Report of the Select Committee on South Bay Arrivals

This document is a first draft discussion document for review and comment by members of the public and the Select Committee on South Bay Arrivals. It is a first effort attempt to capture the consensus view of the Select Committee, and as such, it is subject to review and revision by the Committee. It does not constitute a set of recommendations by the Select Committee or by the Office of Santa Clara County Supervisor Joe Simitian, which prepared the document. As a first draft, there may well be errors and omissions, which will appropriately be addressed during the course of the Select Committee's remaining three meetings on: October 27, 2016; November 3, 2016; and November 17, 2016.

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Report of the Select Committee on South Bay Arrivals – Discussion Draft V.1.

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TRANSMITTAL LETTER

To be drafted by the Chair of the Select Committee on South Bay Arrivals

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GLOSSARY

Air Traffic Control (ATC): A service operated by the appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

Altitude MSL: Aircraft altitude measured in feet above mean sea level.

Arrival and Departure Procedures: Refers to a published procedure. Once the procedure is assigned, the procedure is designed to be flown with minimal to no communication with Air Traffic Control (ATC).

Decibel: Decibels measure sound levels on a scale from the threshold of human hearing, 0 dB, upward towards the threshold of pain, about 120-140 dB. Because sound levels cover such a large range, a logarithmic scale is used with units in decibels. In computing the combined intensity of two sound sources, their decibel levels are not added arithmetically. The sound level of each source must be converted to the linear scale, the linear intensities added, and that total is converted back to the logarithmic decibel scale. An increase of 6-10 dB is perceived by human ears as a doubling of the level of noise.

~~In sound, decibels measure a scale from the threshold of human hearing, 0 dB, upward towards the threshold of pain, about 120-140 dB. Because decibels are such a small measure, they are computed logarithmically and cannot be added arithmetically. An increase of ten dB is perceived by human ears as a doubling of noise.~~

Day Night Sound Level (DNL): DNL is a weighted measure of the average noise level in a 24-hour day. It is computed by summing sound intensities over a 24-hour period, applying a factor of 10 penalty to nighttime events that occur between 10:00pm and 7:00am. The weighted sum is divided by the number of seconds in a day (86,400) to obtain the average sound intensity per second. This average is converted to the logarithmic decibel scale to compute the DNL value. The measurements of sound intensities used to compute the DNL level use an "A-weighted" frequency filter to approximate the frequency response of the human ear. Often the FAA uses an *annual* DNL value to measure long-term noise exposure. The annual DNL value is the average of daily DNL values over a year.

~~DNL is a measure of the annual average noise in a 24-hour day. It is the 24-hour, logarithmic (or energy) average, A-weighted sound pressure level with a 10-decibel penalty applied to the nighttime events that occur between 10:00pm and 7:00am.~~

DNL Contour: A line of constant DNL level (noise exposure) in the vicinity of an airport. FAA defines significant noise exposure as any area at or above the 65dB DNL contour; that is the area within an annual DNL level of 65 decibels or higher.

~~The "map" of noise exposure around an airport. FAA defines significant noise exposure as any area within the 65dB DNL contour; that is the area within an annual average noise exposure of 65 decibels or higher.~~

Fixes: In aviation, a fix is a virtual navigational point that helps aircraft maintain their flight path. Fix is a generic name often interchanged with waypoint or intersection.

Fleet Mix: The mix or differing aircraft types operated at a particular airport or by an airline.

Frequency Weightings: Used to allow a sound level meter to measure and report noise levels that represent various sensitivity profiles. These are electronic filters within a sound level meter that adjust the way in which the instrument measures the noise. The most commonly used Frequency Weightings are 'A' (profile approximating the human ear), 'C' (profile that is flatter than 'A', including lower frequency, bass, components), and 'Z' (full unfiltered bandwidth). DNL incorporates only "A" weighted measurements.

~~what humans hear. These are electronic filters within a sound level meter that are used to adjust the way in which the instrument measures the noise. The most commonly used Frequency Weightings are 'A', 'C' and 'Z.' DNL incorporates only "A" weighted decibels.~~

Glide Slope: Generally a 3-degree angle of approach to a runway. Provides vertical guidance for aircraft during approach and landing.

Ground Track: The path an aircraft flies over the ground.

Hold Procedure (Holding): A predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from ATC.

Instrument Flight Rules (IFR): Rules governing the procedures for conducting instrument flight.

[COMMENT: Definitions of "Moving Noise" / "Noise Shifting" should be added to the Glossary.]

NextGen (Next Generation): An encompassing term for the ongoing, wide-ranging transformation of the United States' national airspace system. It has sometimes been described as an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management.

Optimized Profile Descent (OPD): An arrival procedure that is designed to allow aircraft to use idle engine power and reduce level-offs during descent, best suited for use during periods of medium to light traffic.
An OPD is defined in two parts. The first part is a "performance" path between top-of-descent to the first constrained waypoint (the beginning of the STAR), which is designed to be flown in flight-idle or ECON mode. The second part is the STAR itself, which is a "geometric" path (i.e., targeted speeds and positions) that is shallower (between 2° and 3°) and flown at non-idle power.

Procedures, general: A published, standardized set of instructions that an aircraft can fly with minimal input from ATC. Procedures are designed with strict separation criteria from other procedures.

Runway: A long strip of land or water used by aircraft to land on or to take off from. For aircraft arriving to San Francisco International Airport, the primary Runways used are Runway 28 Right (28R) and 28 Left (28L), which are parallel to each other.

Sequencing: The lining up of aircraft into a single flow by ATC so that all aircraft are separated to appropriate criteria. This is normally mentioned in association with landing.

Standard Instrument Departure (SID): A published IFR departure procedure from an airport printed for pilot/controller use in graphic form to provide obstacle clearance.

Speed Brakes: Moveable aerodynamic devices on aircraft that cause drag to reduce airspeed during descent and landing. It also causes turbulence and noise.

Standard Terminal Arrival Route (STAR): A published IFR arrival procedure to an airport printed for pilot/controller use in graphic form. STAR's provide transition from the enroute structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

Time Based Flow Management: TBFM uses time and distance to control an aircraft's approach to an airport and to help air traffic controllers sequence air traffic by directing aircraft to be at a specific location at a specific time, which optimizes arrival flow.

~~instead of distance to help air traffic controllers sequence air traffic by directing aircraft to be at a specific location at a specific time, which optimizes arrival flow.~~

Terminal Radar Approach Control (TRACON): FAA air traffic facility that uses radar and non-radar capabilities to provide approach control services to aircraft arriving, departing, or transiting airspace controlled by the facility.

Vector: A heading issued to an aircraft to provide navigational guidance by radar; i.e., a series of instructions from ATC directing an aircraft between two end points.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used to indicate weather conditions that are equal to or greater than the minimum VFR requirements.

Waypoint: A waypoint is a predetermined reference point in physical space used for purposes of navigation. It is also known as a fix.

COMMENT: Following this section, a list of Guiding Principles or Criteria by which the SC will make decisions should be added.

