

SILICON VALLEY'S AIRPORT



Downtown Airspace and Development Capacity Study

September 13, 2018 Stakeholders Meeting

The Challenge



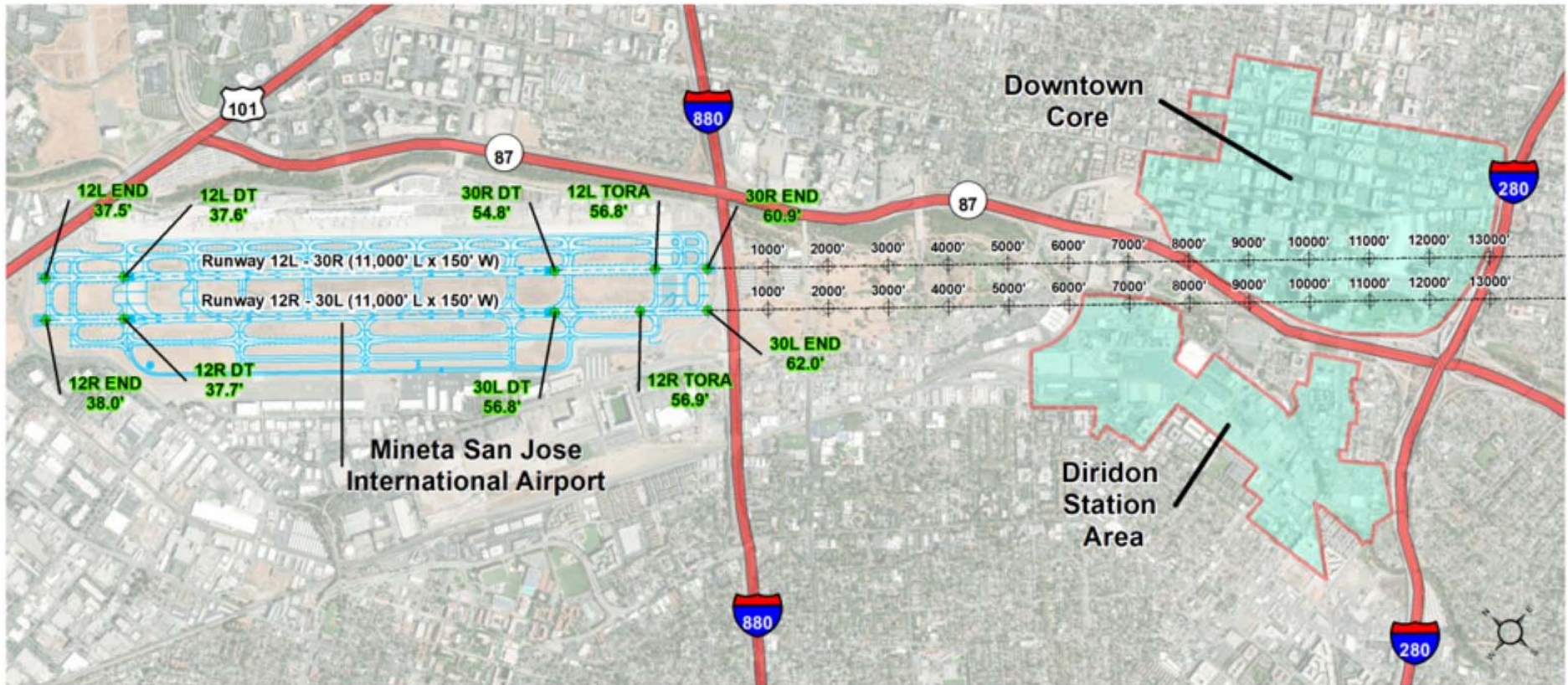
- Downtown and Airport are two of San Jose's economic priorities
- FAA protection of airspace invisible "surfaces" (via "FAR Part 77" and "TERPs")
- FAR Part 77 and TERPs do not consider specific airline emergency procedures known as one-engine inoperative (OEI)
- OEI study last conducted in 2008, establishing straight out and west corridor OEI protections

