



Redding Regional Airport



Airport Master Plan

AGENDA

Planning Advisory Committee (PAC)

Meeting #4

Wednesday, April 23, 2025

1:30 pm

REU – Shasta Room

1. Welcome/Introductions
2. Review of the Master Plan Process
3. Preferred Development Concept
4. Capital Improvement Program
5. Energy Assessment (Quest Energy)
6. Land Use Compatibility Plan
7. Closing Remarks

MASTER PLAN PROCESS



FORECAST REVIEW

Forecast Summary

	2022	2027	2032	2042	CAGR 2022-2042
ENPLANEMENTS AND AIR CARGO					
Annual Enplanements	100,890	139,402	148,602	154,500	2.15%
Air Cargo (lbs.)	2,643,117	3,361,260	4,057,350	5,737,840	3.95%
ANNUAL OPERATIONS					
Commercial Operations (Itinerant)					
Air Carrier (>59 seats)	1,860	2,748	3,190	2,728	1.93%
Commuter Airline (<60 seats)	2,044	1,123	0	0	-100.00%
Air Cargo	2,235	2,841	3,430	4,850	3.95%
Other Air Taxi	16,304	18,694	21,712	25,803	2.32%
Total Commercial Operations	22,443	25,406	28,332	33,381	2.00%
General Aviation Operations					
Itinerant	17,100	19,101	21,234	26,242	2.16%
Local	21,951	24,311	27,026	33,400	2.12%
Total General Aviation Operations	39,051	43,412	48,260	59,642	2.14%
Military Operations					
Itinerant	548	549	549	549	0.01%
Local	345	298	298	298	-0.73%
Total Military Operations	893	847	847	847	-0.26%
Total Itinerant Operations	40,091	45,056	50,116	60,173	2.05%
Total Local Operations	22,296	24,609	27,324	33,698	2.09%
TOTAL ANNUAL OPERATIONS	62,387	69,665	77,439	93,870	2.06%
BASED AIRCRAFT					
Single Engine Piston	175	176	182	197	0.59%
Multi-Engine Piston	15	14	13	11	-1.54%
Turboprop	19	23	25	29	2.14%
Jet	12	15	18	25	3.74%
Helicopter	19	21	24	28	1.96%
TOTAL BASED AIRCRAFT	240	249	262	290	0.95%

CAGR - Compound annual growth rate

TABLE F1 Activity Update			
Year	Based Aircraft	Operations	Enplanements
2022	240	62,387	100,890
2024	242	50,073 ¹	88,565 ²
Forecast Years			
2027	249	69,665	139,402
2032	262	77,439	148,602
2042	290	93,870	154,500
¹ FAA OPSNET tower count operations.			
² USDOT - Bureau of Transportation Statistics			

Table 5A: Planned Critical Aircraft and Runway Design Code

	Current	Future
RUNWAY 16-34		
Current Critical Aircraft	C-III-3	D-III-3
Example Critical Aircraft	Boeing 737-700	Boeing 737-800
Lowest Visibility	½-Mile	½-Mile
Runway Design Code	C-III-2400	D-III-2400
RUNWAY 12-30		
Current Critical Aircraft	C-III-3	A/B-I(small)
Example Critical Aircraft	Boeing 737-700	Beech Bonanza 55
Lowest Visibility	Visual	Visual
Runway Design Code	C-III-VIS	A/B-I-VIS

FAA Forecast Approval Letter



U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Airports Division

San Francisco Airports District Office
2999 Oak Creek Rd., Suite 200
Walnut Creek, CA 94597

August 29, 2023

Mr. James Wadleigh
Airport Manager
Redding Regional Airport
6751 Woodrum Circle #200
Redding, CA 96002

SENT VIA E-MAIL

Dear Mr. Wadleigh,

RE: FAA Review Comments for Updated Aviation Activity Forecast – 28 August 2023;
Redding Regional Airport (RDD); AIP Grant/Project 3-06-0194-063-2022

The San Francisco Airports District Office (SFO-ADO) has completed the review of the updated Aviation Activity Forecasts for the Redding Regional Airport (RDD). The SFO-ADO review comments are as follows:

- FAA concurs with the forecast approach and methodologies presented in the updated aviation forecast validation document. The COVID-19 adjusted forecast alternative recovery scenario analysis and forecast assumptions presented are considered reasonable and well supported.
- FAA concurs with the forecast levels and growth rates for the total operations, and based aircraft, as presented in **Exhibit 2J – Forecast Summary** of the RDD Chapter 2 Forecasts – dated August 25, 2023. The subject aviation activity forecast is considered generally consistent with the FAA 2022 Terminal Area Forecast (TAF).
- FAA concurs with the near-term forecast presented for peak passenger enplanements through 2027 presented in the **Exhibit 2J – Forecast Summary**. This correlates with the maximum number of departing seats RDDs current Airlines contract(s). Per Table 3-4 of the AIP Handbook, to determine whether a project (e.g., expanded passenger terminal) is justified, there must be an actual need for the project at the airport within the next five years. Thus, the forecasted enplanements in 2027 are the most relevant.
- FAA concurs that the Runway Design Code (RDC) for Runway 16-34 is C-III-2400. Due to magnetic variation adjustment, the future runway designation is 17-35. Based on the most recent year of aircraft activity (2022) it appears reasonable that the Future RDC will be D-III-2400 for Runway 17-35.

FACILITY REQUIREMENTS

- **Runways/Taxiways**
 - **Terminal**
 - **Aprons**
 - **Hangars**

Exhibit 4A: Current ALP Concept

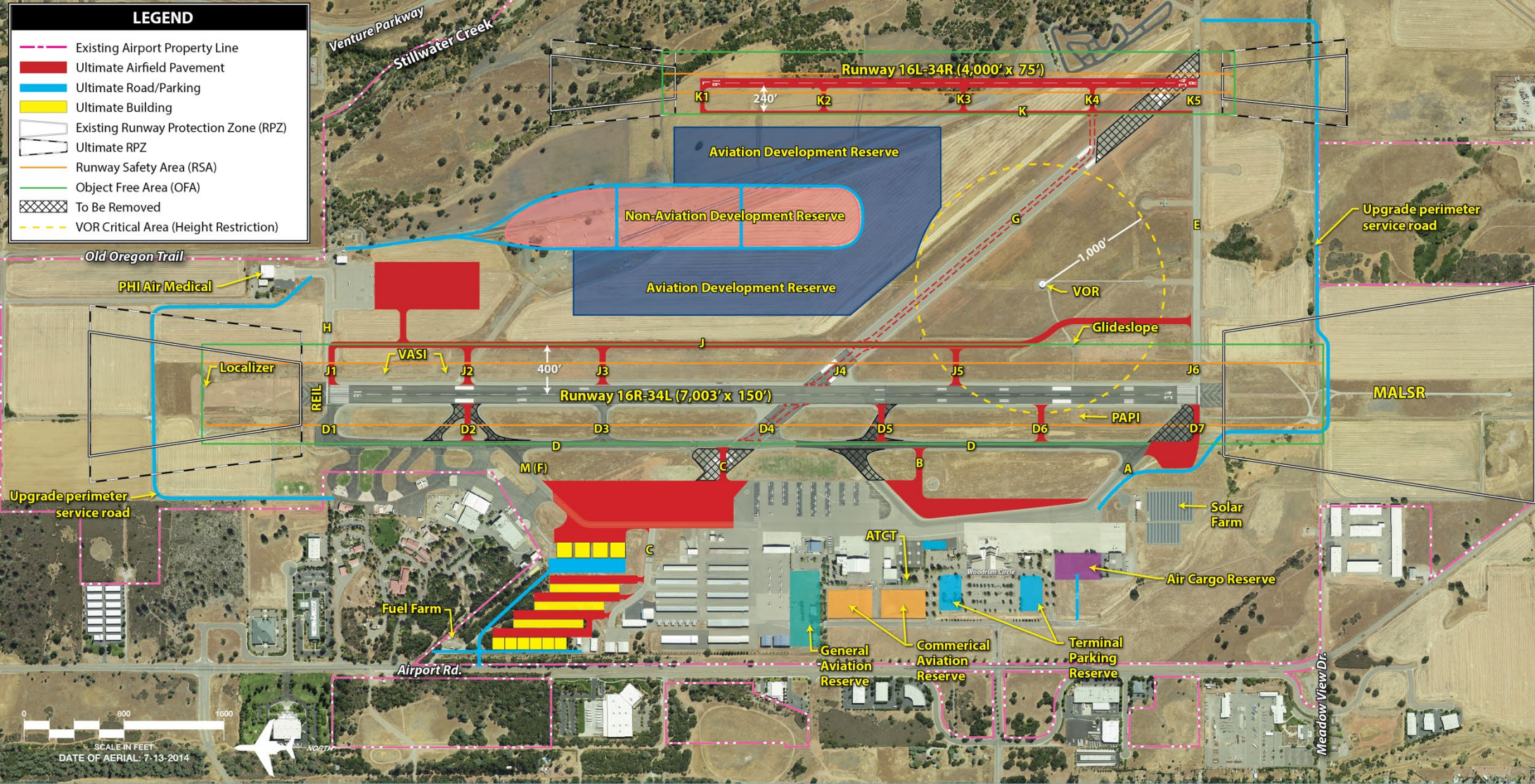


Table 3F: Runway Eligibility

For the following runway type...	Must meet all of the following criteria...	And is...
Primary Runway	1. A single runway at an airport is eligible for development, consistent with FAA design and engineering standards.	Eligible
Crosswind Runway	1. The wind coverage on the primary runway is less than 95%.	Eligible if justified
Secondary Runway	1. There is more than one runway at the airport. 2. The non-primary runway is not a crosswind runway. 3. Either of the following: a) The primary runway is operating at 60% or more of its annual capacity. b) FAA has made a specific determination that the runway is required.	Eligible if justified
Additional Runway	1. There is more than one runway at the airport. 2. The non-primary runway is not a crosswind runway. 3. The non-primary runway is not a secondary runway.	Ineligible

Legacy Crosswind Runway



Federal Aviation
Administration

Memorandum

Date: April 4, 2025

To: Office of Airports Regional Directors, AXX-600s
Regional Airport Planning and Programming, AXX-610s
Airports District Office Managers, XXX-ADOs

From: Danielle J. Rinsler, Director, Airport Planning and Programming, APP-1

Subject: Reauthorization Program Guidance Letter (R-PGL) 25-01: Runway Projects

DANIELLE J
RINSLER

Digitally signed by DANIELLE
J RINSLER
Date: 2025.04.04 12:10:21
-04'00'

Justification for FAA Funding:

1. Primary runway provides greater than 95% wind coverage.
2. Only one crosswind runway can be considered a Legacy Crosswind Runway.
3. The Legacy Crosswind Runway must have received AIP funding in the past (previous federal investment).

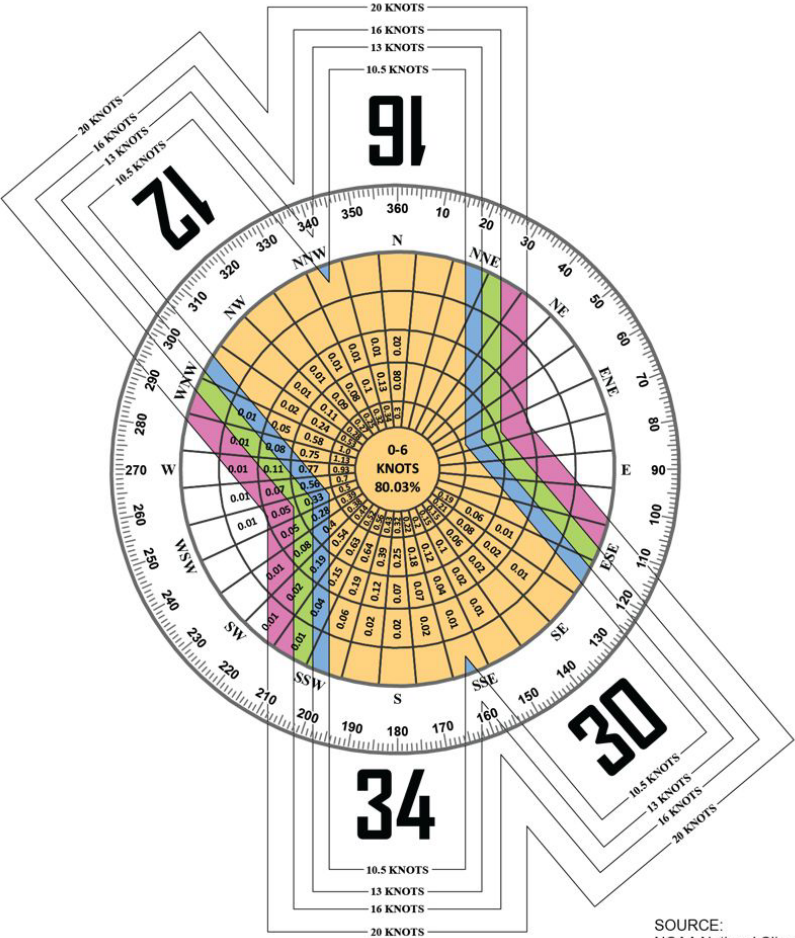
Potential Funding Levels:

1. Rehabilitation project – ADO may consider funding at existing dimensions.
2. Reconstruction project – ADO may only fund to A/B-I design standards.

Exhibit 3C: Wind Rose

95.5% Wind Coverage for Runway 16-34

ALL WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 16-34	99.50%	99.82%	99.97%	100.00%
Runway 12-30	95.39%	97.83%	99.31%	99.88%
All Runways	99.70%	99.91%	99.99%	100.00%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Redding Regional Airport
Redding, California

OBSERVATIONS:
112, 110 All Weather Observations
Jan. 1, 2014 - Dec. 31 2023

Table 5B: Recommended Declared Distances (Runway 16-34)

Declared Distance Parameters	Recommended Declared Distances (feet)	
	Runway 16	Runway 34
TORA: Takeoff Run Available	7,003	7,003
TODA: Takeoff Distance Available	7,003	7,003
ASDA: Accelerate-Stop Distance Available	7,003 (6,997)	6,997
LDA: Landing Distance Available	7,003 (6,997)	6,997

(Currently Published)

Note: Localizer antenna penetrates Runway 16 runway safety area by 6 feet.

Table 3J: Commercial Aircraft Takeoff Runway Length

Aircraft Type	MTOW (lbs.)	TAKEOFF LENGTH REQUIREMENTS (feet)				
		Useful Load				
		60%	70%	80%	90%	100%
B737-700	154,500	5,000	5,900	6,800	7,900	10,100
B737-800	174,200	5,300	6,000	6,800	7,300	8,200
B767-300	350,000	7,700	8,300	8,900	9,200	10,000
CRJ-200	53,000	4,500	5,100	5,600	6,100	6,600
CRJ-700	75,000	4,400	4,800	5,200	5,500	5,900
CRJ-900	82,500	5,100	5,600	6,000	6,400	7,000
EMB 170	79,344	3,600	4,000	4,300	4,800	5,300
DC10-40	555,000	8,600	9,000	9,800	10,300	11,100

- Airfield elevation: 504.7' MSL
- Mean maximum temperature of the hottest month: 99.9°F
- MTOW: maximum takeoff weight
- **Boldface** is representative of the current critical aircraft.
- Length calculations above 30 are rounded up to the next 100.
- **RED** indicates the calculated length is greater than the existing 7,003' runway length.

