Regional Airport Planning Committee Meeting Notice

9:30 A.M. – Noon
Friday, September 25, 2009
MetroCenter Auditorium
101 8th Street
Oakland, CA 94607

Tentative Agenda

COMMITTEE MEMBERS

Chair:
Rich Garbarino, ABAG
Vice Chair:
Dean Chu, MTC
Members:
David Chiu, City and Co. San Francisco
Alice Fredericks, Marin County
Alice Lai-Bitker, BCDC
Jake Mackenzie, MTC
Cary Greene, SJC
Elisha Novak, FAA
James Spering, MTC
Carole Groom, BAAQMD
John Gioia, Contra Costa County
John Martin, SFO
Kristi McKenney, OAK
Leander Hauri, General Aviation
Sam Salmon, ABAG
Sean Randolph, BCDC
Terry Barrie, Caltrans
Tom Bates, BCDC
Mark Luce, ABAG
Roger Dickinson, Sacramento County
Carl Miller, Monterey County
Leroy Ornellas, San Joaquin County

Alternates:
G. Hardy Acree, Sacramento County
Susan Palmeri, San Joaquin County
Tom Greer, Monterey County
John Bergener, SFO

Staff liasions:

Lindy Lowe, BCDC
Joe LaClair, BCDC
Doug Kimsey, MTC
Marisa Cravens, ABAG

1. **Call to Order**

2. **Approval of Minutes of June 26, 2009 Meeting**

3. **Public Comment Period *(Each speaker is limited to three minutes)***

   The public is invited to speak on any item not on the agenda.

4. **Regional Airport System Planning Analysis (RASPA)**

   A. Schedule Update

   B. Baseline Runway Capacity Analysis
   A key element of the RASPA work currently underway is the analysis of future airport runway capacity and aircraft delays. The study consultants will present the results of the runway capacity analysis for Oakland, San Francisco, and San Jose Airports. The capacity analysis was conducted for the 2020 and 2035 planning years using the Base Case forecasts of aviation activity at each airport. The results will inform the analysis of alternative approaches to meeting future Bay Area aviation demand (David Hollander, SH&E).

   C. Target Analysis Approach to Evaluating Alternative Airport System Scenarios
   Staff will discuss the methodology that will be employed to assess various solutions to long-range aviation capacity issues, such as use of Alternative Airports, High Speed Rail, new Air Traffic Control Technologies, airport Demand Management strategies, etc. More and more, regional planning agencies are using performance-based analyses to determine how different solutions (scenarios) do in relation to a pre-defined set of targets or objectives. Proposed targets would be established for 2035 for such measures as acceptable levels of aircraft delay, Greenhouse Gas emissions, aircraft emissions affecting air quality, and airport noise exposure. (Doug Kimsey and Chris Brittle)

5. **General Aviation Airport Land Use Study**
   ABAG has completed an FAA-funded study to create a hypothetical cost scenario for purchasing land around GA airports in order to reduce noise and safety risks. This study has produced an inventory of undeveloped lands around the Bay Area's General Aviation airports. The FAA will describe and answer questions about their process for fee simple acquisitions and easements. (Marisa Cravens, Elisha Novak)

6. **Announcements and New Business**
   Next RAPC Meeting will be held on October 23, 2009

7. **Old Business**

8. **Adjournment**

All items on the agenda are subject to action by the Committee. Actions suggested by staff are subject to change by the Committee.

Speaker Sign-Up and Time Limits. The public is encouraged to comment on agenda items at Committee meetings by completing a request-to-speak card (available from staff) and passing it to the Committee secretary or chair. Public comment may be limited by any of the procedures set forth in Section 3.09 of MTC's Procedures Manual (Resolution No. 1058, Revised) if, in the chair's judgment, it is necessary to maintain the orderly flow of business.

Access to Meetings. Meeting facilities are accessible to persons with disabilities. If you require special assistance, please contact any staff member prior to the meeting. An interpreter for the deaf will also be made available upon request to the staff at least five days prior to the meeting.

Bagley-Keene Open Meeting Act. The Committee is governed by the Bagley-Keene Open Meeting Act which requires the Committee to: (1) publish an agenda at least ten days in advance of any meeting; (2) describe specifically in that agenda the items to be transacted or discussed; and (3) refuse to add an item subsequent to the published agenda. In addition to these general requirements, the Bagley-Keene Act includes other specific provisions about how meetings are to be announced and conducted.

Record of Meeting. RAPC meetings are tape-recorded. Copies of recordings are available at nominal charge, or recordings may be listened to at MTC offices by appointment. Audio casts are maintained on MTC's Web site for public review for at least one month.

Regional Airport Planning Committee
Draft Meeting Minutes

9:30 A.M. – Noon
Friday, June 26, 2009
MetroCenter Auditorium
101 8th Street
Oakland, CA 94607

1. **Call to Order**

   The regular meeting of the Regional Airport Planning Committee was called to order at 9:38 a.m.

2. **Roll Call**

   Vice Chair, Dean Chu
   David Chiu
   Alice Lai-Bitker
   Carole Groom
   John Gioia
   Kristi McKenney
   Sean Randolph
   Terry Barrie
   Mark Luce

3. **Approval of the meeting minutes of March 27, 2009**

   Vice Chair Chu ask for approval of the minutes.

   Kristi McKenney raised a correction to the spelling of her name. Correct spelling is McKenney.

   Consultant Christine Cassotis name was misspelled.

   In discussion of the Regional Survey in relation to the High Speed Rail, it was not Terry Barrie who raised the question but Cary Greene

   Minutes were approved as corrected.

4. **Public Comment**

5. **Progress on RASPA: Presentation by SH&E of 2035 Baseline Forecast and Capacity**

Dave Hollander, Vice President, SH&E and Beverly Jones, Vice President, SH&E called into the meeting from Boston to present the information on:

- A brief recap of information previously presented to RAFC
- Recent changes in airport shares
- Forecasts of aircraft operations

Vice Chair Chu raised a question about the last slide. It states that they are looking at the utilization of the runways without estimating what the airline decisions are about what type of aircraft. What has been the trend of adoption for the Airbus 380? Are there some assumptions as to the general adoption of that aircraft in this projection?

Mr. Hollander responded that they rely heavily on developing the fleet-mix assumptions based on work performed by the individual airports. SH&E received from SFO their projections of the future fleet-mix at their airport and it included the A-380 on some of the highest density long-haul international markets. They are not present at either Oakland or San Jose.

Committee Member Luce asked about the connection between the passengers and the airport related to access to the airport as they see the demands shifting, the degree to which that access will determine which airports will receive more activity.

Mr. Hollander said that they utilized ABAG demographic and socio-economic projections in estimating how domestic passengers would be geographically distributed across the region in 2035. Oakland International's closest airport share goes from 33% in 2006 to about 34% in 2035. San Jose's closest airport catchment area trip generation went from 27.3% to about 28.3% in 2035. However, while this information provided some context and perspective to the forecasts, the individual airport forecast shares of regional traffic were generally based on the historic and recent trends in the distribution of traffic and air services between the three primary airports, and expectations regarding how services and associated levels of passenger traffic were likely to distribute in the future. Mr. Hollander also said that the individual forecasts were "unconstrained" in that they did not consider the capacity of the three airports, and it was very possible that these unconstrained forecasts could push or exceed the capacity limits of individual airports, particularly SFO.

Committee Member Gioia commented that the projections for 2035 are 20-25 years out. Mr. Gioia asked if, when figuring those projections, they are considering the current configuration of the airline industry? How would the projections change, if any, if there were a greater consolidation of airlines or new low cost airlines?

Mr. Hollander stated that one of the factors is the presence of United Airlines substantial gateway at SFO. Because of SFO's status as a leading U.S. international gateway airport and its substantial base of local O&D demand, it was assumed that even if United were to fail at some point in the future, or suspend its gateway operations at SFO, that another major carrier or carriers would step in and re-establish comparable operations.

Mr. Gioia mentioned High Speed Rail and wondered if it was in the assumptions.

Mr. Hollander answered that HSR is not factored into the baseline forecasts. The future impacts of high speed rail will be addressed in subsequent phases of the study.

Mr. Gioia asked about projections made 25 years ago and the accuracy of those projections.

Chris Brittle noted that the 1970 Regional Airport Systems Study had forecasted that the Bay Area airports would serve over 80 million annual air passengers and that a fourth regional airport was needed. This level of activity still has not been reached at the three Bay Area airports, so there is definitely uncertainty in the forecasts. Our forecasts include a range of High, Medium, and Low to address this issue.

Committee Member Randolph asked if international traffic was broken down by market areas? Also he noted the small increase in international traffic in Oakland and San Jose mostly from Mexico and Canada. Is this primarily because of the historical routes and the regional demographics of their catchment areas?

Mr. .Hollander responded that the international traffic forecasts were developed by world region, and reflected different rates of growth for individual world regions (Asia, Europe, Mexico, Canada, Latin America, Australia/Oceania).

Mr. Randolph also asked if they projected whether most of the growth for SFO would be coming from Asian or European markets or elsewhere?

Mr. Hollander responded that Asian and Europe are the two leading regions for international traffic to and from the Bay Area and together account for approximately 70 percent of 2007 international traffic. Asia represents 43% of total 2007 international passengers from the Bay Area airports; Europe is 26%. Canada is 14%, Mexico is 10%, Australia is 5% of total Bay Area passengers and Latin America is just 2%. So even though other international regions may grow at faster percentage rates than Asia and Europe, these two world regions would continue to account for the majority of Bay Area international traffic over the forecast period.

Most of the international growth for Oakland and San Jose would be from Mexico and Canada. Basically, the forecasts assume that SFO will continue to be the primary, long-haul international gateway airport for the region, but that Oakland and San Jose will increase their presence in the Mexico market and gain new services to Canada, since these international markets are more similar to domestic services in terms of distance and typical aircraft types.

Committee Member Novak commented that the presentation implies that the distribution among the airports is based on geography. Mr. Novak asked if they've looked at other factors?

Mr. Hollander responded that the forecasts of individual airport shares of the region's future passengers reflected an examination of historic and recent trends across the three primary airports, and that changes in catchment area trip generation were presented for context but did not drive the forecasts of future airport shares. The forecasts assume that the significant levels of low cost carrier (LCC) services at SFO are likely to be there for the long-term; that the situation in 2006 when very little low cost carrier service was present at SFO was out of balance; and that although there was likely to be some shakeout of the intensely competitive situation at SFO, that the future airport forecasts do not anticipate a return to the airport shares that occurred in 2006 when there was minimal low cost carrier presence at SFO and the LCC services were heavily concentrated at OAK and SJC.

Mr. Novak commented that the presentation implies that the projections were made based on passengers in airport catchment areas.

Mr. Hollander replied that it was not his intention to imply this and the projections were not made based on closest airport catchment area population or trip generation.

Mr. Greene made the following comments, which did not require a response from Mr. Hollander:

1. He feels the forecast is too conservative related to the growth of San Jose and Oakland airports.
2. Catchment area slides show overlaps between Oakland and San Francisco, and Oakland and San Jose, but he did not see an overlap area between San Francisco and San Jose. Also the slides ignored demand from outside the 9 county region.
3. Growth in San Jose and Oakland airports should be re-examined to look at numbers in a better economy.

Vice Chair Chu asked if the forecast assumes a single air carrier runway at Oakland in the 2035 forecast.

Mr. Hollander confirmed.

Vice Chair Chu asked what is the estimated year that SFO would reach runway capacity?

Mr. Hollander responded that the capacity analysis is ongoing and would be presented to RAPC in a subsequent meeting.

Vice Chair Chu asked about the capacity of the runways at the San Jose Airport, per passenger.

Mr. Greene responded to this question that the airport can accommodate the long-term demand they are currently projecting.

Vice Chair Chu asked if they are investigating what the other two regional airports could handle if SFO does reach capacity.

Mr. Hollander responded that it is difficult to come up with a hard number, but that this was the subject of ongoing work.

Mr. Gioia asked how the numbers would differ if all of these airports were under one control? He feels the outcome would be different.

Mr. Hollander responded that single ownership does not guarantee the ability to distribute traffic exactly like the proprietor would like to see it done. He cited examples including the Port Authority of New York and New Jersey (that operates JFK, LaGuardia Newark as well as Stewart Airport and Teterboro), Los Angeles World Airports that operates LAX, Ontario, Palmdale and Van Nuys. The Port Authority would like to use Stewart as a reliever to the three primary New York area airports, and LAWA would like to develop commercial services at Palmdale and encourage growth at Ontario, yet in both these instances, it has been difficult to foster significant traffic growth at the secondary airports with available capacity.

Committee Member Luce asked if the Sacramento airport was factored into the consideration.

Mr. Hollander replied that Sacramento's growth was taken into consideration in analyzing historic trends and that Sacramento will be considered when evaluating future scenarios for accommodating regional demand.

Public comment

Member of the public, Francois Gallo asked: "In determining the future capacity needs for the region, was any consideration given to the needs and anticipated growth of air cargo?"

Mr. Hollander said that they had developed forecasts for air cargo and stated that all-cargo operations tend to be concentrated at different times of day than peak times for passenger services. Nevertheless, all-cargo activity and cargo that moves in the belly of passenger aircraft are both considered and reflected in the forecasts.

Mr. Gallo asked if that incorporated the ABAG study where the growth would be in the future.

Mr. Hollander said that the cargo forecasts were developed for each individual airport separately and did not specifically map the location of cargo demand in the region.

Mr. Brittle commented that staff will get final comments from airports and other interested parties and then finalize the Forecast Report.

6. **High Speed Rail Presentation**
   Vice Chair Chu commented that Mr. Leavitt was unable to join the Committee. The presentation will be made at the September meeting. Mr. Chu focused the Committees attention on the High Speed Rail map on the wall of the auditorium.

7. **Federal Airport Funding Reauthorization**
   Vice Chair Chu introduced Robin Hunt, District Manager, FAA San Francisco Airports
   Ms. Hunt updated the Committee on the current status of the Reauthorization legislation.

   Vice Chair Chu asked if the airports received any allocations for stimulus money?

   Ms. Hunt informed the Committee that airports received $1.1 Billion in stimulus money. 75% of the funds have been distributed in grants and 25% has been allocated.

   Vice Chair Chu asked how the FAA plans to fund the next generation Air Traffic Control system?

   Ms. Hunt commented that the future funding will probably be provided as before, from the trust fund. This will limit available funding.