Airspace Surfaces

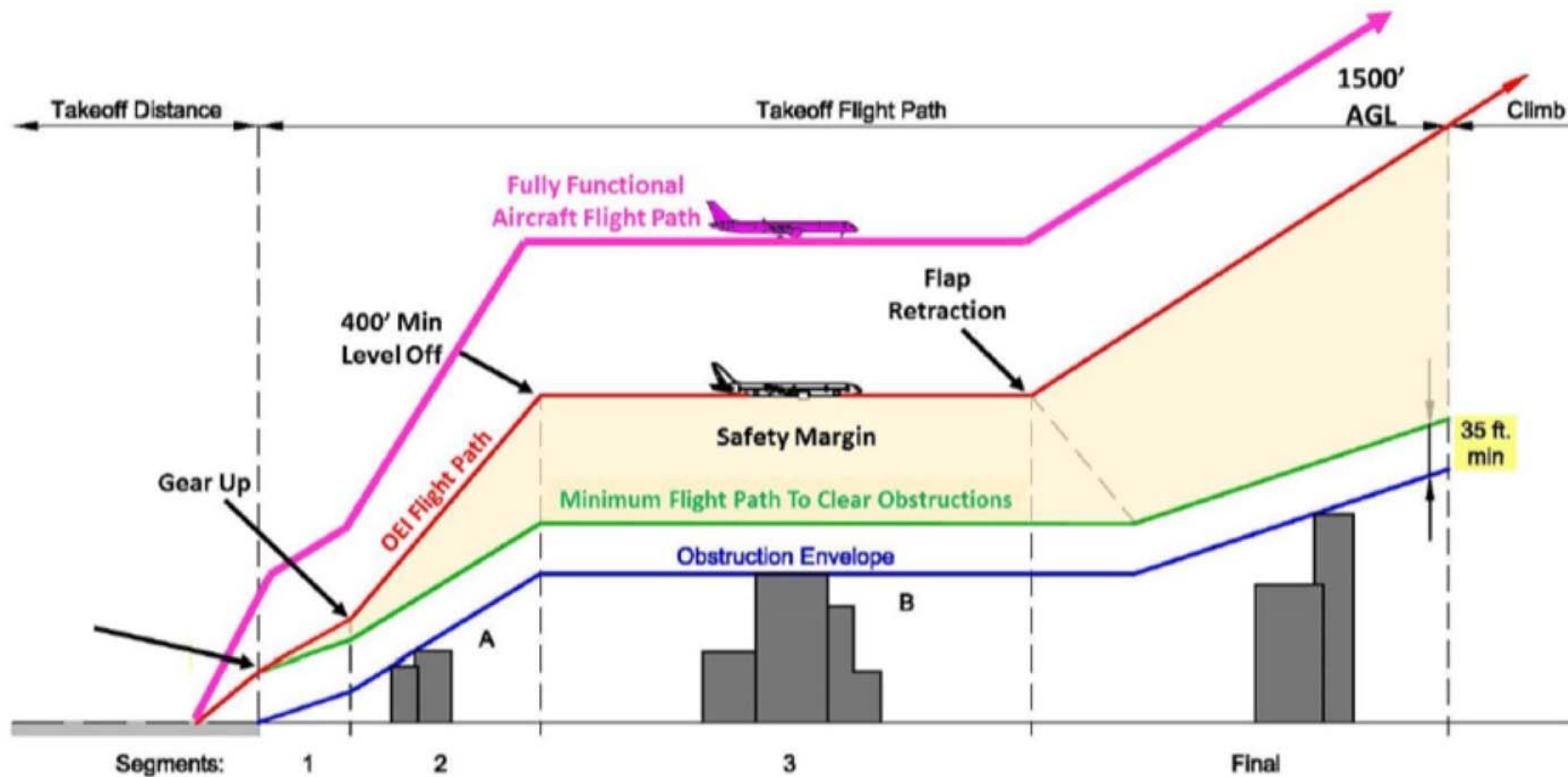


- OEI Surfaces – Runway 12L/12R
 - FAA AC 120-91 Obstacle Accountability Area
 - ICAO OEI Surface
 - West OEI Corridor
- Initial TERPS Surfaces – Runways 12L/12R
 - TERPS Initial Climb Area Departure Surface
 - TERPS ILS Final and Missed Approach Surfaces
- Part 77 Approach, Transitional and Horizontal Surfaces

Study Evaluation Area



What is One Engine Inoperative



Airline Response to Obstacles



- Request another runway (wind, weather, air traffic permitting)
- Off-load passengers and/or cargo (weight penalty)
- Make a refueling stop
- Cancel current day's flight
- Change aircraft
- Change OEI procedure
- Cancel air service if payload loss affects financial viability

Project Steering Committee



Community Representatives

Theresa Alvarado – SPUR

Scott Knies – San Jose Downtown Association

Matt Mahood – Silicon Valley Organization

David Bini – Santa Clara & San Benito Counties Building & Construction Trades Council

Josue Garcia – Santa Clara County Residents for Responsible Development

Matt Quevedo – Silicon Valley Leadership Group

Julie Matsushima – Airport Commissioner and Downtown Resident

City Staff

John Aitken and Judy Ross – Airport Department

Kim Walesh and Blage Zelalich – City Manager's Office/Office of Economic Development

Rosalynn Hughey – Planning, Building and Code Enforcement

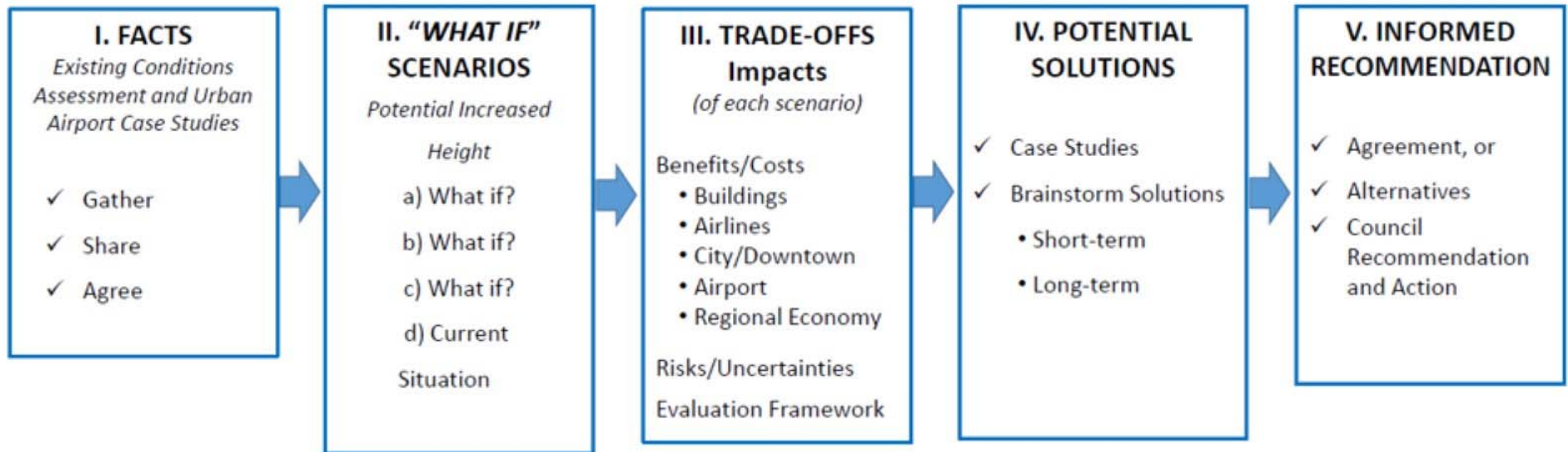
David Hai Tran & Christina Ramos – District 3 Office