Exhibit 4D: Runway Extension Alternatives

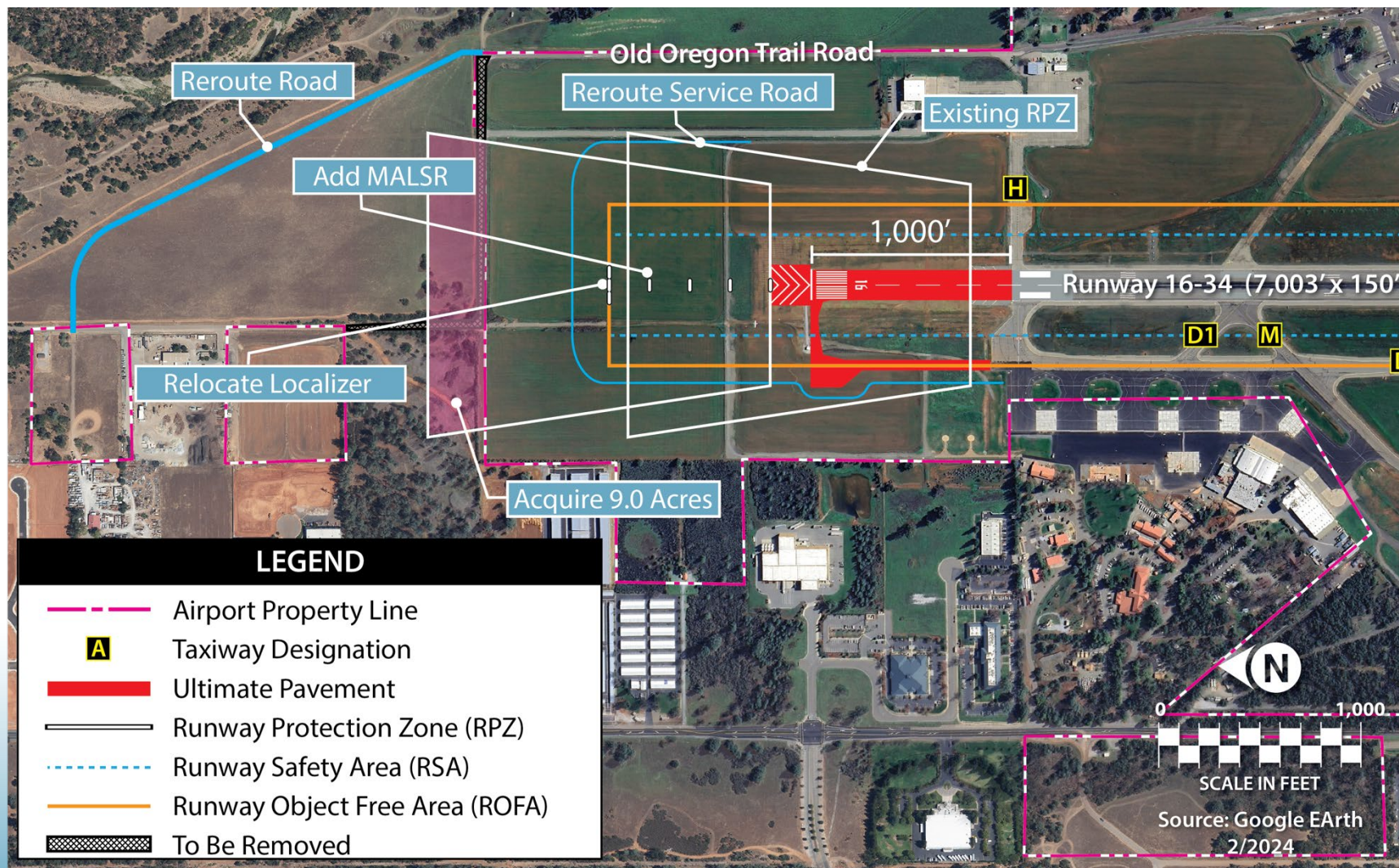


Exhibit 4D: Runway Extension Alternatives

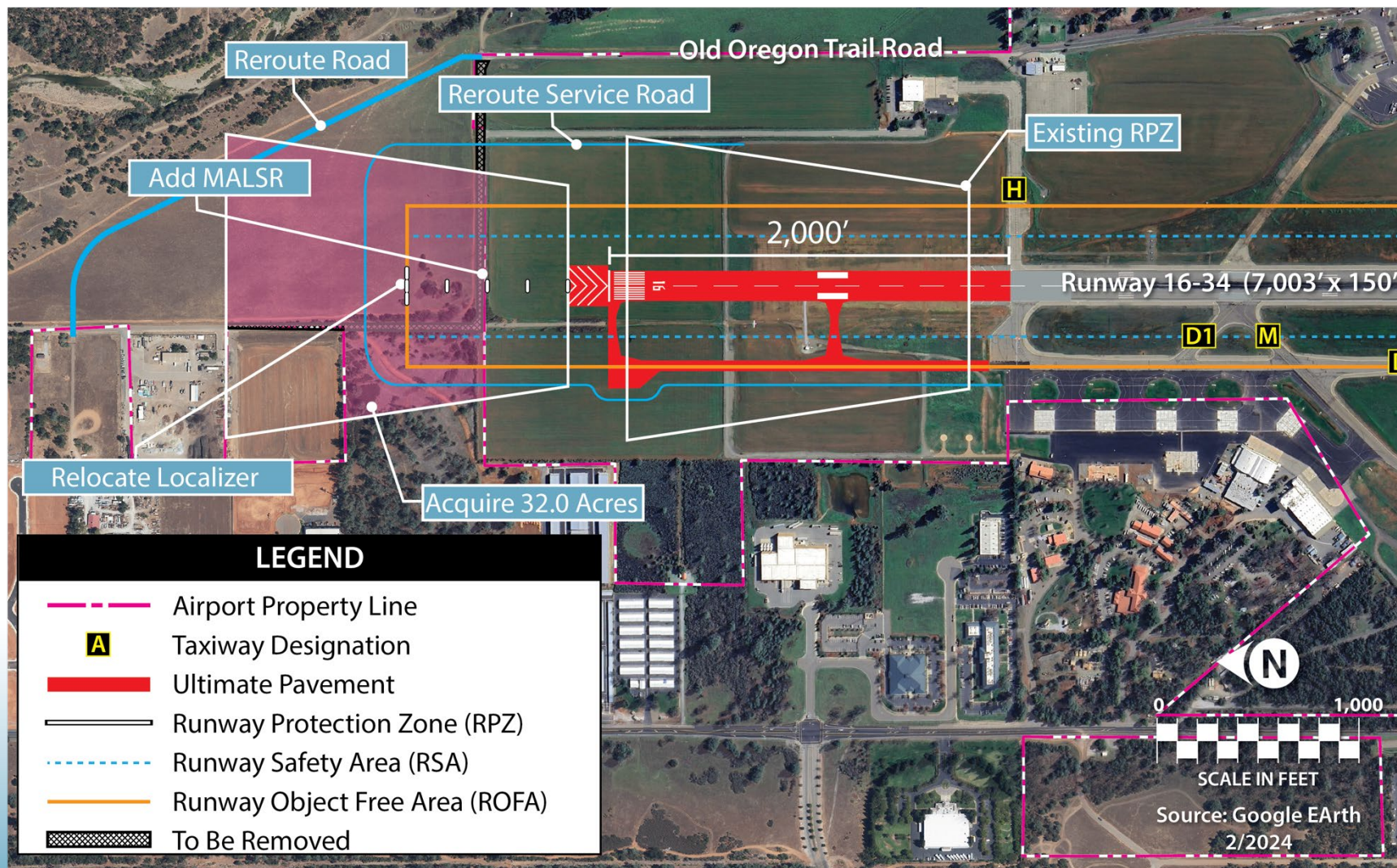
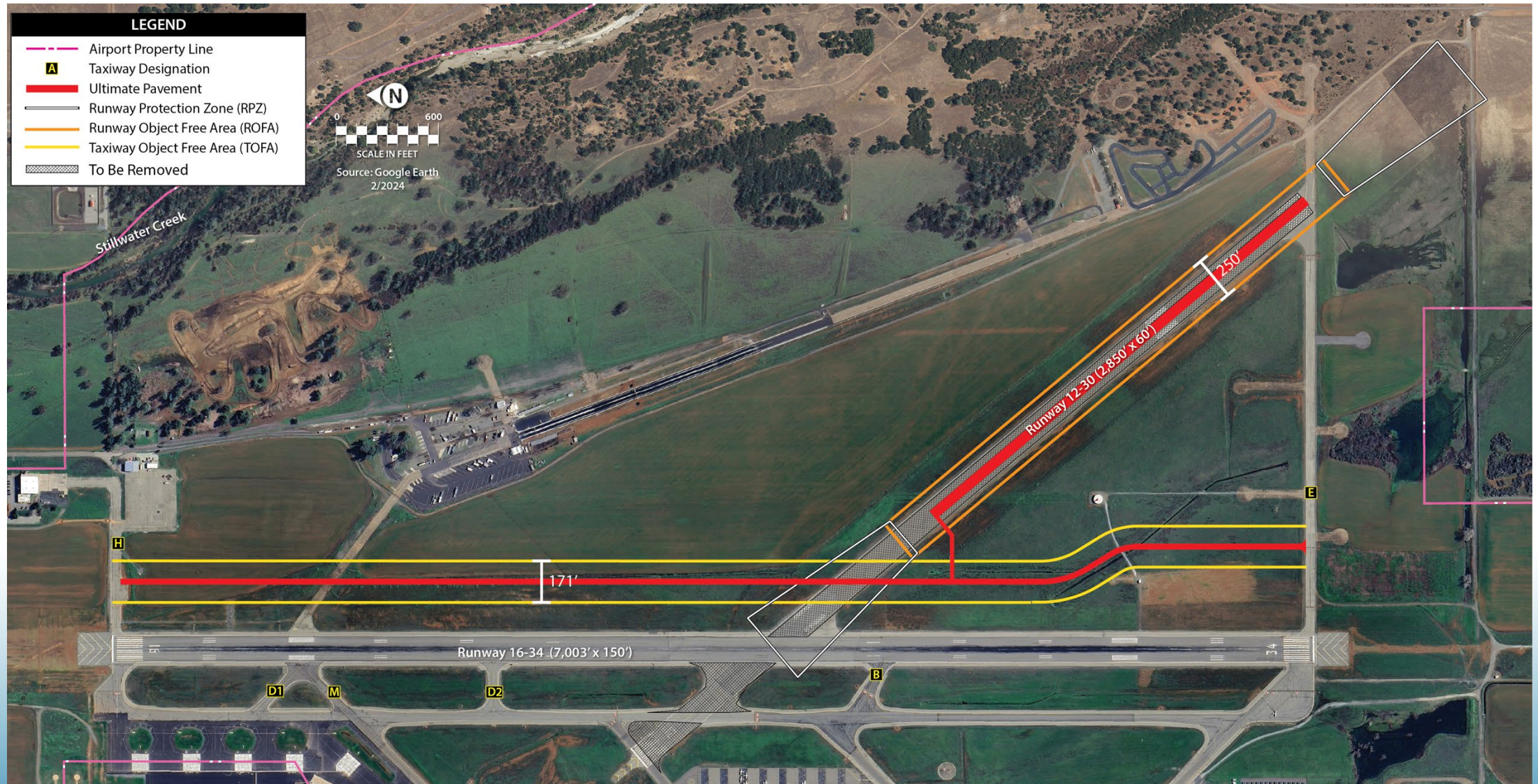


Exhibit 5B: Runway 12-30 A/B-I Standards



RUNWAY LENGTH SUMMARY

- Commercial Aircraft: At 7,003 feet, Runway 16-34 is adequate for the current critical aircraft (737) for most destinations including Denver.
- Commercial Aircraft: An additional 1,000 feet would accommodate more distant destinations (Dallas, Chicago, etc.).
- Airtankers (DC-10/C-130): Currently weight restricted. Cal Fire/USFS desire an additional 2,000 feet of runway length.

Exhibit 3F: Terminal Space Requirements

			Planning Activity Levels				
			Existing	Current Need 100,890	Short 139,402	Intermediate 148,602	Long 154,500
DEPARTURES PROCESSING							
Ticket Counters							
Utilization Factor	90%	0	164	226	241	251	
Agent Positions	#	5	7	9	10	10	
Frontage	LF	94	42	54	60	60	
Area	SF	650	460	590	660	660	
Ticket Lobby							
Queing Area	SF	1,650	920	1,270	1,360	1,410	
TSA Baggage Check	SF	580	840	1,080	1,200	1,200	
Outbound Baggage	SF	Outside	2,020	2,590	2,880	2,880	
Airline Ticket Office/Baggage Screening	SF	2,240	1,720	2,210	2,460	2,460	
Ticket Lobby Circulation	SF	1,750	480	620	690	690	
Subtotal Airline Operations	SF	6,220	5,980	7,770	8,590	8,640	
Public Area							
Circulation	SF	2,500	11,930	16,460	17,560	18,280	
Lobby/Waiting Area	SF	3,180	Included in Circulation				
Security Stations							
Number	#	1	1	2	2	3	
Queing Area	SF	1,050	590	810	860	900	
Station Area	SF	2,360	360	720	720	1,080	
TSA Administration/Operations	SF	0	700	1,400	1,400	2,100	
CONCOURSE FACILITIES							
Passenger Holdrooms							
Gates	#	1	2	2	2	3	
Gate Area	SF	1,760	Included in Holdroom Area				
Holdroom Area	SF	1,740	3,540	4,570	4,830	5,860	
Airline Operations	SF	0	2,000	2,000	1,500	1,500	
Concourse Circulation							
Circulation Area	SF	850	1,062	1,371	1,449	1,758	

Note: Level of Service C+ is applied

Exhibit 3F: Terminal Space Requirements

			Planning Activity Levels				
			Existing	Current Need 100,890	Short 139,402	Intermediate 148,602	Long 154,500
ARRIVALS PROCESSING							
Baggage Claim							
Passengers claiming bags	85%	207	207	286	305	318	
Claim Display Frontage	LF	45	150	200	220	220	
Claim Device Floor Area	SF	670	750	1,000	1,100	1,100	
Inbound Baggage	SF	0	1,800	2,400	2,640	2,640	
Baggage Service Office	SF	0	300	400	440	440	
Claim Lobby							
Area Excl. Device Area	SF	600	4,930	6,810	7,260	7,560	
Circulation Area	SF	600	2,970	4,100	4,360	4,550	
PUBLIC SPACES							
Restrooms							
Area	SF	1,465	2,040	2,820	3,010	3,130	
Concessions							
Food & Beverage	SF	5,365	1,210	1,670	1,780	1,850	
Retail	SF	0	500	700	740	770	
Support	SF	0	340	470	500	520	
Rental Car							
Counter Frontage	LF	50	43	59	63	65	
Counter and Office Area	SF	1,100	640	880	940	980	
Counter Queuing Area	SF	690	340	470	500	520	
Airport Administration							
Administration/Operations	SF	1,690	5,100	7,100	7,500	7,800	
Business Center	SF	230	Included in Admin				
FUNCTIONAL AREA TOTAL							
Total Functional Area	SF	32,720	46,702	63,431	67,139	71,483	
BUILDING SYSTEMS/SUPPORT							
Mechanical/HVAC	SF	2,450	1,870	2,540	2,690	2,860	
Vertical Circulation/Structural Space	SF	1,290	1,900	2,500	2,700	2,900	
General Storage	SF	1,090	3,270	4,440	4,700	5,000	
TOTAL TERMINAL							
Gross Building Area	SF	37,550	53,742	72,911	77,229	82,198	

Note: Level of Service C+ is applied

Exhibit 4E: Terminal Expansion Alternative 1



Terminal Building: The Bottom Line

- Existing Size: 37,550 sf
- Current Need: 53,742 sf (16,192 sf needed now)
- 20-Year Need: 82,198 sf (44,648 needed within 20-years)

Areas of Focus:

Hold Room: Need 4,000+sf

Ticket Lobby: Need 2,000+ sf

Bag Processing (inbound/outbound): Need +3,200 sf

General Circulation (all areas): +12,800 sf

Concessions (excluding existing restaurant): Need +1,000 sf

Gates: 1 currently/3 needed

Figure 4.4: Vehicle Parking Expansion Options

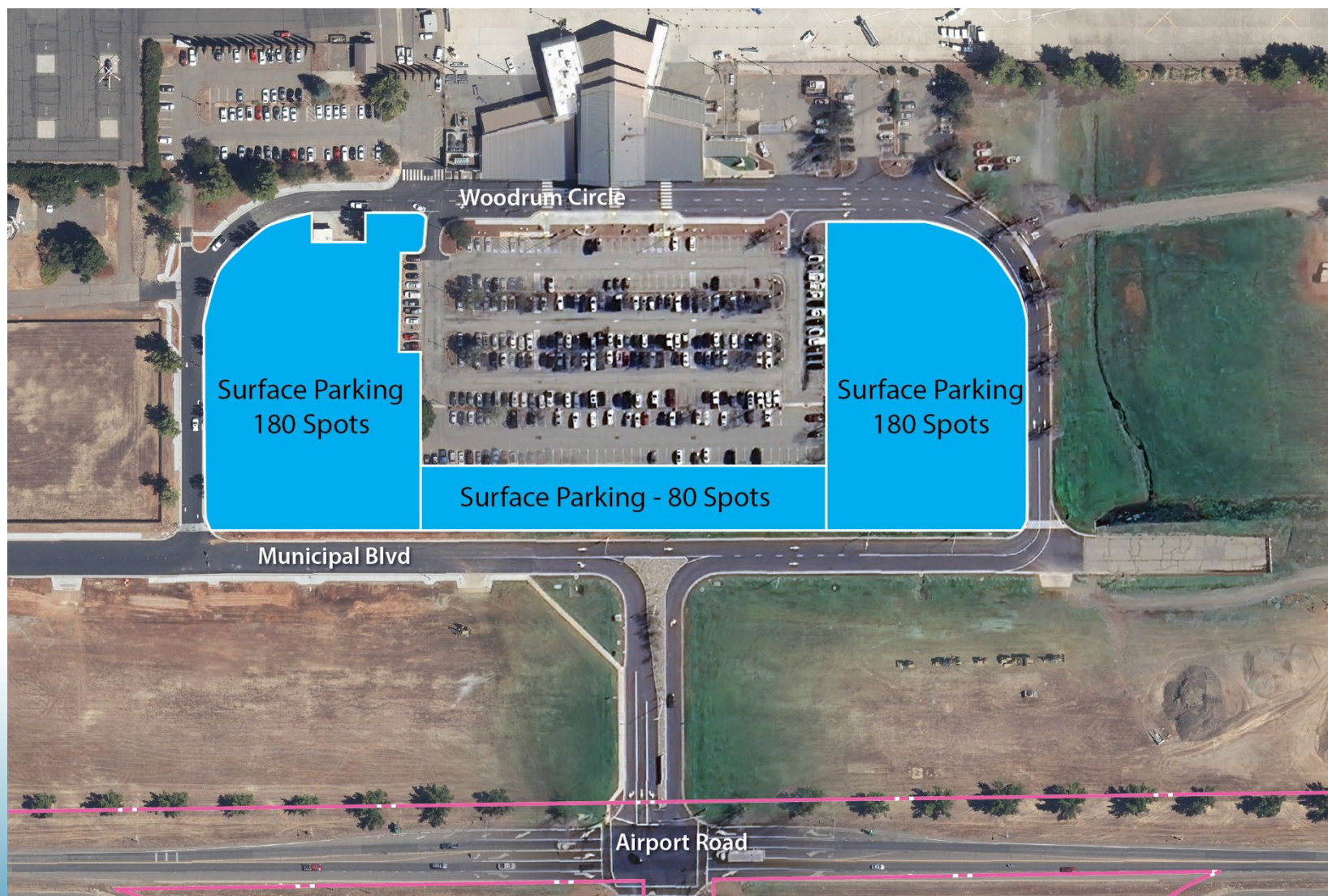


Exhibit 4H: Terminal Apron Alternatives

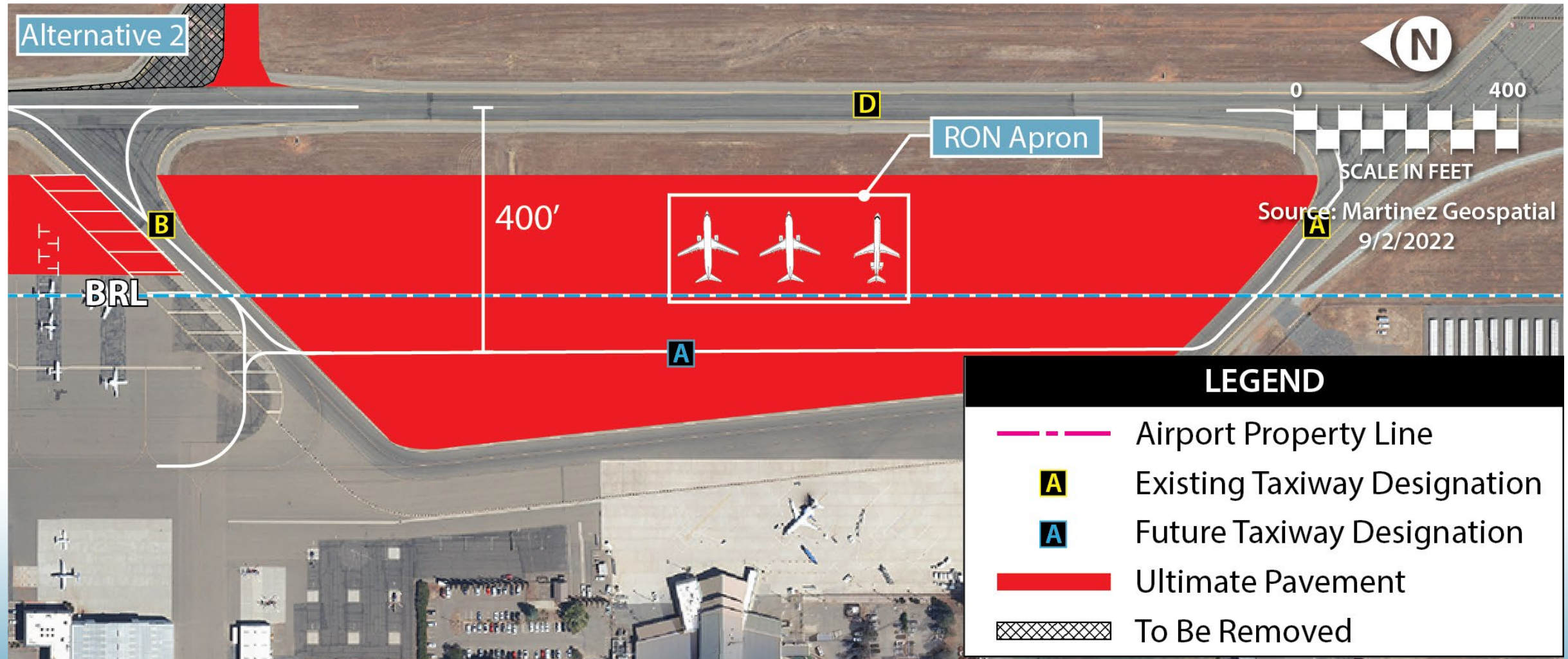


Figure 4.5: Air Cargo Facilities

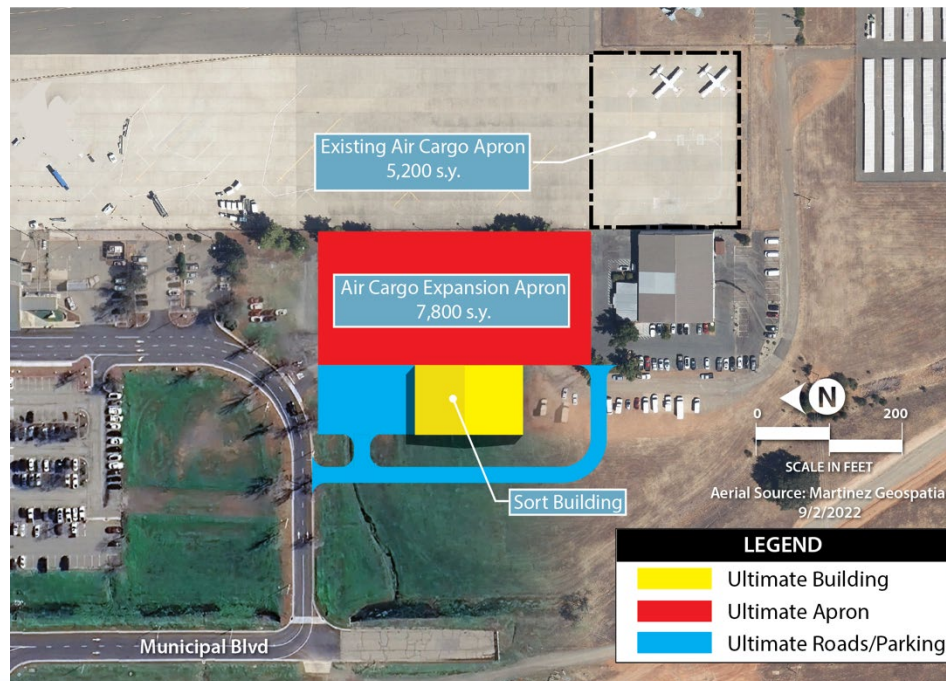


Table 3S: Hangar Needs

	Currently Available	Short Term	Intermediate Term	Long Term	Total Need
Based Aircraft	240	249	262	290	–
Aircraft to be Hangared	192	204	220	249	58
Hangar Positions					
T-Hangar Positions	104	107	113	124	20
Box Hangar Positions	19	37	39	44	25
Conventional Hangar Positions	27	37	42	51	24
Hangar Area Requirements					
T-Hangar Area	122,000	149,000	158,000	173,000	51,000
Box Hangar Area	47,000	92,000	98,000	111,000	64,000
Conventional Hangar Area	82,100	112,000	126,000	153,000	70,900
Total Storage Area (sf)	251,100	353,000	382,000	437,000	185,900
Maintenance Area	19,365	30,600	33,600	39,600	20,235

Exhibit 4K: Airport Alternative 2



Table 3T: Aircraft Apron Requirements

	Currently Available	FORECAST			
		Short Term	Intermediate Term	Long Term	Total Need
Local Apron Positions	36	55	52	51	15
Local Apron Area (sy)	12,500	27,400	26,000	25,300	12,800
Transient Apron Positions	77	43	47	58	-19
<i>Piston Transient Positions</i>	69	21	24	29	-40
<i>Turbine Transient Positions</i>	8	21	24	29	21
Transient Apron Area (sy)	30,000	27,700	30,900	37,400	7,400
Total Apron Area (sy)	42,500	55,100	56,900	62,700	20,200

Figure 4.2: Taxiway Geometry Options



PREFERRED DEVELOPMENT CONCEPT

Exhibit 5A: Recommended Development Concept

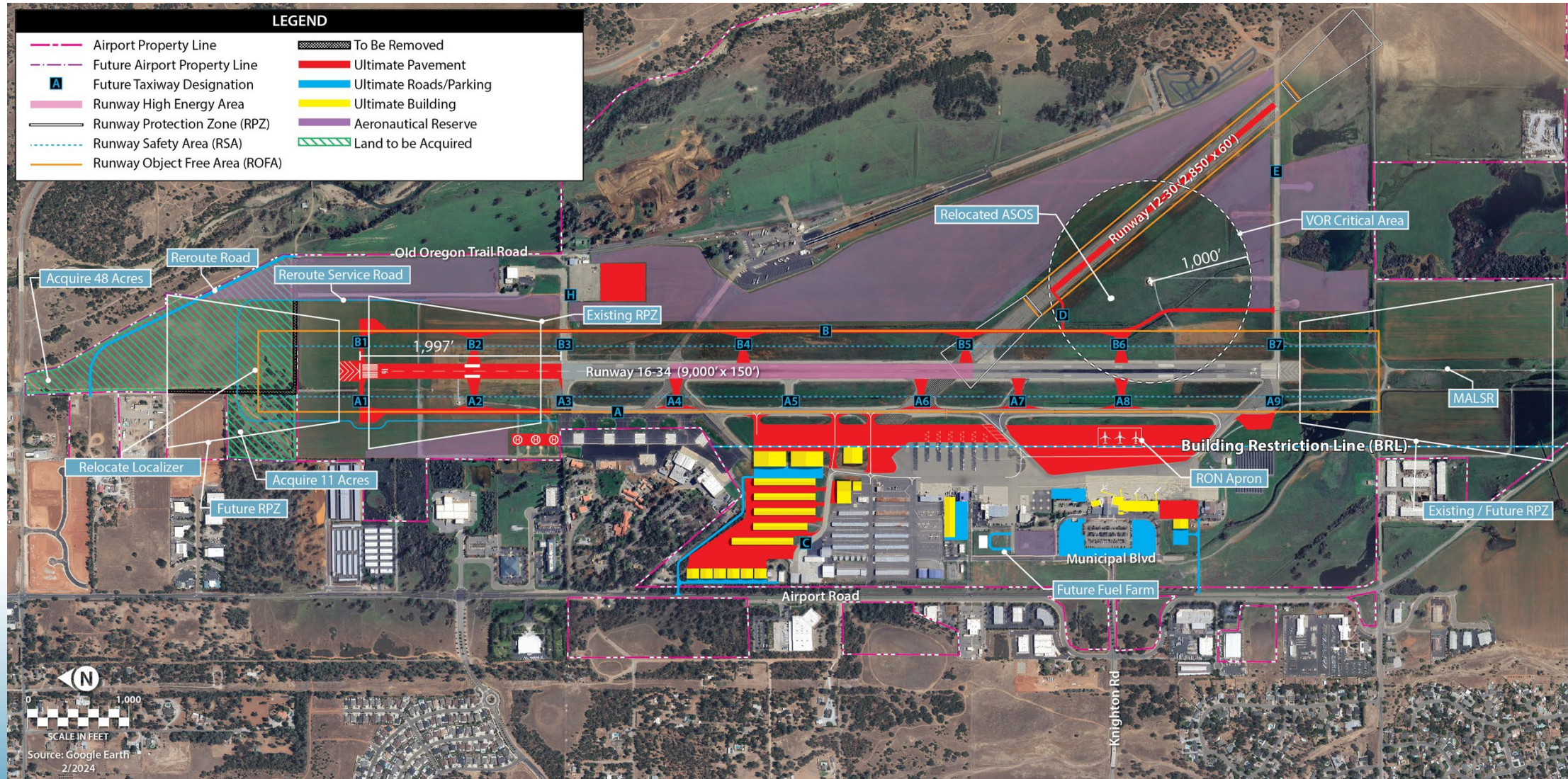


Exhibit 5C: On Airport Land Use Plan

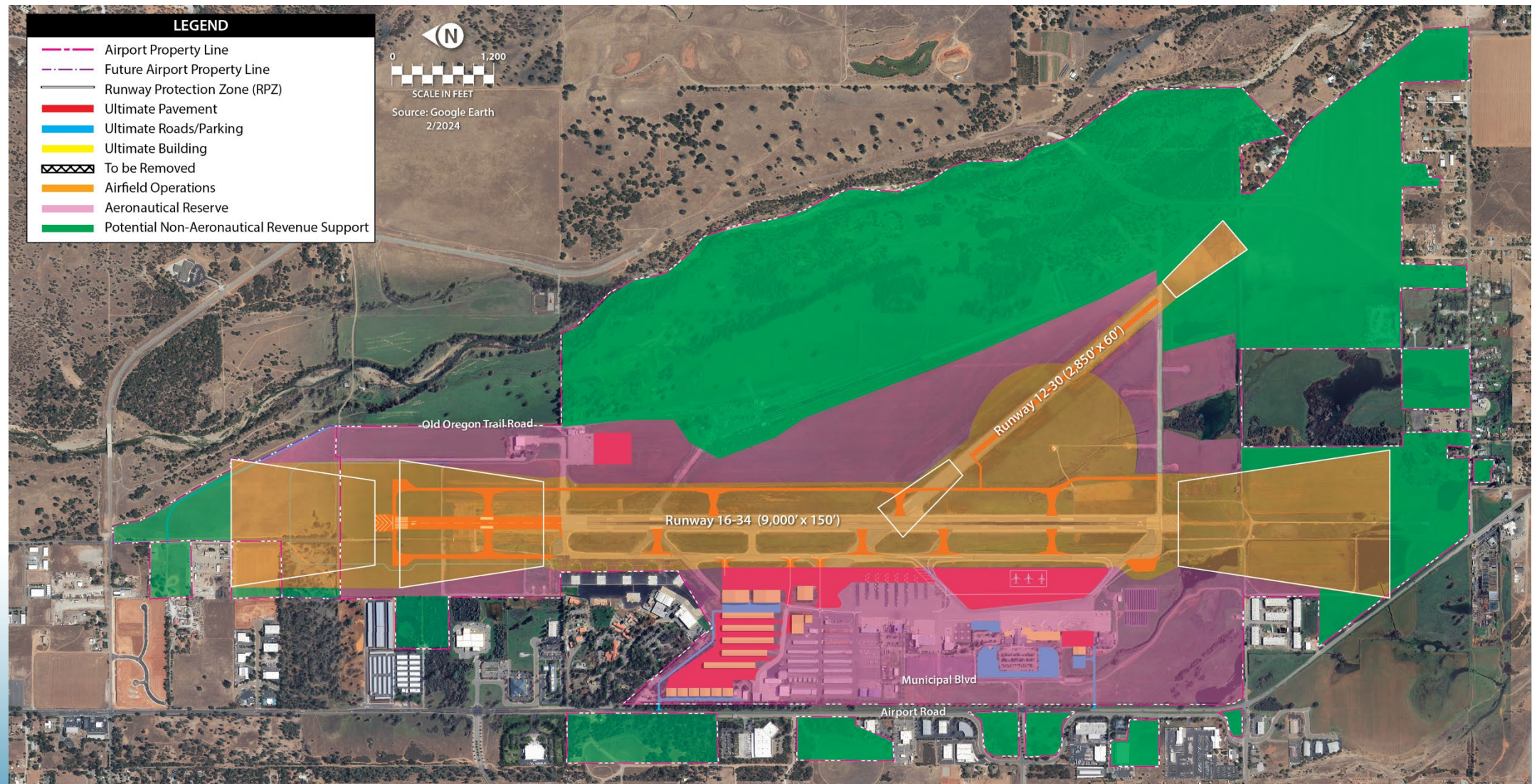


Exhibit 6A: Capital Improvement Program

Project No.	Timeframe (Fiscal Year)	PROJECT DESCRIPTION	NPR	Federal Share	Local Share	Total
SHORT TERM (Years 1-5)						
1	2025	Rehabilitate Runway 16-34	81	\$27,899,980	\$1,468,420	\$29,368,400
2	2025	Master Drainage Study - Reimbursement	64	\$555,940	\$29,260	\$585,200
3	2026	Design of Runway 16-34 RSA Improvements	90	\$1,089,840	\$57,360	\$1,147,200
4	2027	Design Reconstruction of Twys D/Future A/Connectors	79	\$1,812,021	\$186,679	\$1,998,700
5	2028	Construction of Runway 16-34 RSA Improvements	90	\$12,375,090	\$1,274,910	\$13,650,000
6	2028	Wildlife Hazard Assessment & Management Plan	64	\$158,655	\$16,345	\$175,000
7	2029	Construction of Twys D/Future A/Connectors	79	\$24,931,500	\$2,568,500	\$27,500,000
8	2029	Acquire SRE (Plow & Broom)	73	\$285,579	\$29,421	\$315,000
9	2030	Design of Passenger Terminal Expansion - Phase I	47	\$5,439,600	\$560,400	\$6,000,000
10	2030	Acquire ARFF Vehicle	75	\$1,427,895	\$147,105	\$1,575,000
SHORT TERM TOTAL				\$75,976,100	\$6,338,400	\$82,314,500

Exhibit 6A: Capital Improvement Program

Project No.	Timeframe (Fiscal Year)	PROJECT DESCRIPTION	NPR	Federal Share	Local Share	Total
INTERMEDIATE TERM (Years 6-20)						
11	IT	Construction of Passenger Terminal Expansion - Phase II	47	\$36,264,000	\$3,736,000	\$40,000,000
12	IT	Security Fencing, Access Control System, Wildlife Mitigation	56	\$4,283,685	\$441,315	\$4,725,000
13	IT	Airfield Lighting Improvements Study (Environmental/Pre-Design)	74	\$309,423	\$31,877	\$341,300
14	IT	Expand Terminal Apron/Relocate Twy A	68	\$15,956,160	\$1,643,840	\$17,600,000
15	IT	Construct USFS Helicopter Parking Apron	-	\$0	\$0	\$3,200,000
16	IT	Acquire 59 Acres for Airspace Protection and Rwy Extension	66	\$2,184,906	\$225,094	\$2,410,000
17	IT	Airfield Lighting Improvement Projects Based on Previous Study	83	\$5,439,600	\$560,400	\$6,000,000
18	IT	Runway/Taxiway Extension (1,997 feet)	80	\$38,802,480	\$3,997,520	\$42,800,000
19	IT	Construct Replacement Access Road to East Side	38	\$1,903,860	\$196,140	\$2,100,000
20	IT	Pavement Rehabilitation	67	\$1,813,200	\$186,800	\$2,000,000
INTERMEDIATE TERM TOTAL				\$106,957,314	\$11,018,986	\$121,176,300

Exhibit 6A: Capital Improvement Program

Project No.	Timeframe (Fiscal Year)	PROJECT DESCRIPTION	NPR	Federal Share	Local Share	Total
LONG TERM (Years 11-20)						
21	LT	Expand Terminal Apron/Add RON Positions	68	\$23,662,260	\$2,437,740	\$26,100,000
22	LT	Reconfigure Runway 12-30	74	\$12,783,060	\$1,316,940	\$14,100,000
23	LT	Construct East Side Parallel Taxiway/Connectors	75	\$52,220,160	\$5,379,840	\$57,600,000
24	LT	Construct Air Cargo Complex (Apron, Building, Parking, Road)	68	\$16,046,820	\$1,653,180	\$17,700,000
25	LT	Add Terminal Surface Parking	36	\$7,887,420	\$812,580	\$8,700,000
26	LT	Construct Transient GA Apron Expansion	68	\$6,074,220	\$625,780	\$6,700,000
27	LT	Construct GA Taxilanes - Phase I	65	\$9,519,300	\$980,700	\$10,500,000
28	LT	Construct GA Apron Expansion	68	\$14,958,900	\$1,541,100	\$16,500,000
29	LT	Construct GA Taxilanes - Phase II	65	\$5,348,940	\$551,060	\$5,900,000
30	LT	Construct GA Taxilanes - Phase III	65	\$4,442,340	\$457,660	\$4,900,000
31	LT	Pavement Rehabilitation	67	\$3,626,400	\$373,600	\$4,000,000
32	LT	Eastside Apron Expansion	68	\$5,167,620	\$532,380	\$5,700,000
33	LT	Master Plan Update	69	\$1,813,200	\$186,800	\$2,000,000
LONG TERM TOTAL				\$163,550,640	\$16,849,360	\$180,400,000
GRAND TOTAL				\$346,484,054	\$34,206,746	\$383,890,800