8. **New Business**

   The next meeting of the Regional Airport Planning Committee will be held on September 25, 2009.

9. **Old Business**

10. **Adjournment**

    The meeting adjourned at 11:19 a.m.

Regional Airport Systems Plan Analysis Phase 2
Consultant Deliverables

Technical Memos	Due Date
Air Passenger Ground Origins Forecast	mid-October
Diversion of Passengers to HSR	late September
Methodologies for Analysis of Airport Noise, GHGs, and Air Quality	late-September
Description of Potential New ATC Technologies and Demand Management Strategies	late October
Effects of New ATC Technologies and Demand Management of Runway Capacity and Delay	mid-November
Effects of Using Alternative Airports and HSR on Runway Capacity and Delays	mid-November
Results of Airport Noise, GHG, and Air Quality Analysis	
Forecast Tracking System	late April, 2010
Runway Congestion Tracking System	late April, 2010

Main Reports	
Baseline Aviation Forecasts (Completed)	late August
Baseline Runway Capacity for OAK, SFO, SJC	mid-September
Detailed Definition of 6 Target Analysis Scenarios	late October
Aircraft Operations Forecasts for Target Analysis Scenarios	mid-December
Effects of 6 Target Analysis Scenarios on Runway Capacity and Delay	mid-December
Target Analysis Results for 6 Scenarios re. Delay, Noise, GHGs, and Air Quality	mid-January, 2010

REVISED September 2009
Regional Airport Systems Plan Analysis Phase 2 Meeting Schedule

September

Task Force: September 18

- **Alternative Airports Analysis**
- **Target Analysis Approach to Vision Document**
- **Discussion of Phase 2 Schedule Revisions**

RAPC: September 25

- Baseline Capacity Analysis
- Target Analysis Approach

October

Task Force: October 2, 2009

- **Institutional Arrangements Continued**
- **Baseline Runway Capacity Analysis Results**
- **Target Analysis Continued**

ATC Working Group: 10/14
Demand Management Working Group: 10/13

RAPC: 10/23/09

- Draft White Paper: Institutional Arrangements
- Alternative Airports Preliminary Analysis

November

Demand Management Working Group Meeting 11/12 (by phone)
Air Traffic Control Technology Working Group Meeting 11/13 (by phone

Task Force: November 6, 2009

- **Overview of Demand Management Strategies**
- **Overview of New Air Traffic Control Technologies**

RAPC: 11/20/09

- Presentation of Demand Management Strategies
- Presentation of New Air Traffic Control Technologies

December

Task Force: December 4, 2009

- **Discussion of Target Analysis Scenarios and impacts on Runway Capacity and Delay**

January 2010

RAPC: January 22, 2010

- Target Analysis Results Report
- Planning for Public Workshops

February 2010

Task Force: February 6, 2010

- **Target Analysis Report**
- **Planning for Public Workshops**

First Round of Public Workshops: **DATE TO BE DETERMINED**

March 2010

Task Force: March 5, 2010

- **Mid-point Screening Recommendations**
- **Summary of Public Workshops**

April 2010

Task Force: April 2, 2010

- **Forecast Tracking System**
- **Congestion Tracking System**

RAPC: April 23, 2010

- Report on Public Workshops
- Mid-point Screening Recommendations (Selection of 2 to 3 detailed scenario for further analysis in Phase 2)

SH&E
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BASELINE CAPACITY & DELAY ANALYSIS

Prepared for:

Regional Airport Planning Committee

ABAG
Association of Bay Area Governments

METROPOLITAN TRANSPORTATION COMMISSION

bcdc
Bay Conservation Development Commission

September 16, 2009

Passion. **Expertise. Results.**

Contents

1. Overview and Methodology
2. Oakland Analysis
3. San Francisco Analysis
4. San Jose Analysis
5. Conclusions
6. Appendix

The Baseline Capacity Analysis Answers Two Critical Study Questions

1. ***What are the capacity limits of the primary Bay Area airports?***
2. ***When are these limits likely to be reached?***

- **Capacity and Delay modeling was performed for OAK, SFO and SJC at several activity levels:**
  - 2007 (Actual)
  - 2020 and 2035 (Base Case Forecast)
- **The analysis considers all operations at each airport, including Commercial flights as well as General Aviation, since they may share the use of runways and are managed together by the FAA.**
- **The analysis focuses on runway capacity and delays. Only airspace issues within the immediate vicinity of the airport are addressed.**

All Assumptions and Parameters Were Developed With Input and Consultation from the FAA and Airport Personnel

FAA Personnel

- **OAK ATCT**
  - Ora King and Deborah Omowale
- **SFO ATCT**
  - Mark Sherry
- **SJC ATCT**
  - Mark DePlasco and John DeCuir
- **FAA NORCAL TRACON**
  - Mike Desrosiers and Jason Busch

Airport Personnel

- **OAK**
  - Wayne Bryant and Hugh Johnson
- **SFO**
  - Danielle Rinsler, John Bergener and Bert Ganoung
- **SJC**
  - Craig Simon

Capacities for Each Runway Configuration Were Calculated Using The FLAPS Simulation Model

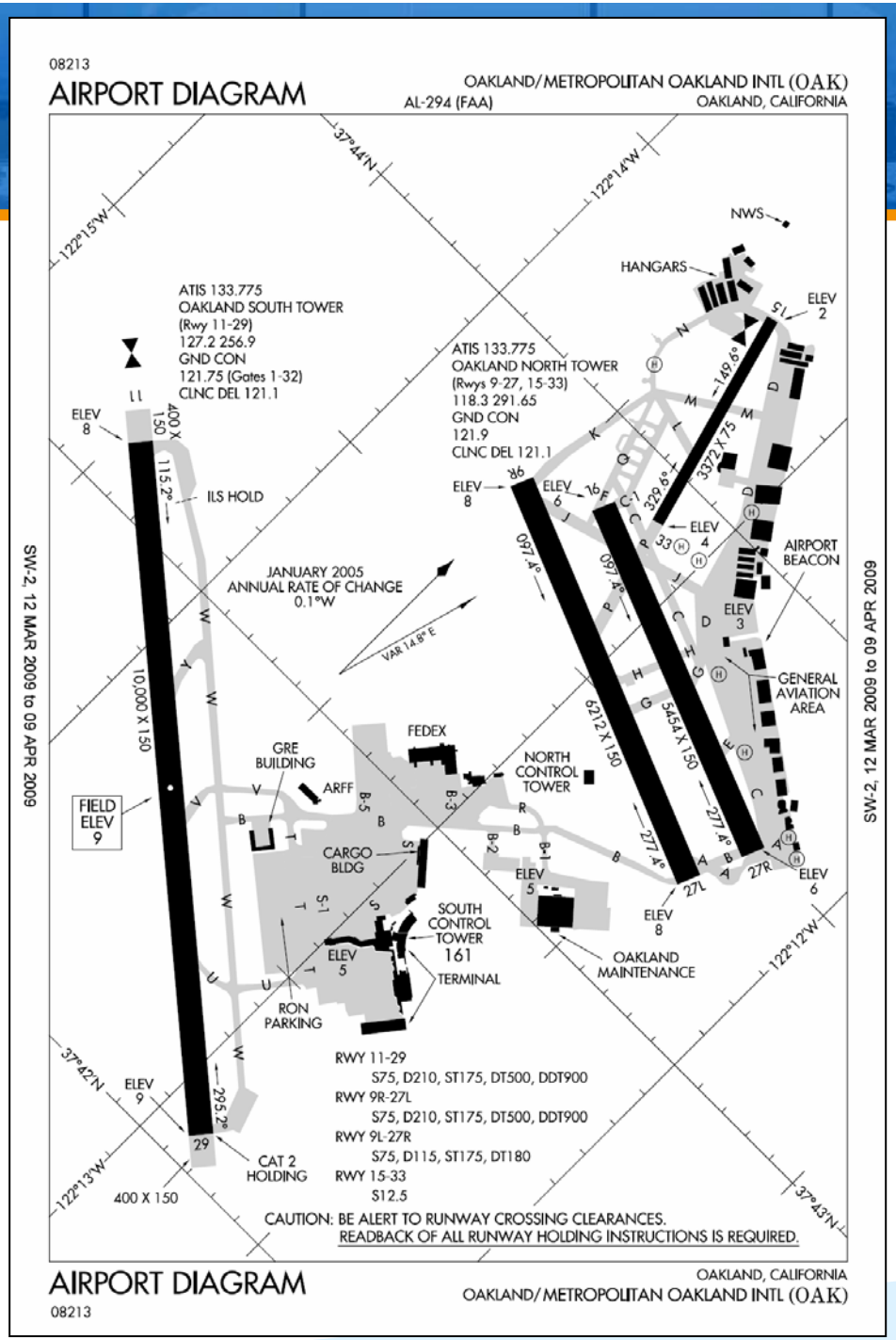
- **A configuration is defined as a set of active runways, runway assignments by aircraft class and appropriate weather conditions.**
- **The key input variables for the capacity calculation are:**
  - Fleet Mix: distribution of aircraft operations by type
  - Aircraft Characteristics: weight class, approach speed, braking performance, etc.
  - Airport Geometry: runway lengths, locations and intersections, and taxiway locations and exit speeds
  - Separation Standards: required clearance between arrivals and/or departures on one or more runways
  - ATC Procedures and runway assignment policies
- **The resulting configuration capacities, runway utilization and weather conditions serve as inputs to the delay modeling.**

The DELAYSIM Model was Used to Simulate Future Airport Operations and Estimate Delays

- **DELAYSIM simulates the selection of runways and the resulting aircraft delays at an airport using historic conditions and actual or forecast patterns of aircraft flight demand.**
- **Key inputs are:**
  - Historical Weather: 10 years of National Weather Service data (1998-2007)
  - Aircraft Demand: Base year and forecast aircraft operations by hour
  - Runway Configuration Capacities: Determined by FLAPS Model
- **On an hourly basis, DELAYSIM selects the "best" available runway configuration given weather, demand and runway availability. When demand exceeds available capacity, delays are calculated.**

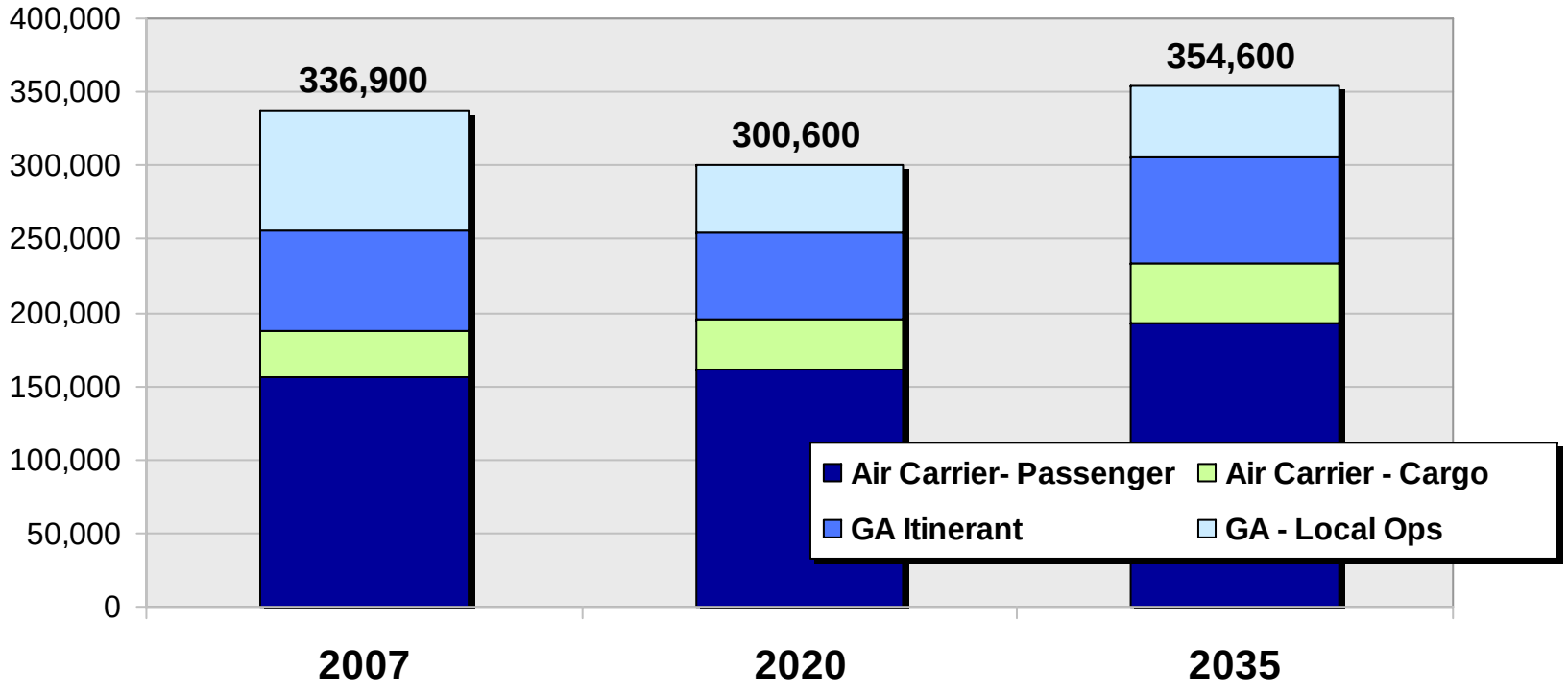
Oakland (OAK): Airfield Layout and Key Operating Factors

- **OAK is two airports in one.**
  - The North Field is primarily used by General Aviation and Air Taxi operators
  - The South Field is used by nearly all commercial carriers
- **OAK has a noise policy that discourages North Field jet departures to the west and jet arrivals from the west.**
- **The GA activity using the North Field has been a large part of OAK's activity. The forecast predicts a significant reduction in this activity from 2007 to 2020.**



OAK's Runway Demand is Forecast to Decline from 2007 to 2020, and Resume Growth Increasing to 355,000 Operations in 2035

