3-4, 6-3-5, 7-1-3, and 7-1-4(c), April 20, 2023. According to Paragraph 6-3-5, a proposed project would have a “substantial adverse effect” if it would have an adverse effect on a significant volume of activity or if it would cause electromagnetic interference with navigational aid or aircraft communication signals.

## I.4 STATE REGULATIONS AND GUIDANCE

State law recognizes the Part 77 obstruction and hazard standards and provides the basis for local agencies and the California Department of Transportation (Caltrans) to enforce them. State law prohibits the construction or alteration of structures or objects that exceed Part 77 obstruction standards unless Caltrans issues a permit. The permit may be waived for a structure or object less than 500 feet above the ground if the FAA determines it would not be a hazard to air navigation.<sup>33</sup> In other words, an object that has been determined by the FAA to be a hazard can be built only if Caltrans issues a permit for its construction.

The 2011 edition of the *California Airport Land Use Compatibility Planning Handbook* (the Handbook) defers largely to FAA guidance concerning airspace protection. The Handbook advises the following:

- The compatibility strategy should be to limit the height of structures and objects so as not to cause hazards to flight.<sup>34</sup>
- The airspace protection boundary should correspond to the Part 77 imaginary surfaces, with consideration given to TERPS surfaces at airports where those surfaces are lower than the Part 77 surfaces.<sup>35</sup>
- Airport Land Use Commissions (ALUCs) should consider the potential for certain land uses to include features that may create hazards to flight, such as bird attractants, interference with visibility (distracting lights, smoke, or glare), thermal exhaust plumes, and electromagnetic interference with aircraft and air traffic control communications and navigation instruments.<sup>36</sup>

## I.5 AIRSPACE PROTECTION POLICY APPROACHES

Two general approaches to local airspace protection planning and zoning are used in the US. One approach establishes maximum structure height limits in the airport vicinity. The other implements FAA OE/AAA determinations without codifying specific height limits.

### I.5.1 Maximum Height Limits

Some land use planning and regulatory agencies have used federally defined airspace surfaces as maximum height limits through overlay zoning ordinances. In setting maximum height limits, developers are afforded certainty with regard to the applicable standards. Often the maximum height limits established through airport overlay zoning are higher than the maximum height limits set in local zoning ordinances for conventional zoning districts (e.g., residential, commercial, and industrial). In such cases, the more restrictive standard usually controls. Two examples are discussed in this section.

#### I.5.1.1 14 CFR Part 77 Obstruction Surfaces

At Indianapolis International Airport (IND), Indianapolis Marion County, Hendricks County, and the Town of Plainfield have coordinated to implement airport overlay zoning that establishes the 14 CFR Part 77 obstruction surfaces as maximum height limits. Height limits are established for the airport instrument

<sup>33</sup> California Public Utilities Code §§21657, 21659(b).

<sup>34</sup> California Department of Transportation, Division of Aeronautics, *California Airport Land Use Planning Handbook*, p. 4-40, October 2011.

<sup>35</sup> California Department of Transportation, Division of Aeronautics, *California Airport Land Use Planning Handbook*, p. 3-41, October 2011. The Handbook does not address situations where existing structures or terrain penetrate the Part 77 surfaces, as at SDIA.

<sup>36</sup> California Department of Transportation, Division of Aeronautics, *California Airport Land Use Planning Handbook*, p. 4-34 - 4-40, October 2011. These potential hazards are considered in Appendix J, Potential Hazards to Flight - Policy Considerations, of this ALUCP update.

approach surface areas, airport -non-instrument approach surface areas, airport transitional surface areas, airport horizontal surface area, and airport conical surface area consistent with 14 CFR Part 77.<sup>37</sup>

#### 1.5.1.2 Lowest Composite Airspace Surfaces

At San Francisco International Airport (SFO), the City/County Association of Governments of San Mateo County implemented an ALUCP that sets the maximum building height limits at the lowest elevation of a set of combined airspace surfaces, including selected 14 CFR Part 77 obstruction surfaces, selected TERPS surfaces, and OEI surfaces.<sup>38</sup> The incorporation of OEI surfaces was considered essential because of the high terrain around much of SFO and the congested airspace, which limit the viability of low-altitude departure turns in multiple directions.

SFO maintains an interactive, three-dimensional GIS map of the composite airspace. The airport staff coordinates with local municipalities in reviewing proposed development projects for compliance with the height limits.

#### 1.5.1.3 Coordination of Development Permitting with FAA OE/AAA Process

It is advisable that local government permitting agencies coordinate airspace protection overlay zoning with the FAA OE/AAA process even if they adopt overlay zoning setting maximum height limits. This prevents the inadvertent permitting of structures that, while not penetrating the critical airspace surfaces, may be determined by the FAA to be hazards based on other considerations (e.g., electromagnetic interference). For this to be effective, the local governments should advise developers to file Form 7460-1 for all proposed structures and objects as soon as possible. Use of the [FAA's On-line Notice Criteria Tool](#) is advisable. Development permits should be issued only after the FAA completes the OE/AAA process for the proposed project and issues a DNH.

### 1.5.2 Implementation of FAA OE/AAA Determinations

Some land use planning and regulatory agencies have incorporated the FAA OE/AAA process into their airport land use compatibility policies and zoning codes without setting specific height limits. The ALUCPs for some airports in San Diego County are examples. Proposed structures and objects are considered compatible with the ALUCP if the FAA issues a DNH with no recommendations for marking or lighting of the structure or object. If the FAA issues a DNH with marking and lighting recommendations, proposed structures or objects can be made conditionally compatible by incorporating obstruction lighting systems or marking per FAA standards and the subject property owner grants an aviation easement to the airport operator. Proposed structures or objects are incompatible with the ALUCP if the FAA issues a DOH.