Kelly Kline – Mayor's Office

Consultants

Landrum and Brown and Jones, Lang, and LaSalle

Collaborative Process



STAKEHOLDER CONVERSATIONS *

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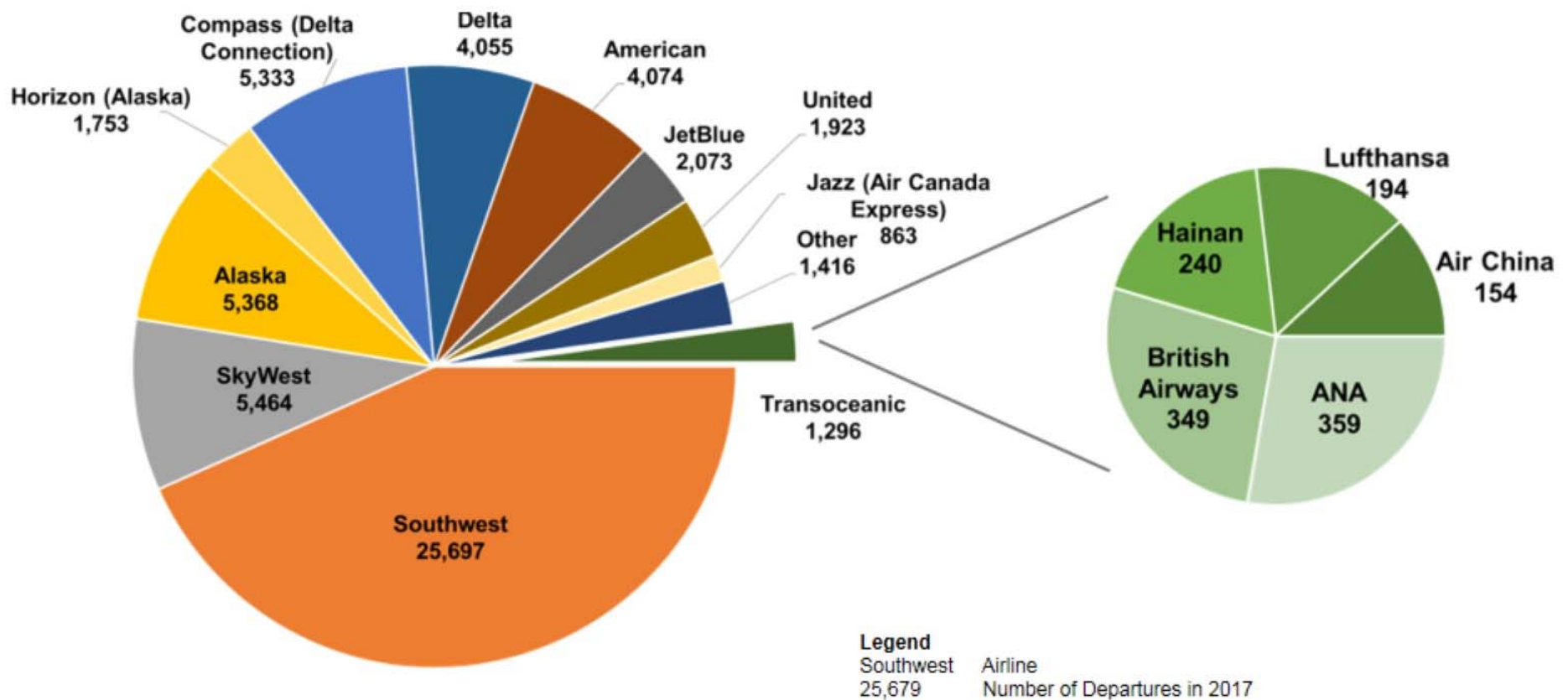
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Progress to Date

