

The Value and Symbiotic Relationship of Commercial and General Aviation

or “How Killing Reliever Airports Hurts Everyone”

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1. Introduction

The efficient operation of commercial aviation is a core element of the US economy. General aviation is an intrinsic element in making the system work.

According to an FAA January 2020 report, civil air transportation in the US contributes \$1.8 trillion in total economic activity – over 5% of the US gross domestic product – and supports nearly 11 million jobs. ¹

Commercial aviation is enabled through more than 5000 public use airports. These airports must efficiently move nearly one billion passengers each year and perform about 50 million operations*. ² Billions of dollars have been invested in the airport infrastructure needed to ensure the efficient operation of commercial aviation and the economy that depends on it.

General aviation plays a central role in developing and providing the *personnel* – the pilots, mechanics and aviation technicians – that commercial aviation requires. A necessary element for these personnel to receive their training is general aviation *airports*.

General aviation *airports* also play a pivotal role in the efficient operation of airports where commercial aviation operates. General aviation and commercial aviation aircraft are substantially different in terms of performance and size; while this is a manageable problem in the openness of the airspace, their intermixing as these aircraft converge to shared runways poses substantial problems to efficiency and safety.

The FAA recognizes these operational and safety challenges. They also recognize the critical importance of general aviation personnel and airports and their symbiotic relationship to commercial aviation and the nation's economy. The FAA solution was to set up "reliever airports," an airport defined under *49 USC § 47102(23)* that the Secretary of Transportation designates to relieve congestion at a commercial service airport and to provide general aviation access.

These reliever *airports* are situated to develop the next generation of pilots; provide functional access to the region for small aircraft; all while allowing commercial aviation to grow unencumbered. Impeding access to these general aviation airports impedes the *current operation* of commercial aviation and impedes the *future viability* of commercial aviation.

**Keep Aviation's Future Alive
Don't Kill Small Airports**

Short term, large airports are not able to efficiently function without general aviation reliever airports. Long term, commercial aviation is not able to function without a functional general aviation providing new pilots and aircraft mechanics

In short, the \$1.2 trillion of the US economy that relies on commercial aviation also relies on general aviation and general aviation airports.

* An operation is defined herein as either a takeoff or landing.

As an example of this symbiotic relationship, this paper explores the potential impact on San Jose International (SJC) were Reid Hillview (RHV) airport to close; RHV represents a reliever airport for SJC, an airport optimized for commercial aviation and critical to the Bay Area economy.

The Santa Clara, California county owners of RHV airport have recently voted to pursue the immediate closure of RHV as a health crisis. Other communities around nearby airports are exploring the example set by Santa Clara County; these include communities around Palo Alto (also a reliever airport for SJC), Whiteman (a reliever airport for Los Angeles), and Montgomery Field (a reliever airport for San Diego). Similar activities are happening in other states and communities.

It is important that all parties understand the economic cost on San Jose's local economy if Reid Hillview airport closes. In doing so, we also hope to clarify the economic value of general aviation to the US economy.

Finally, a brief comment on the basis for the closure of RHV and these other airports: the health issues arising from lead in aviation gas. The RHV aviation community is now using unleaded fuel to immediately address this health issue; the county, however, indicated its objective to close the airport at the earliest possible time regardless of this solution. To draw an analogy from an earlier time: the county's position is tantamount to eliminating automotive lead by eliminating cars and roads (and, in the process, impacting the related economic engine derived from cars and roads). It is an erroneous and limiting choice; indeed, cars successfully converted to unleaded fuel and the economy and health of the public all benefitted. All interests were met and nothing was sacrificed. The RHV aviation community has offered a virtually identical solution.

1.1 Value of Commercial Aviation to San Jose, CA

San Jose, California, is a microcosm of the broader US market. Commercial aviation is a core element of San Jose's economy and it requires the smooth operation of its airport to achieve that mission.

Operationally, approximately 15 million people annually travelled through SJC prior to the pandemic; over 120 million pounds of freight passed annually through SJC.³ At its peak, SJC handled 134,000 tons – 268 million pounds – of cargo and nearly 6000 aircraft cargo operations.⁴ Seven passenger airlines operate out of SJC, down from the twelve that operated there pre-pandemic.⁵

These activities are an economic engine for the city. A December 2015 report to the City of San Jose reflected that SJC was responsible for 32,226 jobs. SJC generated \$3.4B in revenue for local businesses, over one billion dollars in personal income, and \$118 million in state and local taxes [all in 2015 dollars].⁶ Despite COVID, 2019-2020 operating revenues at the airport were over \$175 million from rents, concession fees, parking and landing fees.⁷

SUMMARY OF AIRPORT ECONOMIC IMPACTS			
Impact Measure	Site-Generated	Visitor-Generated	Total
Employment	5,239	26,987	32,226
Business Revenue	\$1,738.9 million	\$1,657.6 million	\$3,396.5 million
Personal Income	\$290.5 million	\$747.3 million	\$1,037.8 million
State & Local Taxes	\$33.1 million	\$85.2 million	\$118.3 million

Figure 1 December 2015 Economic Analysis

<https://www.flysanjose.com/sites/default/files/financial/Economic%20Impact%20Study%20Report%20-%20FY13-14.pdf>

Developed property surrounds the airport, practically limiting its ability to expand operations by adding additional runways. SJC's annual service volume is rated at 241,700 operations or 73 operations per hour on its two runways.⁸ 207,611 flight operations – takeoffs or landings – occurred for the twelve months ending in February 2020.⁹ While that leaves some room for the airport to expand commercial aviation operations short-term, it is expected that this full capacity will be necessary and achieved around 2037.¹⁰

That capacity is put at risk with the introduction of general aviation aircraft.

1.2 The Potential Economic Impact on SJC from Closing Reid Hillview

This paper outlines a case that the economic impact on SJC from closing Reid Hillview Airport equals at least five minutes delay for every hour of operation; this is likely a lower boundary.

This 8.3% loss in efficiency of the airport and 5 minutes increase in flight time could have the following annual impact on the region.

Loss of economic output	\$325.4 million
Loss of state and local taxes	\$11.3 million
Increased fuel costs for airlines	\$64 million
Increased hours of operation of the airport	1 hour 25 minutes
Operations capability	Reduction in 51 flights per day

These amounts are discussed in more detail in [Economic Impact from Delays](#).