Annual Aircraft Operations
Baseline 2007 and Base Case Forecast 2020 and 2035



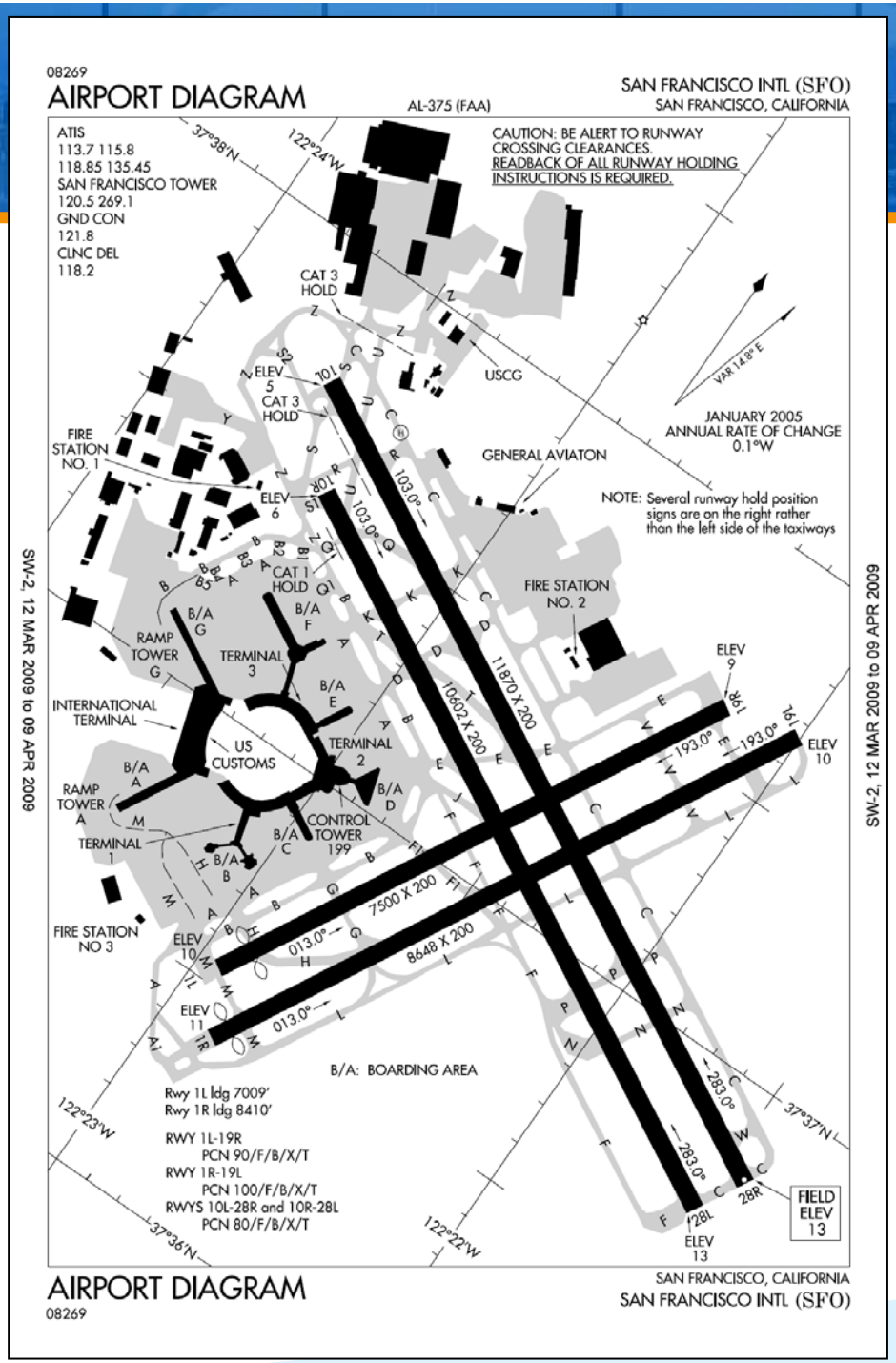
Note: Includes runway demand for both the North and South Fields. Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

- **OAK Capacity & Delay Results are Under Review**

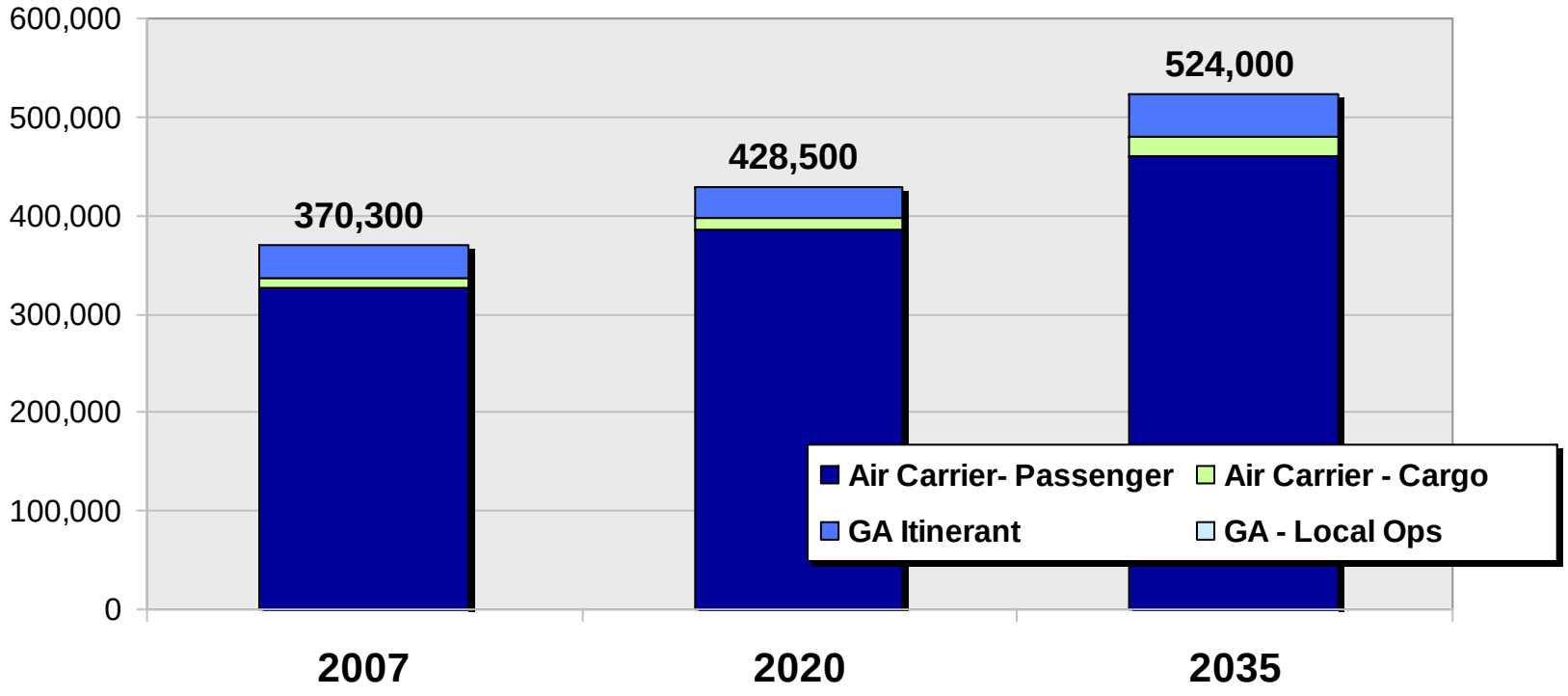
San Francisco (SFO): Airfield Layout and Key Operating Factors

- The preferred configuration is wingtip-to-wingtip arrivals to 28L & 28R with dual departures on 01L & 01R.
- SOIA approaches provide dual arrival runway capacity on 28L & 28R down to weather minimums of 2100 ft ceiling and 4 nm visibility.
- Capacity is substantially diminished during IFR and East flow conditions.



Runway Demand at SFO is Projected to Increase by 42% Over the Forecast Period

Annual Aircraft Operations
Baseline 2007 and Base Case Forecast 2020 and 2035



Note: Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

When operating in West Flow VFR Conditions, SFO Can Accommodate up to 100 Operations per Hour

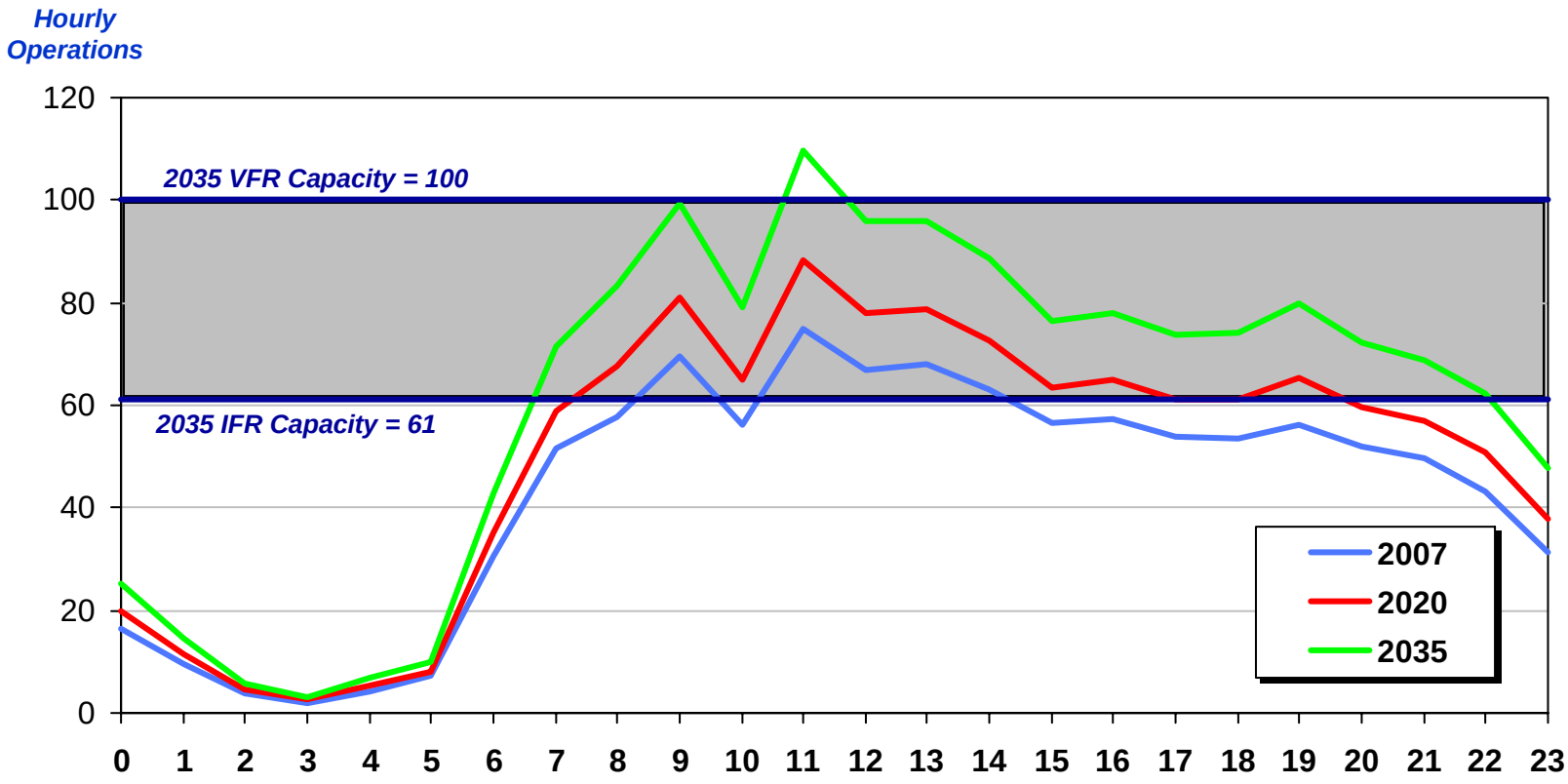
Modeled Capacities of Runway Configurations
Baseline 2007 and Base Case Forecast 2020 and 2035

				Runways				Capacity (ops/hr)		
Percent of 2007 Ops	Configuration ID	Flow	Weather	Jet Landings	Non-Jet Landings	Jet Take-offs	Non-jet Take-offs	2007	2020	2035
58.1%	D-01-VAPS-01	West	VFR	28L 28R	28L 28R	01L 01R	01L 01R	95	99	100
20.7%	D-01-MVFR-02	West	MVFR	28R	28R	28L	28L	81	81	83
9.8%	D-01-IFR-02	West	IFR	28R	28R	28L	28L	56	61	61
3.1%	D-01-MVFR-01	West	MVFR	28L 28R	28L 28R	01L 01R 28L 28R	01L 01R	87	90	93
2.8%	D-01-IFR-01	West	IFR	28R	28R	01L 01R 28L	01L 01R	56	62	62
1.7%	D-02-VFR-01	East	VFR	19L 19R	19L 19R	10L 10R	10L 10R	77	77	77
1.4%	D-01-SOIA-01	West	MVFR	28L 28R	28L 28R	01L 01R 28L 28R	01L 01R	75	81	81
1.1%	D-02-MVFR-02	East	MVFR	19L 19R	19L 19R	19L 19R	19L 19R	53	55	54
0.5%	D-01-SOIA-02	West	MVFR	28R	28R	28L	28L	75	80	81
0.4%	D-02-MVFR-01	East	MVFR	19L 19R	19L 19R	10L 10R	10L 10R	56	56	56
0.1%	D-01-IFR-04	West	IFR	28R	28R	28L	28L	40	40	40
0.1%	D-02-IFR-02	East	IFR	19L	19L	19L 19R	19L 19R	52	52	50
0.1%	D-01-IFR-03	West	IFR	28R	28R	28L	28L	45	45	45
0.1%	D-02-IFR-01	East	IFR	19L	19L	10L 10R	10L 10R	53	53	52

Note: The baseline capacity analysis does not assume any improvements to SOIA procedures.