Suggested criteria are:

1. Is this recommendation based upon objective data about noise and population impact of the proposal? (estimates of potential impact are needed, even for "known" beneficial fixes, so we can validate whether the benefits, when achieved, are as large as expected, or if further adjustments are required)

2. Will this recommendation help bring us back to an acceptable noise baseline? (pre-NextGen should be the minimum but new technology should be reducing noise for everyone not increasing it)

3. Will this recommendation lead to a fairer distribution of noise? (no community should be asked to bear an unfair noise burden or "cost" of increased aircraft traffic)

4. Will this recommendation yield the greatest benefit for the most people?

5. Will this recommendation mitigate the impact of air traffic concentration above ‘sacrificial communities”? (dispersion is a potential tool to ensure this does not happen)
6. How will this recommendation be enforced]

SECTION 1: FAA NORTHERN CALIFORNIA INITIATIVE, FEASIBILITY GROUPS 1 THRU 6

In November 2015, the "FAA Initiative to Address Noise Related Concerns in Santa Cruz/Santa Clara/San Mateo/San Francisco Counties" was released. Known as the Northern California Initiative, or NorCal Initiative, it included a number of proposed technical solutions that were brought to the FAA to analyze, study, and/or evaluate. On May 16, 2016, the results of Phase 1 of the NorCal Initiative was released, consisting of a Feasibility Study (Study) of the proposed technical solutions. The FAA then grouped the solutions deemed feasible into six groups, as discussed further below in Section 1 of this Report.0

[COMMENT: In this or a new first section, it is suggested that we add a preamble comment that PBN should not be the guiding principal to herald for terminal procedures. Instead, appropriate consideration should be first given to the constituents that live below the flight route corridors who feel the effects of Airplane Noise. Efficiency should not come at the expense of citizen angst.]

1.1 Feasibility Group 1: SFO Class B Amendment

Class B airspace is the restricted airspace around the nation's busiest commercial airports designed to ensure a higher level of safety for aircraft landing at the airport. It can be visualized as an upside down wedding cake. The airport is at the center of the cake topper with the airspace reaching to 10,000 feet over the airport in a series of concentric circles. To the south, SFO's Class B airspace reaches roughly to the junction of Summit Road/Skyline Boulevard/Highway 17 (approximately 35 miles from SFO) in the Santa Cruz Mountains.

The FAA has advised the Committee that there is an identified problem in that the SFO Class B airspace, as currently configured, does not fully provide containment of the entire flight path (the so called "SERFR procedure"), which approaches SFO from the south over the Santa Cruz Mountains.

[COMMENT: When Class B airspace is altered, General Aviation airspace is sacrificed … forcing those airplanes to fly lower. A preferred approach would simply raise the altitude at which airplanes enter the approach procedure. That single step will keep airplanes within the existing Class B airspace.]

As a result, aircraft are required to "level off" to stay within the airspace (or "cake"). Leveling off, however, means aircraft are taken off their Optimized Profile Descent (OPD), or idle descent to final approach. This change in glide path requires aircraft to use speed brakes, increase thrust, or take other actions which in turn generate more noise. This leveling off is presently occurring just off the Capitola coastline (near the point in space known as the EPICK waypoint), as well as over the Mid-Peninsula.

Feasibility Group 1 contains proposals to amend the SFO Class B airspace to fully contain the SERFR procedure by altering the size or shape of the airspace (or the size or shape of the cake layers) to keep aircraft inside the airspace (or cake) and on their OPD. Once the SFO Class B is amended, the expectation is that more flights will fully execute an OPD and no longer need to make altitude and speed adjustments, thereby reducing the noise exposure near the Capitola coastline (i.e., the EPICK waypoint) and over the Mid-Peninsula, but not in the vicinity of the MENLO waypoint. No changes to the Class B

airspace should result in lowering the altitudes of arriving aircraft (whether vectored or direct) at any point along the path.

***Recommendation*:** The Select Committee recommends adoption of Feasibility Group 1.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 1 encompasses seven of the items in the Study: 1.d.i; 1.d.ii; 2.b.i; 2.c.iii; 2.d.ii; and 3.d.ii.

[COMMENT: Suggest moving night time arrivals including cargo planes to section 2.4]

1.2 Feasibility Group 2: Transition the SERFR Standard Terminal Arrival Route (STAR) Back to the BSR Ground Track Prior to EPICK

Feasibility Group 2 contains proposals to move the arrival procedure from the south, back west to a similar ground track previously used for the BSR procedure. This design would put the SERFR flight path back over the BSR ground track, roughly 3-4 miles to the west of where the path currently reaches the Santa Cruz County coastline (near the City of Capitola). However, it should be noted that even with a "return to the BSR ground track," aircraft would not actually fly the same conventional procedure as the previous BSR. The BSR procedure predated NextGen and did not use satellite-based navigation. NextGen uses satellite navigation and Optimal Profile Descents (OPD). These Optimal Profile Descents include some waypoints with an altitude control "window" providing a range of altitudes (from lowest to highest; e.g., 7,000 feet to 9,000 feet) that aircraft must be within when crossing the waypoint. In addition, and speaking generally, the pre-NextGen flights were relatively dispersed as compared to present-day NextGen procedures which consolidate, to a greater degree, flights along a narrower path.

The FAA has advised the Committee that a new flight procedure that is GPS-based and that contains an OPD could be designed to fly the old BSR ground track, as suggested in the proposals

In Feasibility Group 2. The FAA has presented to the Committee a "notional DAVYJ procedure," a notional concept of this new OPD over the BSR ground track. Because the notional DAVYJ is an OPD route 3-4 miles to the west of SERFR, it has a profile similar to SERFR, at altitudes higher than the SERFR procedure and lower than the old BSR procedure.

[COMMENT: Before this idea is incorporated, it is recommended that a detailed, comparative analysis of the ground effects from a new approach procedure be evaluated.

Also, the Committee should be assured that a new route would in fact, be Higher than SERFR, Lower than BSR (by how much?) This assertion is not in concert with data presented by the FAA.

Only when it is shown that it is an improvement to overall noise and fewer people are affected should it be implemented.]

Recommendation: The Select Committee recommends: TO BE DETERMINED

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 2 encompasses two of the items in the Study: 1.f.i and 3.d.ii.

1.3 Feasibility Group 3: Increasing Percentage of NIITE Flights Which Remain on NIITE Until at Least the NIITE Waypoint

Feasibility Group 3 applies to nighttime operations, from 1:00am-6:00am. At present, nighttime operations on the NIITE procedure (which does not include all flights at night) depart SFO over the San Francisco Bay (Bay), reach the NIITE waypoint in the Bay north of the Bay Bridge, then turn to the northeast to fly out of the Bay Area over several East Bay communities. About 35 percent of NIITE flights are currently turning early. Because the flights turn earlier, they are at a lower altitude when they turn; and consequently may generate more noise exposure on the ground.

Feasibility Group 3 contains proposals to increase the percentage of these eastbound NIITE flights that remain on the path until reaching the waypoint, thereby reducing early turns which cross land at lower, noisier altitudes. The FAA has advised the Committee that the result should be less noise exposure for some East Bay communities; such change, however, is not expected to provide benefit to residents in the three-county area served by the Committee. The Committee assumes that the proposed change would not limit the FAA's ability to route more arrival traffic over BDEGA-east (including, for instance, OCEANIC arrivals in the middle of the night).

Recommendation: The Select Committee recommends adoption of Feasibility Group 3.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 3 encompasses five of the items in the Study: 2.a.ii.a; 2.a.ii.c; 2.g.ii; 3.d.i; and 3.d.ii.

1.4 Feasibility Group 4: Create a New South Transition for the NIITE Standard Instrument Departure (SID)

Feasibility Group 4 also applies to nighttime operations, from 1:00am-6:00am. At present, nighttime operations on the NIITE procedure (which does not include all flights at night) depart SFO over the San Francisco Bay (Bay), reach the NIITE waypoint in the Bay north of the Bay Bridge, then turn to the northeast to fly out of the Bay Area over several East Bay communities. The NITTE procedure does not provide a path for nighttime departures headed to southern destinations.