This approach provides maximum flexibility to developers consistent with the preservation of airspace. This flexibility can be especially important in areas with high land values, such as downtowns. This approach, however, has at least two important drawbacks:

- It leaves OEI airspace vulnerable to encroachment because the FAA does not typically consider OEI airspace in the OE/AAA process. This concern is greatest at commercial service airports with constrained airspace, caused by high air traffic volumes, nearby airports, or high terrain, such as SDIA.

<sup>37</sup> Indianapolis-Marion County, Code of Ordinances, Section 742-205; Hendricks County, *The Hendricks County Quality Growth Strategy, Zoning Ordinance*, Section 14.4; Town of Plainfield, Indiana, Zoning Ordinance, Article 3.7, A - Airspace Overlay.

<sup>38</sup> City/County Association of Governments of San Mateo County, *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*, November 2012, Section 4.4. SFO staff and consultants defined the OEI surfaces in consultation with the airlines. This resulted in the definition of a "composite" OEI surface that the airlines agreed would meet their needs.

- The FAA’s issuance of a DOH depends on finding a “substantial aeronautical impact,” which is an adverse impact to a “significant volume of operations.” The FAA’s guidance documents do not specifically define “significant volume of operations.” Thus, a DOH determination requires the exercise of judgement by the FAA with which airport operators and aircraft operators may disagree.

In short, the FAA OE/AAA process cannot be completely relied upon to protect all airspace which an airport operator may consider to be critical.

The ALUCPs for the 16 airports in San Diego County address these shortcomings to an extent by stipulating that a project is incompatible with the ALUCP airspace standards, notwithstanding the issuance of a DNH by the FAA, if the airport operator determines that the proposed structure or object would increase the ceiling or visibility minimums for an existing or planned instrument procedure, airway, route, or minimum vectoring altitude or conflict with instrument or visual flight rules airspace.

The 2014 SDIA ALUCP does establish a maximum height limit, regardless of FAA issuance of a DNH, beneath the TSS off each runway end. The TSS was an airport design surface used to determine the location of the runway landing threshold. The latest edition of the FAA’s airport design advisory circular has replaced the term TSS with RESS as discussed in Section I.3.4.<sup>39</sup>

## I.6 AIRSPACE PROTECTION POLICY CONSIDERATIONS FOR SAN DIEGO INTERNATIONAL AIRPORT

The 2014 ALUCP included three goals to be achieved by the airspace protection policies, all of which remain appropriate for the updated ALUCP:

- Assuring flight safety by limiting the height of new structures and objects
- Preserving the operational capability of the Airport
- Preventing further reduction of available runway landing distance<sup>40</sup>

The basic approach to airspace protection policy in the 2014 ALUCP is proposed to be continued in the updated ALUCP, with some modifications.

### I.6.1 Combined RESS-OEI Surfaces as Maximum Height Limit

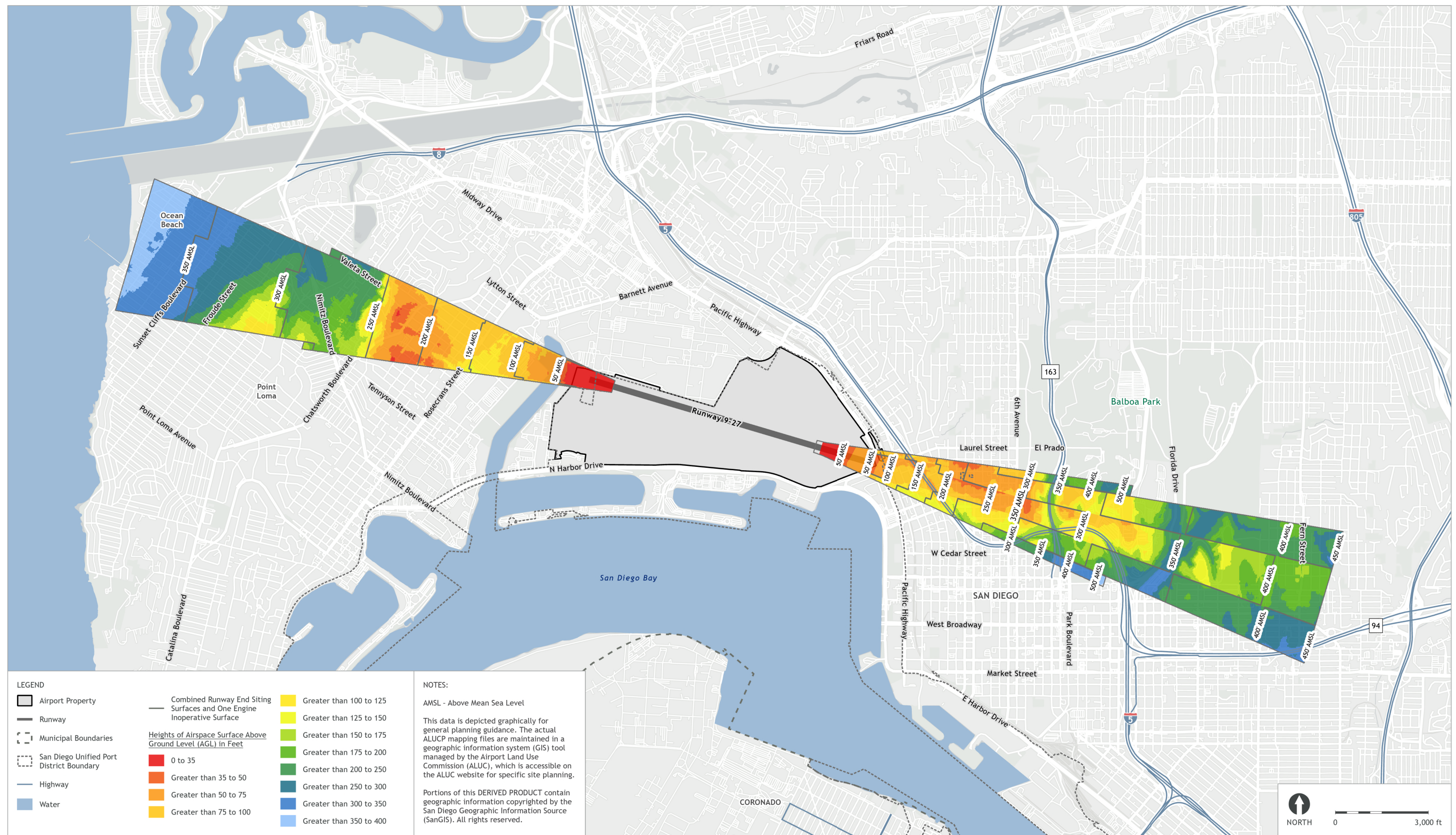
The 2014 ALUCP policy establishing the RESS (formerly known as the TSS) as a maximum height limit should be modified by adding the OEI surfaces to the RESS as maximum height limits. Protection of the OEI surfaces is vital to maintaining the long-term viability of SDIA to serve long-haul commercial air service.