Under the 2035 Forecast, Late Morning Demand Will Exceed SFO's Maximum VFR Capacity

Average Weekday Aircraft Operations by Hour
Baseline 2007 and Base Case Forecast 2020 and 2035

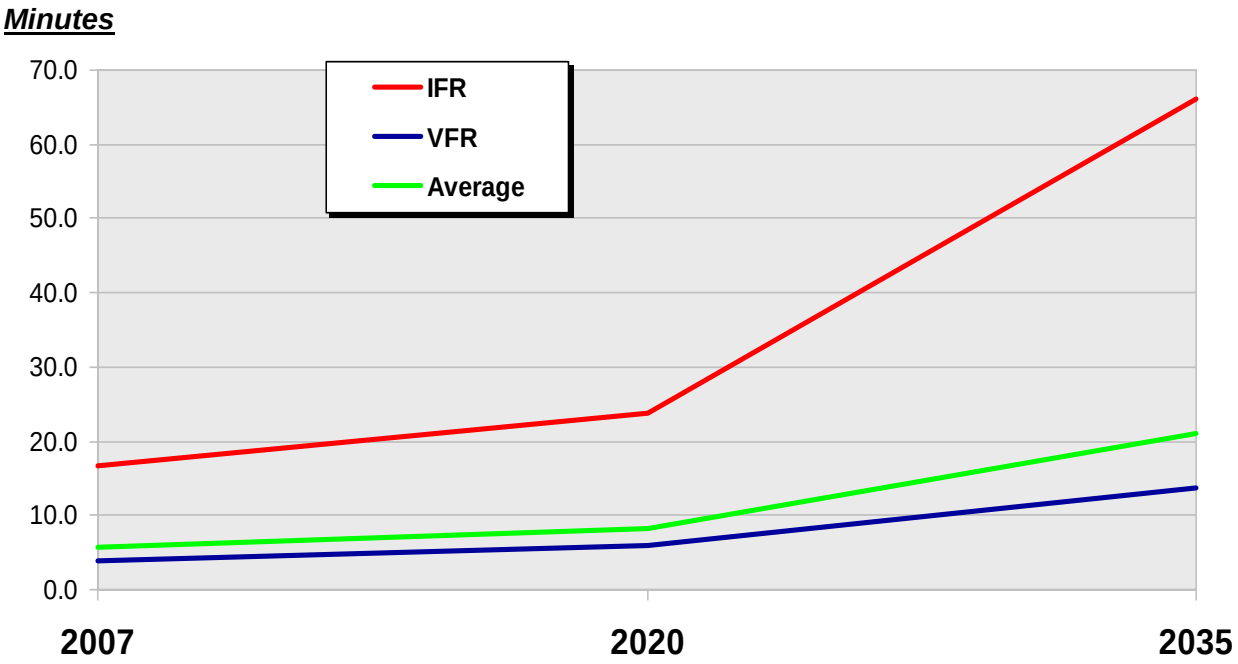


Notes: 2007 capacities = 95 VFR and 56 IFR; 2020 capacities = 99 VFR and 61 IFR

SFO's Good Weather (VFR) Delay Averages 13.8 Minutes in 2035

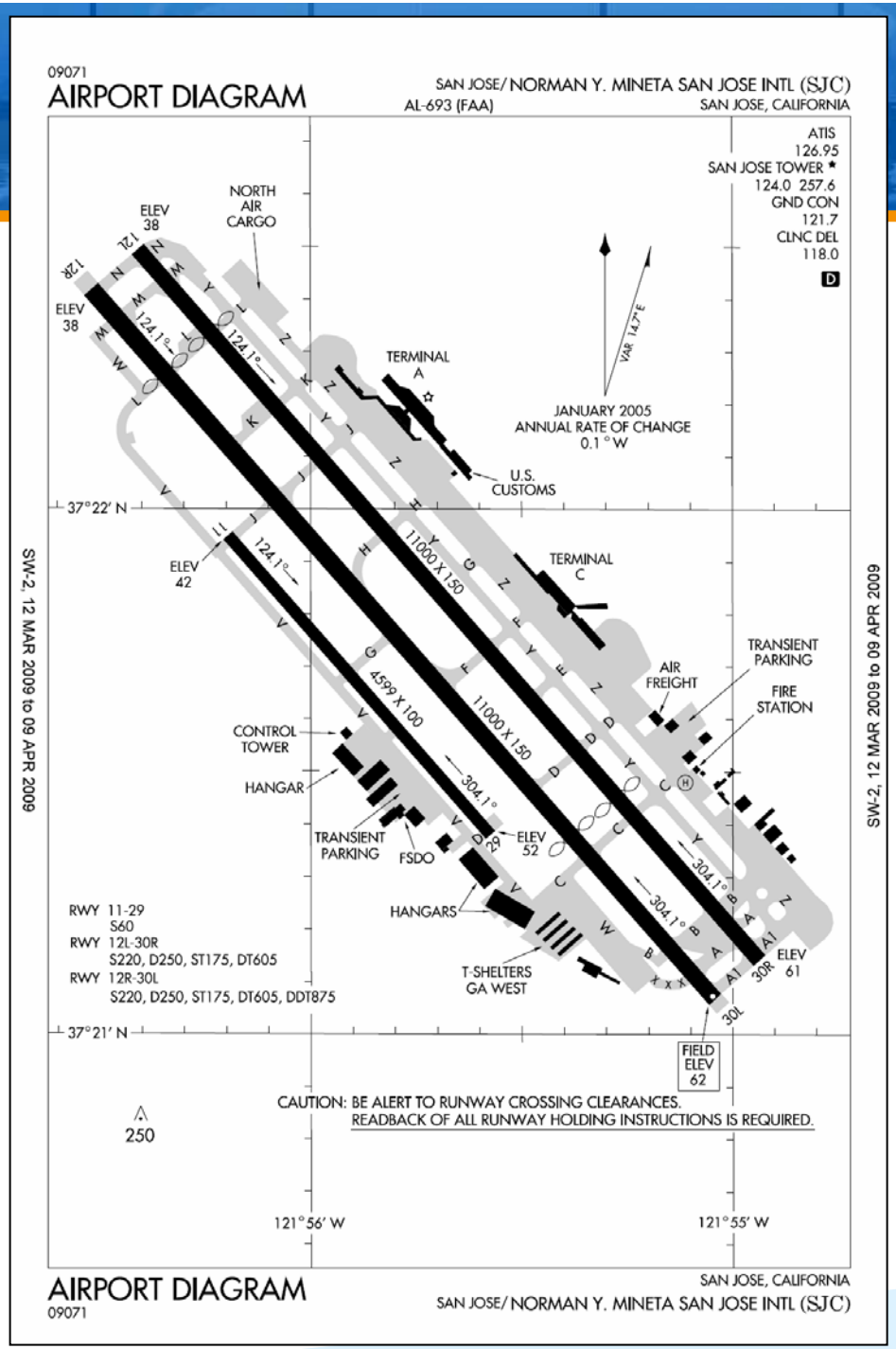
Average Minutes of Delays by Weather Condition
Baseline 2007 and Forecast 2020 and 2035

- **SFO operates under VFR more than 80% of the time**
- **SOIA is used less than 2% of the time (about 150 hours per year)**
- **IFR West flow conditions occur about 16% of the time**



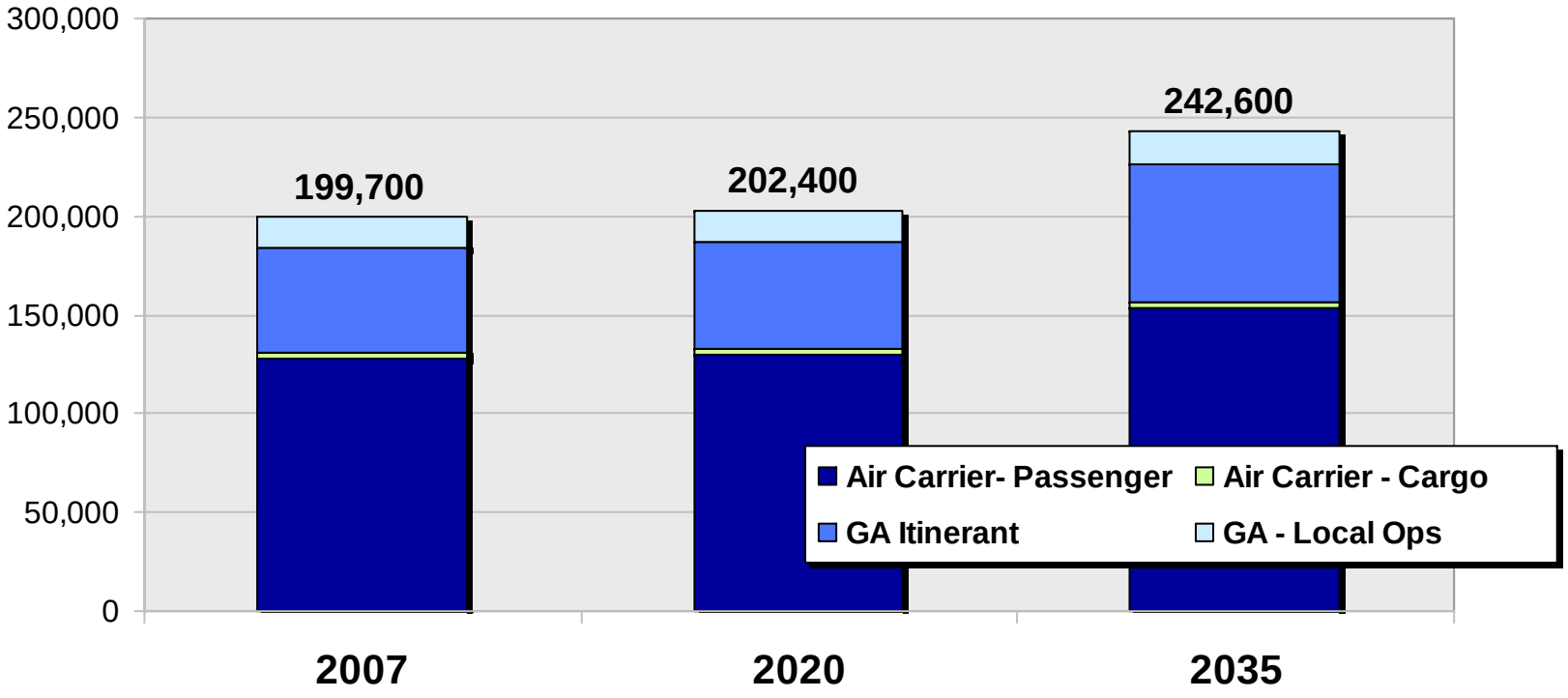
San Jose (SJC): Airfield Layout and Key Operating Factors

- Commercial jets arrive on 12R-30L and depart on 12L-30R
- All jet departures use runway 12L-30R
- Runway 11-29 on the south side of the airport is used almost exclusively by GA operators



SJC's Runway Demand is Forecast to Increase by 21% from 2007 to 2035

Annual Aircraft Operations
Baseline 2007 and Base Case Forecast 2020 and 2035



Note: Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

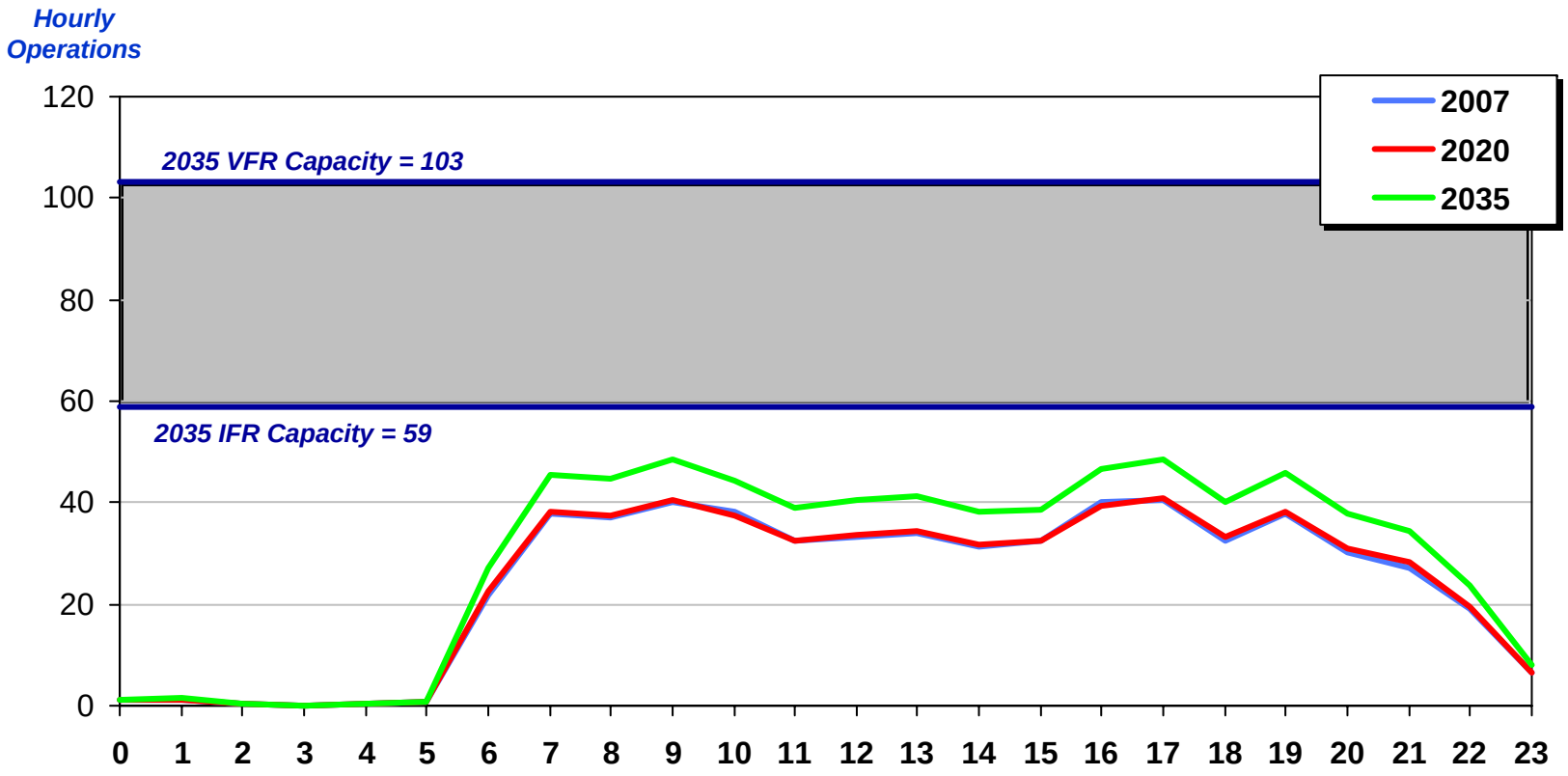
At SJC More than 80% of Operations are Conducted Under Optimal Weather (VFR) Conditions

Modeled Capacities of Runway Configurations
Baseline 2007 and Base Case Forecast 2020 and 2035