Airline Market Share – passenger

Passenger airline market share in 2017



Source: ANOMS

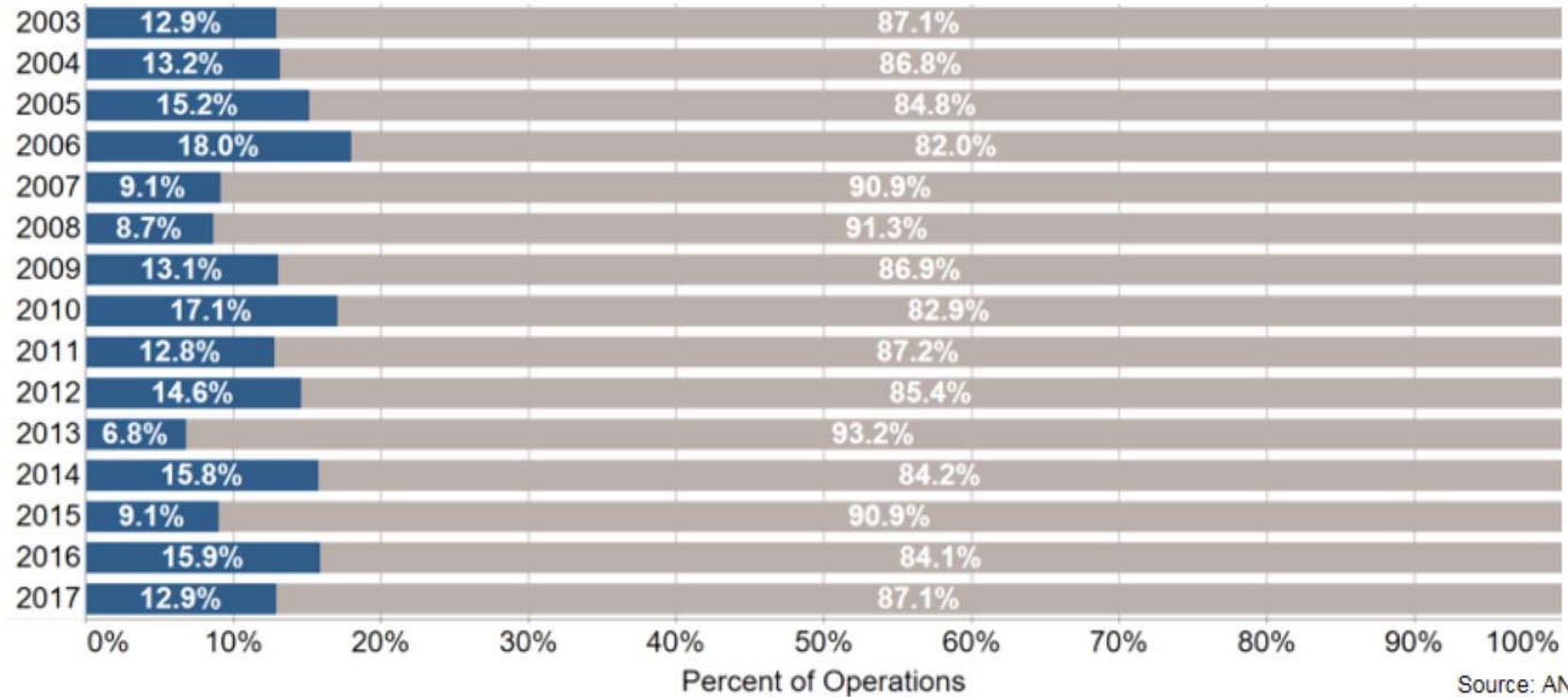
Yearly Operations by Flow



2003 – 2017 Average



Yearly Proportions



Source: ANOMS



“What If” Scenario Assessment

Airspace Protection Scenarios



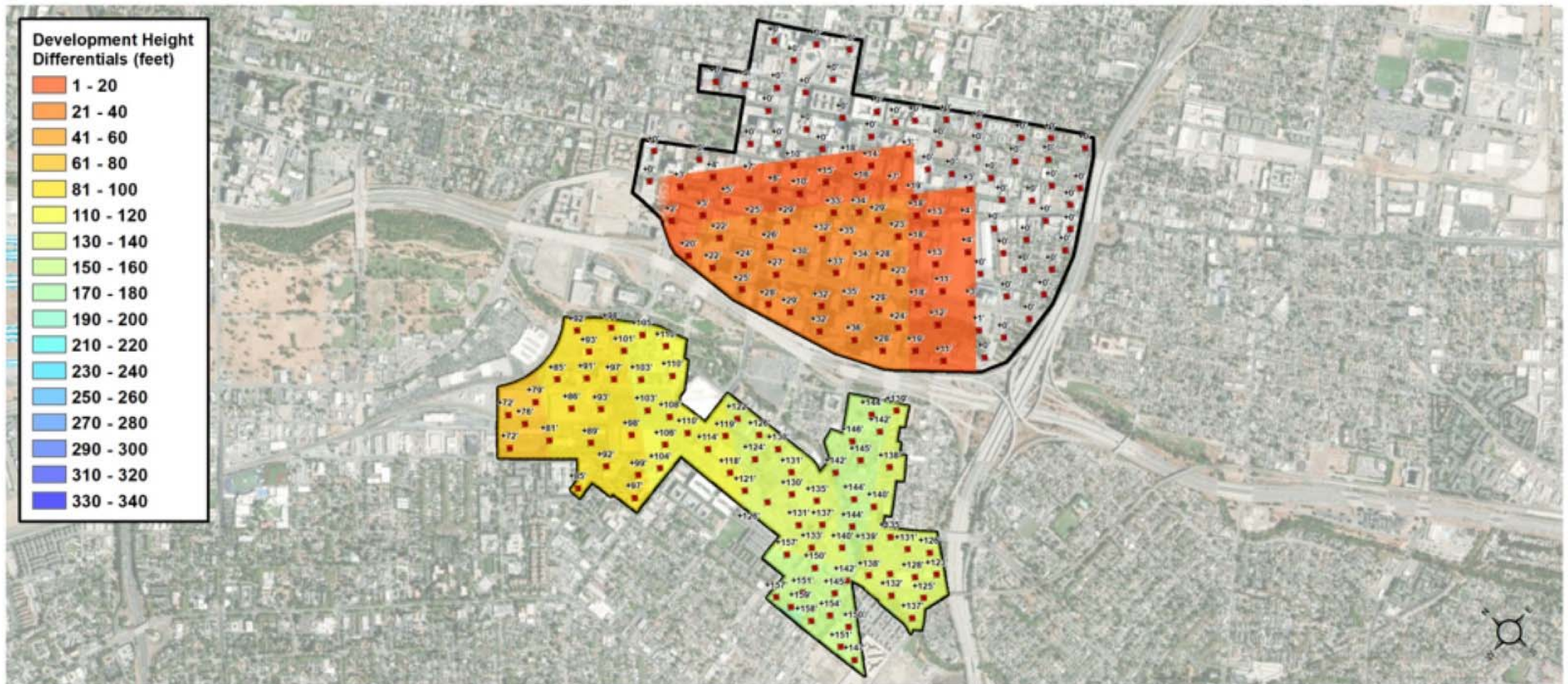
Four Airspace Scenarios

- **Scenario 4:** No OEI protection, TERPS only
- **Scenario 7:** Straight-out OEI protection only
- **Scenario 10:** Straight-out OEI with West OEI Corridor alternatives
- **Scenario 9:** No OEI, increased FAA height limits

Selected Aircrafts

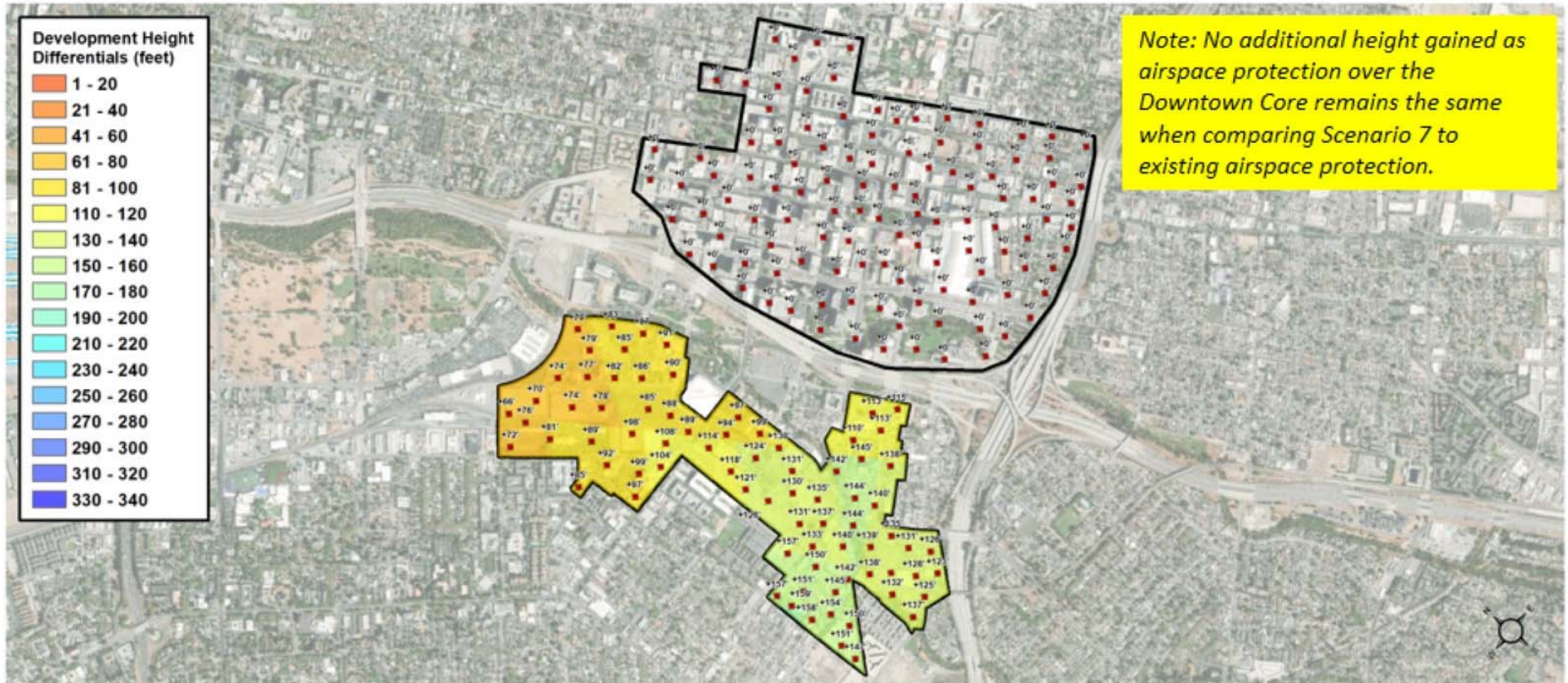
- Boeing 373-800
- Airbus 320-200
- Boeing 787-9
- Boeing 777-300ER

Scenario 4 – NO OEI – TERPS Only



Differential height increases represent the additional developable heights as compared to existing airspace protection.