**Exhibit I-14** depicts the combined RESS, FAA OEI, and ICAO OEI surfaces off both runway ends. Off the west end, the combined surfaces range from approximately 35 to 125 feet above the ground east of Chatsworth Boulevard. West of Chatsworth, the surfaces range from approximately 100 to 400 feet above the ground. Off the east end of the runway, the surfaces over most of the area west of Balboa Park range from approximately 50 to 125 feet above the ground. Along the northern edge, the combined surfaces range from approximately 35 to 50 feet above the high terrain. East and south of Balboa Park, the surfaces range from approximately 150 to 350 feet above the ground.

<sup>39</sup> US Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13B, *Airport Design*, March 2022, Section 3.6, Table 3-4.

<sup>40</sup> Airport Land Use Commission, San Diego County Regional Airport Authority, *San Diego International Airport Land Use Compatibility Plan*, Amended May 2014, p. 1-2.







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**Exhibit I-15** depicts the profiles of the RESS and OEI surfaces along the extended runway centerline off the east end of the runway. The exhibit illustrates the effect of adding the OEI surfaces to the RESS. The FAA OEI surface is approximately 60 feet above the ground at Interstate 5, approximately 30 feet lower than the RESS. From that point east to 6<sup>th</sup> Avenue, the FAA OEI surface ranges from approximately 50 to 60 feet above the ground, approximately 30 to 80 feet below the RESS. From 6<sup>th</sup> Avenue east to the end of the RESS, over Balboa Park, the OEI surface ranges from approximately 50 to 100 feet above the ground. The OEI surfaces extend approximately 7,000 feet beyond the end of the RESS, with heights ranging from approximately 100 to 250 feet above the ground in that area.

**Exhibit I-16** is a three-dimensional perspective rendering of the combined RESS and OEI surfaces off the east end of the runway. The drawing illustrates the relationships among the surfaces. The lowest elevations are in the center of the area. The elevations step up laterally from the center to the outer edges.

**Exhibit I-17** depicts the profiles of the RESS and OEI surfaces along the extended runway centerline off the west end of the runway. In most of this area, the FAA OEI surface is slightly lower than the other surfaces, and no more than approximately 10 feet below the RESS. For approximately 1,000 feet west of Chatsworth Boulevard, the RESS is slightly lower than the OEI surfaces. The OEI surfaces extend approximately 6,000 feet beyond the west end of the RESS, with heights ranging from approximately 170 to 350 feet above the ground.

**Exhibit I-18** is a three-dimensional perspective rendering of the combined RESS and OEI surfaces off the west end of the runway. There is much less vertical variation among the surfaces than on the east side. As on the east side, the elevations tend to step up laterally from the center to the outer edges of the combined surfaces.

## 1.6.2 Airspace Protection Area

**Exhibit I-19** depicts all TERPS approach OCSs, the nonstandard departure OCSs, the outer boundary of the 14 CFR Part 77 imaginary surfaces, and the outer boundary of the 14 CFR Part 77 notification surface. The airspace protection area is defined by the outer boundary of the combined surfaces. The airspace protection area boundary is unchanged from the 2014 ALUCP.