The impact on consumers would include:

- Flight delays and inconvenience; missed connections
- Increased flight and transit times
- Increased flight costs
- Decreased flight availability and flight options
- Loss of productive time
- Impact on business goals

The impact on freight and products would include:

- Late or non-arriving cargo
- Loss of perishables

- Inability to meet delivery and express commitments
- Increased shipping costs

The impact on the neighborhood would include:

- Increased hours of noise and operation
- Increased noise in new areas
- Decreased city services through reduced tax generation of airport

The impact on the airport would include:

- Decreased passenger capacity
- Decreased passenger revenue
- Insufficient capacity to meet 17-year projected requirements of airport facility
- Increased costs versus other commercial airports (SFO, OAK); decreased competitiveness versus other airports
- Decreased efficiency thereby decreasing the city's return on investment
- Impact on reputation and ability to meet on-time goals and/or avoid cancellations
- Increased personnel operational costs
- Increased gate congestion

The impact on airlines would include:

- Increased fuel costs
- Increased compensation costs to delayed passengers
- Increased operational personnel costs
- Potential impact on meeting pilots' duty period limitations
- Decreased routes into/from SJC
- Ripple impact on preceding and follow-on flights
- Increased gate congestion

The author encourages the FAA; the County of Santa Clara; the cities of San Jose and other cities that rely on SJC; airlines; and consumers to perform a more rigorous economic analysis of the impact of Reid Hillview Airport's closure on SJC.

In addition, the FAA would benefit from examining the financial benefit derived from reliever airports across the entire national air space.

2. General Aviation: The Personnel Pipeline for Commercial Aviation

Civilian pilots, mechanics and aviation technicians – not military – make up the majority of individuals now serving in commercial aviation. These individuals typically trained in general aviation aircrafts and at general aviation airports. *General aviation's role as a pipeline of future pilots and mechanics is therefore an intrinsic element of the US economy.*

There is a substantial need for commercial aviation personnel. This is driven by multiple factors.

- **Average age.** The average age of airline transport pilots – those pilots that fly larger turbine jets – has steadily been increasing since 2002. In 2019, the average age was 50.8. ¹¹ In 2009, Congress made the mandatory retirement age of airline pilots 65; based on the 2019 average age of pilots, roughly 50% of the nation's pilots will retire in the next 13 years. ¹²
- **COVID-19.** Faced with multiple billions of dollars in losses and the grounding of thousands of airplanes, airlines offered early retirement packages and tens of thousands of aviation employees left the industry as a result. American Airlines alone had nearly 39,000 employees leave the company. ¹³ Airlines are now scrambling to fill these positions as demand surges as individuals take delayed vacations and trips. ¹⁴
- **Emergence of low-cost flights and migration to smaller aircraft.** Airlines are recognizing and adapting to market demand for low-cost flights. To do that, they are migrating operations from wide-body aircraft servicing major hubs to narrow-body aircraft that they can consistently operate at a higher load (occupancy) factor. In addition, these narrow-body aircraft are increasing performance, allowing them to fly ever-longer nonstop flights. The trend towards higher efficiency flights enables lower costs, which increases pilot demand; and increases in fleet size and the number of flights required will further increase pilot and maintenance personnel demand. ¹⁵
- **Increased air freight.** With increasing air freight by Amazon, UPS, and others, cargo flights should continue to expand. This will also marginally increase pilot demand.
- **Emergence of next generation aircraft and air services.** Drone delivery, electric vertical takeoff and landing (eVTOL) aircraft, "air taxis," and many other emerging forms of aviation will need pilots either actively flying or supervising flight initially until fully autonomous aviation is deemed safe and reliable. Nearly 350 thousand pilots will be needed by 2024, an increase of around 130,000 from 2020 levels. ¹⁶

Based on these trends, Boeing forecast *before the pandemic* that the North American market will need 569,000 new aviation personnel between now and 2039: 208,000 pilots, 192,000 aircraft technicians, and 169,000 cabin crew members. World-wide, 2,086,000 new commercial aviation personnel will be needed, and 319,000 business aviation and civil helicopter aviation personnel will be needed. ¹⁷

Following the pandemic, these needs have only increased. The need for pilots trained through General Aviation has only increased.



Figure 2 https://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_PTO_PDF_Download.pdf

General aviation represents the pipeline for fulfilling this personnel need. Without the personnel pipeline from general aviation, business and vacation travel will be curtailed and a substantial block of the \$1.2 trillion US economy that counts on aviation will be affected.

3. The San Jose Airport

It is helpful to understand the current operational capabilities and limits of the airport before discussing the potential impact of general aviation.

3.1 Normal Work Loads

SJC represents a typical airport that services primarily commercial and scheduled air travel. The airport is heavily used for commercial (72%) and air taxi (10%) operations; private corporate jets and other general aviation make up the balance.

Roughly 568 daily operations occurred for the 12-month period ending February 2020.¹⁸ SJC permits the operation of eligible large aircraft from 6:30am to 11:30pm; non-eligible aircraft are further restricted. Daytime operations, those arrivals and departures between 7 am – 7 pm, accounted for 74% of operations; evening operations between the hours of 7 pm – 10 pm accounted for 16% of operations; and nighttime operations between 10 pm – 7 am accounted for 10% of all airport operations.¹⁹

The airport operations rate therefore looks like this:

Operation period	% of Operations	Hours	Flights	Operations per Hour
7am - 7pm	74%	12	420	35
7pm - 10pm	16%	3	91	30
10pm - 7am	10%	9	57	6

SJC's annual service volume is rated at 73 operations per hour across its two runways.²⁰ These are maximum rated capacities; factors such as separation standards, aircraft characteristics, weather, and safety would reduce this rate.

73 Operations per hour works out to each runway maximally supporting approximately 36 operations per hour or an average of 1 minute 40 seconds per operation.[†] We will come back to the significance of this time when we explore the impact of general aviation on airport operations.

Commercial aircraft are typically departing on one runway (the one closest to the terminal) and landing on the other.²¹ General aviation aircraft typically operate on the runway furthest from the terminal.²²

[†] This period of time is largely dictated by the time an aircraft requires to touchdown, slow-down, taxi to an exit taxiway from the runway, completely exit (get the tail out of the way), plus provide some margin of safety prior to the next arrival.