Exhibit 6B: Recommended Development Staging

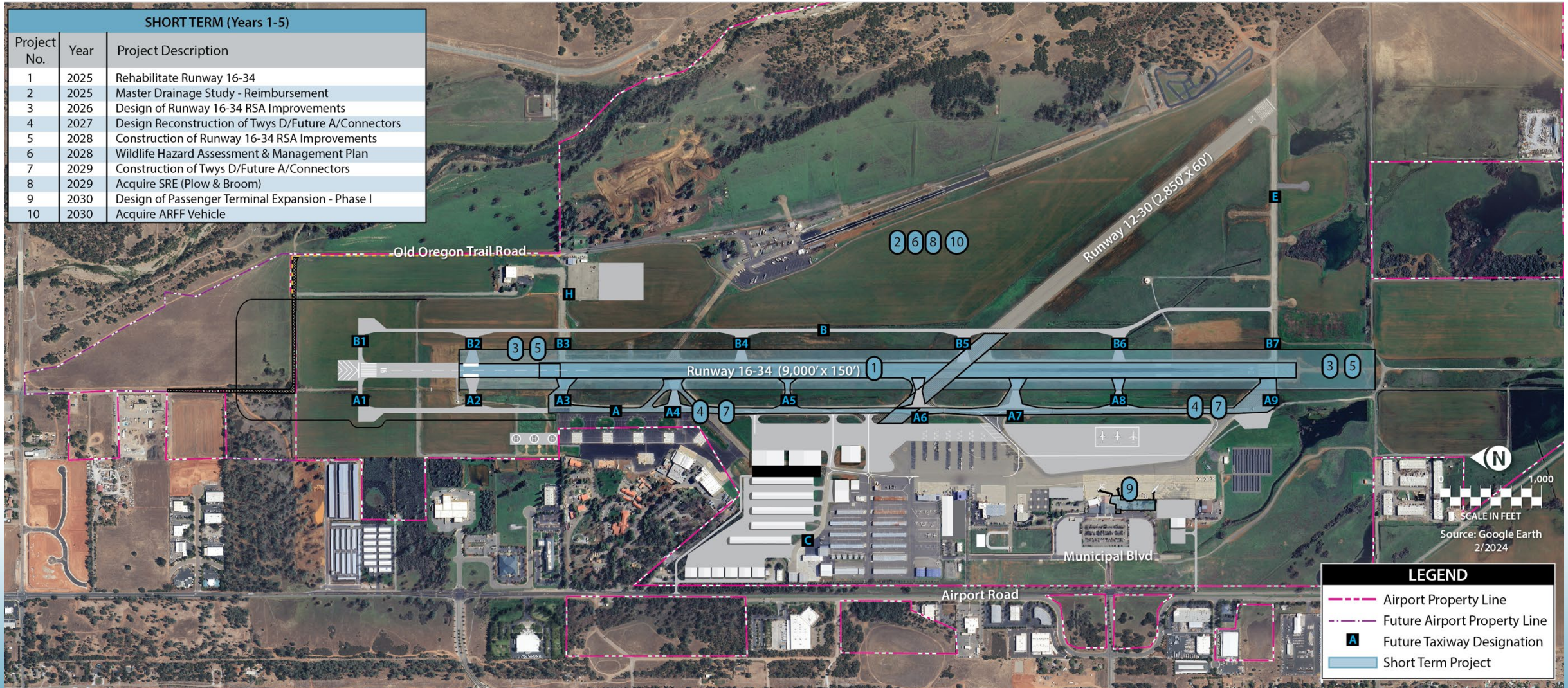


Exhibit 6B: Recommended Development Staging

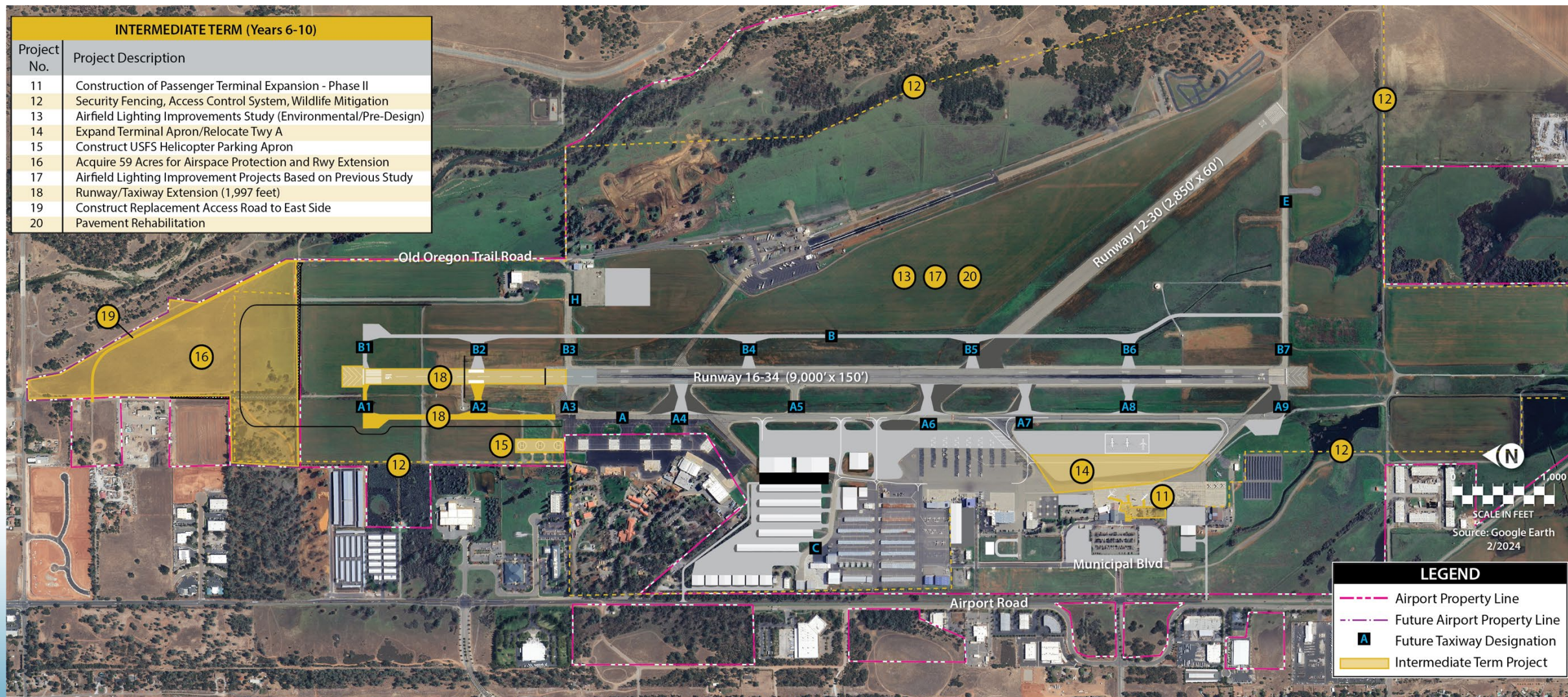
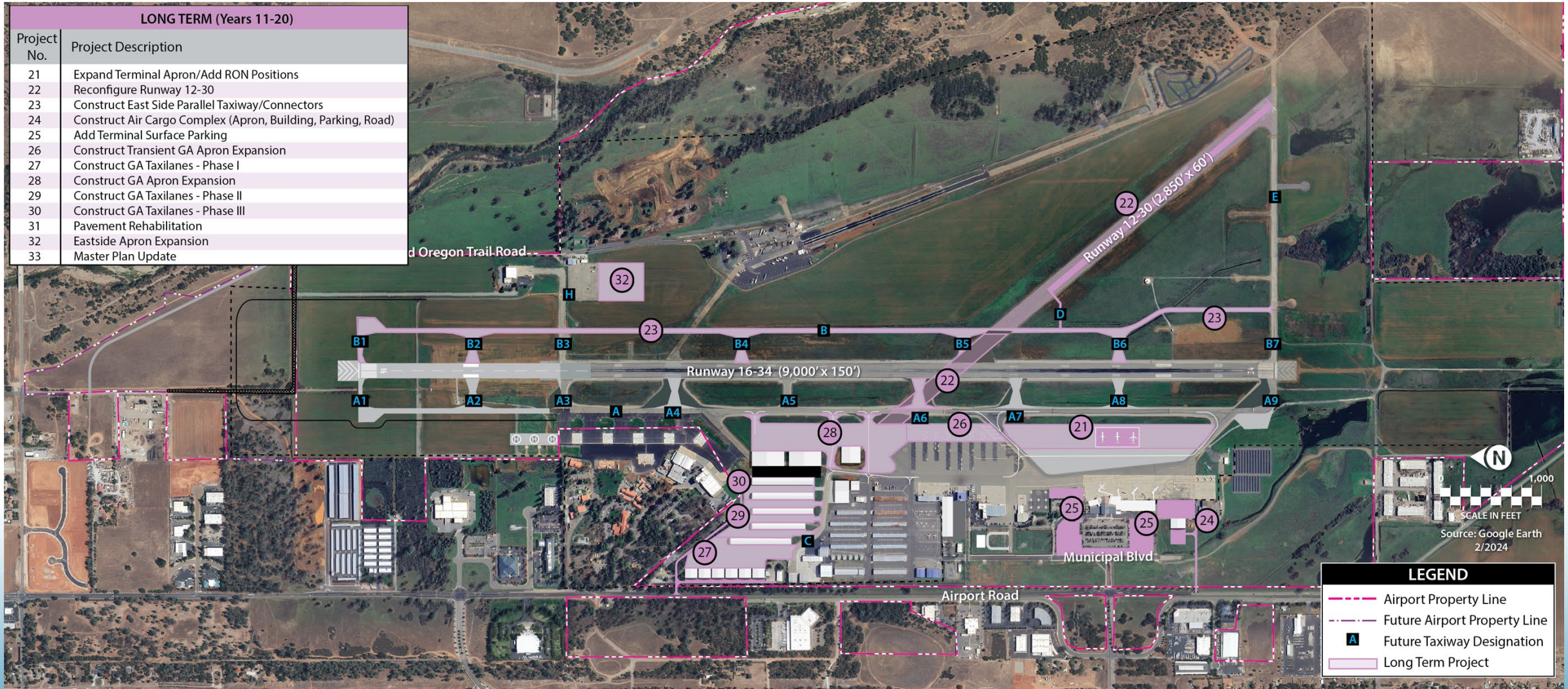


Exhibit 6B: Recommended Development Staging



Redding Regional Airport Energy Audit 04/23/2025

Process and Objectives

1. Assess Baseline Energy Use

- Site Visit:
 - Data Collection
 - Staff Interviews
- Review Utility Data
- Develop Calibrated Energy Models

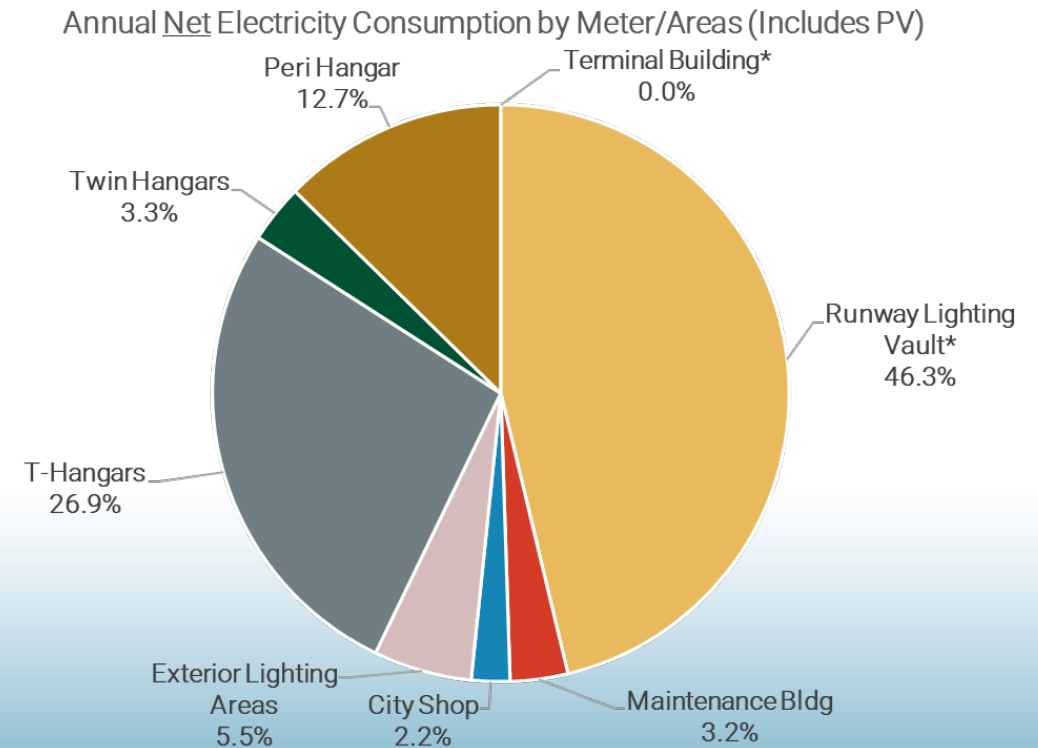
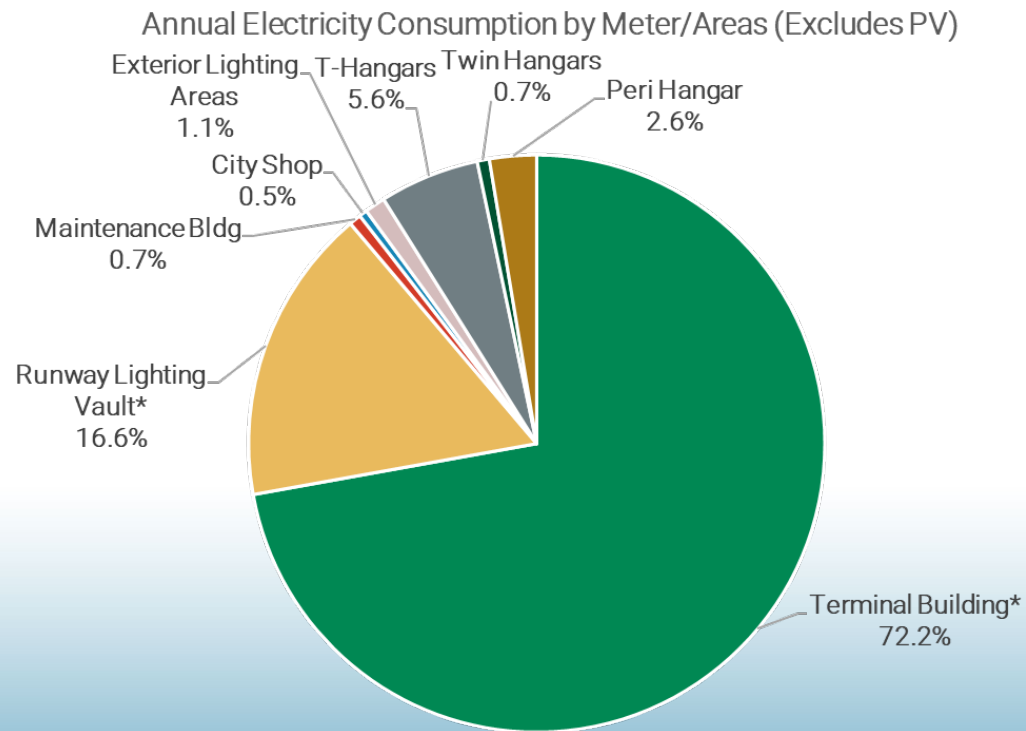
2. Identify/Quantify Savings Opportunities:

- Upgrades to lighting, HVAC, DHW, Renewable Energy
- Guidelines and best practices for New Construction/Major Renovations

#	Building/Location in Scope
1	Terminal Building
2	Runway Lighting Vault
3	Maintenance Bldg
4	City Shop
5	Eastside Sec Ltg
6	Terminal Parking
7	Transient Ramp
8	Gate 25/OldTermPrkg
9	Hangar A
10	Hangar B
11	Hangar C
12	Hangar D
13	Hangar E
14	Hangar H
15	Hangar I
16	Hangar J
17	Hangar K
18	Hangar L
19	Hangar M
20	Twin Hangars
21	Peri Hangar

Baseline Energy Breakdown

In CY 2023, the City of Redding buildings consumed **1,307,105 kWh per year**, and solar PV generated **1,118,232 kWh per year** for a net electricity consumption of 188,873 kWh per year at an annual cost of **\$89,035 per year**.



