

SFO Fly Quiet Program 2.0

SFO Roundtable

Technical Working Group Recommendation

August 5, 2026

Framework Principles for Evaluating FQP Elements

Incentivize actions that pilots and airlines can influence and that provide meaningful community noise reduction

Meaningful Noise Reduction (≥ 3 dB)

Meaningful noise reduction with equitable community coverage

Specific & Actionable

Each element measures a distinct, attributable behavior that is actionable

Learning & Discussion

Use data to identify patterns & discuss improvement opportunities with airlines

Pilot/Airline Influence

Focus on actions that pilots and airlines can influence

Scoring & Recognition

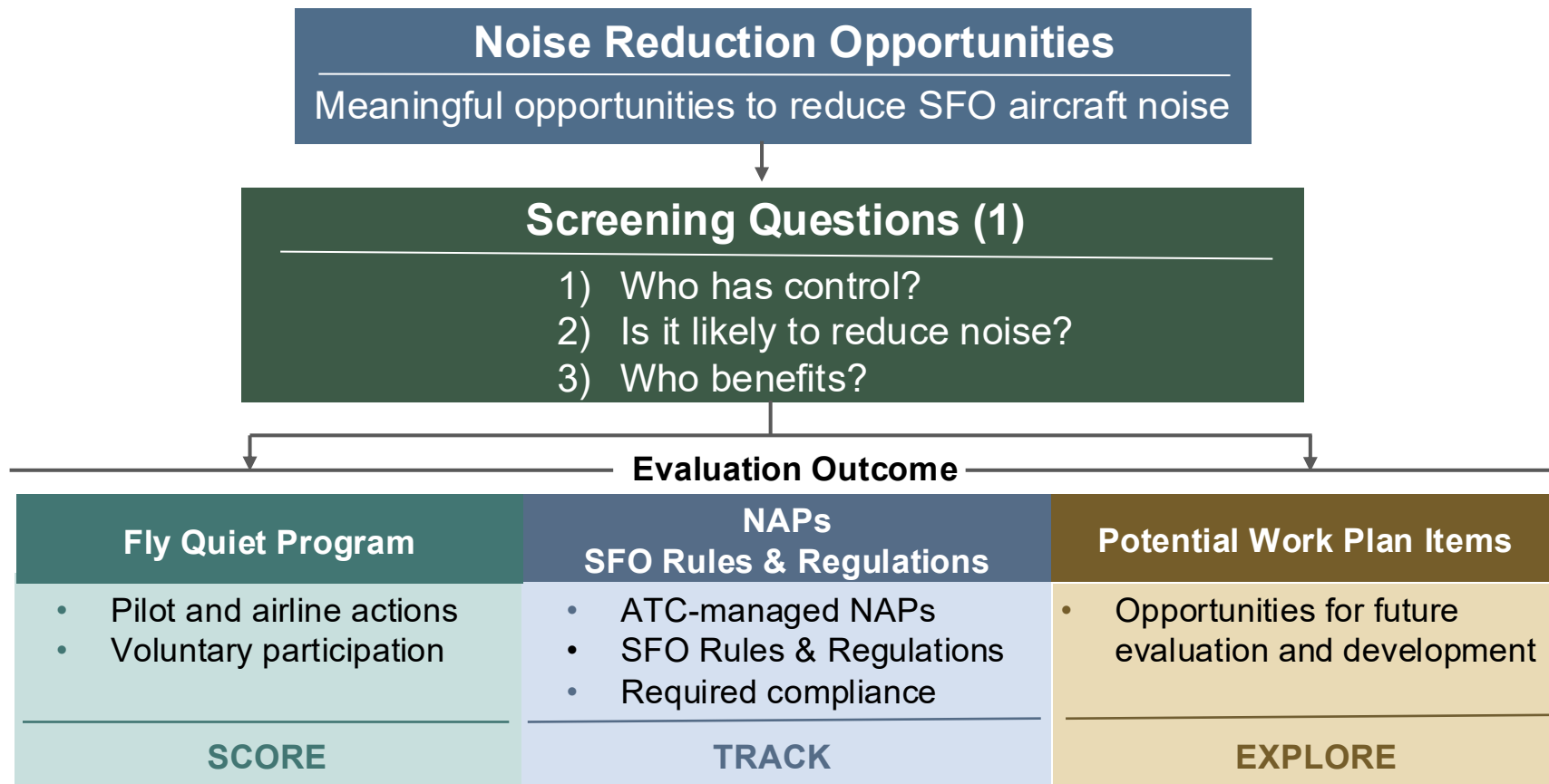
Score elements independently; recognize achievement, not rank alone