Currently, nighttime (as defined under "DNL" in the glossary) SFO departures headed to southern destinations use the SSTIK departure procedure. These nighttime operations on the SSTIK departure procedure depart SFO over the San Francisco Bay (Bay) to the northeast and quickly loop back around over the Peninsula communities of Brisbane, San Bruno, and South San Francisco to head to southern

destinations. Because flights currently departing on the SSTIK procedure make a quick loop from the Bay down over the Peninsula, they do so with related noise exposure for the Peninsula communities below. A number of these communities have asked if other flight paths might be explored.

Feasibility Group 4 proposes that nighttime SSTIK departures use the NIITE procedure up to the NIITE waypoint, which is in the Bay north of the Bay Bridge, then the aircraft would head west out over the Golden Gate Bridge. By keeping the SSTIK departures over the Bay and Pacific Ocean, the aircraft are able to gain altitude over unpopulated areas. As a result, when they are eventually flying over the San Francisco Peninsula on their way to southern destinations they will do so at a higher altitude (and will thus be quieter).

The Committee assumes that the proposed change would not limit the FAA's ability to route more arrival traffic over BDEGA-east (including, for instance, OCEANIC arrivals in the middle of the night).

Recommendation: The Select Committee recommends adoption of Feasibility Group 4.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 4 encompasses six of the items in the Study: 1.f.iii; 2.a.ii.a; 2.f.i; 2.g.ii; 3.d.i; and 3.d.ii.

1.5 Feasibility Group 5: Increasing Percentage of CNDEL Flights Which Remain on CNDEL Until at Least the CNDEL Waypoint

The CNDEL is a departure procedure from the Oakland International Airport, with aircraft heading northwest over the San Francisco Bay (Bay) to the CNDEL waypoint which is located off the northwesterly end of Alameda Island. Under the current procedure/path, aircraft reach the waypoint and then turn west and south over Brisbane and South San Francisco. Sixty percent of the CNDEL departures are currently turned before the CNDEL waypoint. This means they reach the San Francisco Peninsula sooner and at lower altitudes. These turns are due to spacing and sequencing the CNDEL aircraft with other departing aircraft in the Bay Area airspace.

Feasibility Group 5 contains proposals to increase the percentage of CNDEL departures that stay on the procedure longer and do not turn prior to the CNDEL waypoint, thereby reducing the number turning before the CNDEL waypoint and crossing land at lower, noisier altitudes.

Recommendation: The Select Committee recommends adoption of Feasibility Group 5.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 5 encompasses eight of the items in the Study: 1.a.ii; 1.b.i; 1.b.ii; 1.c.ii; 2.a.ii.a; 2.a.ii.b; 3.d.i; and 3.d.ii.

1.6 Feasibility Group 6: Improve Aircraft Set Up and Sequencing Between Facilities

Aircraft are sequenced to ensure they arrive on the final approach course safely and at repeated intervals allowing for airport operational efficiency. Existing metering tools aid in this air traffic management, but aircraft "vectoring" (turning aircraft off the assigned procedure) and "holding" (a maneuver designed to delay an aircraft already in flight while keeping it within a specified airspace) affect a substantial number of flights, especially in congested airspaces such as the San Francisco Bay Area. Vectoring ~~also~~ is a major source of noise because~~;~~ it often involves turning aircraft~~,~~ ~~turning and changes in~~ speed and altitude changes increasing the ~~, with increased~~ noise exposure on affected communities.

[COMMENT: If an aircraft is known to be vectored, keeping them higher until they can be sequenced into an approach to landing would reduce noise. This concept IS feasible, a pilot can do it even if the FMS cannot.]

Feasibility Group 6 contains proposals to use new, more effective, time-based flow management tools currently in development to allow for better sequencing (i.e., spacing) of aircraft to reduce the percentage of aircraft that are vectored or held prior to the final approach path to SFO.

[COMMENT: Terminal Sequencing and Spacing (TSS), or time-based flow management, has been in development for several years but is not expected to become operational for another 3-5 years. GPS technology can create Noise Corridors due to its inherent accuracy of position and flight path. One of our goals is to decrease such avenues. Needed is to ensure that concentration (volume of flights over a particular path) of arriving flights due to TBFM does not increase from what now exists and if possible, to decrease the concentration of arriving flights on a single Arrival Route.]

New metering tools are not an immediately available fix; however, the technology to create Terminal Sequencing and Spacing (TSS), or time-based flow management, is in development. In the future, the expectation is that ~~such~~ GBAS technologies~~ica~~ will allow RNP approaches that would include descending vectored approaches. ~~I~~ Such advances will allow for aircraft flows to be taken into account and assigned an order well in advance of final approach. The benefit of such technological advances are two-fold: (1) reduced percentage of vectored or turned aircraft and related noise exposure; and (2) greater ability to leave aircraft on Optimized Profile Descent (OPD), with an idle descent that is quieter.

Recommendation: The Select Committee recommends adoption of Feasibility Group 6.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Technical Note: Feasibility Group 6 encompasses five of the items in the Study: 3.b.i; 3.b.ii; 3.c.i; 3.c.ii; 3.d.ii.

SECTION 2: OTHER POTENTIAL SOLUTIONS

In the course of the Select Committee's deliberations, a number of additional potential solutions were identified. Each of these proposed "Other Potential Solutions" is discussed further below.

COMMENT: Few, if any, noise mitigation solutions have been evaluated for the Mid-Peninsula areas. Should we evaluate alternative ingress routes to reduce the level of traffic now being experienced?]

[COMMENT: Suggest recommending a roll back of HR658 [? not sure of number] to 'go back' to previously working routes to allow time to fix Class B and to allow time to fully consider both the advantages and the unintended consequences of new routes.]

2.1 Airbus A320 Aircraft Family Wake Vortex Generators Retrofit

Airbus's A320 family of aircraft built before 2014 makes a whistling (or whining) sound on approach due to wing design. The Committee was advised that the whistle (whine) can be reduced by mounting a small air deflector on each wing. The cost of such technology is reportedly modest ($3,000-$5,000 per aircraft). The noise reduction from the retrofit has been claimed to be from between 2 to 11 decibels depending on the phase of flight and angle of the aircraft along the approach. Roughly 35 percent of the aircraft arriving and departing SFO need the retrofit.

[COMMENT: There is a need to impart a sense of urgency to this idea. It can be done easily and orderly, but with an improved timeline that gets it done earlier. Corollary … can SFO require Air Bus airplanes to install the vortex generators as a condition of using the airport? That would speed things along quickly.]

Recommendation: The Select Committee recommends that the Airbus family aircraft arriving or departing SFO undergo the retrofit ~~at the earliest possible opportunity~~by December 31, 2017 either through legislation from Congress or SFO incentives. The Committee takes notes of the fact that one major airline flying into and out of SFO has proposed to retrofit its fleet over the next 2-3 years. While the commitment to retrofit is welcome news, the Committee finds that the time period is unnecessarily and unacceptably long.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.2 Northern Arrivals (BDEGA) into SFO

SFO arrivals from points north arrive via the BDEGA arrival procedure/path. Arriving aircraft reach a point roughly over Daly City and then continue south flying past SFO, using either the Peninsula (the so-called West leg) or San Francisco Bay (the so-called East leg), to essentially make a U-turn and land on Runways 28L and 28R, respectively. The FAA has advised the Committee that the Bodega East leg shares the final approach path into SFO with aircraft arriving from the east on the DYAMD arrival procedure.