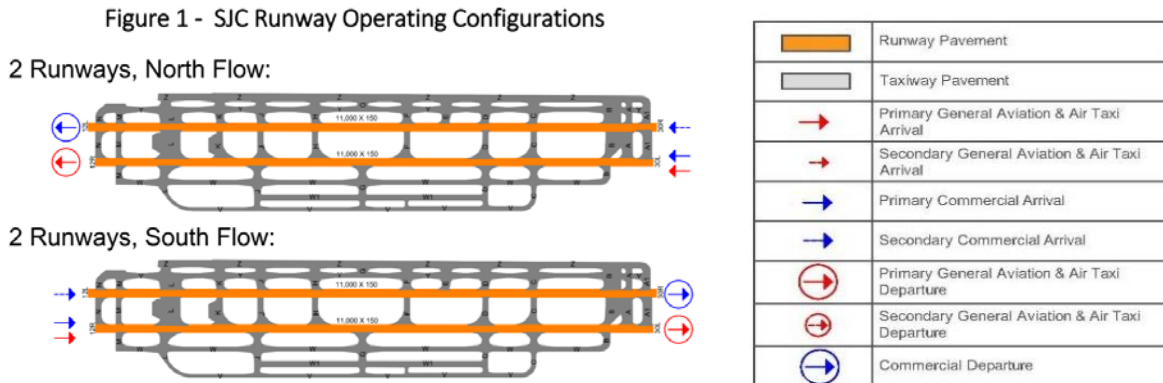


Figure 3 <https://www.flysanjose.com/sites/default/files/improvement/RIMstudy-Task4.3-TechMemo.pdf>

Because the two runways have a centerline separation of 700 feet, parallel approaches are only permitted when aircraft can see each other (i.e., not in bad weather).^{23, 24} Because this separation is less than 2500 feet, side-by-side parallel simultaneous instrument approaches are not permitted. Because of the runways' proximity to each other and issues related to wake turbulence, simultaneous parallel departures must be treated as if the airport only had one runway.²⁵

These issues often limit the maximum operating rate of the airport even under the best of operating conditions. Under the worst of operating conditions, the airport has effectively one runway.

3.2 Federal Preemption on Operation of SJC

General aviation aircraft may use SJC. The city can do nothing to limit general aviation at SJC.

Local government – the City of San Jose – owns the property and the facility. The airspace falls under federal jurisdiction; namely the Federal Aviation Administration (FAA). *Local and state authorities have no authority over airspace and cannot control what aircraft enter that airspace.*

SJC receives federal Airport Improvement Program (AIP) grants; in the last five years alone, these grants amount to \$100 million dollars to San Jose.^{26, 27} A condition of accepting AIP grants is the economic nondiscrimination grant assurance, including the reasonable access provision, and the statutory prohibition on grant of exclusive rights; this *requires the airport to ensure that the airport is consistently available for public use and is operated for the benefit of the public.* 49 U.S.C. 47107(a)(1)-(6); 40103(e) The airport is *required to provide access to the airport, on reasonable terms and without unjust discrimination, to any aeronautical user.*²⁸

This has practical implications to SJC:

- Local officials cannot restrict general aviation aircraft from flying into SJC airspace
- Local officials cannot restrict general aviation aircraft from landing at SJC
- The FAA is the ultimate arbiter of air traffic into SJC
- While SJC may add landing fees or other charges to general aviation aircraft, proportional charges would need to be added for commercial aircraft and passengers. These increases might make SJC less competitive with other regional airports such as SFO or OAK; this might also move tourism and business dollars to other areas as well. Finally, these costs would almost certainly be passed on to consumers resulting in higher ticket prices.
- Any such landing fees would need to be viewed by the FAA as reasonable and not discriminative against certain classes of users less able to afford higher landing fees. The FAA cautions that “extreme care” should be taken in using pricing to allocate traffic.²⁹

4. The Potential Impact of General Aviation on San Jose

General aviation will increase the time required for arrivals and departures into SJC due to differences in aircraft speeds and wake-turbulence issues.

4.1 Arrivals

4.1.1 Impact of Differences in Landing Speeds

Air traffic control (ATC) permits turbojets to arrive at speeds of 170 knots (kts[‡]) within 20 flying miles of San Jose; reciprocating engine or turboprop aircraft can arrive at speeds of 150 kts (*Federal regulation 14 CFR Section 91.117*). Importantly, there is no minimum speed.

A general aviation aircraft often arrives at speeds closer to 90 kts, approximately one-half the speed of turbo-jets (170 kts).

The implications of this can be easily described with an analogy. Consider the traffic back up when a slow tractor is driving on a one lane highway. Every vehicle must slow down behind the tractor. If they cannot slow down (like a large airplane is not able to simply slow down), the vehicle must be far enough back that they don't catch up to the tractor before it is able to exit the road (in the case of aviation, before the aircraft exits the runway). That significantly increases the distance that the car must be behind the tractor.



This affects every flight that follows a general aviation aircraft. If there are multiple general aviation aircraft – multiple tractors on the road, if you will – the problems are further compounded.

A detailed analysis of the impact on SJC can be found in the Appendix: [Arrivals](#).

Because SJC parallel runways are so close to each other, only one runway at a time can be used for landing during poor weather (“IFR conditions”).

Backups and congestion begin to occur.

4.1.2 Impact of Differences in Separation due to Wake Turbulence

Wake turbulence – the vortexes created by a preceding aircraft – further increases the separation required between landing aircraft. As general aviation aircraft – typically lighter in

[‡] 1 Knot = 1.15 miles per hour

weight – are the most vulnerable to wake turbulence, air traffic control must provide greater separation following large landing aircraft, even if they are landing on parallel runways.

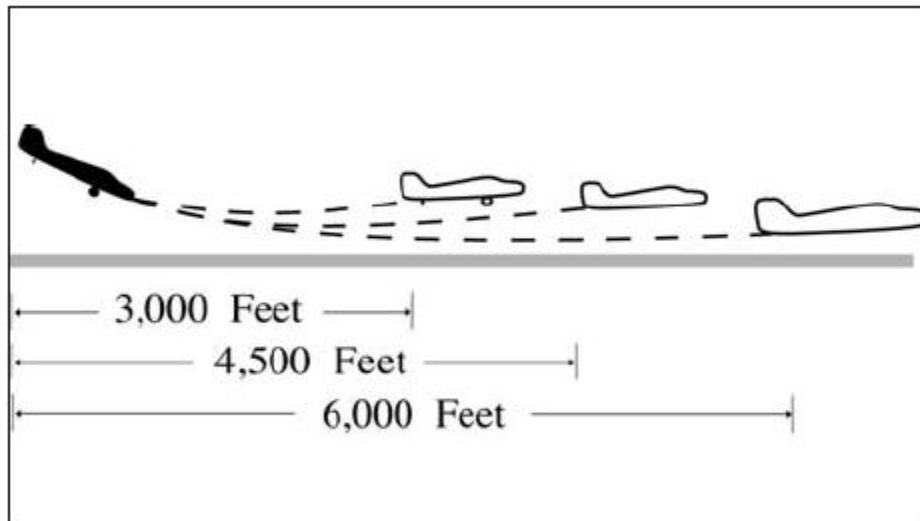


Figure 4 Arrival separation distances of small aircraft to other size aircraft

This increased separation also decreases the efficiency of arrivals.