Scenario 7 - Straight-out OEI

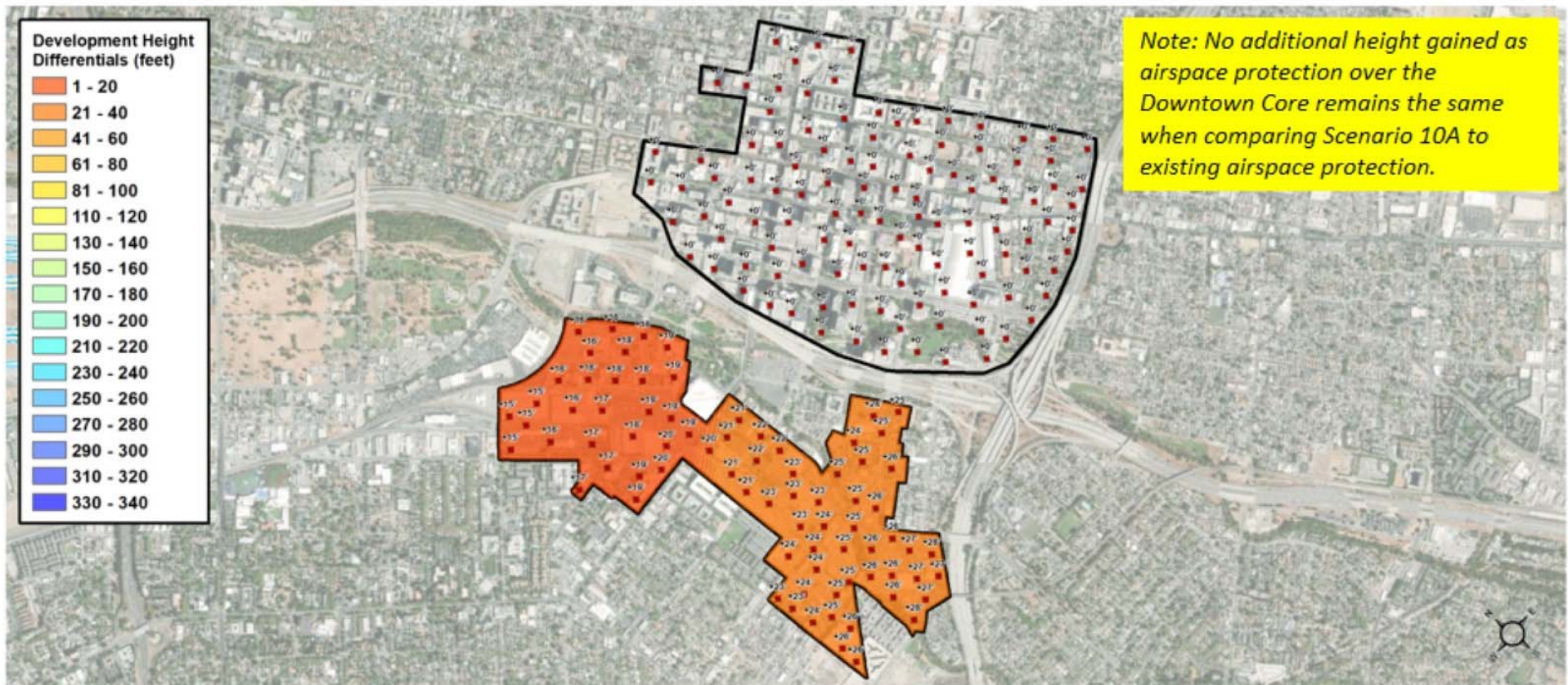


Scenario 10A – Straight-out OEI



West Corridor Alternatives

100' to 195' AGL (53.3:1 surface slope)