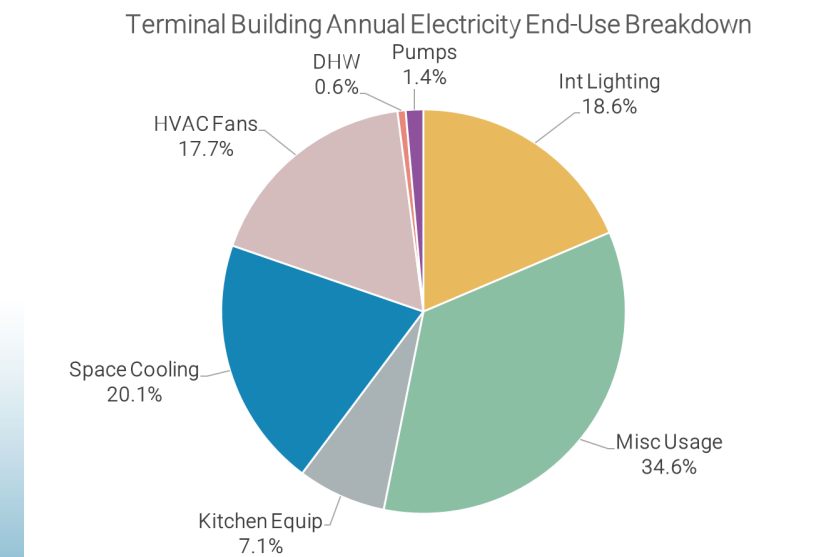
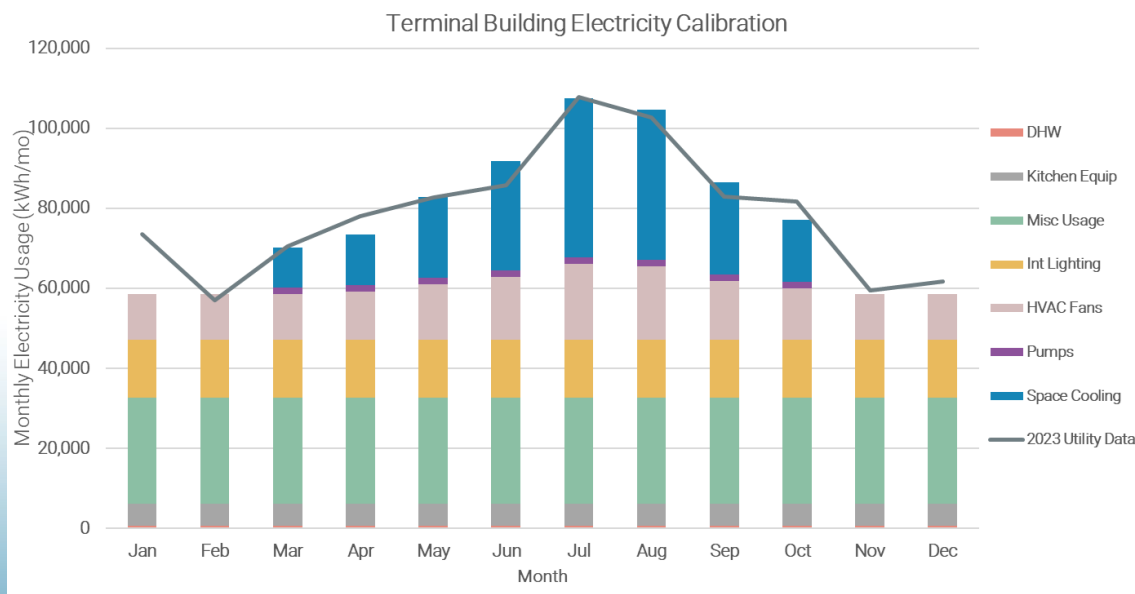
Terminal Building Calibration

Monthly, 2023 utility calibration was created utilizing the following inputs:

- Utility bills
- On-site investigations, photos, interviews
- Base building design drawings
- HVAC specs and logs
- Solar PV data/production

Key Takeaways:

- Space cooling (chiller) increases significantly during warm, summer months.
- HVAC systems represent 38% of total energy usage.
- Kitchen Equipment and Misc Usage represents over 40% of total energy usage

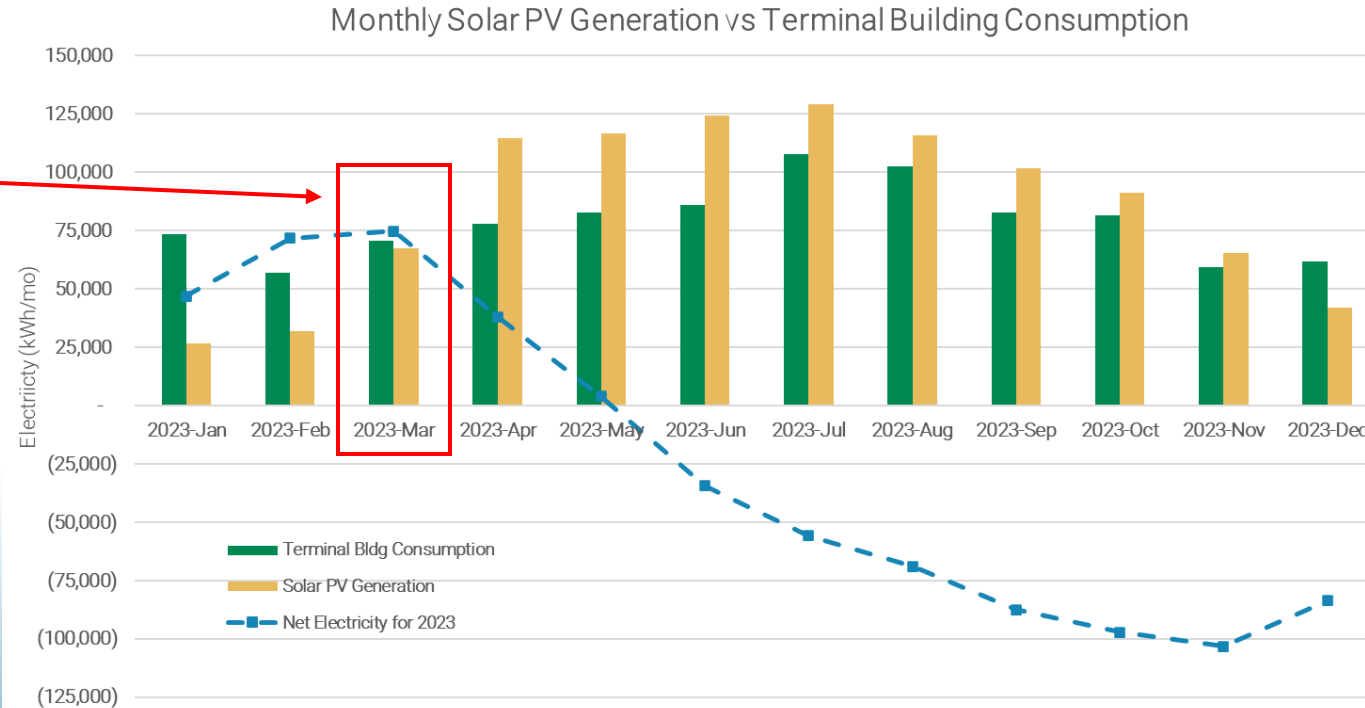


Terminal Building: Net Zero Energy

In 2023, the 600-kW PV system generated **1,026,792 kWh per year** while the Terminal Building consumed **943,412 kWh per year**, thus achieving **Net Zero Energy**.

- During summer months, solar PV system generates more electricity than the Terminal Building consumes
- During winter months, Terminal Building consumes more electricity than solar PV system generates.

Inverter 2 comes
back online



Terminal Building: Energy Conservation Measures

Given that there are plans for major renovations to the Terminal Building, the following are recommendations to improve existing equipment controls and could result in a **5%** reduction in annual energy usage.

1. Retro Commission Existing HVAC Systems and Controls

- Review HVAC programming and schedules
- Verify calibration on sensors
- Thermostat scheduling to better track occupancy and occupied/unoccupied spaces

2. Retro Commission Chilled Water Storage Tank and Demand Reduction

- Utilize thermal storage tanks to reduce the peak demand charges
- Operate air-cooled chiller overnight and dissipate stored CHW during peak hours (\$21 per kW).

3. Continue to Replace Fluorescent/Halogen Lighting Fixtures

- As fixtures fail, replace BOH lighting with LEDs
- LEDs output similar lighting levels at a fraction of energy consumption
- LEDs have longer lifespans and streamlined recycling process.

New Construction Design Considerations: HVAC

Given the highly variable occupancy and operating hours of a terminal, HVAC systems should consider the following design considerations:

- High efficiency systems at part load conditions
- Utilization of zonal systems and controls to respond to variable occupancy and space types
- Demand control ventilation for HVAC and Kitchen
- Energy recovery opportunities to offset simultaneous heating and cooling

Design Options for Airside HVAC Systems

- VRF or CHW/HW Fan coils provide the most optimal zonal control and part load flexibility
- VSD AHUs with VAVs require complex SAT and SP reset controls to optimize part load efficiencies

Airside System Types				
Airside System Type	Part Load Efficiency	Energy Savings	First Cost	Financial Payback
Package CV AHU	Poor	Low	Low	Short
VSD AHU w/ VAV	Average	Mid	Mid	Medium
CHW/HW Fan Coils	Good	Mid	Mid	Medium
VRF Fan Coils	Good	High	High	Long

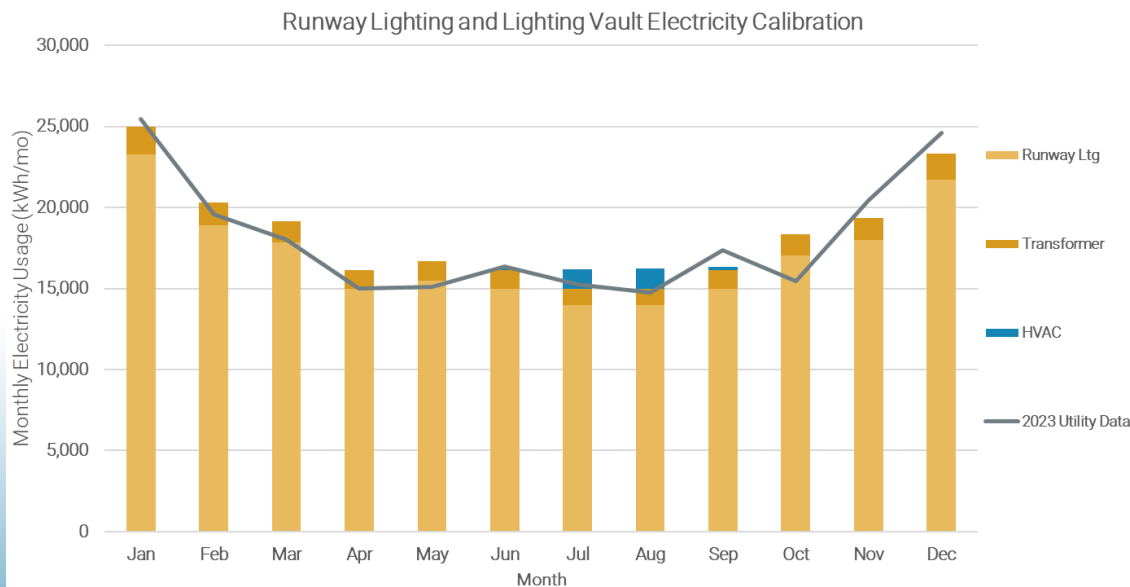
Runway Lighting Calibration

Monthly, 2023 utility calibration was created utilizing the following inputs:

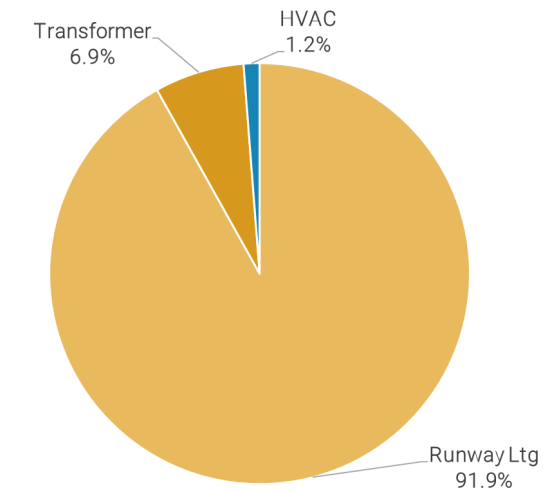
- Utility bills
- On-site investigations, photos, interviews
- Base building design drawings
- HVAC specs and logs
- Solar PV data/production

Key Takeaways:

- As daylight hours increase, runway lighting operating hours decrease (vice versa as daylight hours decrease)
- Runway lighting comprises over 90% of electricity consumption for this meter.



Runway Lighting + Lighting Vault Annual Electricity Breakdown

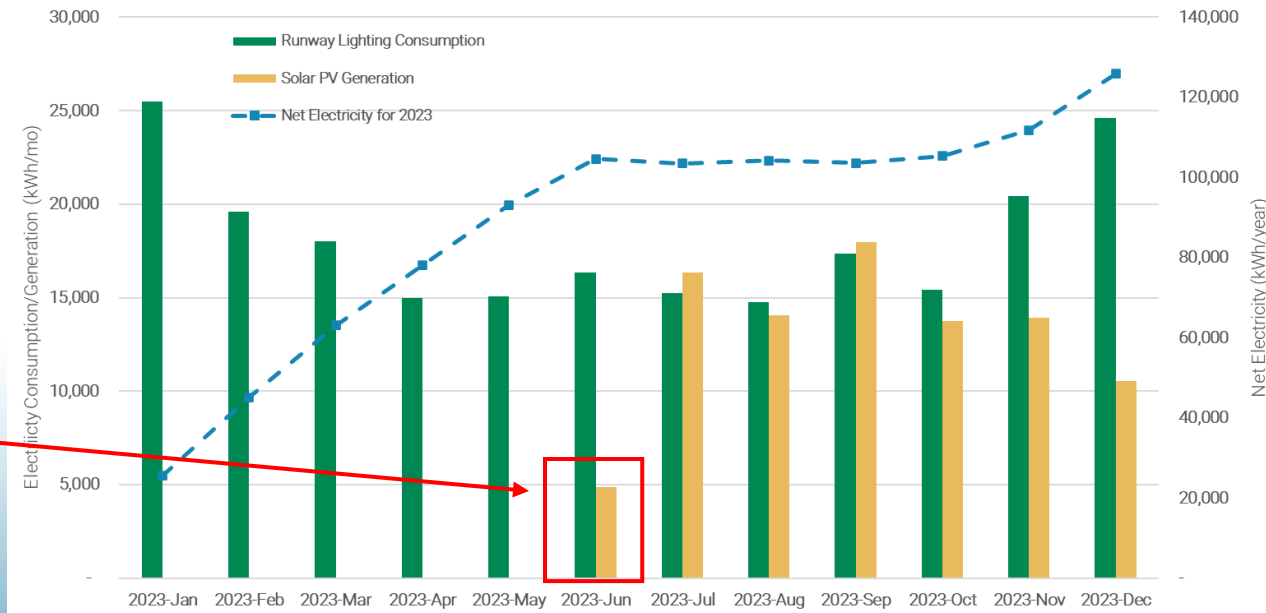


Runway Lighting: Solar PV System

In 2023, the 150-kW PV system generated **91,440 kWh per year** while the Runway Lighting consumed **217,360 kWh per year**, thus PV system offset **41%** of total electricity consumption.

- Solar PV system was offline until June 2023
- During summer months, solar PV system generation is equal to runway lighting electrical consumption
- During winter months, runway lighting electrical consumption is significant more than solar PV generation.

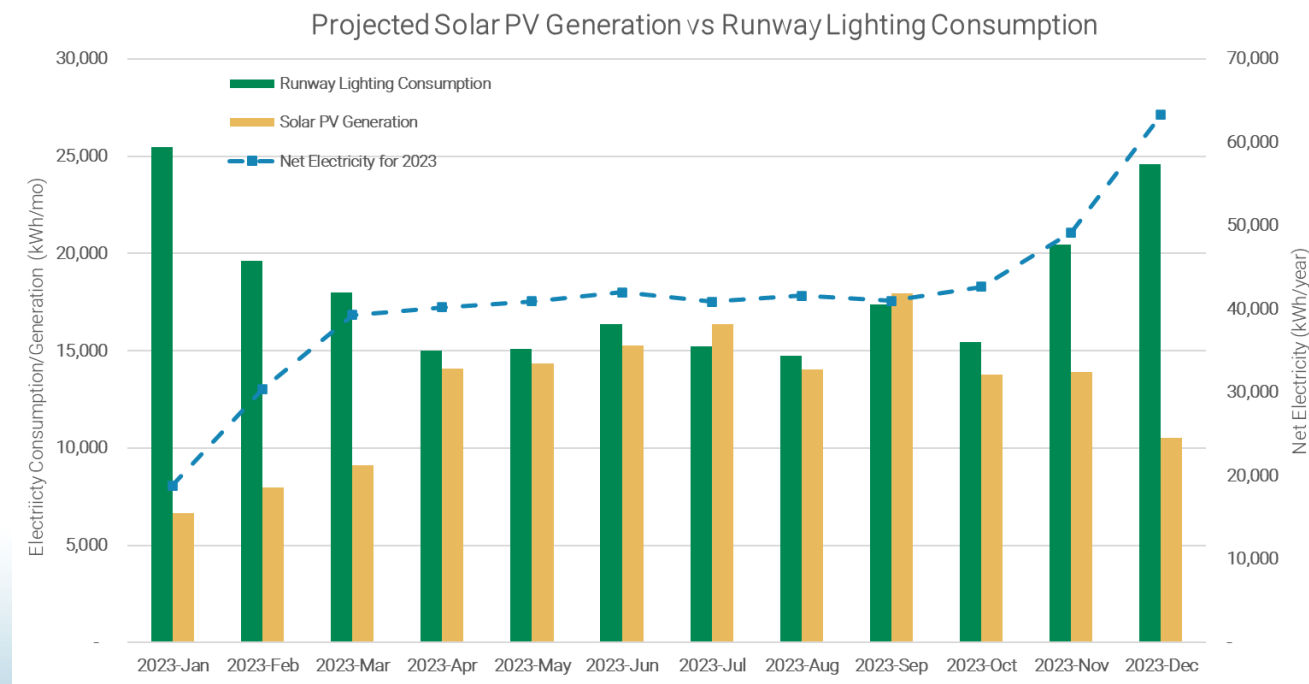
Monthly Solar PV Generation vs Runway Lighting Consumption



PV System comes back online

Runway Lighting: Solar PV System

If the 150-kW solar PV system would have operated all year, the system would have generated **154,093 kWh per year**, thus offsetting **71%** of total electricity consumption for the runway lighting system.