The possible expansion of the airspace protection area to the northwest and northeast, reflecting the SID and obstacle departure procedure OCSs depicted on Exhibits I-7 and I-8, was considered but determined to be unnecessary. The altitude of those departure OCSs ranges from approximately 700 to 800 feet AMSL at the outer edge of the airspace protection area boundary depicted on Exhibit I-19, corresponding to approximately 300 to 800 feet above the ground. The underlying terrain within the airspace protection area ranges from sea level on the northwest side to approximately 400 feet MSL on the northeast side.<sup>41</sup>

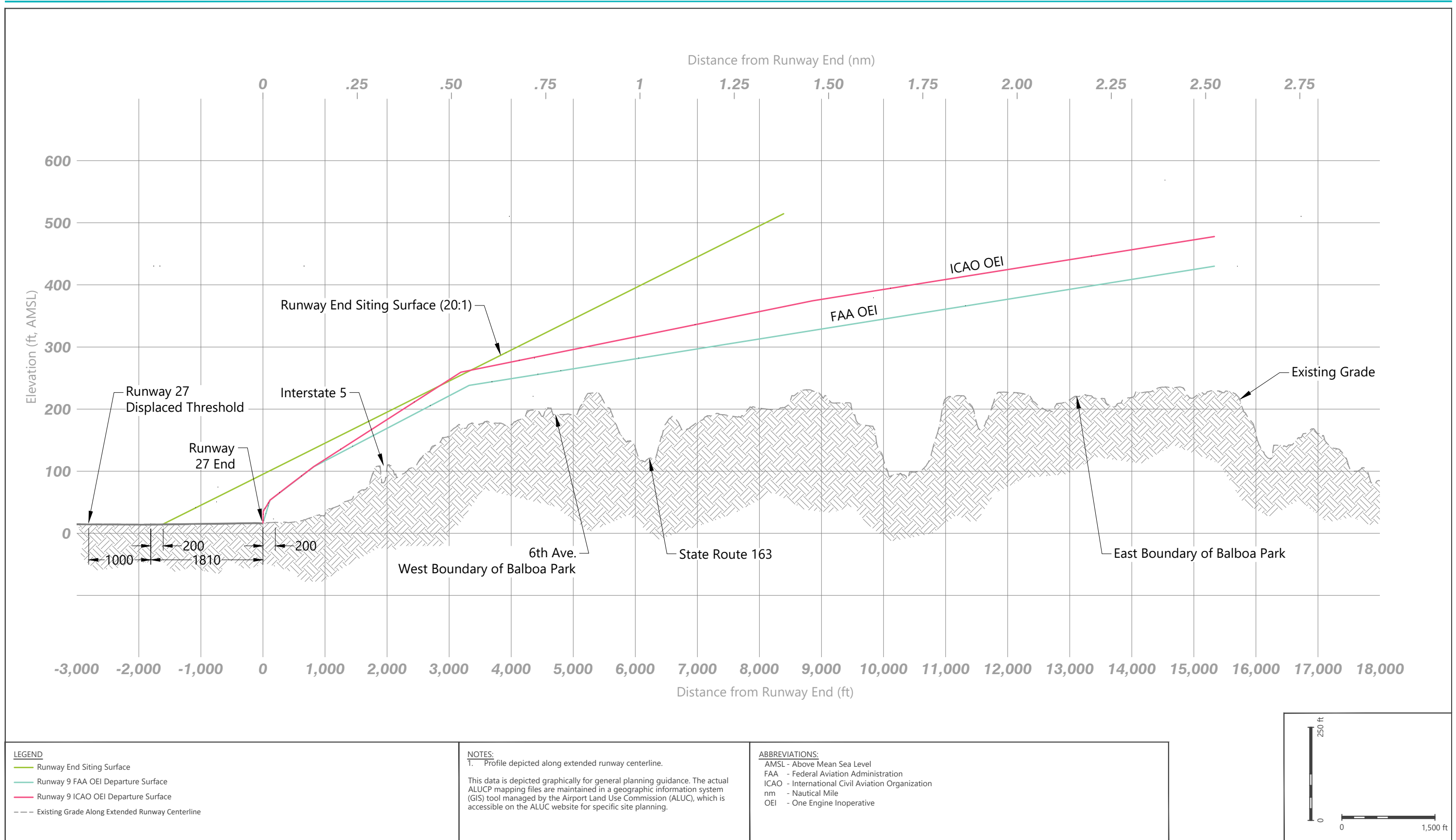
Regardless of the location of a proposed project, whether inside or outside the ALUCP airspace protection area, project sponsors are obligated to comply with the federal airspace protection regulations of 14 CFR Part 77.