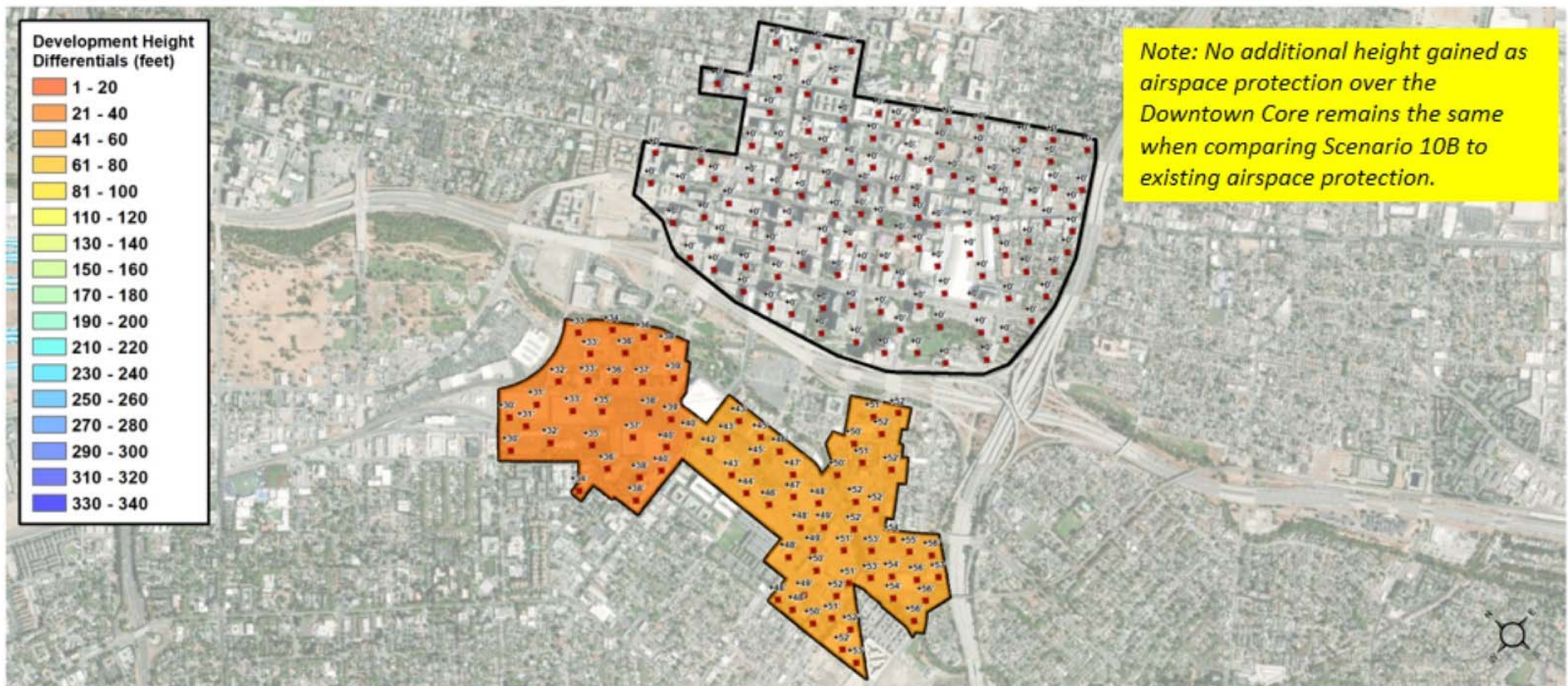


SCENARIO 10B – Straight-Out OEI



West Corridor Alternatives

115' to 224' AGL (47.5:1 surface slope)

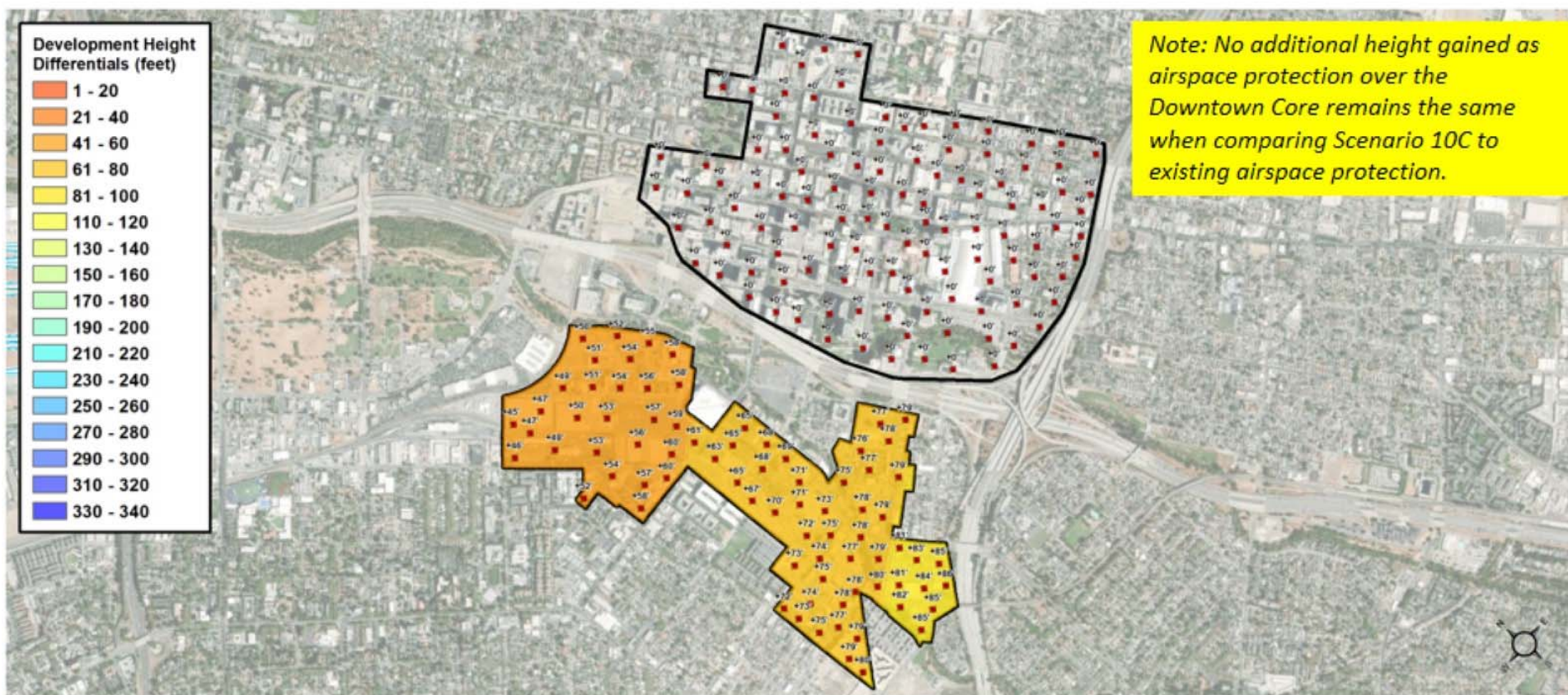




Scenario 10C – Straight-Out OEI

West Corridor Alternatives

129' to 240' AGL (42.8:1 surface slope)