Percent of 2007 Ops	Configuration ID	Flow	Weather	Runways: Jet Landings	Runways: Non-Jet Landings	Runways: Jet Take-offs	Runways: Non-jet Take-offs	Capacity (ops/hr): 2007	Capacity (ops/hr): 2020	Capacity (ops/hr): 2035
80.8%	D-01-VAPS-01	West	VFR	29 30L	29 30L	30R	29 30R	92	98	103
12.0%	D-02-MVFR-01	East	MVFR	11 12R	11 12R	12L	11 12L	62	63	64
3.1%	D-02-VAPS-01	East	VFR	11 12R	11 12R	12L	11 12L	89	96	98
2.5%	D-01-MVFR-02	West	MVFR	29 30L	29 30L	30R	29 30R	62	63	65
1.3%	D-01-IFR-01	West	IFR	30L	30L	30R	29 30R	54	59	59
0.2%	D-02-IFR-01	East	IFR	12R	12R	12L	11 12L	53	58	58

Excess Capacity is Forecast for SJC, with Projected Demand Well Below Representative VFR and IFR Capacities in 2035

Average Weekday Aircraft Operations by Hour
Baseline 2007 and Base Case Forecast 2020 and 2035

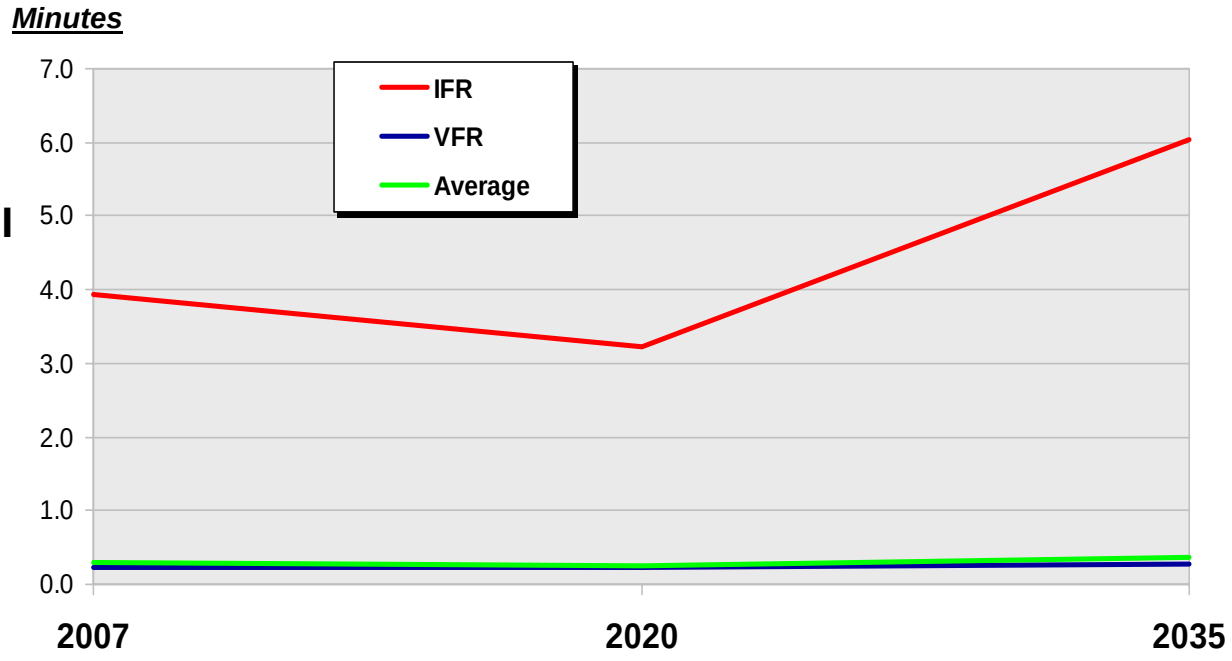


Notes: 2007 capacities = 92 VFR and 54 IFR; 2020 capacities = 98 VFR and 59 IFR

SJC's Average Delay is Less Than 1 Minute, While Average Delay in Poor Operating Conditions is 6 Minutes in 2035

Average Minutes of Delays by Major Operating Conditions
Baseline 2007 and Forecast 2020 and 2035

- **SJC operates under VFR 97% of the time**
- **SJC has no Cat II or Cat III ILS approach**

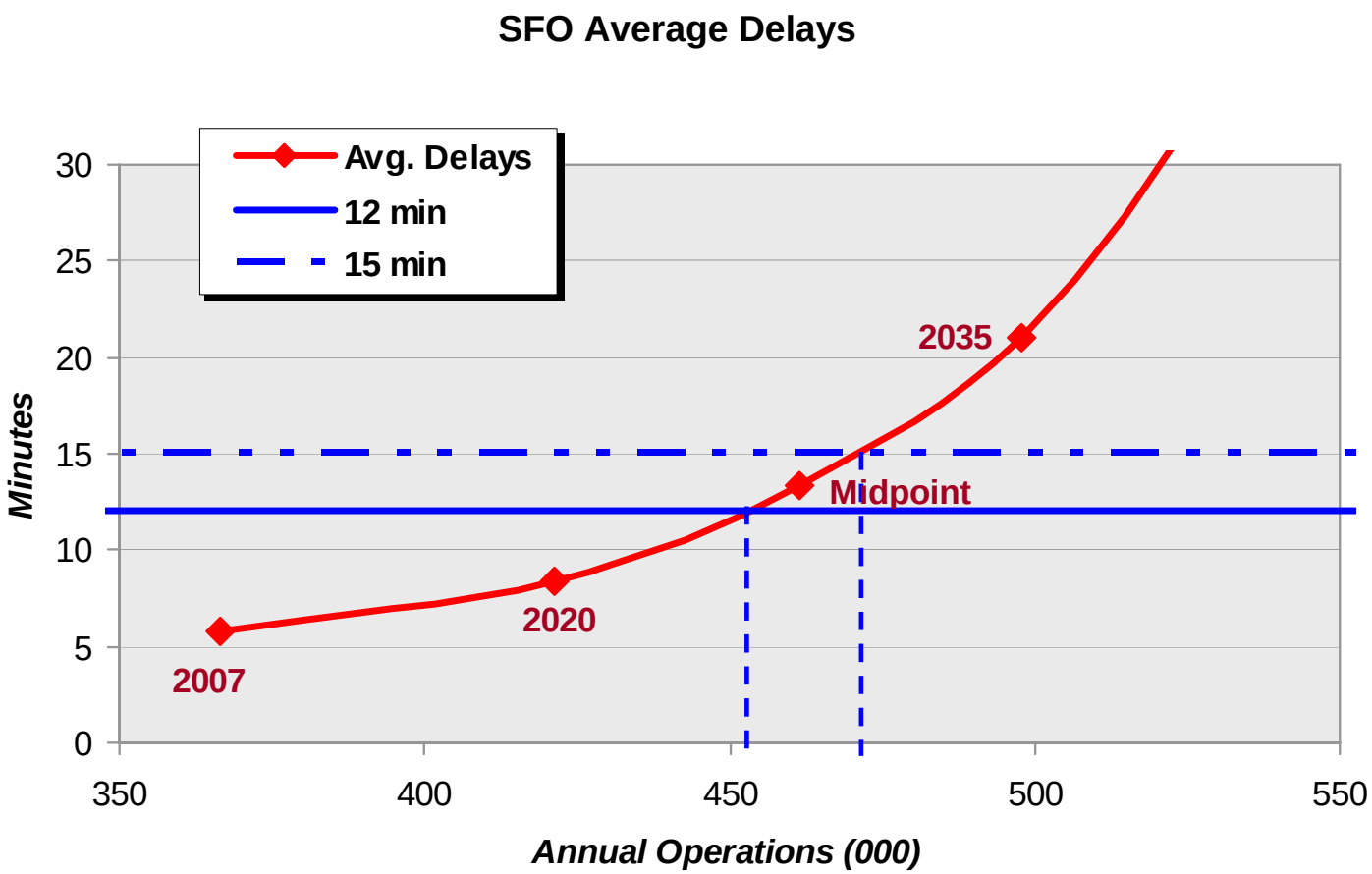


Delay Thresholds Used to Estimate Airfield Capacity

- **Airfield capacity & delays vary by hour of the year, weather conditions and demand.**
- **Average aircraft delay is a common metric for defining annual airfield capacity.**
  - An average delay of 15 minutes per aircraft is commonly accepted as a serious delay condition.
- **For this study, the airfield is projected to reach capacity when average annual delays range from 12 to 15 minutes.**
- **Because neither OAK or SJC is forecast to reach capacity by 2035 (under Base Case assumptions), the 2035 operations forecasts were scaled up to determine the operations level at which each airport would reach capacity.**

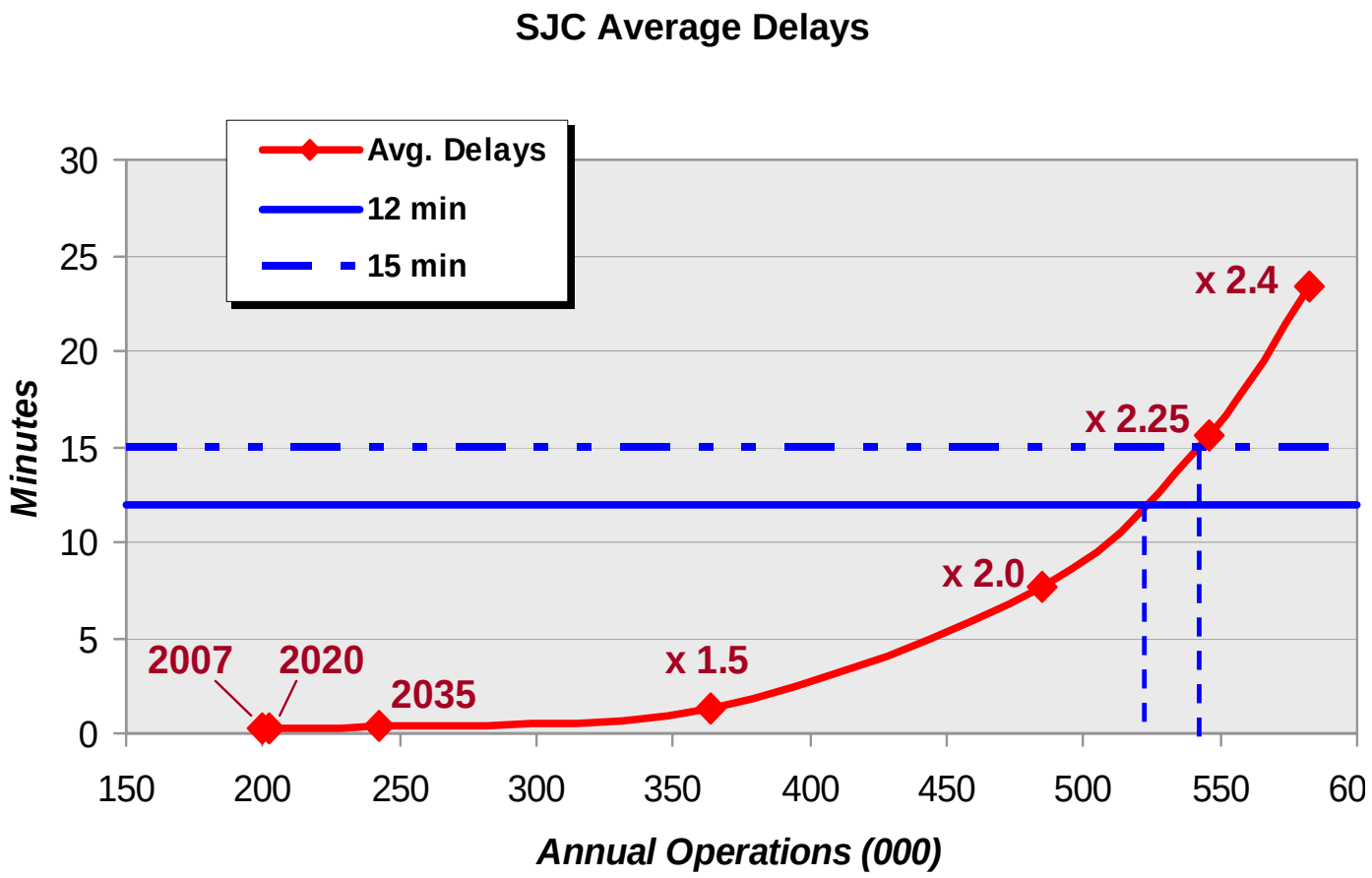
- **OAK Capacity Under Review**

SFO is Forecast to Reach Airfield Capacity at 455,000 to 470,000 Operations



Notes: "Midpoint" = the average of 2020 and 2035 operations

Even at Double the 2035 Demand Level, SJC Would Still Not reach its Full Capacity

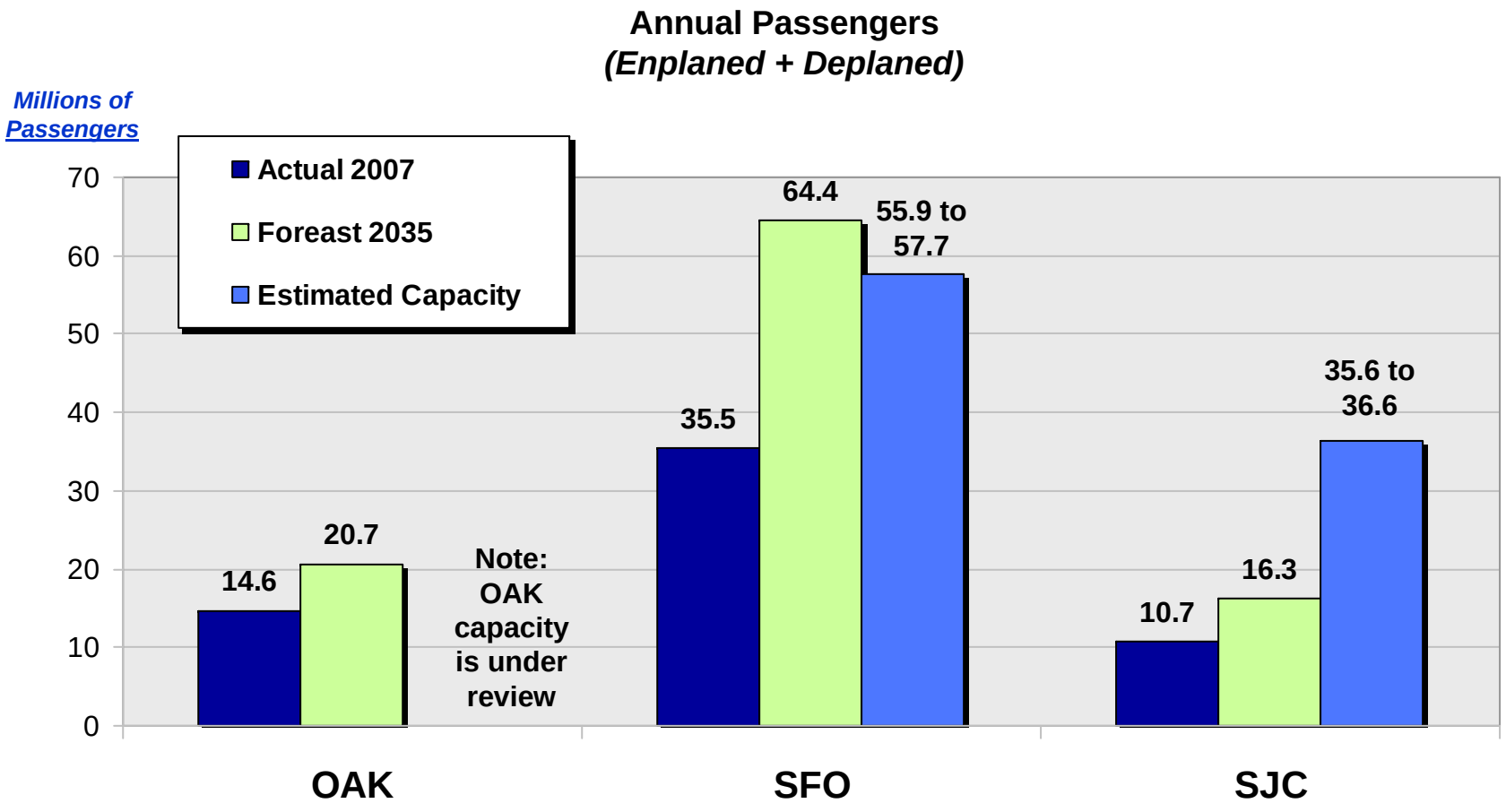


SJC has the Capacity to Accommodate Over 500,000 Operations

Notes: Capacities are for all three runways serving commercial air carrier and general aviation users.