Program Decisions

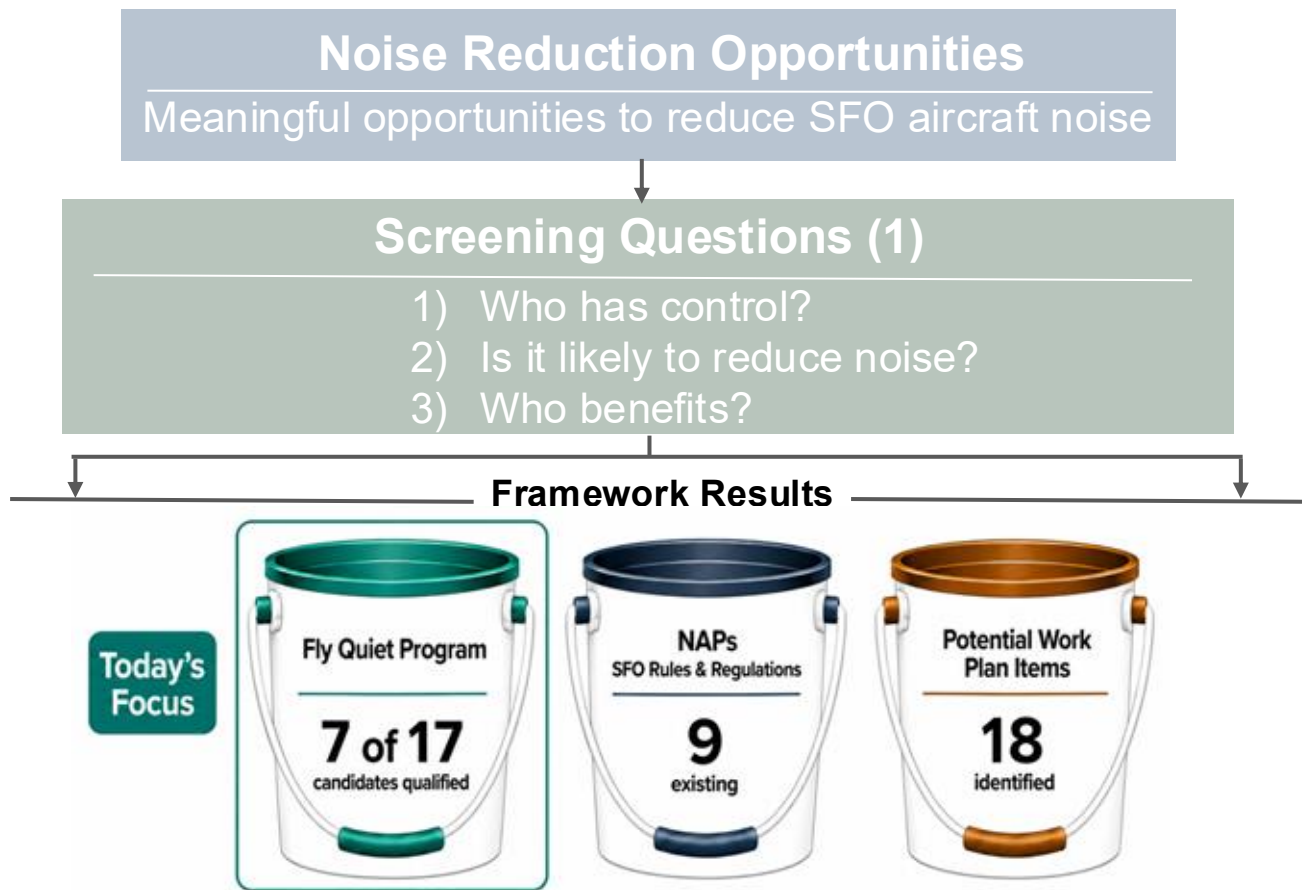
Use findings to guide program decisions and future work plans