Aircraft using the East leg, or over-the-bay route, obviously have a dramatically reduced noise exposure versus aircraft using the West leg, which fly over the highly populated Mid-Peninsula.

In years past, there was a roughly equal split of aircraft using the West and East legs of the BDEGA arrival procedure/path. The FAA has advised the Committee that ten years ago, in May 2006, the "split" between the two legs was 52 percent West leg and 48 percent East leg. In May 2016, roughly 70 percent of the arriving aircraft used the Peninsula (the so-called West leg), while roughly 30 percent of arriving aircraft used the San Francisco Bay (the so-called East leg). This overutilization of the Peninsula or West leg negatively affects the highly populated Mid-Peninsula communities.

Recommendation: The Select Committee recommends greater use of the San Francisco Bay (BDEGA East leg) to the fullest extent possible. Indeed, during the overnight hours (11:00pm until 6:00am), when air traffic flows are reduced, the Committee recommends that virtually all aircraft arriving from the north on the BDEGA procedure use the San Francisco Bay (BDEGA East leg).

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.3 Woodside VORTAC (Navigational Beacon)

Aircraft fly in the vicinity of the Woodside VORTAC, a ground-based navigational aid, to arrive at SFO. Aircraft activity in this area includes aircraft arrivals from numerous origin points, including but not limited to OCEANIC arrivals, which come in from the west from overseas.

Based on discussions between and among SFO, the FAA, the SFO Airport/Community Roundtable, and local elected officials, a new noise abatement procedure was implemented at the Woodside VORTAC in July 1998. Pursuant to this procedure, for those flights routed over the Woodside navigational beacon, "traffic permitting," air traffic controllers shall clear SFO OCEANIC arrivals to cross the Woodside VORTAC at or above 8,000 feet mean sea level.

The Committee received numerous reports from the community that this agreement is not currently honored. There are reports of aircraft flying over the Woodside VORTAC at altitudes appreciably lower than 8,000 feet, including at night when residents are particularly sensitive to noise. The Committee also found that there is an authorized Ocean Tailored Arrival (OTA), which specifically allows arriving OCEANIC aircraft to be at or above the Woodside VORTAC at 6,000 feet. This OTA is also used in the overnight hours when residents are particularly sensitive to noise. The FAA has advised the Committee that while OCEANIC flights represent just four percent of the daytime traffic arriving into SFO, OCEANIC flights represent thirty-six percent of the flights arriving at SFO at nighttime ~~(1:00am-6:00am).~~.

The Committee understands that making mandatory the Woodside VORTAC minimum floor at 8,000 ft may require raising altitudes of vectored traffic near the bay to prevent additional noise over other mid-Peninsula communities.

***Recommendation* 1:** The Select Committee recommends that per the current noise abatement procedure, aircraft comply with the obligation to cross the Woodside VORTAC at 8,000 feet mean sea level, traffic permitting. The Committee further recommends that this altitude restriction, to the

greatest extent possible and traffic permitting, also be applicable to all vectored flights that are in the vicinity of the Woodside VORTAC.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

***Recommendation* 2:** The Select Committee recommends revision of the Woodside VORTAC Ocean Tailored Arrival to honor the existing noise abatement procedure to cross the Woodside VORTAC at 8,000 feet.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

***Recommendation* 3:** The Select Committee recommends further restrictions to prohibit any overnight crossings at the Woodside VORTAC below 8,000 feet.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.4 Overnight Flights

During the hours of ~~11~~10:00pm-~~6~~7:00am the number of flights in to and out of SFO is significantly reduced. As a result, there is considerable potential for aircraft to be rerouted over unpopulated or less populated areas, specifically the San Francisco Bay and Pacific Ocean, instead of the Peninsula.

[COMMENT: The issue of operating hours is now part of the Class B Redesign. We should separate the topic and ask that it be acted upon as soon as possible.]

Currently SFO employs a number of overnight noise abatement procedures. Examples include but are not limited to: (a) Nighttime Preferential Runway Use, which maximizes flights over water and minimizes flights over land and populated areas between 1:00am and 6:00am; (b) Ocean Tailored Arrivals, a procedure that allows aircraft to use what is called a continuous, ~~constant~~ descent approach (CDA) to the airport; and (c) Prohibitions on "run-ups" of mounted aircraft engines for maintenance or test purposes between the hours of 10:00pm and 7:00am daily with limited exceptions.

[COMMENT: Suggest adding item 3.d.ii to this group. It discusses night time arrivals and should include overnight cargo flights while recommending that they make use of the full length of the bay for their arrivals. Suggest a different STAR route (BDEGA East or FAITH) to minimize the noise associated with their arrival into the area. This is an area that could be dealt with in a timely manner.]

***Recommendation*:** The Select Committee recommends that the FAA, SFO, and industry users convene with the purpose of establishing new additional overnight noise abatement procedures within the next six months.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.5 MENLO Waypoint

The MENLO waypoint is located several city blocks south of the intersection of Willow Road and Highway 101. It is the final waypoint on the SERFR arrival procedure/path, which is an arrival procedure into SFO from the south that approaches the airport from the Santa Cruz Mountains. Aircraft on the SERFR arrival procedure/path then cross the MENLO waypoint to join the final approach path into SFO. The altitude of the MENLO waypoint is currently 4,000 feet. Given its location over a highly populated area, the location and altitude of the MENLO waypoint are problematic and a source of many community complaints.

The FAA has advised the Committee that in June 2016, an average of 183 aircraft arrived each day into SFO on the SERFR procedure/path, representing 30 percent of the arrivals into SFO. The FAA has also advised the Committee that currently 50 percent of the aircraft on the SERFR arrival procedure/path are vectored off the procedure/path prior to the MENLO waypoint. As discussed in Item 2.9 in this Report (Aircraft Vectoring), the vectored SERFR aircraft are eventually sequenced for merging onto the final approach into SFO. The FAA has also suggested that the Committee take note of the fact that there are other aircraft in the vicinity of the MENLO waypoint that are not related to the SERFR arrival

procedure/path. These "other aircraft," the FAA pointed out, represent 85 percent of the aircraft in the vicinity of the MENLO waypoint.

[COMMENT: The SERFR traffic (15% of SFO arrivals) is the only traffic that must cross MENLO at 4,000 ft. All other traffic is vectored traffic, which does not follow a specific procedure but rather instructions from Air Traffic Control.]

[COMMENT: The 85 percent number above is in question .... please verify]

With all this in mind, it has been suggested that the altitude of the crossing at the MENLO waypoint be increased. It has also been suggested that a different final waypoint be established for the SERFR procedure, located to the east and/or north of the current MENLO waypoint (presumably over a less populated area and at a higher altitude). This suggestion could involve establishment of a new waypoint, or the use of existing waypoints, such as the ROKME, FAITH or DUMBA waypoints. These waypoints are located in the San Francisco Bay, just to the north and south of the eastern shoreline of the Dumbarton Bridge, respectively and FAITH is far to the southeast. Under this suggestion, aircraft would cross at one of these waypoints, which would be at a higher altitude as compared to the current altitude at the MENLO waypoint, before joining the final approach into SFO.