## 1.6.3 Review of 2014 ALUCP Airspace Policies

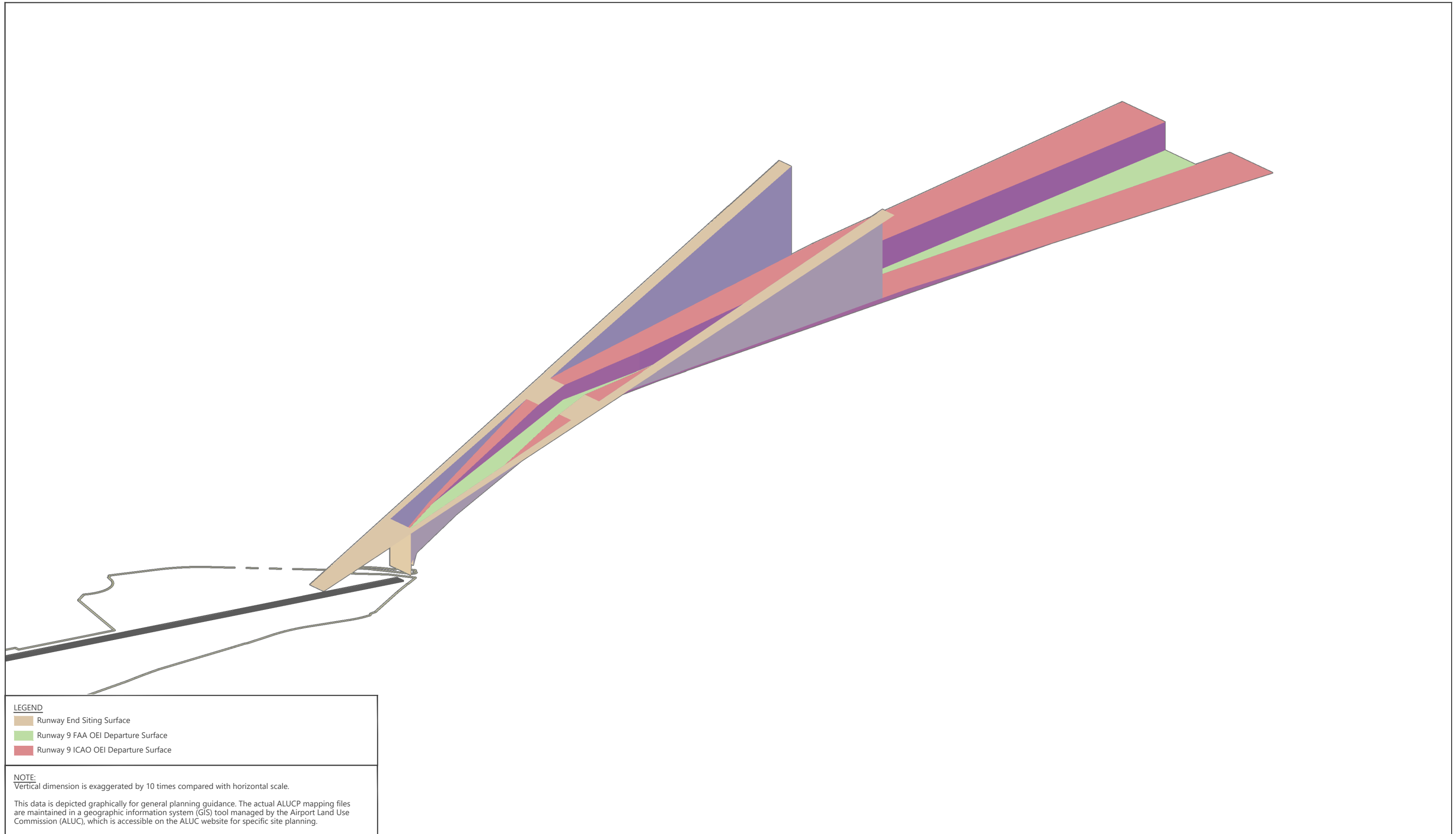
**Table I-1** presents the 2014 ALUCP policies and considerations for potential update of the policies. The 2014 ALUCP policies are quoted in the middle column, and potential policy update considerations are in the righthand column. In addition to the considerations noted in Table I-1, the policies should be reorganized to clearly distinguish among incompatible, conditionally compatible, and compatible uses.

<sup>41</sup> <https://en-us.topographic-map.com/map-t6514/San-Diego-County/?center=32.75068%2C-117.13812&zoom=14&popup=32.7591%2C-117.13061> (accessed February 16, 2024).

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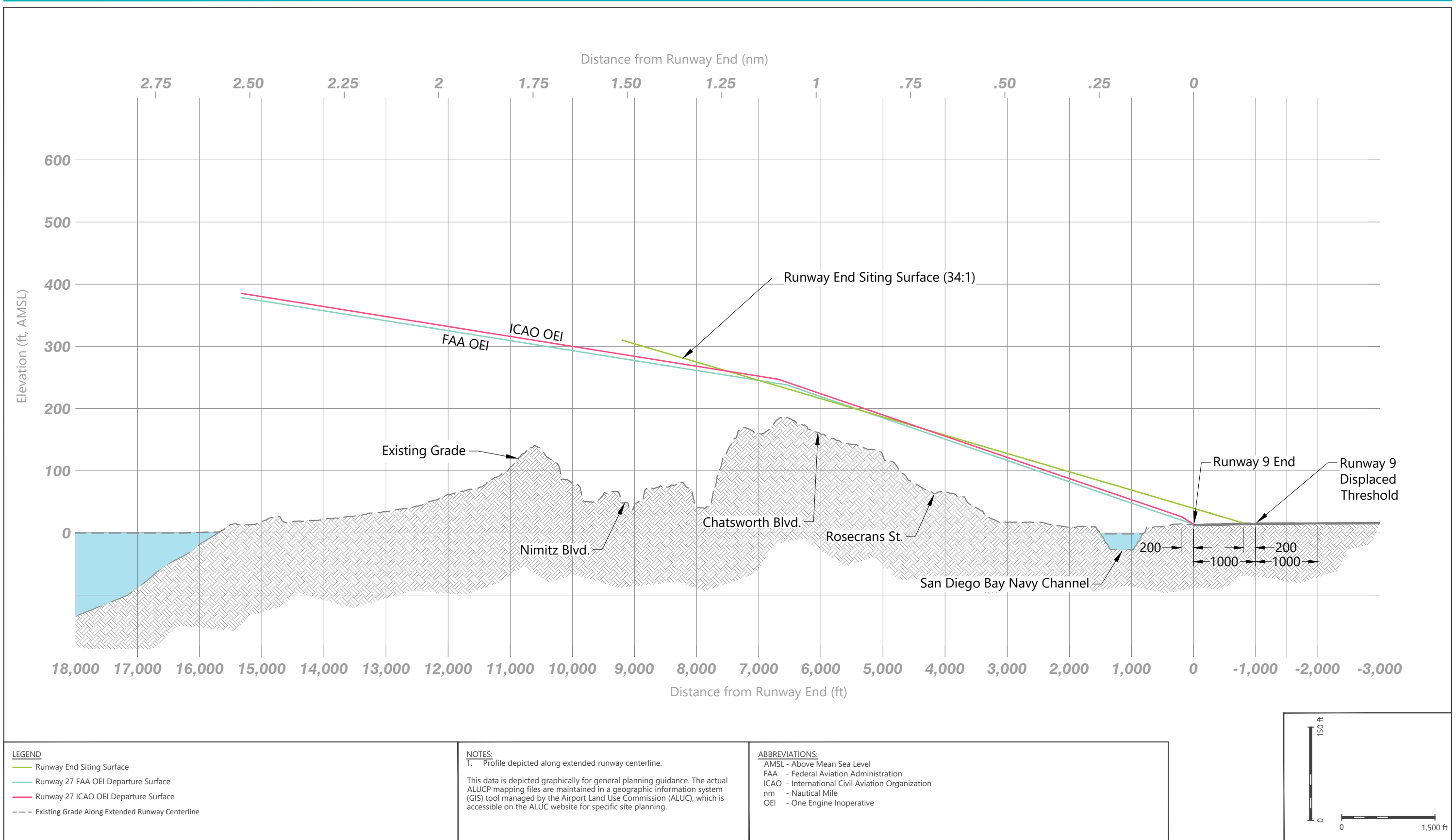