"x1.5" = 1.5 times 2035 operations; "x2.0" = 2.0 times 2035 operations; etc.

Based on the Unconstrained Passenger Forecast, SFO Will Significantly Exceed Airfield Capacity in 2035, While SJC will Have Unused Capacity



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Appendix

Passion. **Expertise. Results.**

Base Case Forecast Aircraft Operations at Primary Bay Area Airports

Category	Oakland			San Francisco			San Jose		
	2007	2020	2035	2007	2020	2035	2007	2020	2035
Air Carrier Passenger	155,900	161,100	192,600	326,200	384,600	461,200	127,800	129,500	153,000
All-Cargo	32,200	34,300	40,500	9,800	12,000	19,000	3,000	3,200	3,700
Subtotal Air Carrier	188,100	195,400	233,100	336,000	396,600	480,200	130,800	132,700	156,700
GA - Jets	18,600	23,300	33,200	27,800	27,600	39,300	28,600	31,100	44,300
GA - Nonjets	48,900	35,900	38,700	6,400	4,300	4,500	24,600	23,100	24,900
Total GA (Itinerant)	67,500	59,200	71,900	34,200	31,900	43,800	53,200	54,200	69,200
Subtotal Above	**255,600**	**254,600**	**305,000**	**370,200**	**428,500**	**524,000**	**184,000**	**186,900**	**225,900**
Military (total)	400	400	400	2,700	2,700	2,700	100	100	100
GA - Local Ops	81,300	46,000	49,600	100	-	-	15,700	15,500	16,700
Subtotal Local & Military	81,700	46,400	50,000	2,800	2,700	2,700	15,800	15,600	16,800
Total All Operations	**337,300**	**301,000**	**355,000**	**373,000**	**431,200**	**526,700**	**199,800**	**202,500**	**242,700**

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Large and Heavy Weight Aircraft are forecast to Account for an Increasing Share of OAK's Aircraft Demand

Annual Operations by Aircraft Weight Class and Type
Baseline 2007 and Base Case Forecast 2020 and 2035

Weight Class	Type	Percent of Annual Operations 2007	2020	2035
Small	Jet	3.0%	3.9%	4.2%
	Non-Jet	40.1%	28.9%	26.6%
	Subtotal	**43.1%**	**32.8%**	**30.8%**
Large	Turboprop	1.9%	2.4%	2.3%
	Jet	43.1%	49.3%	51.5%
	Regional Jet	6.0%	7.0%	8.3%
	Subtotal	**51.0%**	**58.7%**	**62.0%**
Boeing 757	**Jet**	**0.8%**	**1.7%**	**0.3%**
Heavy	**Jet**	**5.1%**	**6.9%**	**6.9%**
Total		100.0%	100.0%	100.0%

Notes: Small = <44,000 lbs; Large = >44,000 lbs and < 300,000 lbs; Heavy = > 300,000 lbs

Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

The Future Fleet Mix at SFO Reflects its Role as an International Gateway with Large and Heavy Jets Accounting for an Increasing Share of Aircraft Operations

Annual Operations by Aircraft Weight Class and Type
Baseline 2007 and Base Case Forecast 2020 and 2035

Weight Class	Type	Percent of Annual Operations 2007	2020	2035
Small	Jet	3.0%	2.3%	2.2%
	Non-Jet	1.7%	1.0%	0.8%
	Subtotal	**4.8%**	**3.2%**	**3.1%**
Large	Turboprop	13.4%	7.9%	3.8%
	Jet	38.2%	46.3%	57.5%
	Regional Jet	16.7%	14.3%	13.2%
	Subtotal	**68.2%**	**68.4%**	**74.5%**
Boeing 757	**Jet**	**11.6%**	**9.4%**	**0.0%**
Heavy	**Jet**	**15.4%**	**18.9%**	**22.4%**
Total		100.0%	100.0%	100.0%

Notes: Small = <44,000 lbs; Large = >44,000 lbs and < 300,000 lbs; Heavy = > 300,000 lbs

Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

Over the Forecast Period, Large Jets Become More Prevalent at SJC, Increasing from 47% to 56% of Aircraft Activity

Annual Operations by Aircraft Weight Class and Type
Baseline 2007 and Base Case Forecast 2020 and 2035

Weight Class	Type	Percent of Annual Operations 2007	2020	2035
Small	Jet	6.6%	6.1%	6.4%
	Non-Jet	19.3%	16.4%	14.7%
	Subtotal	**25.9%**	**22.5%**	**21.1%**
Large	Turboprop	3.4%	2.7%	2.4%
	Jet	46.9%	50.1%	56.1%
	Regional Jet	20.5%	16.4%	18.8%
	Subtotal	**70.8%**	**69.3%**	**77.4%**
Boeing 757	**Jet**	**1.8%**	**7.1%**	**0.4%**
Heavy	**Jet**	**1.5%**	**1.1%**	**1.1%**
Total		100.0%	100.0%	100.0%

Notes: Small = <44,000 lbs; Large = >44,000 lbs and < 300,000 lbs; Heavy = > 300,000 lbs

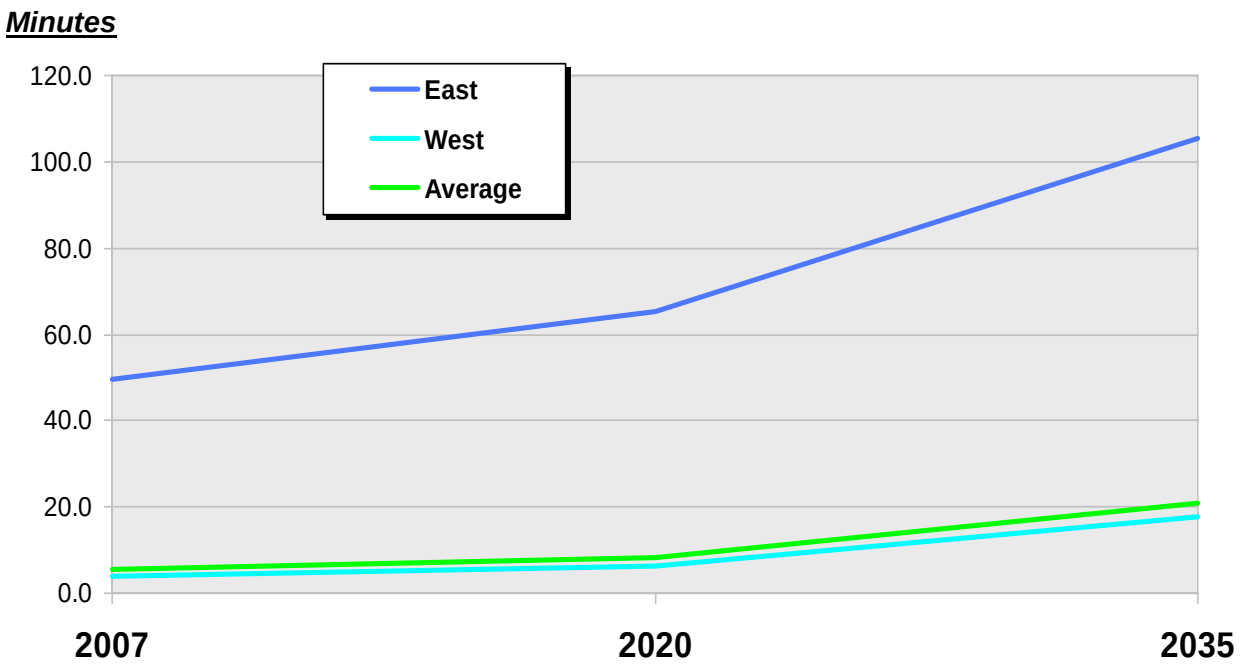
Excludes military operations.

Source: Regional Airport System Plan Update – Baseline Aviation Activity Forecasts for the Primary Bay Area Airports, August 27, 2009

In 2035, Average Delay at SFO Reaches 21 Minutes, and Average East Flow Delay Exceeds 100 Minutes

Average Minutes of Delays by Major Operating Conditions
Baseline 2007 and Forecast 2020 and 2035

- **SFO operates to the West 93% of the time**
- **East flow VFR capacities are generally much lower than West flow**
- **East flow generally occurs during stormy winter weather**

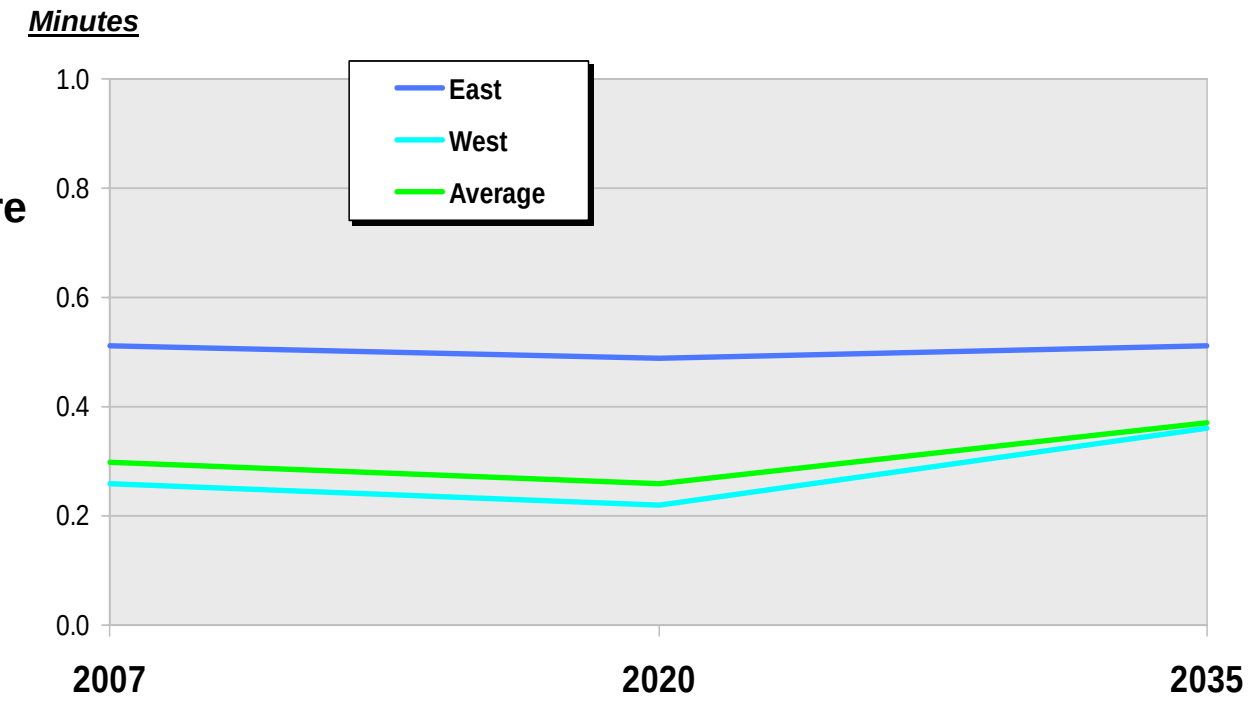


Note: 2007 capacities = 95 VFR and 56 IFR; 2020 capacities = 99 VFR and 61 IFR

SJC's Average Delay is at less than One Minute in East and West Flows

Average Minutes of Delays by Major Operating Conditions
Baseline 2007 and Forecast 2020 and 2035

- **SJC operates to the West 93% of the time**
- **SJC East flow capacities are equal to or greater than West flow for some configurations**
- **Adjustments have been made to Delaysim analysis to prefer West flow when winds are light**



METROPOLITAN TRANSPORTATION COMMISSION

bcdc SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Regional Airport Planning Committee

To: Regional Airport Planning Committee September 25, 2009
From: RAPC staff
Subject: Target Analysis Approach

Background. The objective of our current study is to analyze a range of approaches to addressing Bay Area airport capacity issues while avoiding constructing new runways in the Bay. The consultant's runway capacity analysis shows that at least one airport, San Francisco International, is forecast to face significant capacity issues prior to 2035. The purpose of this memo is to discuss the framework that RAPC staff will be using to identify the most promising strategies for addressing the region's long-range capacity issues.