***Recommendation* 1:** The Select Committee recommends that the FAA restore the altitude crossing at the MENLO waypoint to a minimum of 5,000 feet, and if possible, increase it to higher levels. ~~increase the altitude crossing at the MENLO waypoint~~.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

Recommendation 1b: The Select Committee recommends that the FAA consider the possibility of increasing the horizontal width of the MENLO waypoint window to allow dispersal of the noise now concentrated over East Palo Alto.

(Vote: Aye, Nay, Absent or Abstain)

***Recommendation* 2:** Additionally, the Select Committee recommends that the FAA assess the feasibility of establishing a different waypoint for entry to the final approach into SFO on the SERFR arrival procedure, including the proposal to use the FAITH way point.

A different waypoint could be established and located either to the east, southeast and/or north of MENLO, or by using existing waypoints ROKME, FAITH or DUMBA. The new waypoint should be at a location that allows flight over compatible land uses (i.e., over water or sparsely populated land masses) and at a high enough altitude to ensure that noise exposure of approaching aircraft is minimized. The Committee acknowledges that this recommendation potentially involves working with stakeholders to revise the San Jose International Airport Class C airspace to maintain safety clearance requirements. ~~if the ROKME waypoint option is pursued.~~

[COMMENT:

A new idea is to have ATC reassign ingress routes to other arrival procedures to limit the number of airplanes allowed to use the waypoint within a time interval (5-10 planes per hour?)]

The Select Committee does not recommend that a different final waypoint be established for the SERFR procedure, either through the establishment of a new waypoint or by using an existing waypoint, if such an action simply results in "noise shifting."

However, per the FAA's own guidance, recall that procedure changes that result in noise levels below 45 dB DNL or altitudes above 7,000 ft AGL (above ground level) over densely populated residential areas shall not be considered "noise shifting" since, 'such changes will not result in a significant noise increase over the ambient noise level'.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.6 Raise Floor of ~~Establish Smaller and More Numerous~~ Altitude Control Windows on the New SERFR Arrival Path

An altitude control window at a waypoint provides a range of altitudes (from lowest to highest; e.g., 7,000 feet to 9,000 feet) that aircraft must be within when crossing the waypoint. The FAA has advised the Committee that the range of altitudes is provided because the aircraft fleet mix varies. The last leg of SERFR has only one altitude control window, at waypoint EPICK (just offshore from Capitola on the Santa Cruz County coast) with a range of 10,000 feet to 15,000 feet. By reducing the size of that window by 2,000 feet, so that its range is 12,000 feet to 15,000 feet, aircraft would be at a higher altitude when crossing the EPICK waypoint.

Recommendation: The Select Committee recommends that the FAA decrease the size of the altitude windows on the SERFR procedure or path so that aircraft crossing EPICK do so at a higher altitude.

Recommendation 2:

It is suggested that the arrival procedure for SERFR or any subsequent route in this sub-region begin shortly after departing Monterey toward Monterey Bay. This procedure could easily be used to allow aircraft to reduce speed early, while over the Bay (less noise) and begin their OPD descent into the Santa Cruz area and beyond and affecting fewer people.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.7 Increase the Altitude and Profile of Descents into SFO

An approach slope is the descent path that aircraft follow on final approach to land on a runway. An approach slope is also known as a glide slope, as the path is ideally a gentle downward slope. A commonly used approach slope in modern aviation is 3.0 degrees from the horizontal.

~~As~~ At SFO, the two main landing runways are 28L and 28R and they are parallel to each other. Currently, 28R has an increased glideslope over 28L.

It makes more sense to reverse these angles. ~~Runway 28L has a glide slope of 2.85 degrees, while Runway 28R has a glide slope of 3.0 degrees. The variation in the glide slopes is a function of the two runways being parallel to each other.~~ If the glide slope on both Runways 28L and 28R at SFO were increased and the glide slope on runway 28L were made the steeper approach, it would allow descending aircraft, particularly those approaching over mid-peninsula communities, to begin their descent at a higher altitude, thereby reducing noise exposure on the ground.

Other airports use a steeper glide slope. For instance, the Frankfurt airport is using 3.2 degrees while London City airport uses a glide slope of 5.5 degrees.

~~If the glide slope on both Runways 28L and 28R at SFO were increased, even if only by 0.15 degrees each, it would allow descending aircraft to begin their descent at a higher altitude, thereby reducing noise exposure on the ground.~~

***Recommendation*:** The Select Committee recommends that the FAA determine the feasibility of increasing the glide slopes of SFO Runways 28R and 28L and making the glide slope of runway 28L the steeper of the two within constraints of aircraft safety. ~~The Select Committee recommends that the FAA determine the feasibility of increasing the glide slopes of SFO Runways 28R and 28L.~~

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.8 Increase All Altitudes

Aircraft noise is noise pollution produced by any aircraft or its components. The noise is generated during the various phases of a flight, such as when the aircraft is: (a) on the ground while parked using auxiliary power units; (b) while taxiing; (c) during takeoff; (d) while over-flying while enroute; and (e) during landing. Aircraft noise is also generated both underneath and lateral to departure and arrival paths. This latter form of aircraft noise has been the primary source of complaints since the March 2015 implementation of NextGen. At the risk of stating the obvious, the higher the altitude of departure and arrival paths, the quieter the experience is on the ground. Or, in other words, aircraft at higher altitudes tend to be quieter.

Recommendation: The Select Committee recommends that to the greatest extent possible, while still ensuring the safety of the aircraft, that the altitude be increased for all flight procedures/paths in to and out of SFO.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.9 Aircraft Vectoring

Vectoring is assigned verbally by FAA air traffic controllers, and generally involves turning aircraft off the assigned procedure/flight path. Vectoring of SFO arrivals over the Mid-Peninsula is common and principally generated from three sources: (1) arrivals from the north (BDEGA); (2) to a lesser degree, overseas arrivals from the west (OCEANIC); and (3) the roughly 50 percent of the arrivals from the south (SERFR) that are currently vectored off the SERFR procedure/path. These arriving aircraft are vectored to properly sequence them for merging onto the final approach into SFO.

[COMMENT: A 50% vectoring rate implies that the SERFR route is being *over used*. An alternative route should be employed to minimize the vectoring now being experienced on this route. Alternatively, a process to limit the usage of the SW approach route could be employed to push incoming flights onto other approaches.]

It should be noted that while noise generated by vectoring in the first two instances (i.e., BDEGA and OCEANIC) occurs in the vicinity of the MENLO waypoint, these vectored flights do not need to cross the MENLO waypoint~~, the location of these operations is unrelated to the presence of the MENLO waypoint~~, as discussed further in Item 2.5 in this Report (MENLO Waypoint).

Vectoring can be a source of significant noise. If the vectoring directive from air traffic control to the pilot includes a change in speed, a turn, and/or an altitude restriction, an increase in noise is a likely result. On the other hand, if the vectoring directive is unrestricted, with the pilot not being given a speed or altitude restriction, it is possible that less ~~unlikely that~~ noise will result. The FAA has advised the Committee that vectoring is done for safety reasons, and that the specific directive provided is dependent on the flight environment variables present. Consequently, according to the FAA, it is not predictable what the noise exposure will be from vectoring.

Yet, vectoring is the source of many of the noise complaints presented to the Committee by the community. This is due in part because the aircraft vectoring over the Mid-Peninsula do so at low altitudes. In addition, the topography of the Mid-Peninsula is uneven. To further complicate the matter, while ~~some~~ many members of the community have complained that vectoring is a source of noise, others warn that efforts to keep greater numbers of aircraft on the established flight paths concentrates even greater amounts of noise on those who live or work under the established flight track (this is the issue some advocates refer to as “sacrificial noise corridors”). So, if you vector, you create noise over a relatively wide area; if you don’t, you concentrate a greater amount of noise on a relative few (a smaller number) who are already heavily burdened.