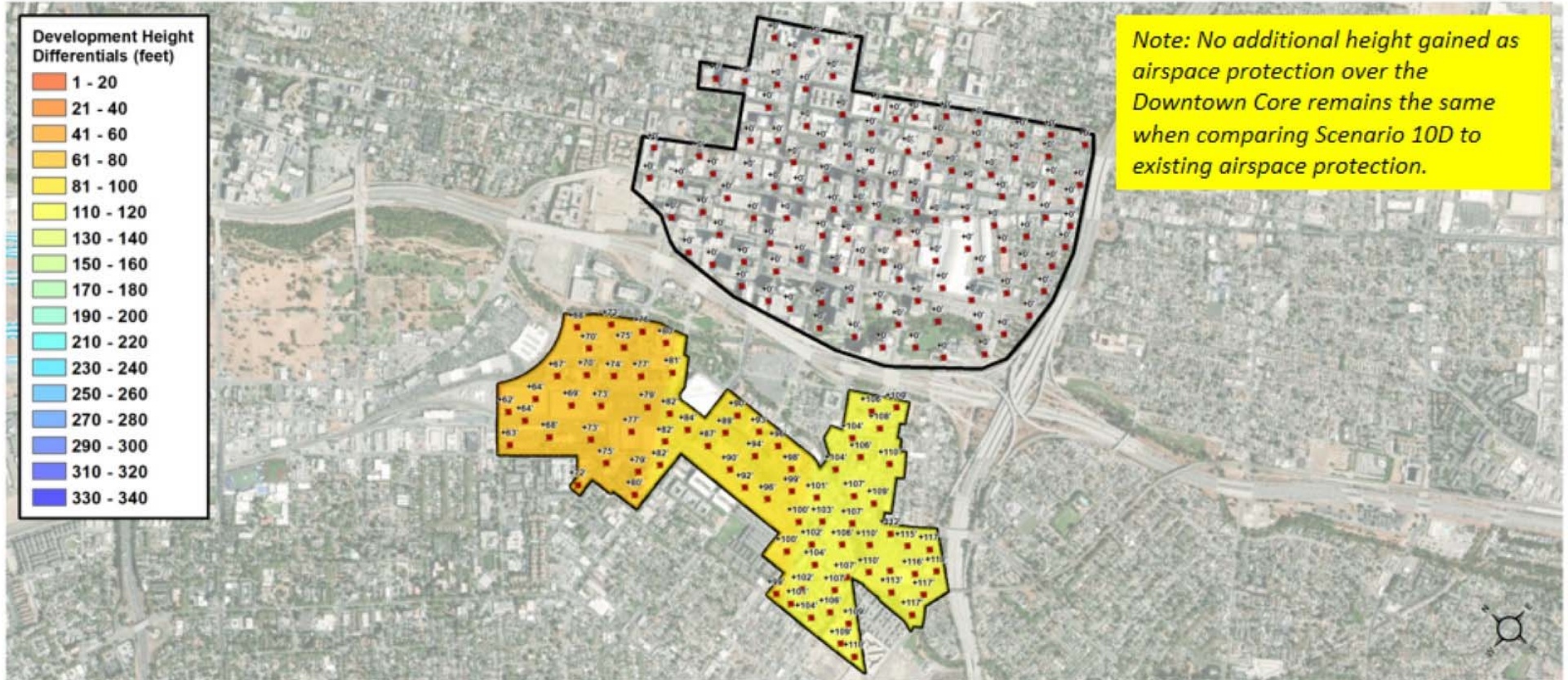


SCENARIO 10D – Straight-Out OEI



West Corridor Alternatives

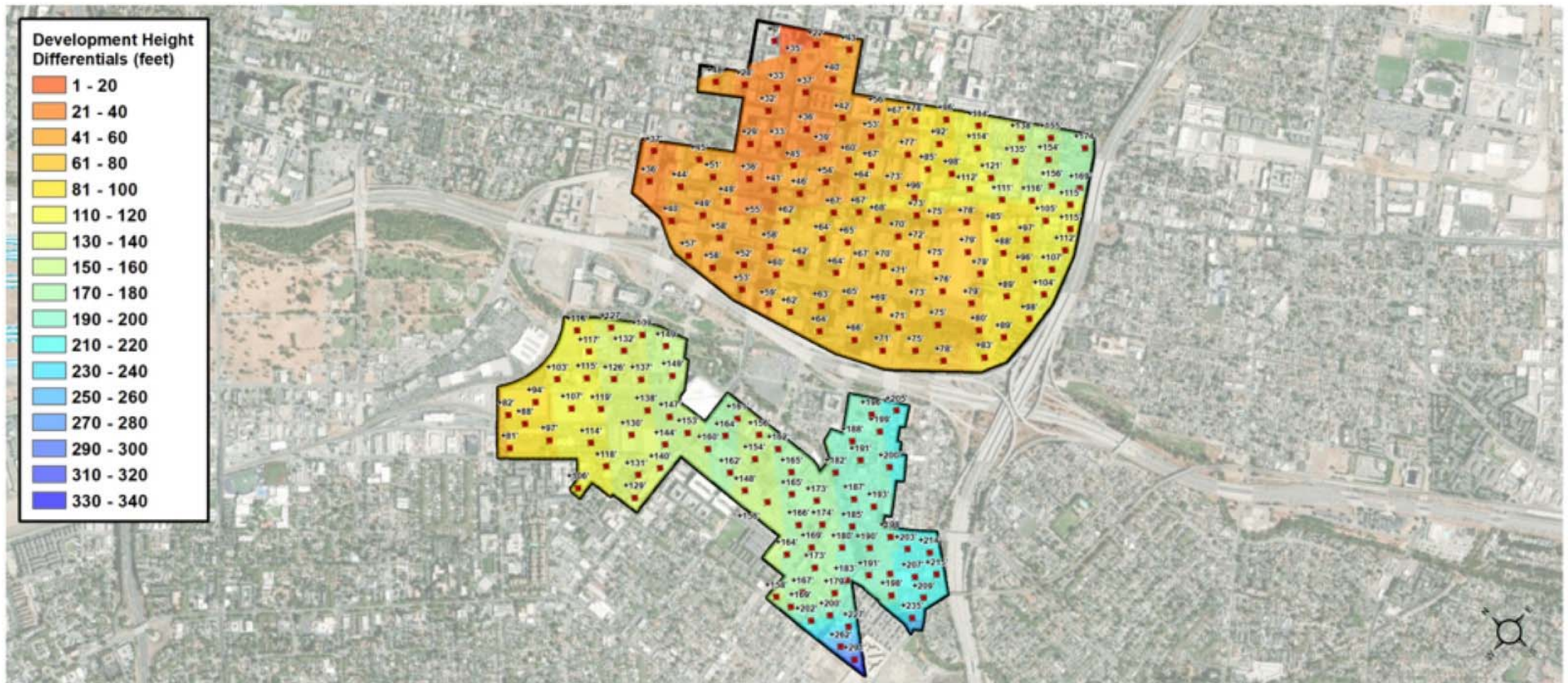
146' to 260' AGL (38.5:1 surface slope)



Scenario 9 – NO OEI



Increased FAA Height Limits





AIRCRAFT PERFORMANCE CITY PAIR ASSESSMENT

Aircraft Performance Assumptions

City Pair Assessment



AIRCRAFT FLEET EVALUATION

Aircraft	Engine	Maximum Takeoff Weight (MTOW) (lbs.)	Seats
A320-200	CFM56-5B4	171,960	150
B737-800	CFM56-7B26	174,200	175
B787-9	GENX-1B74-7	560,000	290
B777-300ER	GE90-115BL	775,000	370

CITY PAIR ASSESSMENT

Origin	Destination	Distance (Statue Miles)
Domestic		
SJC	JFK	2,569
SJC	HNL	2,417
International		
SJC	FRA	5,703
SJC	PEK	5,942