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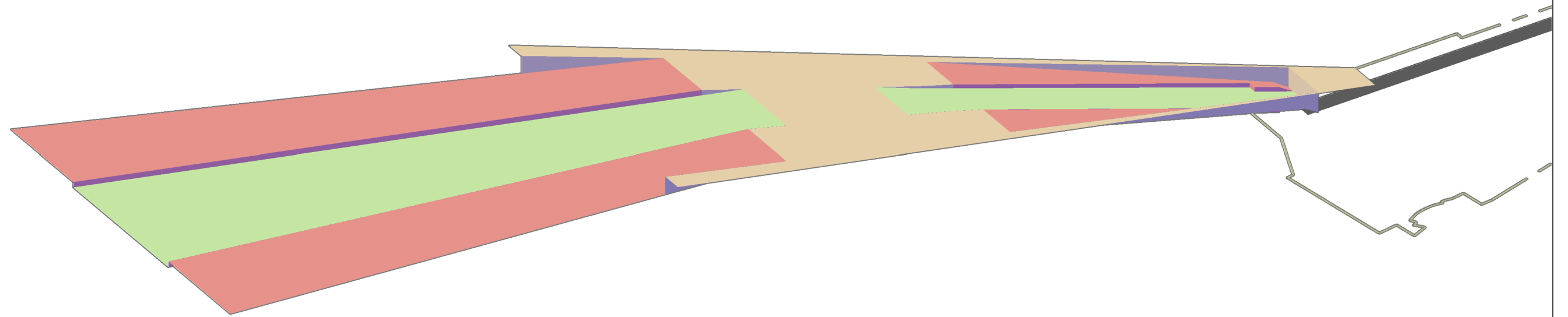




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**LEGEND**

- Runway End Siting Surface
- Runway 27 FAA OEI Departure Surface
- Runway 27 ICAO OEI Departure Surface