It has been suggested that the altitude at which aircraft are vectored over the Peninsula be increased, to reduce the noise exposure experienced on the ground. It should be noted, however, that the FAA has advised the Committee that increases in the altitude of the BDEGA West leg vectored aircraft could require the aircraft to fly somewhat further south, in order to safely descend and make the U-turn to join the final approach into SFO.

[COMMENT:

Glen Martin estimated that the above paragraph describes what could be done. However, he also noted that the altitudes of such flights near MENLO are about 5500 feet. However, analysis shows that the actual altitudes are closer to 4,000 feet on average (Lower than SERFR!).

His comment suggests that if 5500 feet is true and in use, it must be OK. If so, the vectored flights could turn earlier to achieve the 5500 feet altitude over MENLO and still be able to execute the maneuver.]

***Recommendation*:** The Select Committee recommends that the FAA identify locations that have the most compatible land uses for vectoring, such as over the Pacific Ocean or San Francisco Bay, and vector the SFO arriving air traffic in those locations to reduce noise exposure experienced on the ground.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.10 Modify BRIXX Procedure into San Jose International Airport

The BRIXX arrival is an arrival procedure/path from the north into San Jose International Airport (SJC) which runs down the Peninsula, roughly over La Honda and Boulder Creek before turning and flying south and then turning east and north (essentially a big U-turn) to join the final approach into SJC. The BRIXX path intersects with the SERFR arrival path (which approaches SFO from the south over the Santa Cruz Mountains), roughly just to the north of Mount McPherson in the Santa Cruz mountains.

The FAA has advised the Committee that, under NextGen, BRIXX basically overlaid a predecessor path, which was named GOLDN. The change to a satellite based navigation flight path, as opposed to the prior ground track flight path, resulted in the BRIXX arrival path becoming more concentrated; with vectoring moving southward, and moving closer to the designated flight path. The FAA further advised the Committee that roughly 76 percent of the BRIXX flights are vectored or turned off the path prior to the point where BRIXX intersects with SERFR. These changes resulted in complaints from residents in affected residents.

It has been suggested that these complaints be addressed by: (1) moving the intersection of BRIXX and SERFR farther to the north and east, potentially to waypoint EDDYY, which is located roughly over the Rancho San Antonio Open Space Preserve; and (2) increasing the altitude of BRIXX so that it is above the altitude of the SERFR arrival path.

The FAA has advised the Committee that these potential solutions raise a number of concerns. First, moving the flight path as suggested potentially moves noise further into the already impacted Mid-Peninsula area and places arriving aircraft at too high of an altitude too close to SJC. In order for those aircraft to safely land, the aircraft would have to fly even further south to make the necessary turn to the east and the north to join the final approach into SJC, potentially resulting in new noise exposure. Increasing the altitude of BRIXX also potentially limits the FAA's ability to consider other potential solutions the Select Committee might advance, such as raising the altitude on SERFR.

[COMMENT: This solution should not be recommended without a detailed study including noise and population impacts.
As presented by the FAA, this change would further increase noise in the already overburdened Mid-Pen area.
As this will move noise to another community it is not clear why this recommendation was not disqualified on this criteria as were recommendations 2.11, 2.12, 2.13, 2.14.
Decision-making criteria for evaluating the recommendations in this report need to be determined before voting and the criteria must be applied consistently.]

***Recommendation*:** The Select Committee recommends: TO BE DETERMINED

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

2.11 Modify NRRLI Waypoint on the First Leg of SERFR

In the Carmel Valley (Monterey County), aircraft joining the SERFR arrival procedure/path turn over the Valley to reach the NRRLI waypoint. That turn has created adverse noise exposure on the ground. Prior to the March 2015 implementation of NextGen procedures, aircraft flew over the Carmel Valley in a straight line. It has been suggested that the NRRLI waypoint be moved to where the SERFR procedure/path intersects the coastline near the City of Seaside along the Monterey Bay.

The FAA has advised the Committee that this proposed solution, however, has the potential to move existing noise to another community. For that reason, the Select Committee has not endorsed this solution. The FAA may, however, wish to examine whether this proposed solution, or a variation thereof, could be effectively implemented without shifting noise.

2.12 San Jose International Airport Reverse Flow: Aircraft Arrivals

Under normal conditions, aircraft arriving at San Jose International Airport (SJC) arrive from the south and depart heading north. During inclement weather, or a significant change in wind direction over the San Jose area, the takeoff and landing approaches are temporarily reversed with aircraft arriving at SJC from the north and departing to the south. This "Reverse Flow" at least since NextGen (March 3015) brings arriving aircraft in at very low~~er~~ altitudes (e.g. ~2,000 feet) to the west of SJC, over the communities of Palo Alto, Mountain View, and Sunnyvale. It has been suggested that the "Reverse Flow" approach could instead arrive from the east of SJC, using a "Normal Flow" departure procedure that is not unused during "Reverse Flow" conditions.

The FAA has advised the Committee that this proposed solution, however, has the potential to move existing noise to another community (a community not represented by the congressional districts that established the Select Committee). For that reason, the Select Committee has not endorsed this proposed solution. The FAA may, however, wish to examine whether this proposed solution, or a variation thereof, could be effectively implemented without shifting noise.

2.13 Redirect Southern Arrivals (SERFR) to an Eastern Approach into SFO

As previously noted, SERFR is a southern arrival procedure/flight path into SFO (i.e., approaching SFO from the south over the Santa Cruz Mountains). Flights on the SERFR procedure include (among others) aircraft from the southwest, such as Phoenix and Houston. In June 2016, the SERFR carried an average of 183 aircraft per day, or 30 percent of the arriving aircraft into SFO.

It has been suggested by some that these aircraft from the southwest be removed from the SERFR arrival procedure, and instead use an eastern approach into SFO. Under this suggestion, aircraft would either use the existing DYAMD arrival procedure (which is for flights arriving at SFO from the east with a flight path that enters the Bay roughly between Milpitas and San Jose), or use a new procedure crossing the FAITH waypoint (which is located at the intersection of Hostetter Road and Morrill Avenue, east of Interstate 680 in East San Jose).

The FAA has advised the Committee that this proposed solution raises a number of potential concerns. In June 2016, the DYAMD already carried the greatest percentage of daily air traffic into SFO, an average of 253 aircraft per day, or 41 percent of the arriving traffic into SFO. The DYAMD arrival procedure also shares the final approach path into SFO with aircraft arriving from the north (on the BDEGA procedure), specifically the 30 percent of BDEGA arrivals that use the San Francisco Bay approach (the so-called East leg). Increasing the aircraft load on the DYAMD procedure as suggested reduces the opportunity to shift aircraft from the BDEGA Peninsula (so-called West leg) approach onto the BDEGA San Francisco Bay approach (so-called East leg). For that reason, the Select Committee has not endorsed this solution {see Item 2.2 in this Report [Northern Arrivals (BDEGA) into SFO]}. However, Mr. Martin has also said that SERFR traffic could be diverted to DYAMD between the hours of 6:00am and 8:00am since the route is lightly used in those hours.

[COMMENT: Perhaps the Committee would choose to make a recommendation with this new information.]