4.1.3 Mechanisms to Manage Backups and Congestion on Arrival

Air traffic controllers and pilots have various solutions when backups and congestion occur for aircraft arriving into SJC (or any destination airport):

- **Flow control** – Flow control keeps an aircraft on the ground until the congestion dissipates.
- **Aircraft “Hold”** - An aircraft in flight is placed in a “holding pattern” where they simply circle until they are able to land.
- **Routes may be extended.** Rather than flying direct routes, aircraft may take longer routes
- **Aircrafts fly slower.** Aircrafts can slow down and fly at slower speeds. Flying at slower speeds is done using flaps, which increases lift but also increases drag; drag is inefficient for aircraft operations. In addition, the use of flaps is a significant contributor to additional noise.
- **Redirected to an alternate airport.** Flights may be redirected to an alternate airport if SJC is facing severe congestion.

All of these “solutions” have costs to airlines, airports, customers, and the community. These costs are reviewed in [Economic Impact from Delays](#).

4.2 Departures

The rate of successive departures is significantly defined by the wake turbulence or vortex created by the preceding aircraft. These vortexes can cause catastrophic damage or loss of control to an aircraft following.

These vortices are most extreme when an aircraft is HEAVY (larger aircraft create bigger vortices), CLEAN (flaps are not extended or are minimally extended, which is the configuration during takeoff), and SLOW (such as during takeoff). As such, there is a particular hazard from wake vortices during takeoff.



Figure 5 Wake vortices versus aircraft size

To avoid these vortices, a delay or separation time is built into the system, which allows the vortices to dissipate between two departures. Aircraft have different separation times when departing a runway; this separation time is based on the size of the aircraft taking off versus the size of the preceding aircraft.

Separation time for ³⁰		
Preceding departure	Small aircraft separation	Large aircraft separation
Heavy (255,000+ lbs)	3 minutes	2 minutes
Large (41,000-255,000 lbs)	3 minutes	No minimum Aircraft could take off on parallel runways if they wanted
B757	3 minutes	2 minutes

San Jose has a large number of “large” aircraft (e.g. comparable to Boeing 737 or the Airbus A320) departing currently. By increasing small aircraft into the departure mix, the aircraft separation time between takeoffs increases substantially versus large aircraft, which reduces the number of operations per hour that are possible.

Because the two parallel runways are so close to each other, it is necessary to treat their capacity as that of a single runway.

5. Economic Impact from Delays

In the absence of a more rigorous evaluation of the economic cost of closing Reid Hillview, the following analysis is provided as a first-order estimate.

A reasonable argument has been made that at least 5 minutes of capacity in either arrivals or departures, or some combination thereof, would be lost each hour. This represents an 8.33% impact on efficiency of the airport.

Below are shown San Jose International economics in 2015 dollars, 2021 dollars adjusted to inflation[§], and the resulting loss of 8.33% in economic value.

	2015	2021 dollars (15% increase)	8.33% impact to 2021 dollars
Business revenue	\$3396.5 million	\$3906.0 million	\$325.4 million
State and local taxes	\$118.3 million	\$136.0 million	\$11.3 million

5.1 Impact on Airlines

Five minutes in increased operation for jetliners: **\$64 million annually**

Assumptions:		
Average fuel flow	750 gallons / hour (e.g. Boeing 737)	
Increased flight time	5 minutes	
Jet-A price	\$5 per gallon	
33 flights/hour	17 operating hours/day	365 days/year

Other potential economic impacts to airlines:

- **Fuel** – longer taxi-out and taxi-in times
- **Rebooking time** of agent
- **Compensation to delayed passengers**
- Addressing **missed connections**
- Extended **operation hours / personnel costs**
 - o Agent, flight operations, towing, baggage, minor maintenance, etc.
- Cost impact of flights **arriving outside of targeted window when they depart SJC**; airlines targeting an arrival slot that they won't hit; inability to meet airport slot allocations at capacity constrained airports due to congestion at SJC
- Potential impact with **pilots' duty period limitations** – pilots can't work more than a specific amount of time. 14 CFR § 91.1057 If a flight doesn't get off in time, alternate crew required
- **Gate availability** and congestion for airplanes and for passengers; gate holding costs due to departure delays. This may be offset by fewer flights arriving.
- **Decreased routes into/from SJC** as a result of decreased operating rates of airport
- **Ripple impact** on preceding and follow-on flights

[§] \$1 in 2015 = \$1.15 in 2021 according to Bureau of Labor Statistics
<https://www.in2013dollars.com/us/inflation/2015?amount=1>

5.2 Impact on SJC Airport

Potential economic impacts to SJC:

- Reduced **return on investment** with decreased efficiency in operation of airport
- Decreased **passenger capacity**
- Decreased **passenger revenue**. Replacing 150 passenger aircraft at 80-90% capacity with 4 passenger aircraft at 25-50% average capacity.
- Increased **operating and personnel costs** (Security, ATC, baggage handlers, parking, etc). The airport is currently open 17 hours; if five minutes per hour are lost and need to be made up with extended time, that is 5 minutes / hour of operation *17 hours of operation open currently = 85 minutes longer operation = 1 hour 25 minutes extended operating hours and the associated costs for that time with respect to personnel.
- Decreased **competitiveness** versus other airports; increased costs versus other commercial airports (SFO, OAK)
- **Reputation** and ability to meet on-time goals and/or avoid cancellations
- Increased **gate congestion**
- **Insufficient capacity** to meet 17-year projected capacity requirements of airport facility
- Increased operating hours
- Decrease in **state and local tax payments**. This is net revenue to state and local government

5.3 Impact on Consumers

Potential economic impacts to individuals flying through SJC:

- **Flight delays** and inconvenience; missed connections
- Increased **flight and transit times**
- Increased **flight costs**
- Decreased **flight availability** and flight options. With reduced airport operations, available flights will go down. As congestion increases, aircraft operators may make use of larger aircraft, modify schedules to take advantage of less congested periods, cancel marginal flights, etc. ³¹ This has the potential both to remove available flights.
- **Loss of productive time**

5.4 Impact on San Jose Business and Tourism

Potential economic impacts to businesses and tourism:

- Impact on **business goals**. Will poor connectivity through SJC impact business in San Jose and the Bay Area?
- Impact on **tourism**. Will poor connectivity through SJC impact tourism?