**NOTE:**

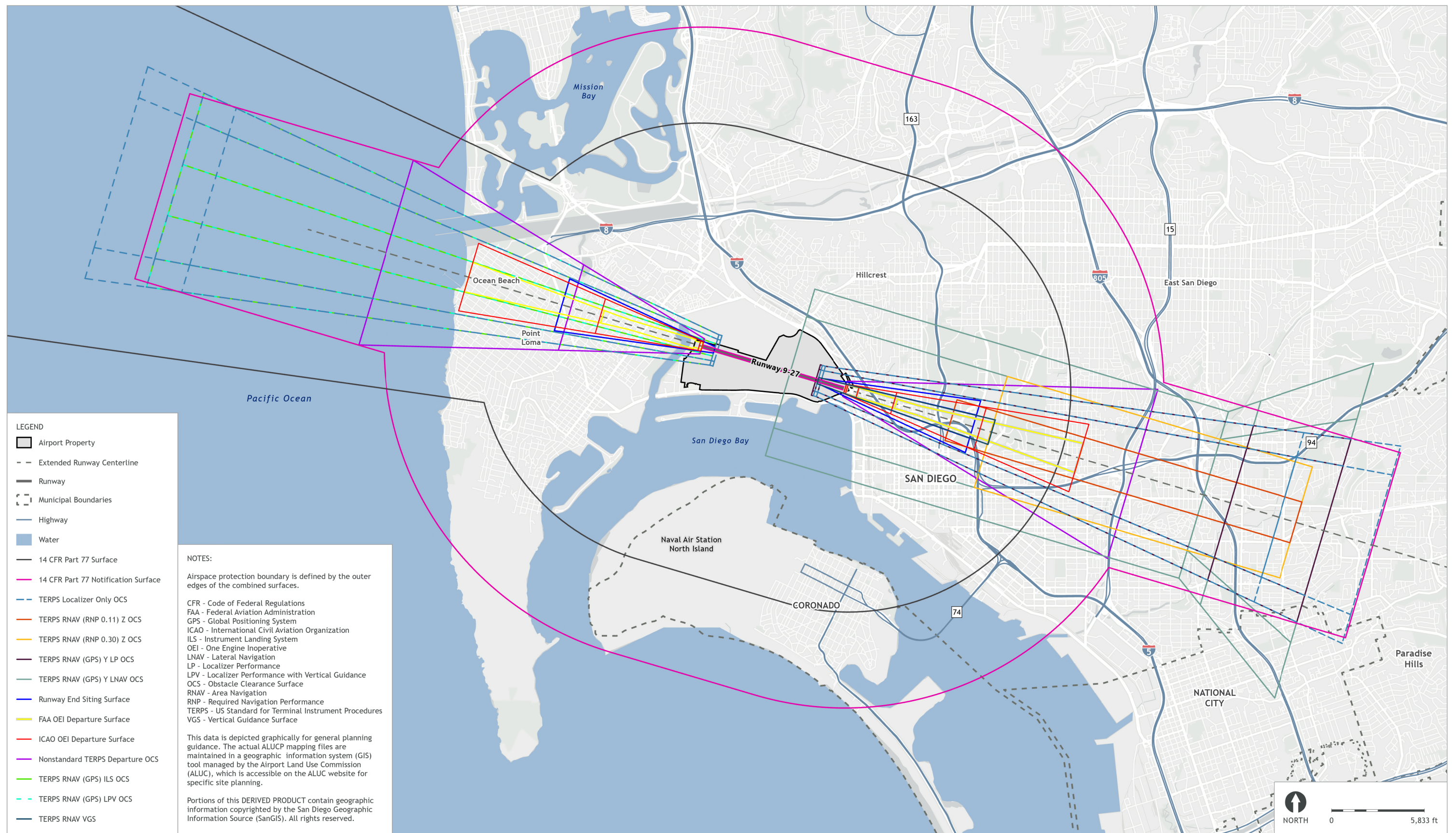
Vertical dimension is exaggerated by 10 times compared with horizontal scale.

This data is depicted graphically for general planning guidance. The actual ALUCP mapping files are maintained in a geographic information system (GIS) tool managed by the Airport Land Use Commission (ALUC), which is accessible on the ALUC website for specific site planning.



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**LEGEND**

- Airport Property
- Extended Runway Centerline
- Runway
- Municipal Boundaries
- Highway
- Water
- 14 CFR Part 77 Surface
- 14 CFR Part 77 Notification Surface
- TERPS Localizer Only OCS
- TERPS RNAV (RNP 0.11) Z OCS
- TERPS RNAV (RNP 0.30) Z OCS
- TERPS RNAV (GPS) Y LP OCS
- TERPS RNAV (GPS) Y LNAV OCS
- Runway End Siting Surface
- FAA OEI Departure Surface
- ICAO OEI Departure Surface
- Nonstandard TERPS Departure OCS
- TERPS RNAV (GPS) ILS OCS
- TERPS RNAV (GPS) LPV OCS
- TERPS RNAV VGS

**NOTES:**

Airspace protection boundary is defined by the outer edges of the combined surfaces.

CFR - Code of Federal Regulations  
 FAA - Federal Aviation Administration  
 GPS - Global Positioning System  
 ICAO - International Civil Aviation Organization  
 ILS - Instrument Landing System  
 OEI - One Engine Inoperative  
 LNAV - Lateral Navigation  
 LP - Localizer Performance  
 LPV - Localizer Performance with Vertical Guidance  
 OCS - Obstacle Clearance Surface  
 RNAV - Area Navigation  
 RNP - Required Navigation Performance  
 TERPS - US Standard for Terminal Instrument Procedures  
 VGS - Vertical Guidance Surface

This data is depicted graphically for general planning guidance. The actual ALUCP mapping files are maintained in a geographic information system (GIS) tool managed by the Airport Land Use Commission (ALUC), which is accessible on the ALUC website for specific site planning.

Portions of this DERIVED PRODUCT contain geographic information copyrighted by the San Diego Geographic Information Source (SanGIS). All rights reserved.

↑  
 NORTH

0 — 5,833 ft



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Table I-1 (1 of 4) 2014 ALUCP Airspace Protection Policies and Considerations for Update

2014 ALUCP		
Policy Number	2014 ALUCP Policy Description	Considerations for Updated Policy
<b>Policy A.1</b>	<p><b>Airspace Protection Boundary</b></p> <p>The airspace protection boundary, as depicted on Exhibit 4-1 [in 2014 ALUCP], establishes the area where the policies and standards of this chapter apply. Additional boundaries at the ends of the runway represent the Threshold Siting Surfaces (TSSs) within which specific height limitations apply. See Section 4.3 [of the 2014 ALUCP] for additional information on TSSs.</p> <p>The airspace protection boundary is based on the outermost edge of the following airspace surfaces:</p> <ul style="list-style-type: none"> <li>• Part 77, Subpart B, 100:1 notification surface boundary</li> <li>• Part 77 civil airport imaginary airspace surfaces</li> <li>• The approach surfaces for both runway ends defined by the criteria in FAA Order 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS)</li> </ul>	<p>No change in airspace protection boundary is needed. See Exhibit I-19.</p>
<b>Policy A.2</b>	<p><b>FAA Notification Requirements</b></p> <p>Project sponsors must comply with FAA notice requirements for proposed construction or alteration of objects exceeding certain heights or that could potentially interfere with NAVAIDS by filing of Form 7460-1 with the FAA, if required.</p> <p>Regardless of location, sponsors of proposed projects shall notify the FAA of proposed structures or objects exceeding 200 feet above ground level.</p> <p>Project sponsors must include a copy of the FAA notice of determination letter with their consistency applications to the ALUC if FAA review is required.</p> <p>See Appendix B [of the 2014 ALUCP] for the submittal requirements under ALUCP consistency determination application process.</p>	<p>The 2014 ALUCP does not address a provision of 14 CFR 77.9(e)(1)<sup>1</sup> explaining when the filing of Form 7460-1 is not required. The updated ALUCP should address this exemption and provide guidance to developers in determining if the proposed construction or alteration is shielded by existing terrain or structures.</p> <p>The updated policy should also explain that any cranes or similar construction equipment required to build the structure must be described on a separate Form 7460-1 from the structure itself.</p>