Source: AICA

Noise Reduction Evaluation Framework



Noise Reduction Evaluation Framework



Element Evaluation Framework

SECTION 1: CONTROL	
Who Has Control?	ATC / Airline / Pilot / Other
Pilot/Airline Control Level	High / Medium / Low / None
SECTION 2: EFFECTIVENESS & BENEFITS	
Time of Day	Day (7am-10pm) / Night (10pm-7am)
How it Reduces Noise	Higher altitude, over water, early turns, reduced thrust, etc.
Usage Volume	High / Medium / Low, H: ≥ 150 /day, M: 50-149/day, L: <50 /day
Communities Benefiting	Identify benefiting communities
Overall Benefit	High / Medium / Low (combines noise reduction, communities benefiting, and usage volume)
Clarifications	Additional information needed

Estimated Usage of SFO Procedures

Daily averages estimated based on 9 months of data (Jun. 2025-Feb. 2026)
published in Airport Director's reports

AVERAGE DAILY DEPARTURES				
GAP	SSTIK	NIITE	TRUKN R1	TRUKN R28
136 Range: 116-151	155 Range: 137-172	51 Range: 36-60	203 Range: 187-216	15 Range: 5-54

AVERAGE DAILY ARRIVALS			
BDEGA	DYAMD	SERFR	PIRAT
166 Range: 141-193 •Down the Bay: 54/day (46-63) •Peninsula: 112/day (87-131)	213 Range: 192-226	150 Range: 142-157	38 Range: 33-43

Source: AICA

Candidate Elements: Evaluated and Not Included in FQP

Element	Conclusion
SSTIK (DEP)	ATC-controlled , Work Plan
NIITE HUSSH (DEP)	ATC-controlled , Track Compliance
Gap Early Turns (DEP)	ATC-controlled , NAP
GAP SNTNA Night (DEP)	ATC-controlled , NAP
Oceanic Woodside (ARR)	ATC-controlled , Work Plan
Noise Exceedance Ratings (DEP)	Not specific and actionable. Mixes multiple NAP and non-NAP procedures. Noise evaluation incorporated into 3 FQP elements.
Early Turns to 28L/R (ARR)	ATC-controlled , Work Plan
BDEGA Down the Bay (ARR)	ATC-controlled , Work Plan
Nighttime 28R (ARR)	ATC-controlled , NAP
Offset 28R approach	ATC-controlled , NAP (soon after July 30, QBridge RNAV offset expected)

FQP 2.0 Elements

1. Shoreline TRUKN – Conditionally Recommended	DEP
2. Gap SNTNA – Day – Conditionally Recommended	DEP
3. Gap Oceanic – Conditionally Recommended	DEP
4. Ground Engine Run-Ups	GBN
5. Fleet Noise Certification	DEP FLEET
6. Arrivals Procedure Noise and Fleet – Conditionally Recommended	ARR FLEET
7. Airline Engagement	ALL