Runway Lighting: Energy Conservation Measures

Given that there are plans for major renovations to the Runway, the following are recommendations to be considered during such renovations:

1. Specify 100% LED Lighting Fixtures

- Beacon, runway, signage, and PAPI (precision approach path indicator) lights

2. Utilize high efficiency transformers

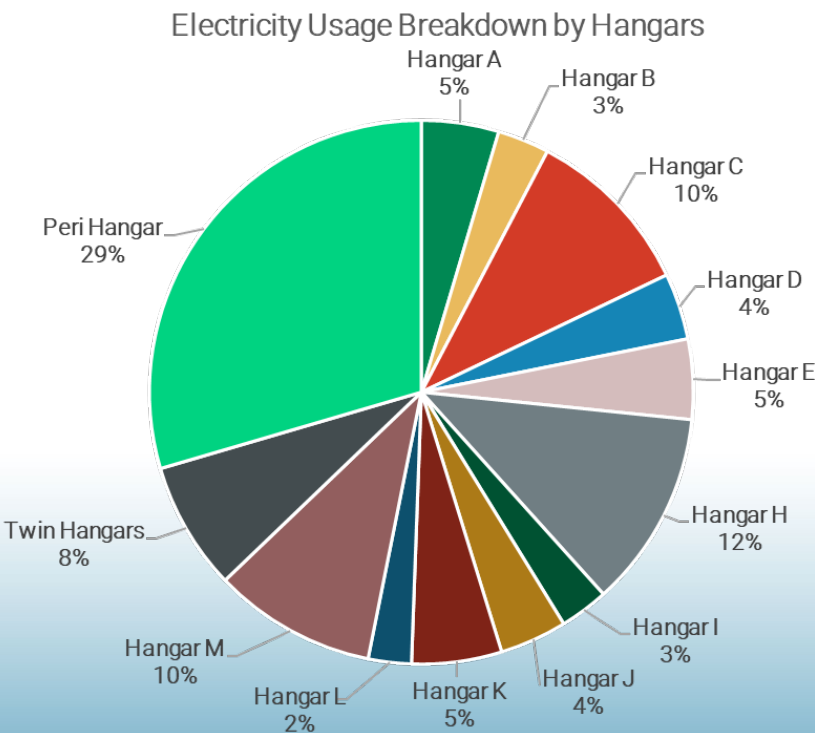
- Optimize transformer type and size to meet lighting loads.
- Minimize electrical losses across the transformer.

3. As the runway lighting loads expand, consider increasing the size of the solar PV system

Storage Hangars Energy and Cost Breakdown

In 2023, the Hangars consumed **116,640 kWh per year** at an annual cost of **\$25,610** per year.

- Peri Hangar comprised nearly 30% of total usage
- Hangar Rows C, H, and M are next largest consumers.



Summary of Aircraft Hangar Electricity Costs			
Building	Electricity Usage	Total Cost	Unit Cost
	(kWh/year)	(\$/year)	(\$/kWh)
Hangar A	5,367	\$1,367	\$0.25
Hangar B	3,586	\$1,069	\$0.30
Hangar C	11,929	\$2,466	\$0.21
Hangar D	4,603	\$1,239	\$0.27
Hangar E	5,558	\$1,399	\$0.25
Hangar H	13,656	\$2,753	\$0.20
Hangar I	3,389	\$1,036	\$0.31
Hangar J	4,663	\$1,249	\$0.27
Hangar K	6,245	\$1,514	\$0.24
Hangar L	2,993	\$970	\$0.32
Hangar M	11,308	\$2,361	\$0.21
Twin Hangars	8,894	\$1,957	\$0.22
Peri Hangar	34,449	\$6,230	\$0.18
Total	116,640	\$25,610	\$0.22

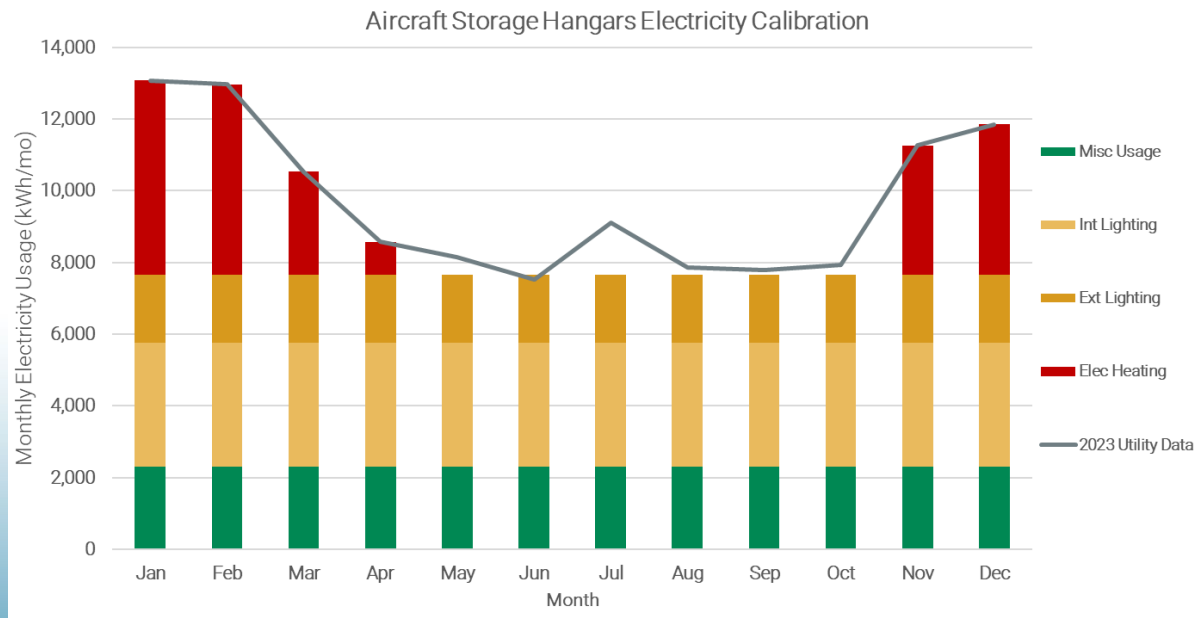
Storage Hangar Calibration

Monthly, 2023 utility calibration was created utilizing the following inputs:

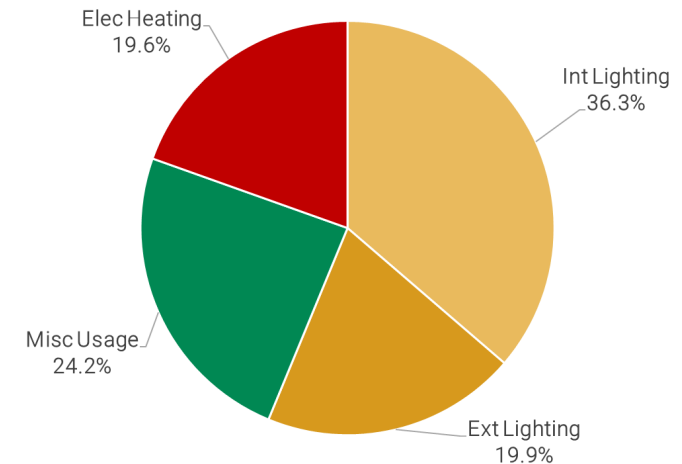
- Utility bills
- On-site investigations, photos, interviews
- Base building design drawings
- HVAC specs and logs
- Solar PV data/production

Key Takeaways:

- Interior + exterior lighting comprises 56.2% of annual energy use.
- Significant increase in winter electricity usage due to electric space heating.



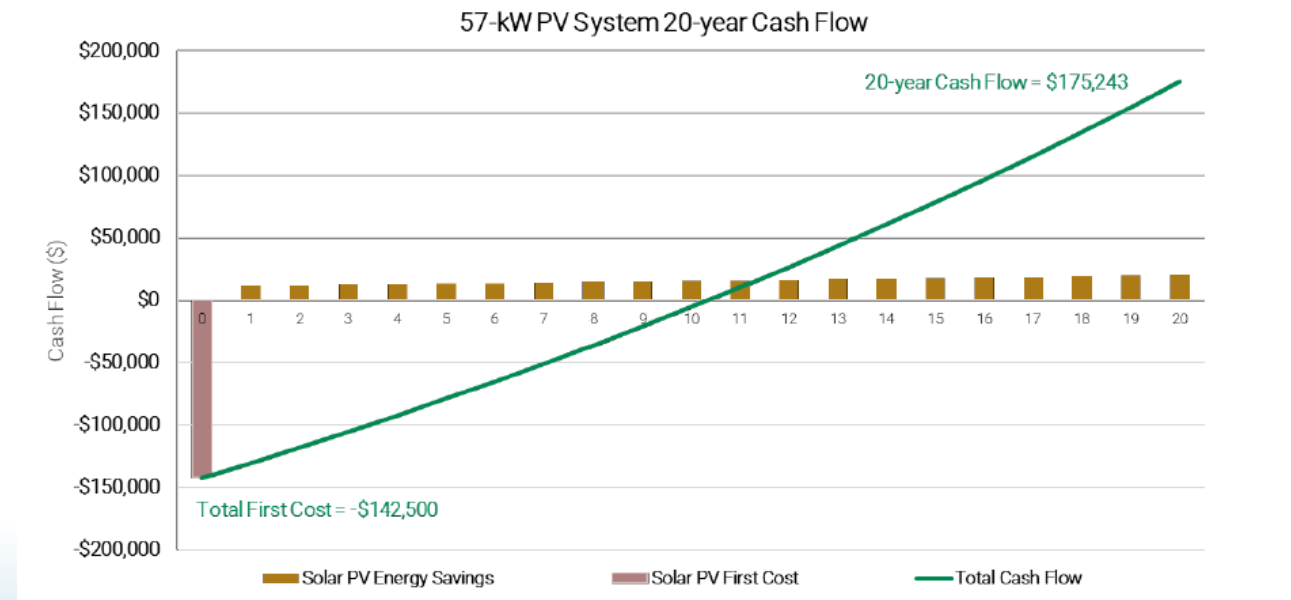
Aircraft Hangars Annual Electricity End-Use Breakdown



Storage Hangar: Energy Conservation Measures

Given that there are plans for major renovations to the Runway, the following are recommendations to be considered during such renovation:

1. **Replace Interior and Exterior Fluorescent Fixtures with LED Fixtures**
2. **Retro Commission Exterior Lighting Controls**
 - Confirm exterior lights turn off during daylight hours.
 - Recalibrate or replace existing photosensors
3. **Consider the installation of Solar PV to offset T-Hangar and Box Hangar A-M Electricity Usage**
 - Investigate utility meter consolidation
 - 57-kW PV system (~6,000 SF) to offset 100% of Hangar electricity usage.
 - 10-11 year payback (without Federal Credits)



Tenant-Operated Buildings

Tenant-operated buildings were also investigated for energy efficiency opportunities; however, their utility data was not available.

Lighting Measures:

- Replacing Metal Halide and Fluorescent Fixtures with LEDs
- Clean Skylights and install daylighting controls

HVAC Measures:

- Retro-commission HVAC systems
- Install Smart Thermostats to Control RTUs
- Replace Inefficient units with High Efficiency Heat Pumps

Plumbing Measures:

- Replaced Gas-Fired units POU Electric or Heat Pump Units
- Install POU Electric units to replace Electric Storage Tanks

#	Building	Building Area (SF)
1	ARFF (Fire Station)	12,000
2	Air Chasta (FBO-Helicopter Services0	10,500
3	FedEx (Cargo Operator)	13,200
4	REACH Air Ambulance Service	1,200
5	Redding Jet Center (FBO)	20,000
6	Baker-Barr Hangar (Corporate Hangar)	11,200
7	Sierra Pacific (Corporate Hangar)	17,400
8	Stringer Hangar (Corporate Hangar)	6,400
9	Tullis Hangar (Corporate Hangar)	8,000
10	Wong Hangar (Corporate Hangar)	6,400
Total		106,300

Utilize Tenant High Performance Design Guidelines to standardize lighting, HVAC, DHW, controls, etc. across tenant operated buildings.

Tenant-Operated Buildings

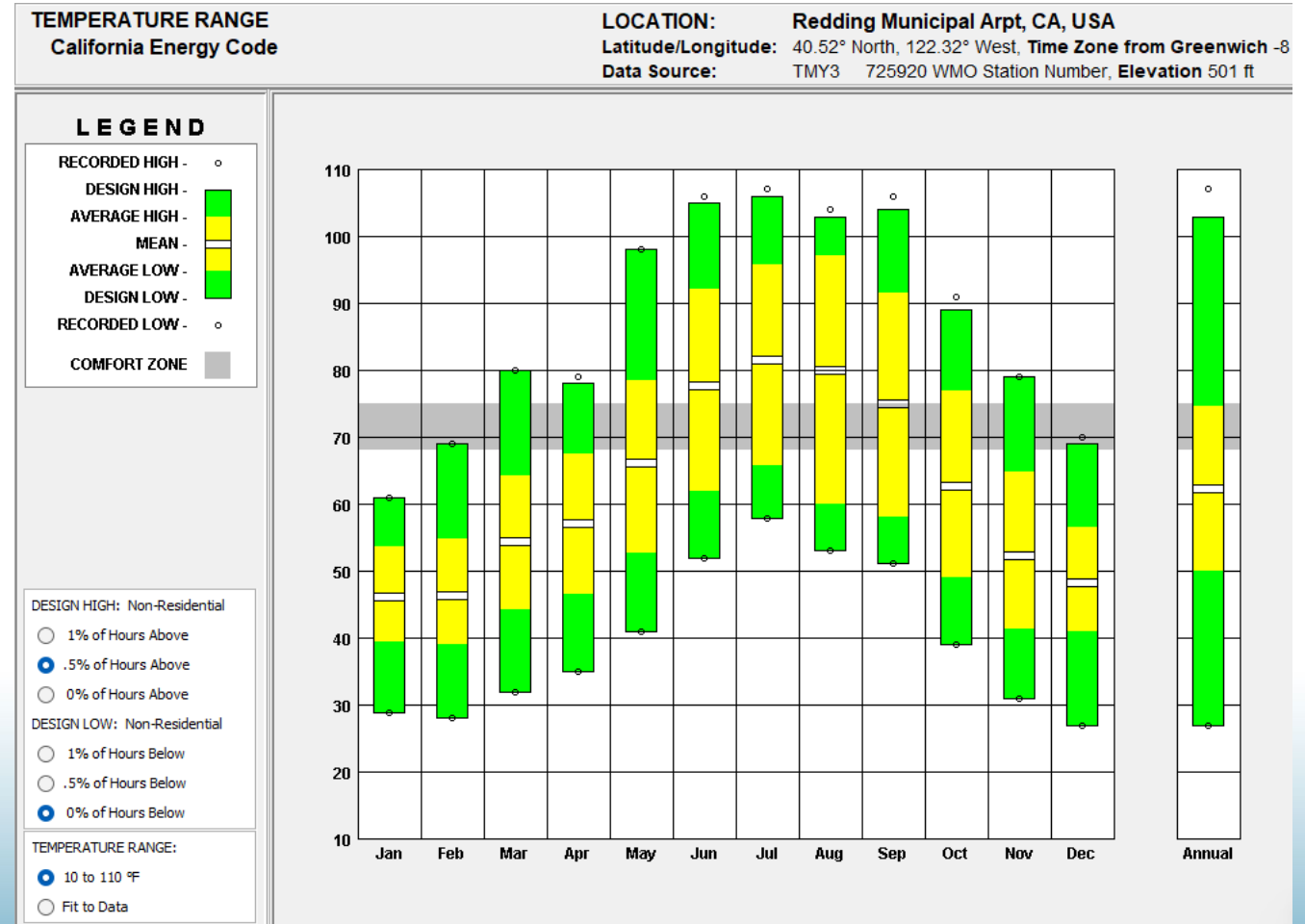
Summary ECMs for Tenant Operated Buildings				
#	Building (s)	Energy System	ECM Description	Simple Payback
1	Redding Jet Center	Lighting	Replace 480W and 1000W Metal Halide Lighting Fixtures with LED Fixtures in the Hangar	1-2 years
2	Redding Jet Center	Lighting	Clean Skylights and Implement Daylighting Controls on Fixtures in the Hangar	3-5 years
3	Redding Jet Center	Lighting	Replace T12/T8 Lighting Fixtures with LED Fixtures in the Hangar and Office Spaces	3-5 years
4	Redding Jet Center	HVAC	Install Smart Thermostats to Control Roofop Heat Pumps	5+ years
5	Redding Jet Center	HVAC	Replace Old Rooftop Heat Pumps with High Efficiency RHEEM RQPL (or similar) heat pumps	5+ years
6	Redding Jet Center	Renewable Energy	Install Solar PV System on South Facing Hangar Roof	5+ years
7	Air Shasta	Lighting	Clean Skylights and Implement Daylighting Controls on Fixtures in the Hangar	3-5 years
8	ARFF	HVAC	Retro Commission Purafile, FC-1, and FC-2 HVAC Units	1-2 years
9	ARFF	Lighting	Clean Skylights and Implement Daylighting Controls on Fixtures in the High Bay	3-5 years
10	ARFF	HVAC	Install Smart Thermostats to Control Roofop Heat Pumps	3-5 years
11	ARFF	DHW	Replace Gas Hot Water Heater with Air Source Heat Pump	5+ years
12	REACH Air Ambulance	Lighting	Replace 480W Metal Halide Lighting Fixtures with LED Fixtures in the Hangar	1-2 years
13	REACH Air Ambulance	DHW	Instal POU DHW or Heat Pump to Replace Electric Resitance DHW Storage Tank	5+
14	Rental Car Service	Lighting	Replace T12/T8 Lighting Fixtures with LED Fixtures	3-5 years
15	Tullis Hangar	Lighting	Clean Skylights and Implement Daylighting Controls on Fixtures in the Hangar	3-5 years
16	Tullis Hangar	DHW	Instal POU DHW or Heat Pump to Replace Electric Resitance DHW Storage Tank	5+
17	Sierra Pacific Hangar	DHW	Instal POU DHW or Heat Pump to Replace Electric Resitance DHW Storage Tank	5+

Questions?