Table I-1 (2 of 4) 2014 ALUCP Noise Policies and Considerations for Update

2014 ALUCP		
Policy Number	2014 ALUCP Policy Description	Considerations for Updated Policy
Policy A.3	<p><b>Hazards</b></p> <p>Hazards, as determined by the FAA, are incompatible with the airspace protection policies and are not allowed.</p>	No change needed.
Policy A.4	<p><b>Threshold Siting Surfaces</b></p> <p>Proposed structures or objects penetrating a TSS, as depicted on Exhibit 4-3 [of the 2014 ALUCP], are incompatible with the airspace protection policies and are not allowed. Sponsors of proposed land use projects within either TSS boundary must provide evidence that the proposed structure or object will not penetrate a TSS.</p>	Change "TSS" to "RESS." Consider adding OEI to the surfaces that, if penetrated, would make a proposed structure or object incompatible. See Exhibits I-14 - I-18.
Policy A.5	<p><b>Compatible Structure or Object</b></p> <p>A proposed structure or object is compatible with the airspace policies if the FAA determines that it is not an obstruction to air navigation.</p>	This policy should be revised to note that projects not requiring FAA review are also compatible.

Table I-1 (3 of 4) 2014 ALUCP Noise Policies and Considerations for Update

2014 ALUCP Policy Number	2014 ALUCP Policy Description	Considerations for Updated Policy
<p><b>Policy A.6</b></p>	<p><b>Conditionally Compatible Obstructions</b></p> <p>If a proposed structure or object is determined to be an obstruction, it may be made conditionally compatible with this [2014] ALUCP if all the following apply:</p> <ol style="list-style-type: none"> <li>1. The proposed project does not penetrate a TSS</li> <li>2. As a result of an aeronautical study, the FAA determines that the obstruction would not be a hazard to air navigation</li> <li>3. FAA analysis determines that the object would not cause any of the following:               <ol style="list-style-type: none"> <li>(a) An increase in the ceiling or visibility minimums for an existing or planned instrument procedure<sup>2</sup></li> <li>(b) A reduction of the operational efficiency and capacity of the Airport</li> <li>(c) Conflict with visual flight rules (VFR) airspace</li> </ol> </li> <li>4. Sponsors of a proposed structure or object must comply with the findings of FAA aeronautical studies (e.g., reduce structure height, install obstruction lighting systems and/or painting/markings of structures) performed under Part 77 regulations<sup>3</sup></li> <li>5. An aviation easement is dedicated to the Airport operator</li> </ol>	<p>Revisions should be considered to:</p> <ul style="list-style-type: none"> <li>• provide for Airport operator, in addition to FAA, analysis of the effects of proposed structures and objects in paragraph 3;</li> <li>• specify the “ceiling or visibility minimums” of concern in paragraph 3(a).</li> </ul>

Table I-1 (4 of 4) 2014 ALUCP Noise Policies and Considerations for Update

2014 ALUCP		
Policy Number	2014 ALUCP Policy Description	Considerations for Updated Policy
1.6.1 Existing Incompatible Uses	<p><b>1.6.1.3 Airspace</b></p> <p>Enlargement and reconstruction of an existing incompatible land use are not subject to consistency review for airspace purposes, unless the work would result in an increase in height that creates an obstruction or hazard (see Section 4.2 in Chapter 4 [of the 2014 ALUCP]). If consistency review is required, an avigation easement must be recorded if:</p> <ol style="list-style-type: none"> <li>1. The structure or object exceeds the obstruction standards of Part 77, as determined by the Federal Aviation Administration (FAA).</li> <li>2. The existing incompatible land use is on a site where the existing ground level penetrates a Part 77 airspace surface.</li> </ol>	<p>There may be existing buildings or objects that penetrate the RESS to a small degree. These would be incompatible with the airspace protection policies. Standards should stipulate that increases in the heights of these structures or objects would be incompatible with the airspace protection policies of the updated ALUCP.</p>

NOTES:

- 1 Title 14, Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, Section 77.9(e)(1).
- 2 A planned procedure is one that is formally on file with the FAA or that is consistent with the FAA-approved Airport Layout Plan.
- 3 Federal Aviation Administration, Advisory Circular 70/7460-1K, *Obstruction Marking and Lighting*.

SOURCES: Airport Land Use Commission, San Diego County Regional Airport Authority, San Diego International Airport Land Use Compatibility Plan, Amended May 2014, p. 4-2 - 4-15 and p.1-10 (columns 1 and 2). Ricondo & Associates, Inc., June 2024 (column 3).