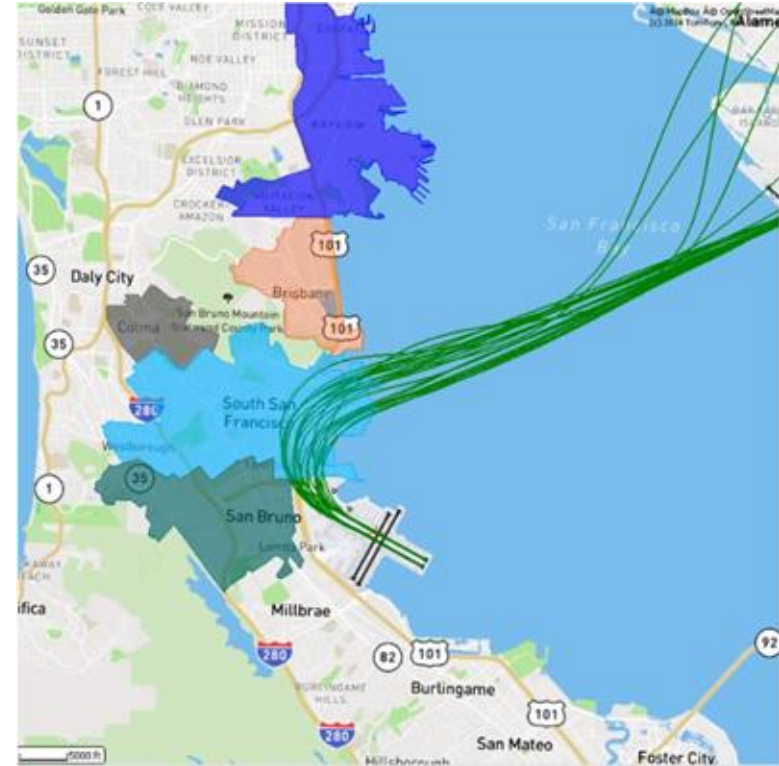
Source: AICA

1. Shoreline TRUKN - DEP

Purpose: Encourage turning right as soon as possible after departing Runways 28L/R to avoid shoreline cities

Assessment: Evaluate turn location of actual departures

Note: Conditionally Recommended:
Remove from FQP if turn location is entirely controlled by FAA or ATC (including runway departure assignment)

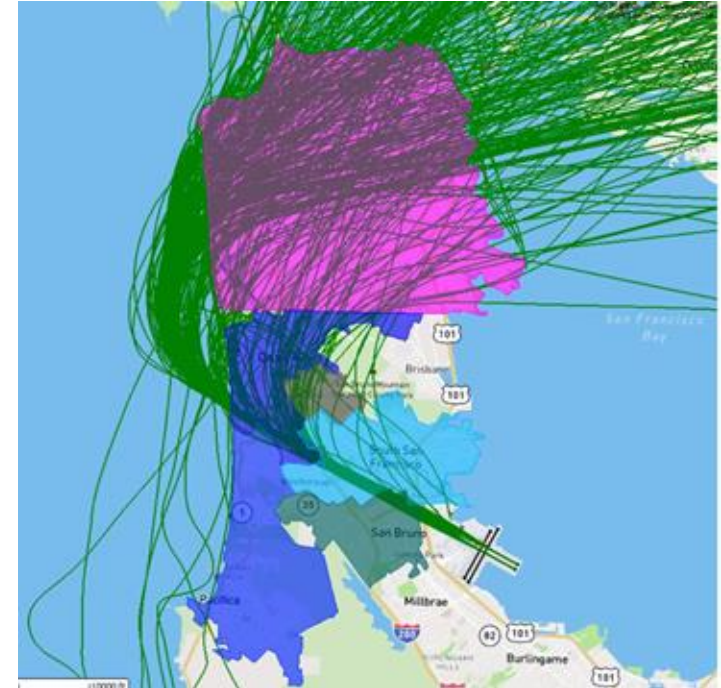


2. Gap SNTNA DAY – DEP

Purpose: Encourage pilots to remain on SNTNA Departure Procedure until over the Ocean and stay over the Ocean until north end of the Golden Gate Bridge

Assessment: Assess % of non-compliance (before 6 nm, before Golden Gate) due to pilot requests

Note: Conditionally Recommended: Measure compliance rates with no early turns before Ocean and after 6 nm gate and/or Golden Gate Bridge. Remove from FQP if SFO shows compliance is $\geq 95\%$. Keep if below 95% and listen to ATC radio exchanges for non-compliant flights to determine if turns were pilot requested