With regard to possible alternative approaches, one approach, HIGHR, located in the San Jose area may well offer additional traffic capacity while relieving the SERFR track now in use. This approach has not been considered by the Committee primarily because there could be impacts to other cities. However, in the FAA's opinion, could be employed if the ground effects could be minimal.

With regard to creating a new procedure using the FAITH waypoint, the FAA has advised the Committee that this flight path has the potential to conflict with departures out of San Jose International Airport and move existing noise to another community (a community not represented by the congressional districts that established the Select Committee). For those reasons, the Select Committee has not endorsed this solution. However, it has been noted that the existence of an overnight curfew at San Jose International Airport might accommodate a new procedure using the FAITH waypoint as a potential solution in the overnight hours. It is requested that the FAA examine whether this proposed solution, or a variation thereof (e.g., at night), could be effectively implemented. ~~The FAA may, therefore, wish to~~

~~examine whether this proposed solution, or a variation thereof (e.g., at night), could be effectively implemented without shifting noise.~~

[COMMENT: This should be a RECOMMENDATION, not a comment.]

Also, from the SFO Noise Abatement Office:

"Reducing nigh time aircraft noise is a key goal of SFO's Night time Preferential Runway Use Program. The SFO Night time Preferential Runway Use program is a voluntary program that was developed in 1988. Between the hours of 10pm and 7am – aircraft operators are asked to comply with the program when conditions allow. Within the program, late night hours are especially critical. The program tries to maximize flights over water and minimize flights over land and populated area between 1 and 6am."

2.14 Fan-in Overseas Arrivals (OCEANIC) into SFO

The OCEANIC arrival procedure into SFO comes in from the west from overseas locations, such as Asia, and Hawaii, with aircraft converging into a single path at the PIRAT waypoint which is off the coast. Once on a single path, the aircraft cross the San Francisco Peninsula at the Woodside VORTAC, a navigational beacon located in the Woodside area, and proceed to the final approach into SFO.

It has been suggested that the arriving OCEANIC aircraft could instead be "fanned-in" into the area of the Woodside VORTAC, using that point and other new waypoints, or by creating a wider horizontal window constraint for crossing the VORTAC, to achieve dispersion of the arriving aircraft. The FAA has advised the Committee that it lacks the technology, i.e., metering tools, to implement this proposed solution. The presence of Special Use Airspace (SUA) along the coastline at this location (which restricts civilian aircraft from using that airspace), further constrains the FAA. The FAA has advised the Committee that while this solution might be feasible, there are a very low number of OCEANIC flights (roughly 31 flights per day in June 2016) per day. In addition, the FAA has advised the Committee that this solution also potentially moves ~~noise~~ impacts to other communities. For these reasons, the Select Committee has not endorsed this solution.

2.15 Herringbone Approach to SFO Arrivals

It has been suggested that noise exposure along a specific corridor/flight path could be reduced if flights joined the path at various points, thus creating a "herringbone" or "trident" effect.

The "herringbone" or "trident" is a multiple approach concept for dispersion of arrivals to reduce the number of overflights along a single path, used in some airports in Europe (e.g., Heathrow and Gatwick). Using this concept, Air Traffic Control would be instructed to distribute arriving aircraft to multiple transition locations along the arrival path, hence the "herringbone" or "trident" patterns.

It has also been suggested that the herringbone approach could be applied to the SERFR arrival procedure, which approaches SFO from the south over the Santa Cruz Mountains. The FAA, however, has advised the Committee that it currently lacks the technology, i.e., metering tools, to implement this proposed solution. The congested San Francisco Bay Area airspace, with three major commercial

airports in close proximity to each other, also potentially limits the applicability of this solution. Finally, the FAA has advised the Committee that a herringbone approach would likely result in an increase in vectoring. For these reasons, the Select Committee has not endorsed this solution. The FAA may, however, wish to examine whether this proposed solution, or a variation thereof, could be effectively implemented once the needed technological tools have been developed.

[COMMENT: While the idea of introducing new noise regions is not generally accepted, the use of four final approach fixes from SERFR could expand the current single SERFR Fix (SWELS) by adding ROKME, WETOR and PONKE to be used as existing fixes that already join the Rwy 28L final approach from the southwest. Such usage would spread and reduce the total noise over a significant part of the population and reduce the net per-person impact.]

2.16 Return to Pre-NextGen Procedures, Altitudes, and Concentration

A continuous thread to the public input received by the Committee was to simply return conditions to what they were prior to NextGen, including aircraft procedures, altitudes, and concentration~~., to "how they were before NextGen."~~

While the Committee is sympathetic to this input, the FAA has repeatedly indicated that changes to the San Francisco Bay Area airspace pursuant to NextGen are not reversible. The FAA has repeatedly advised the Committee that the 2012 federal legislation reauthorizing the FAA required the FAA to adopt and use advanced technology to modernize the air transport system. ~~For these reasons the Select Committee has not endorsed this proposed solution. However, the Select Committee recommends the implementation of a number of solutions to improve NextGen, as discussed throughout this Report~~.

On the other hand, Michael Huerta recently recognized that *"More precise navigation paths have an effect of shrinking the [overall] noise footprint of aircraft, but it does have the effect of concentrating the noise over a smaller area under the flight path." The FAA is willing to adjust flight paths to mitigate noise concerns even if it reduces efficiency. Again according to Huerta, "If we can get an 80% improvement in flight operations efficiency, I will happily take it over a 100% gain if it means avoiding years of litigation [over noise]."*

Mr. Glen Martin has stated that a return previous would be technically feasible.

We understand that the 2012 federal legislation reauthorizing the FAA required the FAA to adopt and use advanced technology to modernize the air transport system. Accordingly, the FAA should implement this advanced technology but they also need to ensure it is implemented in a manner that does not add any additional noise and pollution burden to any community. Accordingly, as the Select Committee believes such an interim solution would provide the greatest immediate noise relief, the Committee requests this immediate solution.

SECTION 3: LONGER-TERM ISSUES

In the Select Committee's deliberations several longer-term issues were identified that went beyond the timeframe of the Committee's work plan. Each of these longer-term issues are of significance and the

Committee recommends that resolution be pursued in as timely a manner as possible via appropriate channels.

Recommendation: The SC recommends the FAA return to the technically feasible Pre-NextGen Procedures, Altitudes and Aircraft Concentrations to return us to a "known better state" prior to re-implementing the advanced technologies required by the 2012 federal legislation.

3.1 Need for an Ongoing Venue to Address Aircraft Noise Mitigation

In the San Francisco Bay Area airspace, noise-related concerns are not confined to a single commercial airport. The three major commercial airports (SFO, Oakland International-OAK, and San Jose International-SJC) that ring the San Francisco Bay (Bay) have a combined 136 arrival and departure procedures (i.e., paths). These arrival and departure procedures crisscross the Bay and, indeed, the entire region. This presents an obvious challenge to those affected by and/or attempting to mitigate aircraft noise. As an example, Santa Cruz Mountains' residents affected by the SERFR arrival procedure from the south into SFO are also affected by the BRIXX arrival procedure from the north into SJC.

The lack of a venue for these multi-airport impacts to be analyzed and discussed is a flaw that became readily apparent to the Committee in its work.