Many planning organizations, including the Metropolitan Transportation Commission (MTC), have begun to use performance-based analysis as way to measure how well various transportation investments will perform against a set of pre-defined operational, environmental, and equity goals for the transportation system. These goals are very useful when made explicit and when they represent outcomes that the public would like to see from future transportation investments in the region. MTC's latest Regional Transportation Plan began with a visioning process to define a set of goals or targets. A target analysis was then conducted to analyze how different combinations of transportation modal investments, land use changes, and pricing approaches stacked up against these targets. Some of the targets were quite ambitious, and the analysis demonstrated that investments in new transportation facilities and services alone would not be sufficient to meet the targets. Nevertheless, the analysis showed where further work was necessary and the need to develop greater regional consensus around some of the more difficult actions that would be required to achieve the targets.

Similarly, RAPC staff will be using a set of proposed performance measures to determine how well various aviation strategies perform in meeting certain operational and environmental objectives for the Bay Area's regional airport system.

The target analysis approach is discussed below, along with some preliminary suggestions about how to define the targets for the upcoming analysis.

Phase 2 Scenarios. As outlined in the adopted Work Scope for the study, potential approaches for addressing the region's long-range airport capacity problems are discussed in terms of various scenarios. Each scenario will be analyzed relative to the trend line, which is how we expect the airport system to perform under our Base Case forecasts for airport activity levels in 2035. The six Scenarios that will be analyzed are:

Scenario 1. This scenario is based on a redistribution of airline service among the three major airports to take advantage of unused runway capacity at less congested airports.

Scenario 2. This scenario assumes some air passenger and air cargo demand will be served at alternate airports (e.g., Travis AFB, Moffett Federal Airfield, smaller general aviation airports, and out of region airports such as Sacramento International, Stockton, and Monterey)

Scenario 3. This scenario shifts all business jet operations from the air carrier runways to Reliever General Aviation Airports around the region.

Scenario 4. This scenario assumes construction of a new California High Speed Rail (HSR) system which diverts some air passengers to rail.

Scenario 5. This scenario assumes implementation of new Air Traffic Control (ATC) Technologies to improve runway and airspace capacity in good and bad weather.

Scenario 6. This scenario assumes airports adopt Demand Management strategies to better balance airline flights with available runway capacity

While these distinct scenarios serve us well for the initial analysis, our overall approach will be to combine elements of the various scenarios after receiving public input from the first round of public meetings to be held in February 2010. This will unable us to focus the remainder of the work on 2-3 main scenarios around which could have the greatest regional consensus.

Proposed Performance Measures. The target analysis will look at performance measures that reflect how efficiently the airport system is operating, as well as the impact of aviation activity on the environment. The proposed performance measures are:

Average Aircraft Delay. The average delay aircraft experience over a year under all weather conditions. Average delay reflects how efficiently airport runways are serving demand.

Greenhouse Gas Emissions. Average daily tons of CO2 generated by aircraft takeoffs and landings. CO2 is the primary Greenhouse Gas produced by aircraft activity.

Aircraft Emissions. Average daily tons of Nitrogen Oxide (NOx) and Hydrocarbons (HC) produced by aircraft takeoff and landings. NOx and HC are the chief pollutants that contribute to smog, and HC is correlated with various species of toxic air contaminants.

Airport Noise. The number of people exposed to noise levels of 65 CNEL (Community Noise Equivalent Level), or greater, a level used to define when an airport has a noise "problem" under state legislation.

More detailed information on each performance measure and how it is calculated is provided in Attachment A.

Potential Targets. For each performance measure a target needs to be defined for 2035. This target is the desired outcome or objective for the regional airport system. The technical analyses of the individual performance measures will determine how the various Scenarios stack up against the targets. Staff's preliminary thoughts on establishing targets for 2035 are discussed below.

Average Aircraft Delay. The proposed target for annual average aircraft delay at an airport would be 12 minutes and reflects the relative proportion of good and bad weather operations. An average annual delay of 15 minutes per aircraft operation is typically considered a serious delay condition, so the regional target is somewhat more ambitious. Basically, average delays above this level mean that the system is performing poorly with more and more flight delays and some flight cancellations.

Greenhouse Gas Emissions. The proposed target for this performance measure is a 40% decrease in aircraft generated CO2 below 1990 levels. The target is based on AB 32 (Global Warming Solutions Act, 2006), and earlier estimates of GHG reductions needed to stabilize climate change by 2050.

Aircraft Emissions. The proposed target for this measure would be no increase in NOx and HC emissions above 2007 levels. This target is similar to CEQA law which generally defines a significant adverse impact as one whose impact is greater than current conditions.

Airport Noise. The proposed target for this performance measure would be no increase in regional population exposed to 65 CNEL or greater in 2035 compared to 2007 levels. The rationale is similar to that for Aircraft Emissions above.

How will Different Scenarios Affect Performance Measures. Compared to the trend line, some scenarios will produce changes in the total number of aircraft operations at the various airports, some will result in changes in the types of aircraft serving the various Bay Area airports, and others would affect the timing of aircraft flights. Other scenarios will involve changes in runway and airspace capacity during different weather conditions. All of these changes will have some effect on the performance targets depending on the direction and magnitude of the change. Attachment B provides a summary overview of how the various scenarios may affect the performance targets.

RAPC Input and Next Steps.

The proposed targets need input from RAPC and the public. Staff is currently seeking input to determine that the right targets are included and appropriately defined and that there are adequate mechanisms to measure the impacts of the scenarios on the targets.

Attachment A

Summary of Performance Measures

1. Aircraft Delay
2007: Current aircraft operations and levels of delay
2035: Trend line-Base Case aircraft operations forecast and associated delays

Metric: Average delay per aircraft operation at each airport, reflecting operations in good and bad weather

2035 Target: 12 minutes average annual delay per aircraft operation

Approach: Uses a combination of consultant models: FLAPS defines an airport's runway capacity under different weather conditions and runway use configurations;DELAYSIM adds in demand (aircraft operations) to calculate delays

Product: Charts and tables showing results for various Scenarios in 2035

2. Greenhouse Gas Emissions
2007: CO2 from current aircraft operations at commercial airports
2035: Trend line would reflect CO2 from increased aircraft operations plus a more fuel efficient airline fleet

Metric: Average daily tons of CO2 from aircraft takeoffs and landings

2035 Target: 40% less aircraft CO2 than in 1990 (consistent with California Assembly Bill 32 target for CO2 reductions by 2035)

Approach: Use a combination of FAA EDMS database and Air District inventory models to calculate CO2 from aircraft operations; CO2 will be calculated for aircraft landings and takeoffs below 3,000 feet (the mixing level; see Aircraft Emissions below).

Product: Charts and tables showing results for various Scenarios in 2035

3. Aircraft Emissions
2007: NOx and HC emissions from current aircraft operations at commercial airports
2035: Trend line-Base Case aircraft operations forecast for 2035 which would reflect improvements in aircraft engine fuels and technology

Metric: Average daily tons of NOx and HC from aircraft takeoffs and landings

2035 Target: No increase in NOx or HC in 2035

Approach: Use a combination of FAA EDMS database and Air District inventory models to calculate NOx and HC emissions from aircraft operations; emissions will be calculated for aircraft landings and takeoffs below 3,000 feet, the mixing level.

Product: Charts and tables showing results for various Scenarios in 2035

4. Airport Noise
2007: Current population within 65 CNEL contour for main commercial airports
2035: Trend-Base Case aircraft operations forecast for 2035; would reflect any changes in aircraft noise from improved engine technologies

Metric: Population exposed to 65 CNEL or greater around three main airports; also would include noise impacts around Alternative Airports and Reliever Airports (methodology for these airports to be determined)

2035 Target: No increase in population within 65 CNEL noise contour in 2035

Product: Charts and tables showing results for various Scenarios in 2035

Attachment B

General Effects of Different Scenarios on Performance Measures

Scenario	Delay	GHGs	Airport Noise	Aircraft Emissions
1. Traffic Redistribution	Will reduce delays at SFO and regionally	Changes in aircraft ops/ fleet mix at each airport	Population exposure will change at each airport	Changes in aircraft ops/ fleet mix at each airport
2. Use of Alternate Airports	Fewer operations at 3 main airports	Changes in overall aircraft operations and fleet mix also delay effects	Less noise at 3 main airports; new noise at Alt. Airports	Changes in overall aircraft operations and fleet mix
3. Reliever Airports for GA Business Jets	Fewer small aircraft operations at 3 main airports	Reduces delays and fuel consumption at 3 main airports	Minimal reduction at 3 main airports; new noise at Relievers	Reduces delays and emissions at 3 main airports
4. HSR	Fewer operations at SFO and SJC	Fewer aircraft operations; less delay and fuel consumption	Fewer aircraft operations at SFO and SJC airports	Fewer total aircraft operations
5. New ATC Technology	Improved capacity, reduced delays	Reduced delays and fuel consumption	Potential benefits from new flight paths	Less delay and aircraft emissions
6. Demand Management	Potentially fewer aircraft operations; less congestion in peaks	Potentially fewer aircraft operations; less delay and fuel consumption	Limited impact	Potentially fewer aircraft operations; less delay and emissions

General Aviation Land Use Inventory

Presentation to RAPC

September 25, 2009

Marisa Cravens, ABAG

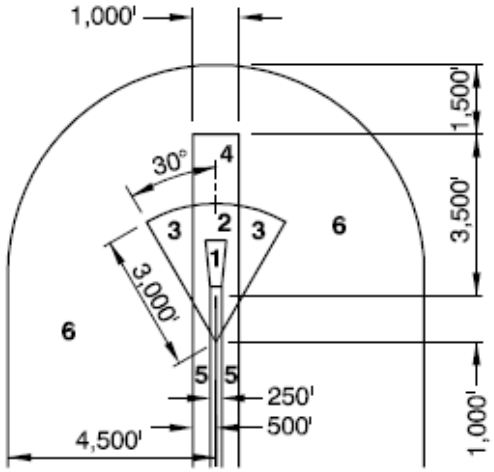
General Aviation Land Use: Purpose of the Study

1. Create an Inventory of Vacant Land around General Aviation Airports
2. Calculate protection costs for minimizing risk exposure

Airports Consulted

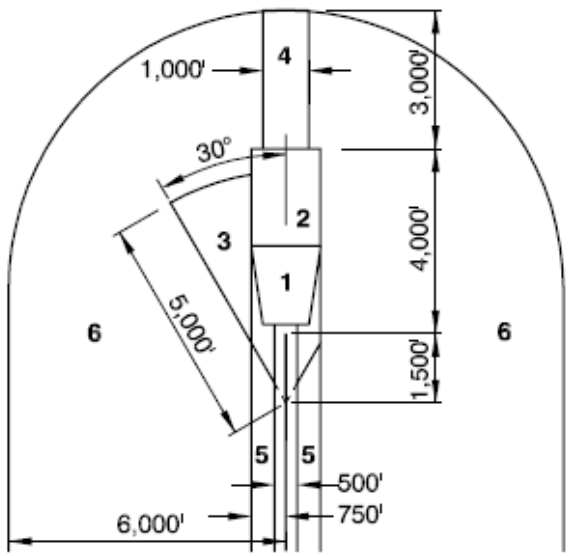
- Buchanan Field
- Byron
- Charles M. Schultz - Sonoma County Airport
- Cloverdale
- Gnoss Field
- Half Moon Bay
- Hayward Executive
- Healdsburg
- Livermore Municipal
- Napa County
- Nut Tree
- Palo Alto
- Petaluma
- Reid-Hillview
- Rio Vista Municipal
- San Carlos
- South County

Safety Zones



Example 1:
Short General Aviation Runway

Assumptions:
- Length less than 4,000 feet
- Approach visibility minimums ≥ 1 mile or visual approach only
- Zone 1 = 250' x 450' x 1,000'

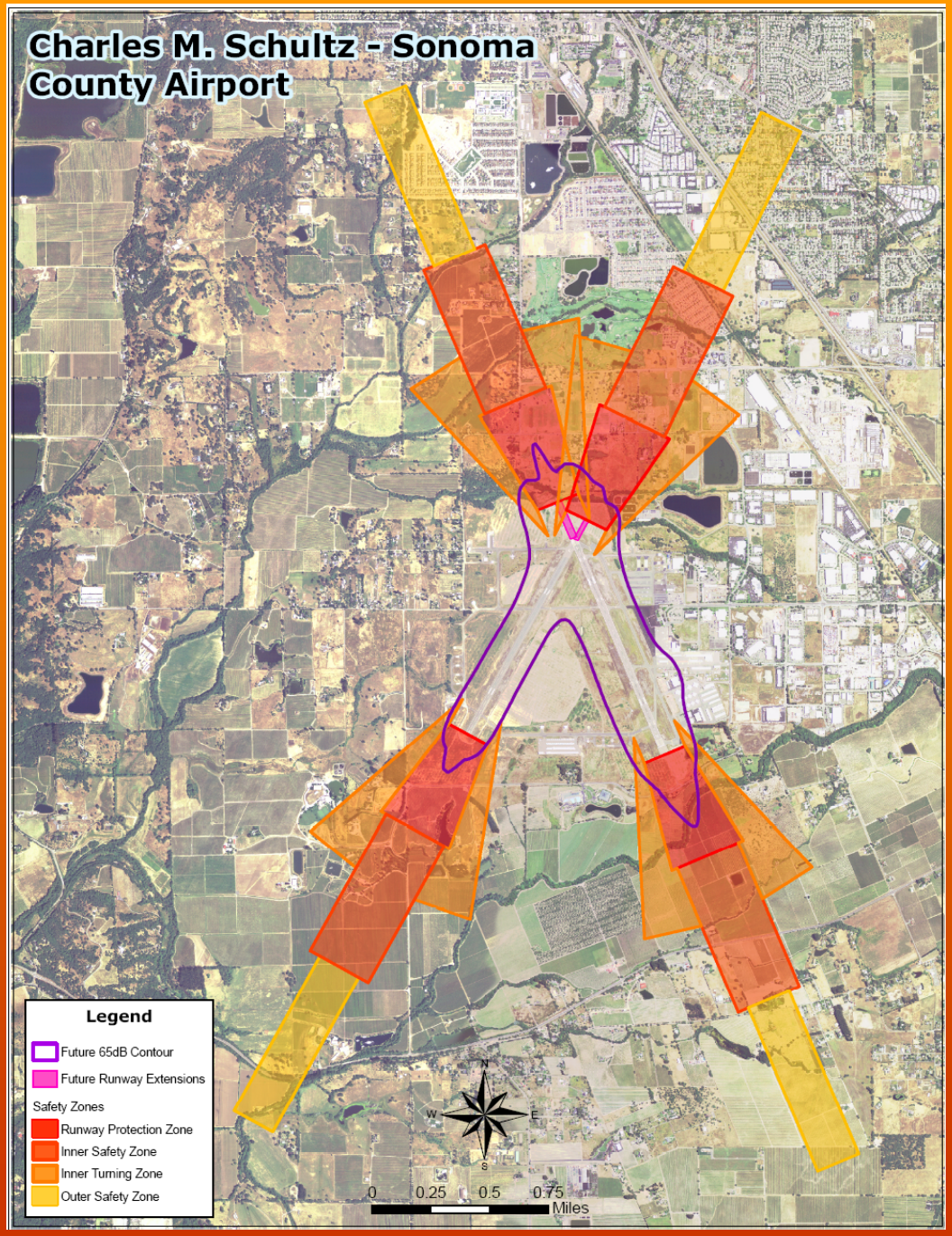


Example 4:
General Aviation Runway with Single-Sided Traffic Pattern

Assumptions:
- No traffic pattern on right
- Length 4,000 to 5,999 feet
- Approach visibility minimums ≥ 3/4 mile and < 1 mile
- Zone 1 = 1,000' x 1,510' x 1,700'