Appendix: Redding Weather Conditions

Key Takeaways:

- Mild winters with average lows in 35-40F range (HDD = 2,600)
- Warmer summers with averages 90-100F range (CDD = 2,400)
- Significant temperatures swings in summer
 - Highs in the 90-100F range
 - Lows in the 60-65F range



Appendix: New Construction Design Considerations: HVAC

Design Options for Waterside HVAC Systems

- Water-cooled systems provide best cooling efficiencies; however, require larger first cost and maintenance
- Utilization of AC-heat pump chillers minimizes quantity of equipment and would incorporate heat recovery.
- It is not recommended to utilize gas-fired systems given solar PV production and mild winter conditions.

Waterside System Types							
Central Plant	COP Cooling		COP Heating		Heat Recovery	First Cost	Financial Payback
	Part Load	Full Load	Part Load	Full Load			
AC-Chiller w/ HW Boiler	COP 5.0	COP 3.5	COP 0.8	COP 0.9	No	Low	Low
WC-Chiller w/ HW Boiler	COP 8.0	COP 5.0	COP 0.7	COP 0.8	No	High	High
AC-Heat Pump Chillers	COP 5.0	COP 3.5	COP 5.0	COP 2.0	Yes	Mid	Mid
Geothermal Heat Pumps	COP 8.0	COP 5.5	COP 8.0	COP 4.0	Yes	High	High

Airport Land Use Compatibility Plan Update



LAND USE COMPATIBILITY PLANNING

- PUC [Public Utilities Code) Section 21674 outlines in the duties of the Airport Land Use Commissions (ALUC)
- ALUCs protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses.
- Adopt and maintain and Airport Land Use Compatibility Plan
- Redding Regional Airport Compatibility Plan last updated in 1984

LAND USE COMPATIBILITY PLANNING

An Airport Land Use Compatibility Plan Does Not:

- Have authority over operations (PUC, Sec. 216749(e))
- Specify land uses on parcels near an airport
- Remove existing incompatible land uses
- Authorize the airport to expand

LAND USE COMPATIBILITY PLANNING

Key Planning Assumptions

- Airport Layout Plan (ALP) and Airspace Drawing
- Updated 20-year aviation activity forecasts
- Updated noise exposure contours

Exhibit C1: California Airport Land Use Planning Handbook Safety Zones

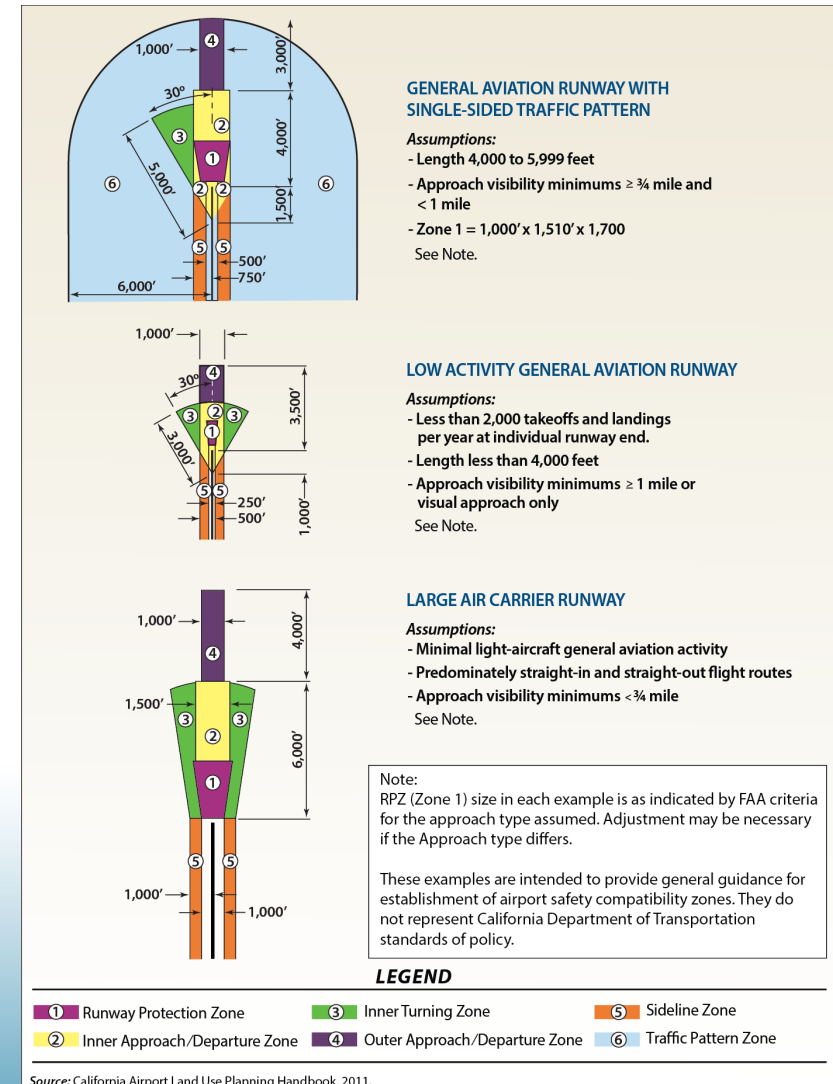
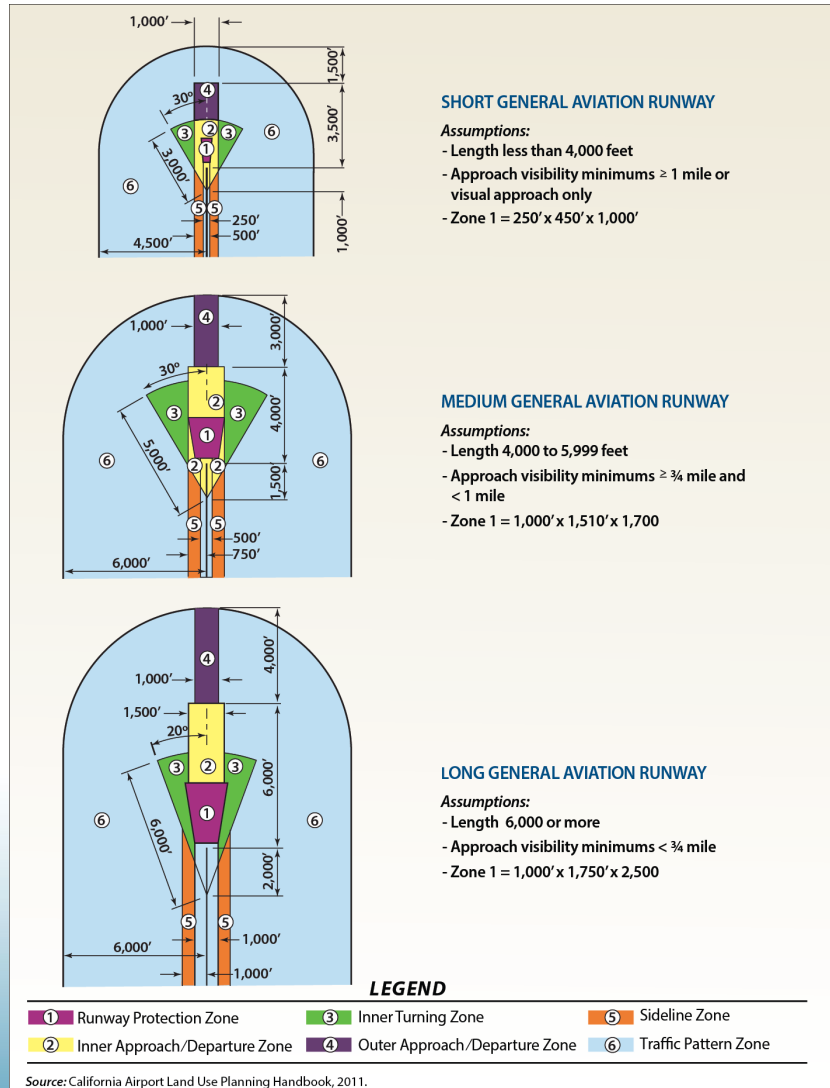


Exhibit 2A: Safety Zones

Runway 16-34 are based on the *long general aviation runway* example

Runway 12-30 are based on the *short general aviation runway* example

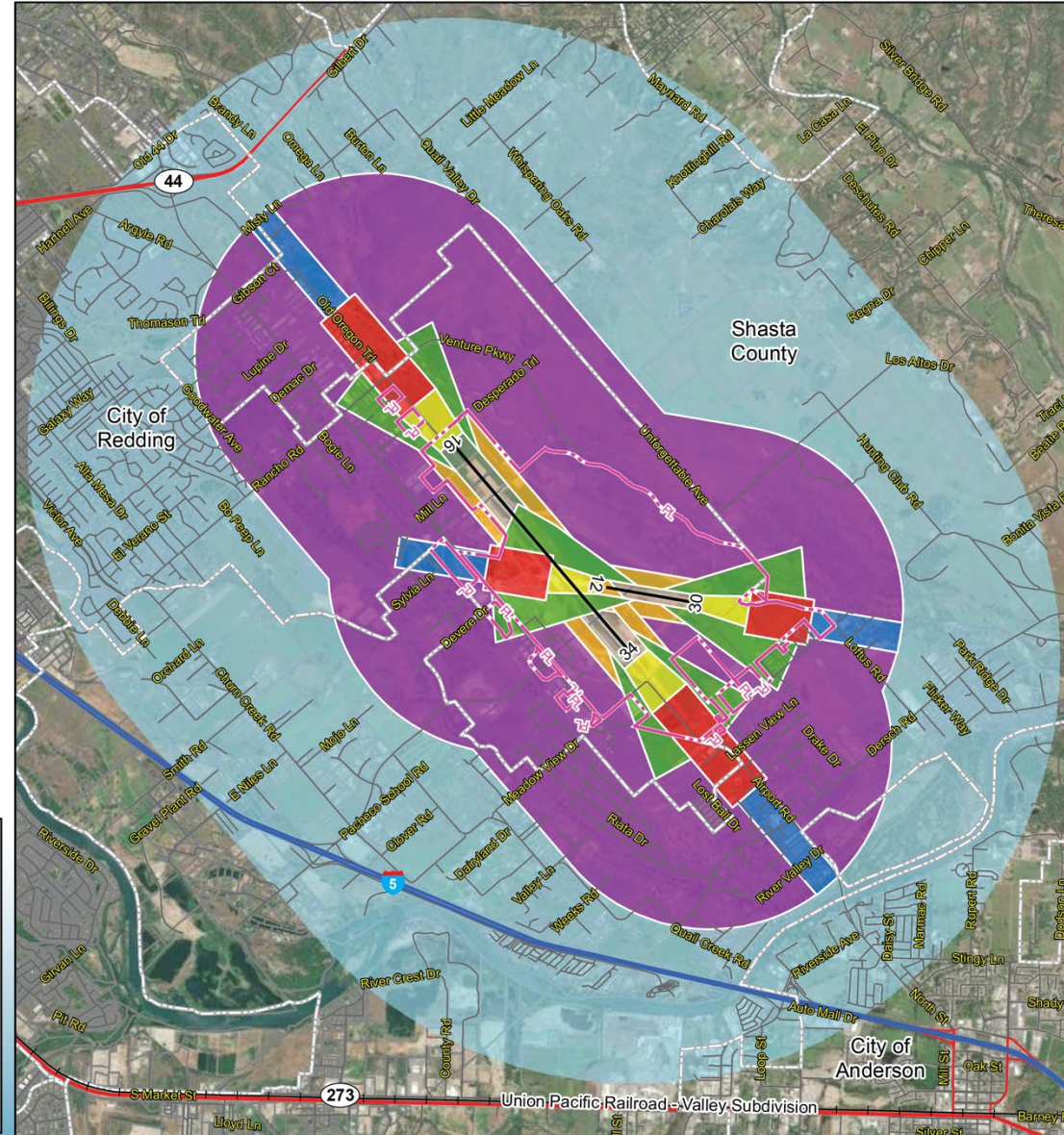
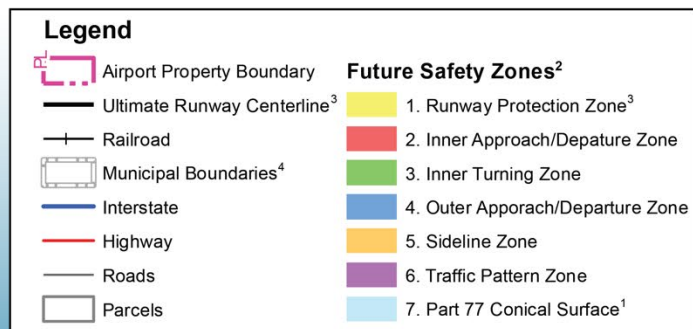


TABLE 4A | Safety Zone Compatibility Criteria Matrix (continued)

Zone 3: Inner Turning	
Dwelling Units (d.u.) per Acre¹	1 d.u. per 2 acres
Max. Nonresidential Intensity²	70 persons per acre
Required Open Land	20%
Allow	Uses allowed in Zone 2; Greenhouses
Allow With Conditions	Uses allowed with conditions in Zone 2; Office, retail, and other commercial uses
Not Recommended³	Major shopping centers, theaters, meeting halls, and other assembly facilities; Children's schools, day-care centers, hospitals, nursing homes; Stadiums, recreation facilities; Hazardous materials
Other Development Conditions⁴	Airspace review in accordance with 14 CFR Part 77.9 (FAA Form 7460) ⁷ ; Dedication of avigation easement ⁶ ; Locate structures maximum distance from extended runway centerline; Minimum NLR of 45 dB residences (including mobile homes) and office buildings ⁷
Zone 4: Outer Approach/Departure	
Dwelling Units (d.u.) per Acre¹	1 d.u. per 2 acres
Max. Nonresidential Intensity²	100 persons per acre
Required Open Land	30%
Allow	Uses allowed in Zones 2-3
Allow With Conditions	Uses allowed with conditions in Zones 2-3
Not Recommended³	Theaters, meeting halls, and other assembly facilities; Children's schools, day-care centers, hospitals, nursing homes; Stadiums, recreation facilities; Hazardous materials
Other Development Conditions⁴	Airspace review in accordance with 14 CFR Part 77.9 (FAA Form 7460) ⁵ ; Dedication of avigation easement ⁶ ; Minimum NLR of 45 dB in residences (including mobile homes) and office buildings ⁷