5.5 Impact on Freight and Cargo

Potential impact on freight and cargo would include:

- **Late cargo** or non-arriving
- Loss of **perishables**

- Inability to meet delivery and **express commitments**
- Increased **shipping costs**

5.6 Impacts on Neighborhoods and Community

The impact on the neighborhood and community would include:

- Increased **hours of noise** and operation. The airport is currently open 17 hours; if five minutes per hour are lost and need to be made up with extended time, that is 5 minutes / hour of operation *17 hours of operation open currently = 85 minutes longer operation = 1 hour 25 minutes extended operating hours
- Increased **noise in new areas**, through longer and noisier approaches. Noisier approaches may occur due to operation at slower speeds and the use of flaps at those speeds.
- **Increased noise in general**. With fewer operations into SJC, aircraft arriving may increase in size.
- Decreased **city services** through reduced tax generation of airport
- Rerouting of **flights over new areas**
- Potential **extension of existing curfew**

5.7 Other Potential Costs

- Impact on **Angel Flights**. A large number of Angel Flights – flights for seriously ill individuals – are done by RHV pilots. How will relocation to San Martin affect the availability of pilots to do these flights? How will that affect the health outcome of these individuals? If PAO also were to close, as may be in consideration, how would that further impact Angel Flights?
- **Insurance industry costs** associated with cancelled trips and delays

6. Alternatives

6.1 San Martin as a Reliever Airport

The FAA Airport Cost Benefit Analysis report cautions about the viability of setting up a reliever airport.³²

Some of the items that should be specifically noted about San Martin:

- Will San Martin provide relief if it is inconvenient to pilots or requires subsequent travel to city centers? Will traffic congestion getting to San Martin limit its attractiveness? Will pilots simply fly on to SJC and other commercial airports in the Bay Area?
- Will ground access costs from San Martin to the Bay Area negate any cost advantages of landing in San Martin? Will access costs – which include travel to the airport – make aviation training in San Martin impractical?
- Will San Martin require significant investment to support the existing RHV capacity? RHV has a control tower and two runways to handle the high volume of traffic
- If investment in San Martin is made, will that result in higher user fees? Will that offset growth or force more pilots to look at landing at SJC? Reid Hillview costs are fully amortized, whereas substantial new investments will be needed at San Martin to match Reid Hillview's capacity.
- Will airport construction at San Martin impact traffic to SJC while it is being developed?
- What is the viability of aviation programs given the extended commute? What is the economic cost of losing the SJSU Aviation program? What is the economic impact - both locally and nationally - on losing four flight schools? What is the economic impact on individuals local to RHV who were pursuing aviation as a career?
- Will the distance between San Martin and SJC require additional flights, such as with future air taxis, introducing further air congestion at SJC?
- Will relocated noise and traffic impact home values around San Martin?

6.2 Moffett as a Reliever Airport

- It is unknown whether the county / federal / private entities could work out a mutually satisfactory relationship
- NASA and the U.S. General Services Administration (GSA) continue to own the 1,000 acres of land in Mountain View, Calif., which includes Hangars One, Two, and Three, an airfield flight operations building, two runways, and a private golf course³³
- Operations are managed and owned by Google through Planetary Ventures
- Moffett has two airports and a runway; it has the capacity to handle RHV traffic
- It may also have the ability to absorb PAO traffic
- This would introduce higher traffic and noise over Sunnyvale communities
- This may increase transitory air traffic through SJC
- This may offload traffic from SJC and reduce its economic strength

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- ¹³ "39,000 American Airlines workers take early retirement, leave or reduced hours in face of COVID-19 pandemic" <https://www.dallasnews.com/business/airlines/2020/04/30/39000-american-airlines-workers-take-early-retirement-leave-or-reduced-hours-in-face-of-covid-19-pandemic/>
- ¹⁴ <https://www.cnbc.com/2021/07/15/airlines-race-to-train-pilots-as-travel-demand-roars-back.html>
- ¹⁵ <https://www.cnbc.com/2019/12/15/the-boom-in-airplane-orders-is-over-for-boeing-and-airbus.html>
- ¹⁶ "FAA Aerospace Forecast; Fiscal Years 2020-2040", Federal Aviation Administration, p. 59.
- ¹⁷ "Pilot and Technician Outlook: 2020 – 2039", Boeing,
https://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_PTO_PDF_Download.pdf
- ¹⁸ <https://adip.faa.gov/agis/public/#/airportData/SJC>
- ¹⁹ "Norman Y. Mineta San Jose International Airport Noise Assessment for the Master Plan Environmental Impact Report," <https://www.sanjoseca.gov/Home/ShowDocument?id=61662>
- ²⁰ <https://www.sanjoseca.gov/Home/ShowDocument?id=61670> "Norman Y. Mineta San Jose International Airport: Evaluation of SJC Future Demand Accommodation with Existing Facilities," April 2019.
- ²¹ "DRAFT TECHNICAL MEMORANDUM, 9-13-2017 UPDATED AIRPORT CAPACITY AND FACILITY REQUIREMENTS ANALYSIS" <https://www.flysanjose.com/sites/default/files/improvement/RIMstudy-Task4.3-TechMemo.pdf>
- ²² "DRAFT TECHNICAL MEMORANDUM, 9-13-2017 UPDATED AIRPORT CAPACITY AND FACILITY REQUIREMENTS ANALYSIS" <https://www.flysanjose.com/sites/default/files/improvement/RIMstudy-Task4.3-TechMemo.pdf>
- ²³ https://www.flysanjose.com/sites/default/files/rsheelen/SJC.FUT_ALP.pdf
- ²⁴ https://www.faa.gov/air_traffic/publications/atpubs/atc_html/chap7_section_4.html
- ²⁵ https://www.skybrary.aero/index.php/Parallel_Runway_Operation#Simultaneous_parallel_approaches
- ²⁶ "AIRPORT 2020-2024 Capital Improvement Program," p. V-564.
<https://www.sanjoseca.gov/home/showpublisheddocument/48679/637118300780200000>
- ²⁷ These grants are substantial; for example, from 2018 through 2024, San Jose will receive \$100 million in FAA grants. "AIRPORT 2020-2024 Capital Improvement Program," 2019-2020 Capital Budget and 2020-2024 Capital Improvement Program,
<https://www.sanjoseca.gov/home/showpublisheddocument/48679/637118300780200000>
- ²⁸ "Airport Business Practices and their Impact on Airline Competition," FAA/OST Task Force Study, October 1999.