***Recommendation* 1:** The Select Committee recommends that a permanent entity be established to address issues of aircraft noise throughout the region ("region" yet to be defined). While the Select Committee's schedule did not permit time to develop a recommended governance structure, some possibilities could include: (1) an adjunct committee of one of the existing community roundtables at either the San Francisco or Oakland International Airports; (2) Association of Bay Area Governments, Regional Airport Planning Committee; (3) Metropolitan Transportation Commission; and/or (4) a wholly new, independent, stand-alone committee/commission devoted to airport noise and/or other regional airport issues.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

***Recommendation* 2:** The Select Committee recommends that that the permanent body may wish to consider several issues which were brought before the Select Committee and which the Committee's structure and timeline did not allow for in-depth review or study. These matters include Items: 2.11 Modify NRRLI Waypoint on the First Leg of SERFR; 2.12 San Jose International Airport Reverse Flow: Aircraft Arrivals; 2.13 Redirect Southern Arrivals (SERFR) to an Eastern Approach into SFO; and 2.15 Herringbone Approach to SFO Arrivals.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

3.2 Restricted/Special Use Airspace

Special Use Airspace (SUA) are areas designated for operations that require restrictions on aircraft not participating in those operations. These operations are often of a military nature. In the San Francisco Bay Area, there are SUA restrictions (military) along much of the Pacific coastline that constrain the FAA's flexibility to expand or restructure the use of civilian airspace.

***Recommendation*:** While the Select Committee is not questioning the need for or importance of Special Use Airspace in our region, the Committee recommends that the Members of Congress review the SUA in our area with an eye towards better balancing special use restrictions and civilian aviation needs, particularly in the congested San Francisco Bay Area airspace.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

3.3 Noise Measurement

Following the March 2015 changes to the San Francisco Bay Area airspace that implemented ~~radar~~ GPS-based NextGen technology and new flight procedures/paths, it became readily apparent to the Committee that the FAA's established noise measurement metrics are inadequate. They do not represent what is being experienced by people on the ground.

The existing metrics do not adequately identify or acknowledge ground level noise exposure, even when noise at the reported levels is enough to be noticeable and disturbing to the public.

The shortcoming exists in large part because the FAA-calculated ***cumulative*** average noise level (DNL over a 24-hour period, or over a year) is not high enough to technically constitute a "significant impact." It is important to note that the FAA models, but does not monitor and assess actual noise levels on the ground.

~~The shortcoming exists in large measure because the cumulative noise level (over a 24-hour period) is not high enough to technically constitute a "significant impact."~~

More specifically, the use of a Day-Night Average Sound Level (DNL) alone is ill-suited to assess ground level impacts, particularly from the standpoint of amplitude, duration, time of occurrence, and repetitiveness (concentration or number of flights ~~paths~~ overhead). In addition, noise analysis at a community level (i.e., over a relatively broad swath) results in a blending of noise that does not reflect more localized impacts. Measuring noise more locally and precisely (e.g., at the census block level) would avoid this "blending" and diluting of noise exposure. The Committee also notes that, on the national level, numerous studies of alternative noise metrics highlight the deficiencies of DNL.

Further, the FAA's metrics rely on A-Weighting to measure sound intensity pressure levels (e.g., the way the human ear hears), commonly expressed in dBA. A-Weighting was originally intended only for the measurement of low-level sounds. Yet it is now commonly used for the measurement of environmental and industrial noise, including aircraft noise, as well as when assessing potential hearing damage and other noise health effects at all sound levels. However, because A-Weighting is applicable to only low

levels, and it tends to devalue the effects of low frequency noise in particular which is now the predominant noise spectrum of most commercial aircraft.

The existing noise measurement specification was created in 1971. The conditions were very different at that time. In that period, high frequency components of airplane flight were common. In today's technology the noise is predominantly found in the lower frequency spectrum. By using the A-Weighting criteria, a majority of the generated noise is ignored rather than measured. Instead, other broad band frequency weightings, such as "C-" and "Z-" Weightings are available. Use of these frequency weightings yields measurements of all noise, instead of only a small fraction of it.

The FAA needs to expand requirements to address coverage: noise monitoring needs to be done comprehensively, to provide high-fidelity noise impact data and to ensure measurement of noise impact from on-procedure as well as vectored flights. Also, there is a need to provide for ongoing monitoring as well (ie. a "permanent" noise monitoring system with adequate funding for ongoing operations and support). Last, the data needs to be made public and freely available for local communities to receive and analyze.

***Recommendation*:** The Select Committee recommends that the U.S. Congress require the FAA to adopt supplemental metrics for aircraft noise that characterize the true impact experienced by people on the ground.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

SECTION 4: PROCESS ISSUES

In its deliberations, the Select Committee identified three process issues of note that warrant further consideration and follow-up.

4.1 Who Makes Recommendations to Whom

In the face of widespread concern about aircraft noise over portions of three counties, the Select Committee was empaneled to provide recommendations to Members of Congress on appropriate measures to eliminate or mitigate noise where practicable. The Committee members understood and accepted that assignment, and this Report represents the Committee's best effort to offer such recommendations.

That being said, the mitigation of aircraft noise is a highly technical matter. The Committee was wholly comprised of (elected) lay people. Charging a group of elected lay people with the responsibility for making recommendations in this area seems less than ideal, particularly when the FAA has the requisite expertise and responsibility to manage aircraft traffic in the public interest.

Simply put, notwithstanding the FAA's good faith effort to provide~~d~~ technical expertise to the Committee, the Committee's view is that the process is fundamentally backwards – the FAA should be

~~coming~~ going to Members of Congress and their affected constituencies ~~with proposals~~ for review and comment of proposals to optimize airspace efficiency and safety while minimizing the obvious deleterious effects experienced in the initial roll-out of NextGen, not the other way around.

Recommendation: Should a similar process be employed here or elsewhere in the country in the future, the Select Committee recommends that, to the greatest degree possible, the FAA be charged with the responsibility for identifying and proposing solutions to mitigate noise concerns, and that community groups and~~/or~~ elected officials be asked for review and comment.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

4.2 Need for Before/After Noise Monitoring

[This item might fit better under Item 3.3, Noise Measurement]

The lack of aircraft noise monitoring prior to the implementation of NextGen hampered the Committee's (and the public's) ability to measure and document the actual impacts of the changes that were implemented in March 2015. Looking ahead, the Committee is concerned that if the FAA fails to perform "before and after" noise measurements related to before and after the implementation of recommendations contained in this Report, there will likewise be an inability to measure, analyze and verify, and document the desired improvements. Accordingly, the Select Committee offers the following recommendation.

***Recommendation*:**

The Select Committee recommends that the FAA transparently monitor and document actual noise exposure intensity and not just simulation estimates, of any feasible solutions both before and after implementation.

Impacts must be quantified, analyzed and verified. Expected benefits must be clearly specified and outcomes assessed to determine whether results have achieved a discernible benefit or not.

Finally, such measured data must be readily accessible to the public on request.

~~The Select Committee recommends that the FAA monitor and document noise exposure of any feasible solutions before and after implementation to ensure impacts are verified, and to determine whether results are of a discernible benefit.~~

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)

4.3 Ensuring Compliance

The Committee received significant comment from both the public, and the elected official members of the Committee, about prior understandings, directives, or agreements, including those regarding altitude restrictions, not being adhered to. Such comments suggest the need for compliance monitoring with respect to previously agreed to efforts, and with respect to newly identified noise mitigation efforts.

***Recommendation*:** The Select Committee recommends careful documentation and ongoing compliance monitoring for any set of solutions accepted and implemented by the FAA. The Committee recommends that the Members of Congress ensure that the FAA takes the appropriate steps to measure and guarantee ongoing compliance.

(Vote: ___ Aye, ____ Nay, ____ Absent or Abstain)