JFK: John F. Kennedy International Airport (New York)
HNL: Honolulu International Airport (Hawaii)
FRA: Frankfurt International Airport (Germany)
PEK: Beijing International Airport (China)

SEASONAL TEMPERATURES

Winter		
Aircraft Type	Temperature (°F)	Notes
A320-200 & B737-800	63°F	Early morning and evening departures
B787-9 & B777-300ER	68°F	Morning and afternoon departures
Summer		
A320-200 & B737-800	81.3°F	Boeing 85% reliability temperature
B787-9 & B777-300ER	81.3°F	Boeing 85% reliability temperature

Transcontinental Weight Penalty Assessment



New York - JFK Winter (63° F)		A320-200 (150 seats/2,384 lbs. cargo)		B737-800 (175 seats/1,604 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	-	1,067	-	-
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	-	-	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	-	-	-
	Opt 10B: 115' - 224' AGL	-	-	-	-
	Opt 10C: 129' - 240' AGL	-	-	-	-
	Opt 10D: 146' - 260' AGL	-	106	-	-
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	8	2,384	-	583
New York - JFK Summer (81.3° F)		A320-200 (150 seats/2,384 lbs. cargo)		B737-800 (175 seats/1,138 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	3	2,384	-	-
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	-	-	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	-	-	-
	Opt 10B: 115' - 224' AGL	-	-	-	-
	Opt 10C: 129' - 240' AGL	-	-	-	-
	Opt 10D: 146' - 260' AGL	-	1,378	-	-
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	13	2,384	3	860

Hawaii Weight Penalty Assessment

Hawaii - HNL Winter (63° F)		A320-200 (124 seats¹/No Cargo)		B737-800 (173 seats²/No Cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	3	-	-	-
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	-	-	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	-	-	-
	Opt 10B: 115' - 224' AGL	-	-	-	-
	Opt 10C: 129' - 240' AGL	-	-	-	-
	Opt 10D: 146' - 260' AGL	-	-	-	-
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	14	-	3	-
Hawaii - HNL Summer (81.3° F)		A320-200 (150 seats/No Cargo)		B737-800 (175 seats/1,599 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	8	-	-	-
Scenario 4	TERPS Only	25	-	-	-
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	16	-	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	8	-	-	-
	Opt 10A: 100' - 195' AGL	8	-	-	-
	Opt 10B: 115' - 224' AGL	8	-	-	-
	Opt 10C: 129' - 240' AGL	9	-	-	-
	Opt 10D: 146' - 260' AGL	18	-	-	-
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	36	-	1	1,599

1. HNL is fuel capacity limited in Feb because of winter winds to 124 PAX and no cargo (i.e., not a takeoff weight limitation).
2. HNL is fuel capacity limited in Feb to 173 PAX a no cargo (i.e., not a takeoff weight limitation).

Asia Weight Penalty Assessment



Beijing - PEK Winter (68° F)		B787-9 (290 seats/10,853 lbs. cargo)		B777-300ER (370 seats/56,089 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	51	10,853	-	19,278
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	25	10,853	-	11,801
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	4,534	-	5,479
	Opt 10B: 115' - 224' AGL	-	9,408	-	6,673
	Opt 10C: 129' - 240' AGL	13	10,853	-	10,537
	Opt 10D: 146' - 260' AGL	34	10,853	-	16,929
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	93	10,853	-	26,672
Beijing - PEK Summer (81.3° F)		B787-9 (290 seats/9,542 lbs. cargo)		B777-300ER (370 seats/55,588 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	56	9,542	-	20,597
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	30	9,542	-	13,268
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	3,933	-	5,293
	Opt 10B: 115' - 224' AGL	-	8,725	-	10,223
	Opt 10C: 129' - 240' AGL	15	9,542	-	11,020
	Opt 10D: 146' - 260' AGL	36	9,542	-	17,545
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	95	9,542	-	28,076

Europe Weight Penalty Assessment



Frankfurt - FRA Winter (68° F)		B787-9 (290 seats/26,198 lbs. cargo)		B777-300ER (370 seats/62,240 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	-	21,580	-	4,400
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	-	15,338	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	-	10,000	-	-
	Opt 10A: 100' - 195' AGL	-	-	-	-
	Opt 10B: 115' - 224' AGL	-	9,349	-	-
	Opt 10C: 129' - 240' AGL	-	14,096	-	-
	Opt 10D: 146' - 260' AGL	-	19,282	-	2,027
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	29	26,198	-	11,735
Frankfurt - FRA Summer (81.3° F)		B787-9 (290 seats/23,514 lbs. cargo)		B777-300ER (370 seats/62,240 lbs. cargo)	
		PAX Penalty	Cargo Penalty (lbs.)	PAX Penalty	Cargo Penalty (lbs.)
Scenario 1	Existing airspace protection	-	-	-	-
Scenario 4	TERPS Only	2	22,911	-	7,811
Scenario 7	Straight-Out ICAO OEI surface protection without West OEI Corridor	-	16,407	-	-
Scenario 10	Existing Conditions: 85' - 166' AGL	-	-	-	-
	Opt 10A: 100' - 195' AGL	-	4,217	-	-
	Opt 10B: 115' - 224' AGL	-	9,353	-	-
	Opt 10C: 129' - 240' AGL	-	14,270	-	-
	Opt 10D: 146' - 260' AGL	-	19,612	-	3,876
Scenario 9	TERPS only with increased TERPS departure climb gradients and approach procedure minima	41	23,514	-	15,397



AIRLINE AIRCRAFT PERFORMANCE ASSESSMENT

Airline Responses



The following airlines participated in the aircraft performance assessment for the various airspace scenarios presented:

- Southwest Airlines
- Alaska Airlines
- American Airlines
- British Airways
- Hainan Airways

Airline Responses



Alaska, American and Southwest

- No penalties in any scenario for Alaska and American
- Very high temperatures (91.4 F – 96.8F) before any payload penalties for Southwest

British Airways

- Scenarios 4 and 7 have no impact to current operations
- Scenario 9 has greatest payload impact on both runways

Hainan Airways

- Payload penalties in Scenario 4 (Only Analyzed)
- Currently using the west corridor with no penalties

Next Steps



- City Council Committee update – September 24
- Complete Case Studies
 - Miami International Airport (MIA)
 - Washington Reagan National Airport (DCA)
 - Las Vegas McCarran International Airport (LAS)
- Meet with Remaining Airlines
- Economic Impact Analysis
- Potential Solutions
- Informed Recommendation to City Council