²⁹ “FAA AIRPORT BENEFIT-COST ANALYSIS GUIDANCE,” p. 24.

https://www.faa.gov/regulations_policies/policy_guidance/benefit_cost/media/FAA_Airport_Benefits_Guidance.pdf

³⁰ “Air Traffic Wake Turbulence Separations,” AIM 7-4-9,

https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap7_section_4.html

³¹ “FAA AIRPORT BENEFIT-COST ANALYSIS GUIDANCE,” p. 19.

https://www.faa.gov/regulations_policies/policy_guidance/benefit_cost/media/FAA_Airport_Benefits_Guidance.pdf

³² “FAA AIRPORT BENEFIT-COST ANALYSIS GUIDANCE,”

https://www.faa.gov/regulations_policies/policy_guidance/benefit_cost/media/FAA_Airport_Benefits_Guidance.pdf

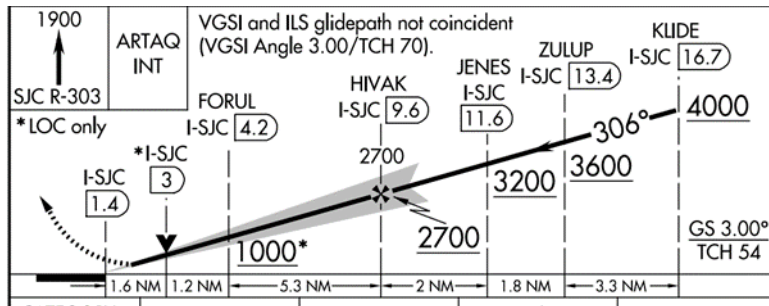
³³ “Google Takes Over Operations Of Moffett Airfield From NASA, Will Invest \$200M Into The Site”,

<https://techcrunch.com/2014/11/10/google-moffett-airfield-nasa/>

7. Appendix

7.1 Arrivals

Consider this common approach that takes an aircraft down to the runway at SJC.** It begins at HIVAK (the final approach fix, designated by the Maltese cross) and ends at the runway, 8.1 nautical miles^{††} (nm) away.



The duration to fly this leg varies depending upon the size and performance of the aircraft.

Aircraft	Aircraft speed (kts)	Time for 8.1nm
Turbojet	170	2 minutes 54 seconds
Turboprop	150	3 minutes 12 seconds
General Aviation	90	5 minutes 24 seconds

Normally turbojets would follow each other– “have separation” in aviation parlance – by approximately two minutes, allowing 30 operations per hour, which is comfortably within the maximum rate that SJC can support (1 minute 40 seconds between operations). However a turbojet following a general aviation aircraft would now need roughly 7 minutes separation: 5 minutes 24 seconds for the general aviation aircraft to fly from HIVAK to the runway, and 1 minute 40 seconds for the aircraft to exit the runway.

That turbojet therefore experiences a five minute increase in his flight time, as does every turbojet behind it. And the assumption is that the aircraft is exiting the runway in the shortest duration possible – 1 minute 40 seconds rather than 2 minutes – which removes an important safety buffer.

Worse, if the turbojets are behind the general aviation aircraft at KLIDE – 15.3 nm from the runway – they would need roughly 12 minutes separation: 10 minutes 12 seconds for the general aviation aircraft to travel the 15.3nm and 1 minute 40 seconds for it to exit the runway. That represents a ten minute increase in flight time for the turbojet aircraft and everyone behind it.

This gets further compounded if there are multiple general aviation aircraft that are landing, as delays stack on to delays. This is the equivalent of multiple tractors on the highway.

** SJC ILS RWY 30L

†† 1 Nautical Mile = 1 nm = 1.15 miles

7.2 Letter from San Jose International Discussing Impact of Closure of RHV



August 16, 2021

Santa Clara County Board of Supervisors
70 West Hedding Street
San José, CA 95110

Dear Santa Clara County Board President and Supervisors:

As the Board of Supervisors considers the Reid-Hillview Airport (RHV) at its meeting on August 17, 2021 (agenda items 36-38, 126), I write to share operational concerns that should be included in your discussions about any changes to RHV.

Currently, RHV is the primary general aviation airport for the County and a critical reliever airport for Norman Y. Mineta San Jose International Airport (SJC). In this role, RHV serves:

- Over 208,000 general aviation flights (2019 data)
- Private and commercial pilot training for aviation students from San José State University and other fixed based operators
- Emergency operations (such as medical, fire, and disaster response)

SJC is the County's only airport for scheduled commercial flights. SJC and RHV serve two very different markets and functions which cannot be construed as interchangeable. As such, changes to RHV have the potential to impact the operations, safety, and infrastructure at SJC—even if only a few of the RHV aircraft and/or air traffic operations relocate to SJC.

Operations

While SJC served 15.65 million passengers in calendar year 2019 (the last full year of pre-pandemic data), it had 173,400 aircraft operations. During that same time, RHV's operational activity was over 208,000. The critical difference between the two airports is the type of aircraft taking off and landing. SJC has primarily commercial and business jet aircrafts, while RHV often serves smaller general aviation aircraft (including single and multi-engine propeller-driven aircraft). These two different types of aircraft travel at significantly different speeds and require specific spacing, sequencing, and wake control guidelines (FAA Order JO 7110.126.A).

Combining the operations of these two different types of aircraft would impact the efficiency and capacity of air operations at SJC. As jet aircraft travel much faster than a propeller aircraft, the sequencing and spacing of aircraft would need to increase to keep the aircraft at a safe distance from each other. This spacing means that when jet aircraft and propeller-driven aircraft are mixed, the time needed for each runway operation increases; thus, the number of

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aircraft SJC's airfield can handle would decrease. This has the potential to slow commercial aircraft operations and create operational issues for SJC and for the travelers we serve.