Exhibit 2B: Existing (2022) Noise Contours

62,387 operations

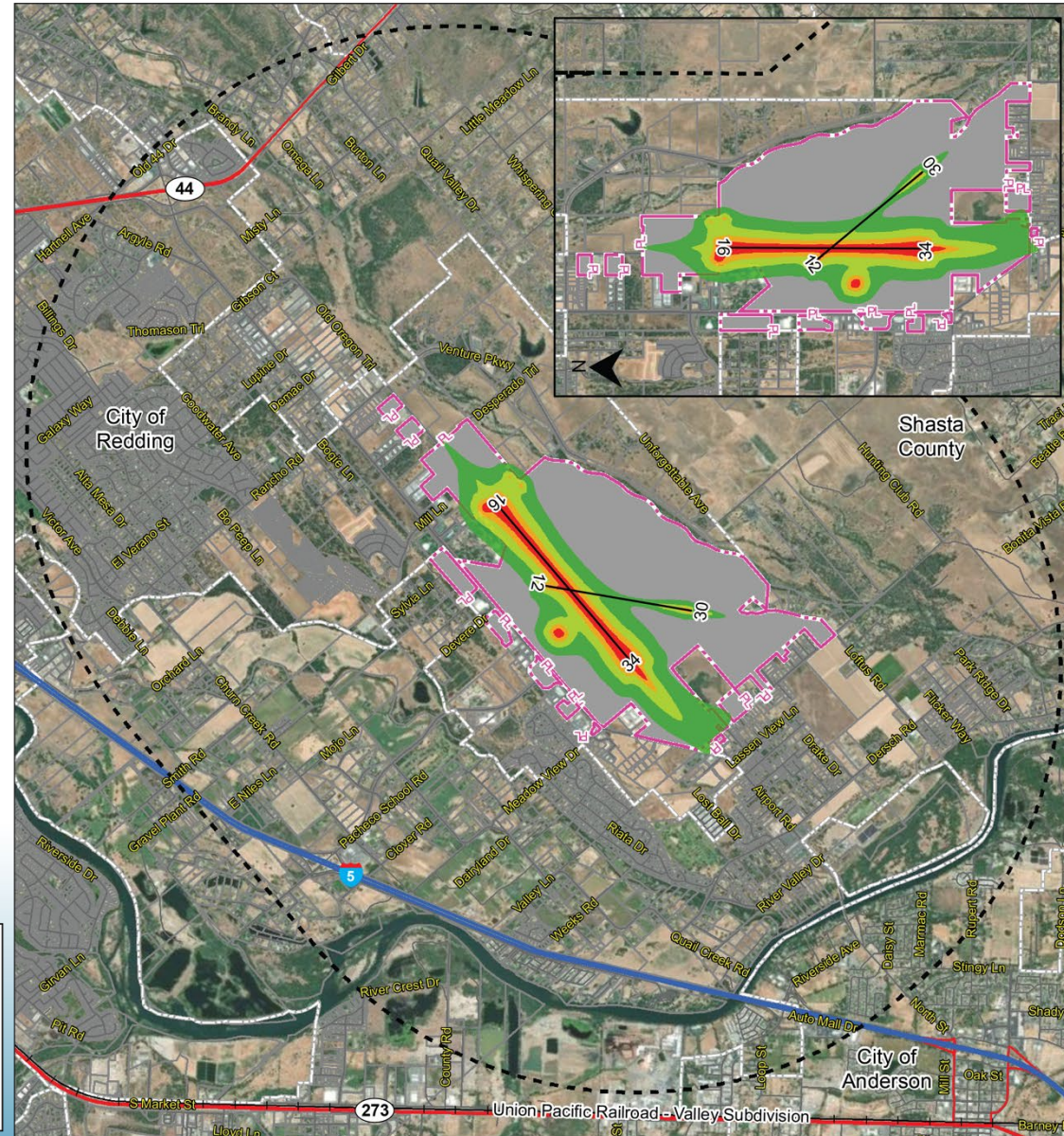
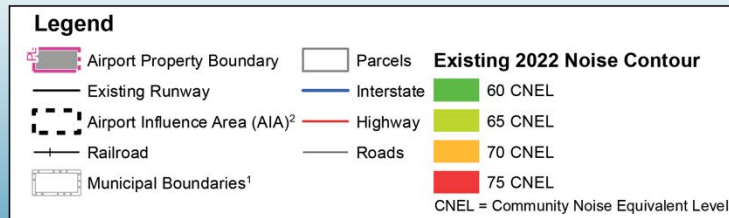
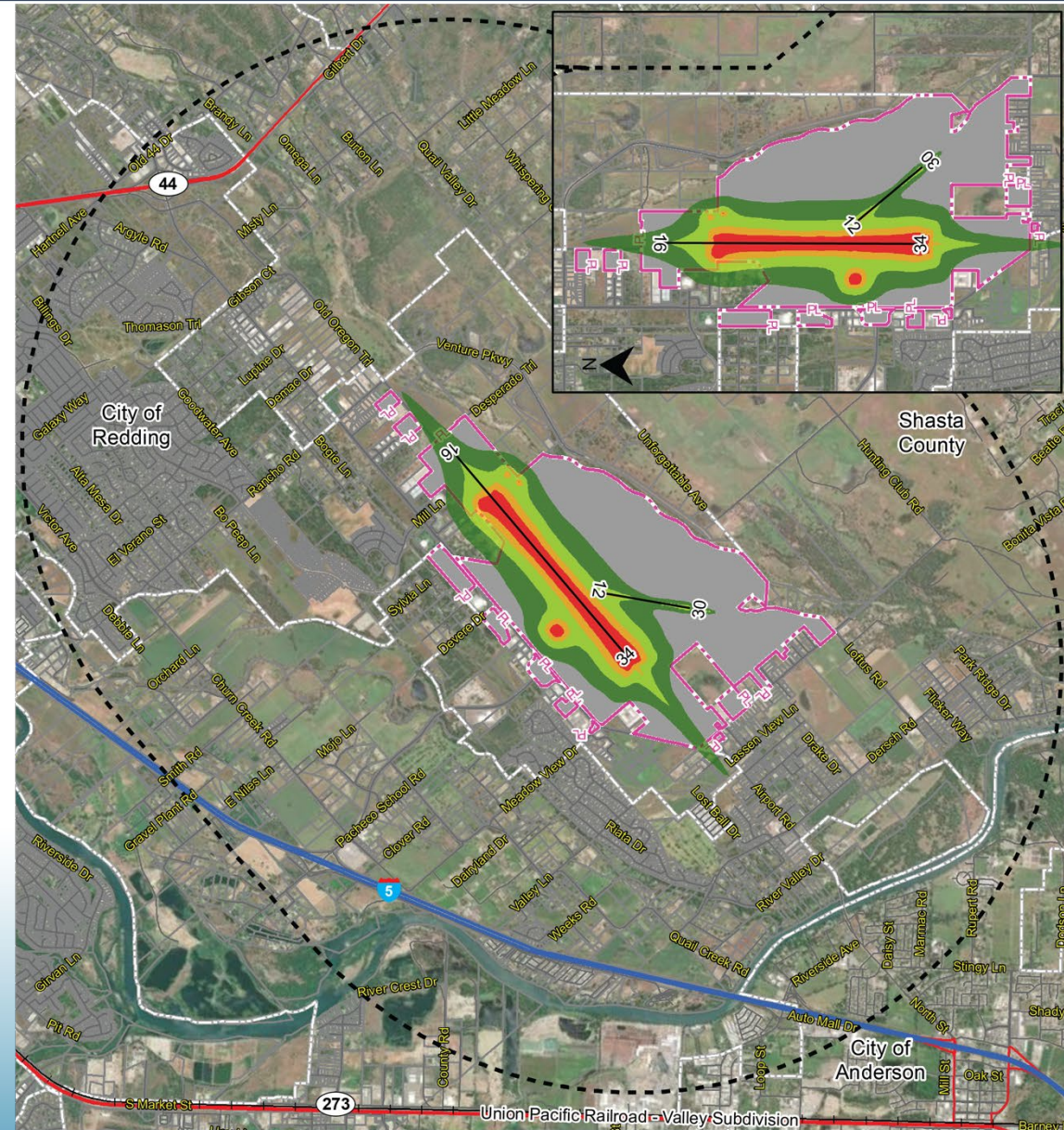
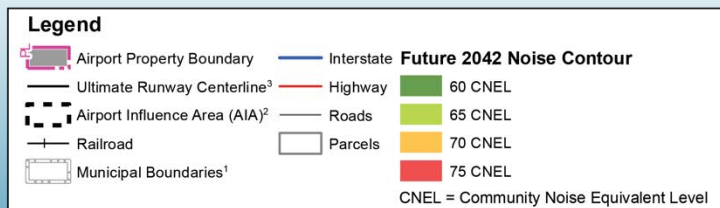


Exhibit 2C: Future (2042) Noise Contours

93,871 operations



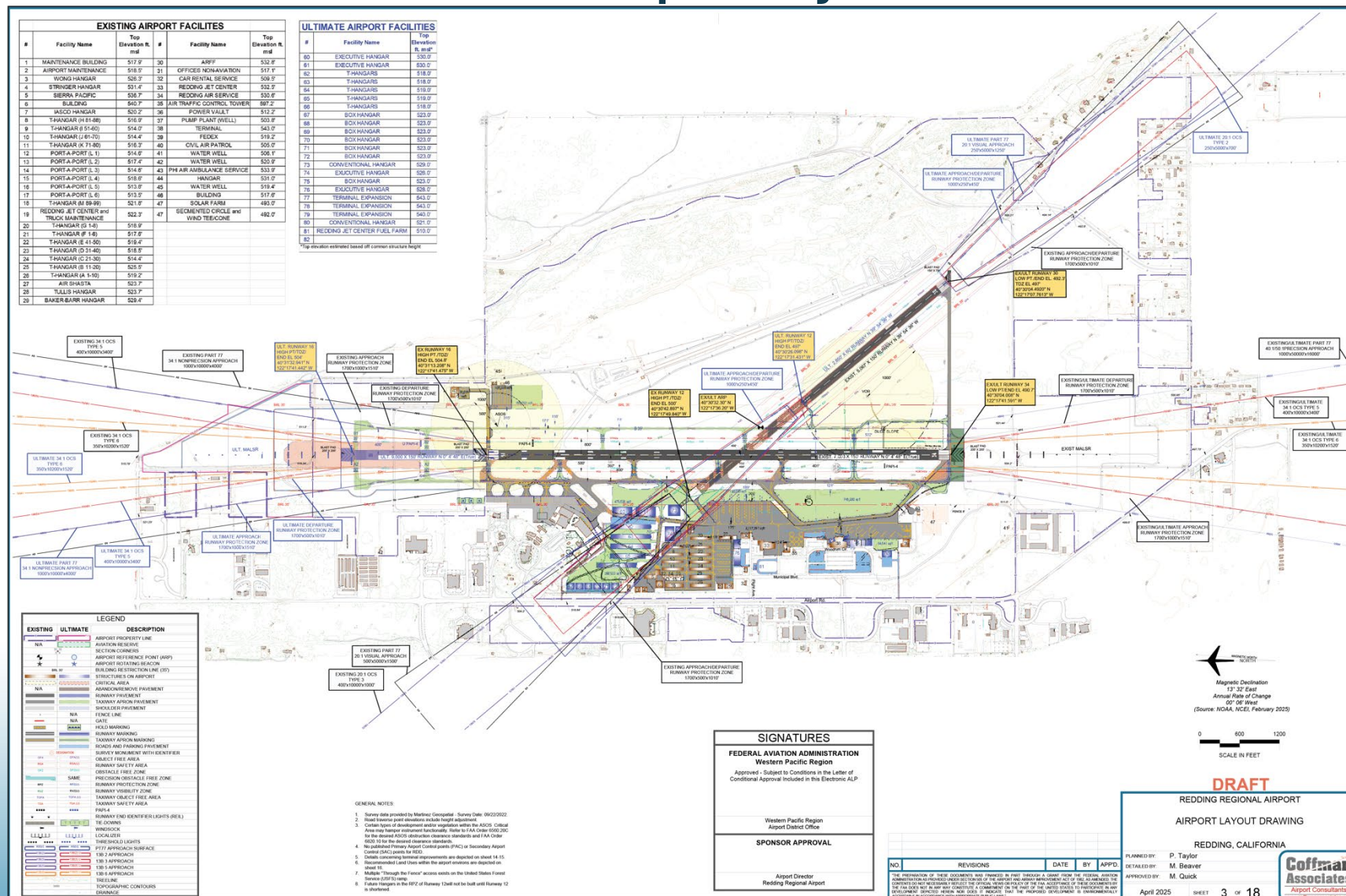


Exhibit 2F: Zoning

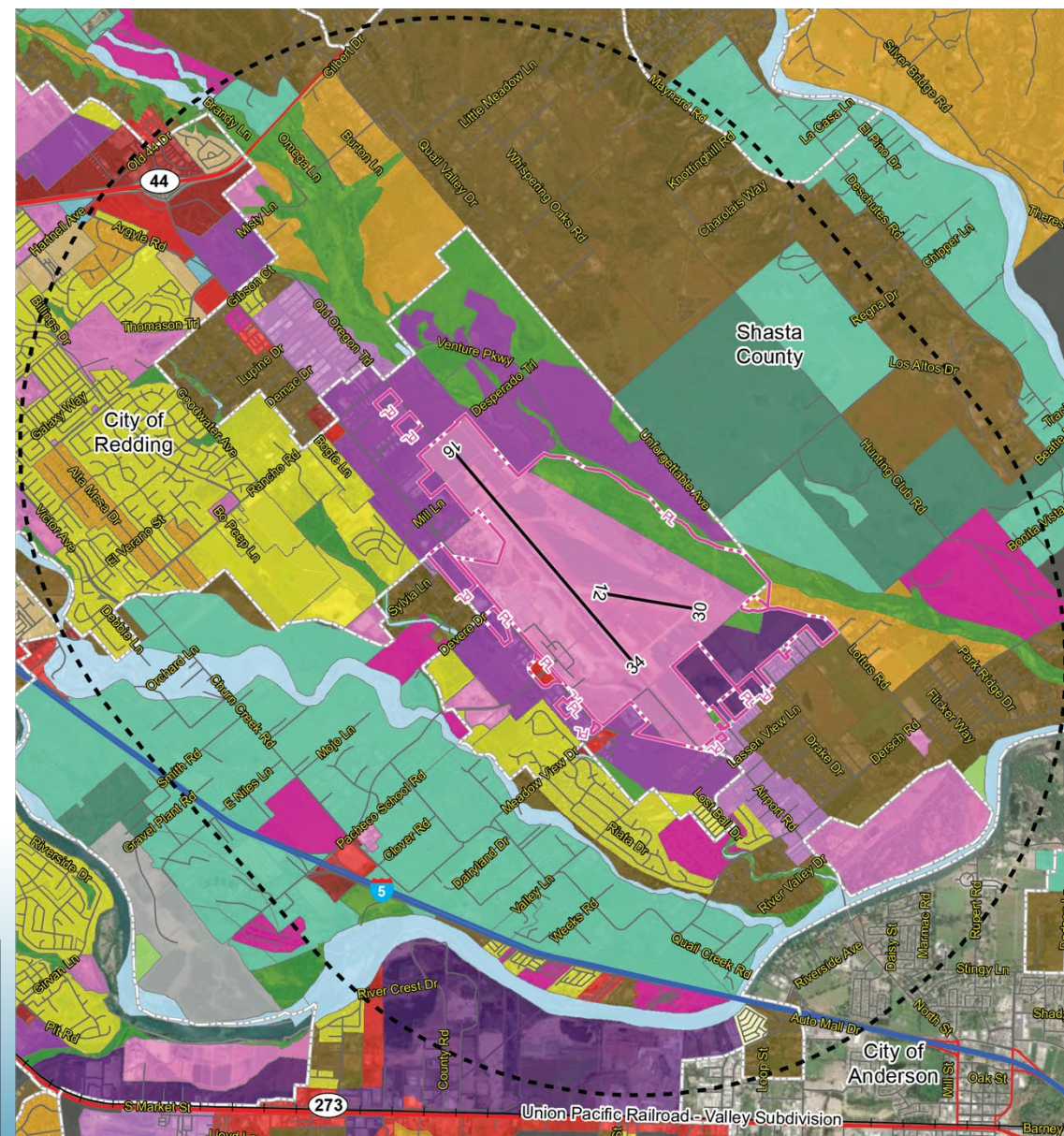
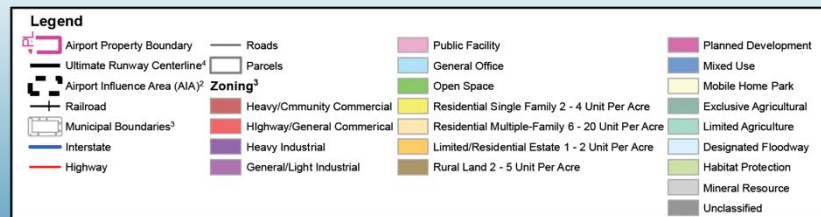
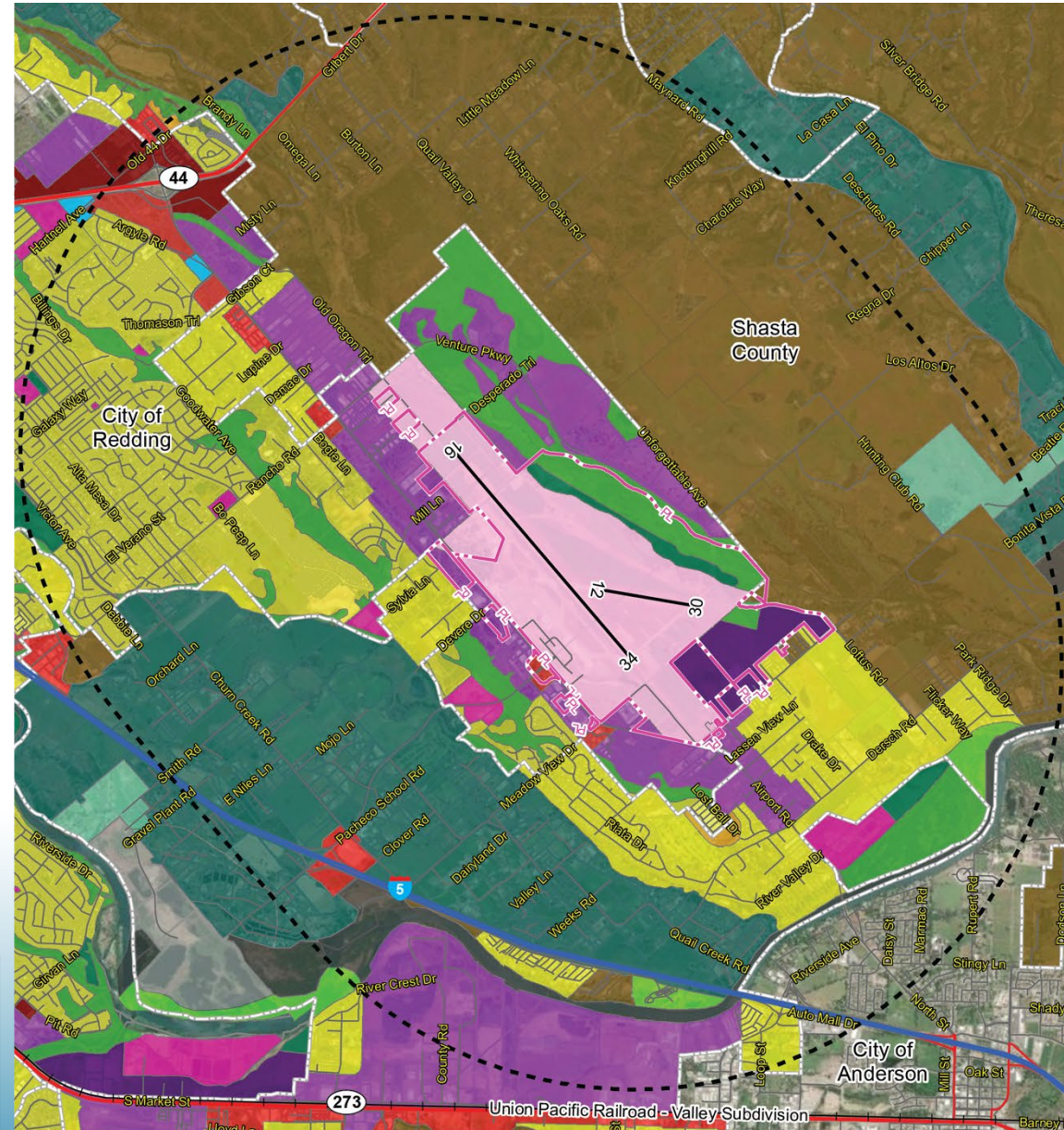
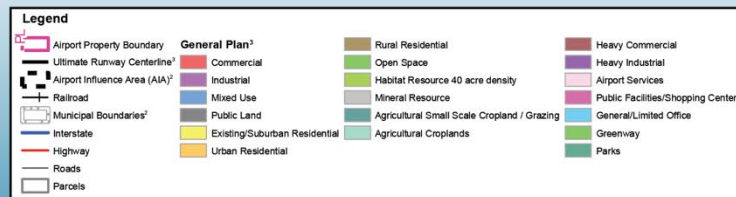


Exhibit 2G: General Plan




LAND USE COMPATIBILITY PLANNING

Next Steps

- Share this draft information with Airport Land Use Commission
- Public participation
- CEQA, as needed
- Adoption by ALUC

NEXT STEPS

- 
- Last public information workshop
 - Apply final comments/edits
 - Local approvals
 - Finalize ALP and submit to FAA
 - Final Deliverables
 - Executive summary brochure
 - Final Master Plan document
 - FAA approved ALP