Example Map:

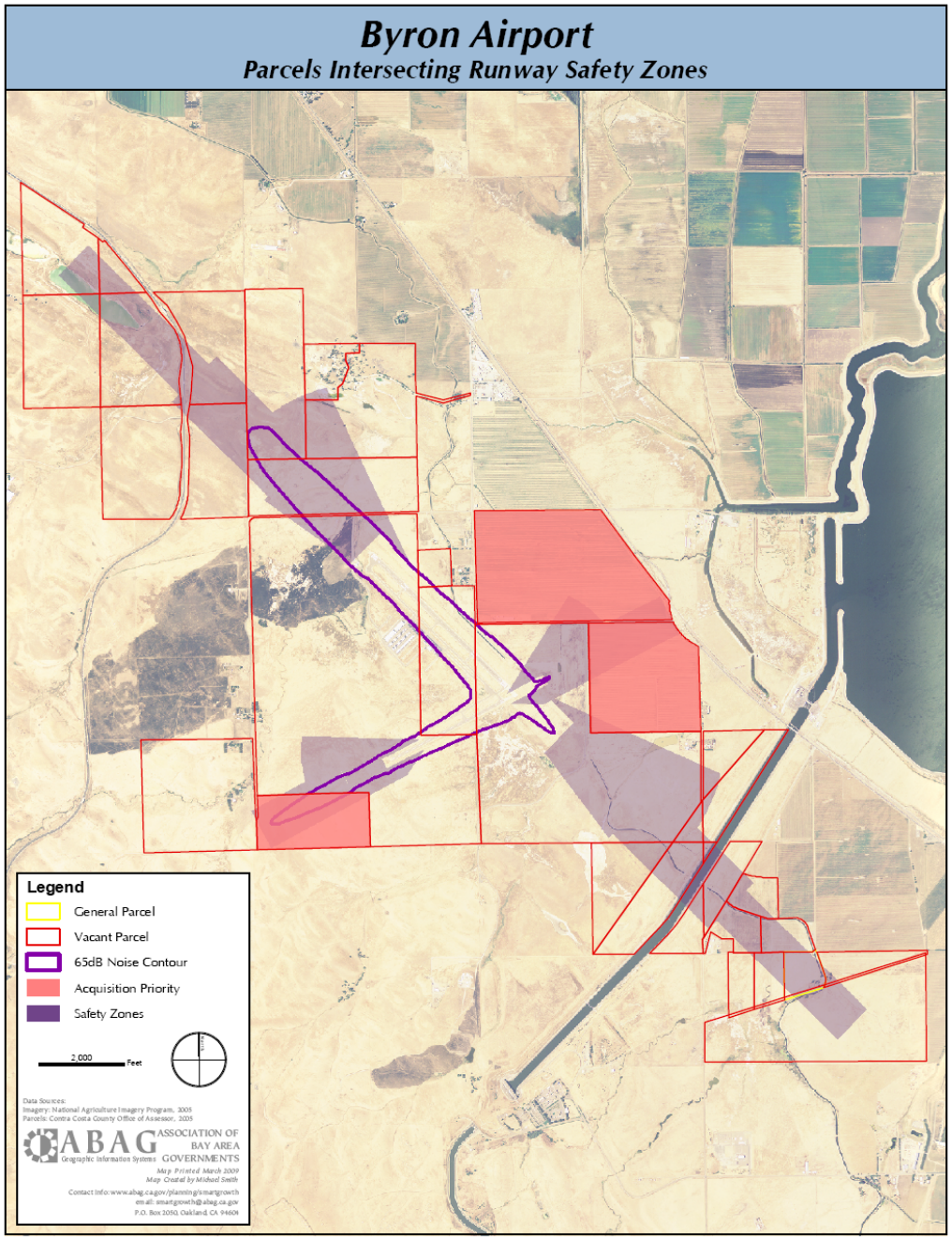
Charles Schultz-Sonoma County



Priority Acquisition

11 out of 16 Airports had Priority Parcels

Total of 47 Parcels



Information in Database

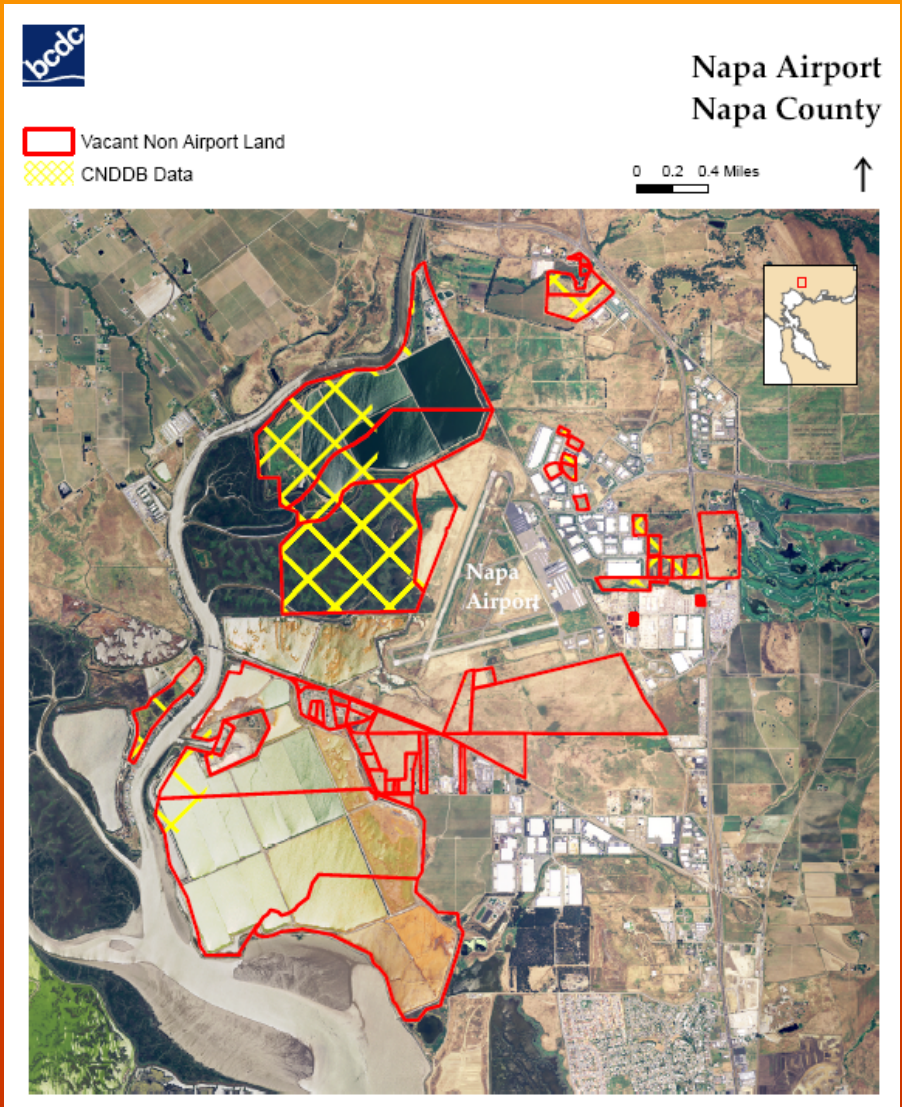
- parcel acreage, address and ID number
- jurisdiction (same as airport or other)
- designation as being in an ALUC safety or noise impact zone
- existing General Plan and zoning district designations
- assessed valuation of property on county assessor roll
- assessed valuation of any existing improvements to the property
- last sale date
- ABAG's updated estimated value
- ratio of improvement to land value
- number of stories of existing improvements
- vacancy status
- airport prioritization for purchase

Information in Database

Does NOT include:

- **Any land with more than $100,000 in improvements**
- **Land owned by Airports or zoned for Airport use**
- **Streets or roads**
- **Water, wetlands, or biologically sensitive areas**

Natural Resource Areas



Habitat Areas near GA Airports

Airport	# Parcels	Total Acres
Hayward	7	15
Livermore	34	393
Byron	11	887
Buchanan	17	335
Gnoss	4	149
Napa	31	1817
Charles Schultz	22	159
Cloverdale	8	149
Half Moon Bay	115	193
Healdsburg	3	247
Nut Tree	22	146
Palo Alto	1	216
Petaluma	1	4
Reid Hillview	13	90
San Carlos	14	338
South County	27	217

Finished Inventory:

Livermore Airport, Alameda County

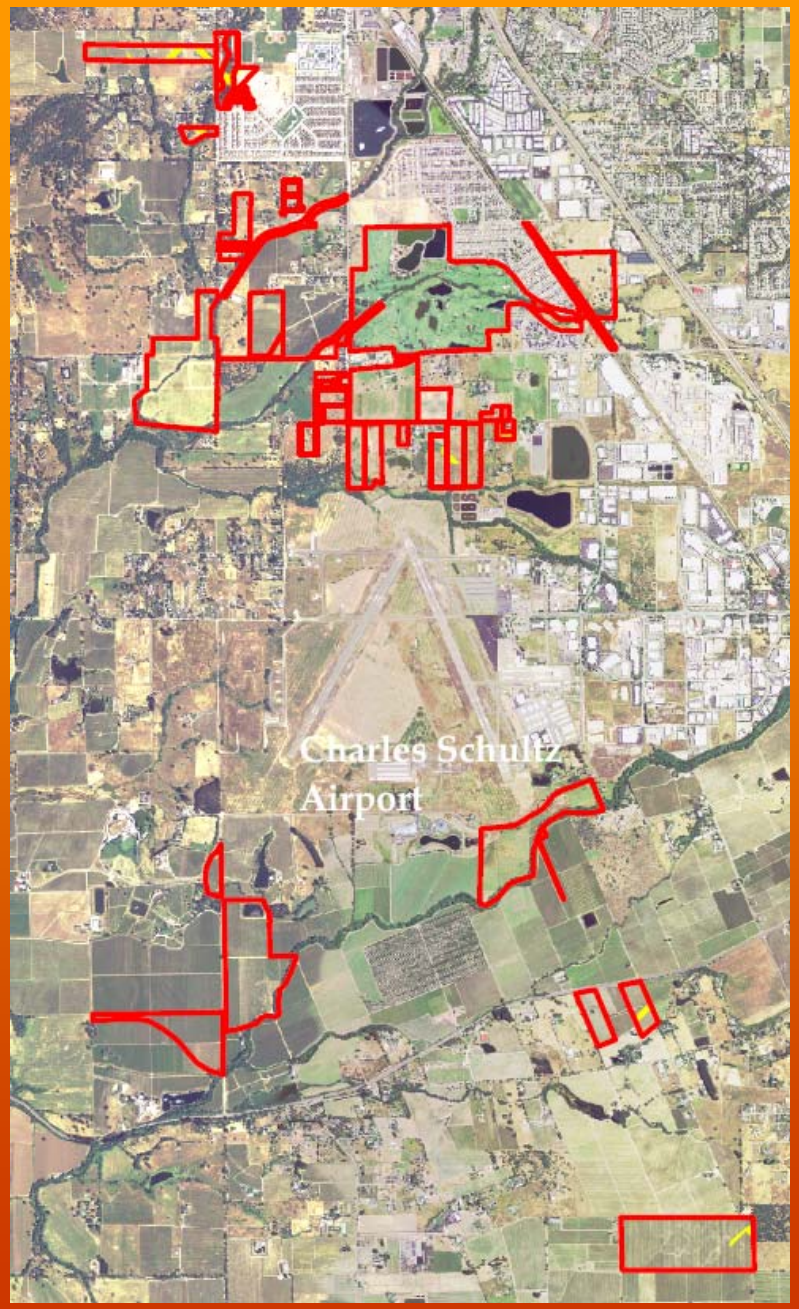
Livermore
Livermore
Livermore

Palo Alto Airport

Byron Airport

Case Study—no Habitat Land

65 dB	$446,310
Safety Zone 1	$0
Total FAA Eligible	**$446,310**
Safety Zone 2	$763,661
Safety Zone 3	$0
Safety Zone 4	$348,805
Total All Parcels	**$1,558,776**



Charles Schultz – Sonoma County Airport

Vacant Non Airport Land

CNDDB Data

Cost Scenarios

	Total	Total FAA Eligible
Buchanan	$71,061,709	$31,917,517
Byron	$0	$0
Charles Schultz	$48,365,812	$3,228,326
Cloverdale	$4,318,993	$2,447,144
Gnoss	$3,880,853	$2,115,813
Half Moon Bay	$11,778,237	$9,322,719

Cost Scenarios Con't

	Total	Total FAA Eligible
Hayward	$1,501,794	$1,500,646
Healdsburg	$1,552,259	$1,116,381
Livermore	$11,260,067	$2,379,390
Napa	$92,059,152	$13,962,729
Nut Tree	$79,866,577	$59,354,811
Palo Alto	$0	$0
Petaluma	$41,751,516	$32,551,101
Reid Hillview	$0	$0
San Carlos	$5,707,364	0
South County	$21,556,640	$12,211,609
Total All:	**$394,660,972**	**$172,108,188**

Questions and Considerations

- Protection Costs are for fee simple acquisition of the entire parcel

- Acquisition funds may still be needed to protect habitat or agricultural land

- More demand than funding available

- No FAA funding available for parcels outside Safety Zone 1