Safety

As noted above, the mixing of jet aircraft with smaller aircraft present multiple safety issues. The speed and size of the aircraft mean the operations vary significantly. The jet blast and wake generated from a jet aircraft have a much greater impact on smaller aircraft when compared to another significantly larger jet aircraft. In general, the pilots of a commercial jet aircraft have more experience than general aviation pilots, as commercial pilots on average have more flight hours. Similarly, a commercial jet aircraft has a robust maintenance schedule and the infrastructure to proactively service the aircraft pursuant to FAA regulations.

Infrastructure Capacity

SJC does not have sufficient infrastructure to absorb the aircraft and operations from RHV. SJC has 46 hangars, 12 nested tie-downs, and 6 small aircraft taxi-in tie-downs, all of which are occupied. SJC maintains a wait list for each of these. There are 48 people on the wait list for hangar space, 4 people waiting for nested tie-down, and 6 people waiting for taxi-in tie-downs. RHV listed 115 single engine planes, 6 multi-engine planes, and 2 helicopters based at their airport. SJC would not be able to accommodate any of these aircraft. In addition, SJC is completely landlocked; expansion to accommodate additional general aviation aircraft is not possible.

RHV also serves as the infrastructure for the County during emergency response and operations. In the event of a disaster that requires aircraft support or the flying in of supplies or equipment, RHV is listed as an asset that the region can utilize to address the disaster without impacting commercial aviation, which also plays a critical role in flying in needed personnel.

Conclusion

I care about the health and safety of our neighbors and residents near RHV. I support efforts to improve the environment and air quality. For this reason, SJC is working with the San Francisco International Airport and San Diego International Airport to support sustainable aviation fuel. Similarly, SJC supports having general aviation fix-based operators transition to unleaded fuels or alternative fuels.

We should take a thoughtful, regional approach to any changes to the current operations of airports in our County. Airports are part of an interconnected system of aviation infrastructure; what happens at one airport will impact the operations and activity at others. My specific

concern about any changes to RHV is that they have the potential to disrupt and impact operations at SJC, the County's only commercial aviation airport for scheduled flights.

Thank you for your consideration. My staff and I are available to address any questions that you may have and look forward to working collaboratively with you and your staff to best address the region's aviation infrastructure needs. Please contact Matthew Kazmierczak at 408-392-3640 or mkazmierczak@sjc.org.

Sincerely,

A handwritten signature in blue ink, appearing to read "John Aitken". The signature is stylized and somewhat abstract, with several overlapping loops and a long, sweeping tail that extends downwards and to the right.

John Aitken, A.A.E.
Director of Aviation

7.3 Letter from San Jose Mayor Sam Liccardo on RHV Airport



Sam Liccardo
Mayor

August 16, 2021
Office of Mayor Sam Liccardo
City of San José

SENT BY EMAIL AND FAX

Re: Items 36, 37, 37A, 38 and 126, regarding community lead exposure and the potential closure of Reid-Hillview Airport

Dear President and Board,

Thank you for considering my thoughts on this important matter.

I have publicly and consistently supported the closure of Reid-Hillview Airport. To whatever extent the County's most recent lead study confirms safety and community health concerns, its closure seems all the more imperative. Yet there also remain critical health and safety issues that the County must resolve as a condition to its closure—and not as an afterthought. By approving the draft Resolution (item 126), the County will have precluded any sensible discussion of how Reid-Hillview traffic, which numbered [208,260 operations](#) in 2019, will be absorbed by surrounding airports.

Two years ago, I drafted and co-signed a November 2019 [memorandum](#) with my colleagues, Councilmembers Arenas, Carrasco, Jimenez, and Khamis (*please see attached*). The direction of that memorandum confirmed the City's support for the closure of Reid-Hillview, but urged the County to work with the City and other stakeholders to ensure that the closure of Reid-Hillview would not result in an influx of general aviation (GA) traffic to Norman Y. Mineta San José International Airport. (Mineta) As the County is aware, **under longstanding FAA regulations, neither Mineta nor any other U.S. airport has the discretion to decline to allow GA traffic to use its airstrips.** In practical terms, that means that large commercial jets carrying 300 passengers must circle in the airspace to wait to land while a pilot trainee in a Cessna practices take-off and landing maneuvers on a runway. In a recent conversation with the FAA about the safety implications of closing Reid-Hillview, federal officials confirmed that a significant increase in the mix of GA aircraft at Mineta will “absolutely increase risk”.

The Council unanimously approved that November 2019 memorandum and direction to urge “completion of the tower and navigation capacity at the San Martin airport as outlined in the 2006 South County Airport Master Plan (including any necessary traffic flow and safety improvements).” I sent a letter to each of you at that time, articulating our concerns about safety issues. City staff remain committed to the position articulated in that memorandum.

Nonetheless, to ensure I do not misrepresent any individual councilmember's position, I will confine the remainder of this letter to my own thoughts.

Three primary concerns animate my position in this matter: **environmental justice, safety, and air service.** Allow me to explain each in turn:

1. Environmental Justice:

Shifting the exhaust from lead-based Avgas from East San José communities to even lower-income neighborhoods in the Mineta flight path (e.g. Guadalupe-Washington, Tamien, Alma, and Spartan Keyes) will not solve the problem, but merely burdens yet another set of high-poverty, densely-populated community of color.

Close review of census-tract demographic data in the [Social Progress Index](#) reveals that neighborhoods within the flight path of Mineta have a higher rate of poverty—defined as the percentage of residents who earn less than 150% of the poverty line—than those neighborhoods most proximate (and downwind) from Reid-Hillview. That is, that very low-income share of the population ranges from 21.2% in Downtown and Delmas Park (census tract 6085500800) to 39.2% in Guadalupe/ Washington (tract 6085501700), all in the Mineta flight path. In contrast, the neighborhoods surrounding Reid-Hillview range from 17.4% in Tully/Ocala (tract 6085503507) to 20.2% in East Valley (tract 6085503506). Critically, as we the consider environmental justice implications of shifting more lead-based emissions to the neighborhoods near Mineta, one should consider that these same Downtown neighborhoods [already tolerate lead emissions from existing AV operations at Mineta, in addition to heavy daily operations of the region's only airport accommodating jet aircraft with kerosene-based fuel, which emits substantial quantities of airborne ozone and PM2.5](#) in those same neighborhoods. They also bear the burden of emissions from 280, 87, the UP freight line, CalTrain, and other major sources of harmful pollution. In short, the residents of such neighborhoods as Tamien, Gardner, and Washington suffer plenty already from transportation-related air pollution, and likely far more than nearly any other San José residents.

None of us desire to pit the health and safety of one set of high-density neighborhoods against the other. Let's work together to solve the problem, rather than simply moving it, by doing everything possible to halt the use of leaded gas in GA aircraft Countywide, and where necessary, to moving flight operations like these to less densely populated areas of the County.

2. Safety:

A significant increase in general aviation traffic—typically, a Cessna that lands and takes off at less than half the speed of a commercial jet—increases operational risks for the 15 million (pre-pandemic) passengers who annually rely on Mineta for safe travel. Conflicts in speeds leave slim margins for error, and GA aircraft generally have far less experienced pilots than large commercial aircraft. Moreover, when commercial jets seek to land at Mineta, but are required to engage in additional circling to accommodate slower GA operations, we see even greater increases in congestion, flight risk, operational error.

Along with operational safety, we also must consider the environmental safety of greater aggregate air pollution resulting from increased congestion at Mineta. The cumulative impact of increased air pollution from airport congestion on respiratory illness and other facets of human health—particularly in highly harmful ozone and PM2.5—is [very significant](#).

3. Service:

GA traffic—particularly during peak periods—dramatically slows and encumbers operations at Mineta, which has a ripple effect for commercial jet operations at the airport. Delays in peak periods constrain capacity at the airport, undermining longstanding efforts to improve service and expand routes to better serve a Silicon Valley community that strongly prefers flights to Boston over Bakersfield, and to Guadalajara over Garberville. Those constraints have substantial impacts on airport-related jobs—many of which are held by some of our most economically vulnerable community members—and the economic impact of the airport.

While the City has spent more than \$1 billion in the last two decades to upgrade and expand airport operations—and will invest hundreds of millions more—it cannot expand the number or capacity of its runways. Space constraints make runway capacity fixed, so every take-off or landing of a slow-moving prop airplane will displace the same operations of more than one commercial jet.

Next Steps

Moving forward, the County may find that it has several alternatives to address the City’s—and ultimately, the community’s—concerns. In our November 2019 memorandum, we urged consideration of one obvious one: ensure sufficient capital investment in the South County airport to serve more GA aircraft. I have serious concerns about the Board’s premature consideration of a proposal to preclude any such investment in San Martin until it has identified a better alternative. Approving such a proposal places the health of a relatively sparsely populated and more affluent community over that of much more populated, more diverse, and less affluent set of neighborhoods, violating the very environmental justice principles that the County cites to justify the proposed closure of Reid-Hillview.

Regardless of which option the County chooses--whether by expanding operations at the South County site or by finding another option--that solution must be part of, and a condition of, the County’s closure decision. It cannot be relegated to an afterthought, because once the closure decision is made, the political will simply will not exist to make the “hard decisions.” Avoiding these hard decisions will mean that the Board has not solved this public health and environmental justice problem, but merely has redistributed it to another low-income Latino/a/x community.

We can do better. We all represent the same residents, and the same neighborhoods. Let’s work together to find a collaborative solution that provides a solid plan for how to proceed. We look forward to the County’s partnership in fully exploring options to redistribute the 208,260 operations at Reid-Hillview, which is more than the number of flights at Mineta for the same time period.

An elemental tenant of good policymaking comes to us from our first lessons in kindergarten: look both ways before you cross the street. A policy decision that helps one group does not relieve the burden on the policymaker to consider other groups who suffer harm. Let's look both ways, to ensure that we can get across safely—together.

I look forward to discussing this further at your convenience.

Sincerely yours,

A handwritten signature in black ink, reading "Sam Liccardo". The signature is written in a cursive style with a large, looping initial "S".

Samuel T. Liccardo
Mayor
City of San José



Memorandum

To: CITY COUNCIL

From: Mayor Liccardo
Councilmember Jimenez
Councilmember Carrasco
Councilmember Arenas
Councilmember Khamis

Subject: SEE BELOW

Date: August 16, 2019

Approved:

SUBJECT: COUNTY OF SANTA CLARA REPORT ON POTENTIAL CLOSURE OF REID-HILLVIEW AIRPORT

RECOMMENDATION

Accept the report from the County of Santa Clara on potential closure of the Reid-Hillview Airport and:

1. Ask staff to convey the importance of capacity-building activities to be addressed by the County prior to site closure and city approval of entitlements, including:
 - a. Completion of tower and navigation capacity at the San Martin airport as outlined in the 2006 South County Airport Master Plan (including any necessary traffic flow and safety improvements),
 - b. Relocation of the San Jose State University (SJSU) Aviation Program to a suitable local alternative site in either San Martin or Hayward, and,
 - c. Relocation of Civil Air Patrol and Cal Fire to a site that allows for emergency/disaster response.
2. Support staff's joint planning efforts with the county, and ask
 - a. The Office of Economic Development to review the potential for increased economic development throughout the Reid-Hillview flight path, and incorporate analysis within the City Wide Retail Strategy Plan.
 - b. Planning to consider economic opportunities in future long range planning efforts.

BACKGROUND

The potential closure of Reid-Hillview Airport by 2031 offers a dual opportunity to both improve neighborhood safety, and to explore the creation of much needed mixed-income housing and expanded economic development, for a region of the city that has often suffered from underinvestment. We appreciate the County presenting to the City Council and their progress in this effort which has been long awaited by the Eastside San Jose community.

As the City and County continue down the path of bringing this vision to fruition, it is important that the City is clear about important prerequisites – a) ensuring the ongoing competitiveness and safety of Mineta San José International Airport by limiting the challenging integration of large and small aircraft, and, b) supporting the training of our next generation of pilots and airline industry professionals from SJSU, and c) ensuring continued air response for emergencies.

COUNCIL AGENDA
August 20, 2019
Subject: Reid-Hillview Airport
Page 2

Brown Act Disclaimer

The signers of this memorandum have not had, and will not have, any private conversation with any other member of the City Council, or that member's staff, concerning any action discussed in the memorandum, and that each signer's staff members have not had, and have been instructed not to have, any such conversation with any other member of the City Council or that member's staff.