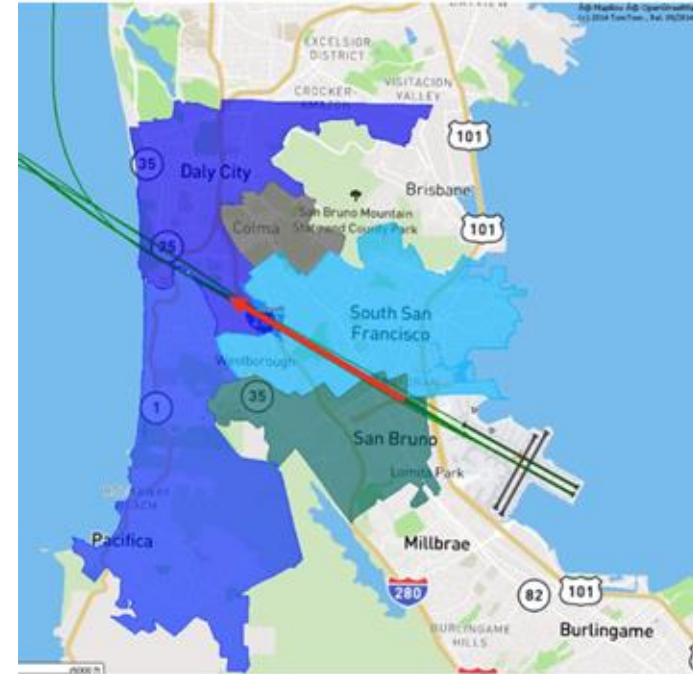
3. Gap Oceanic - DEP

Purpose: Encourage pilots to climb as fast as possible to 3,000 ft then reduce power

Assessment:

- Determine NADP policy differences and usage across airlines
- Measure noise at different gates using appropriate monitors for different aircraft types and destinations to detect differences across airlines

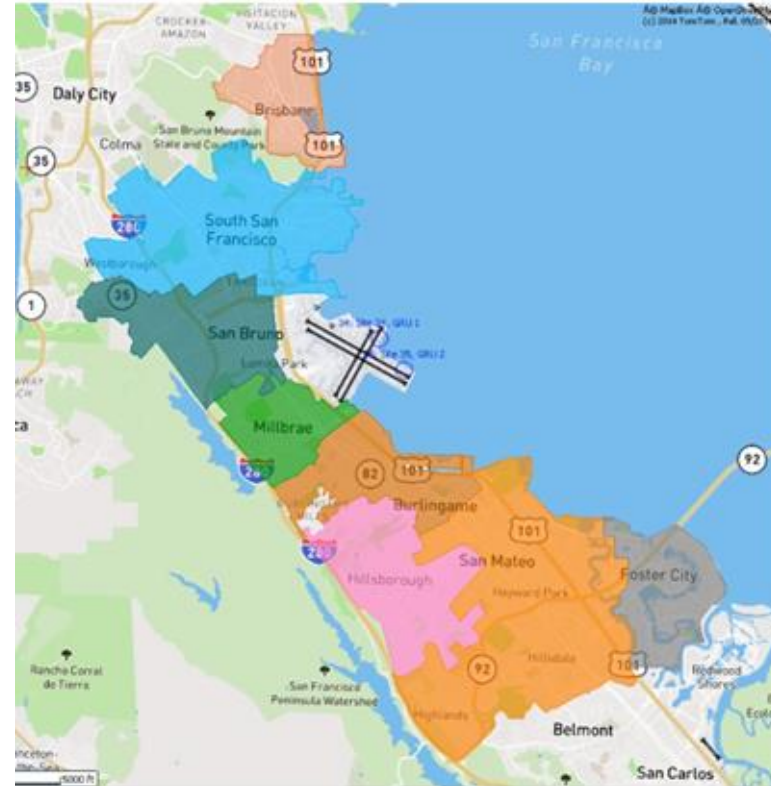
Note: Conditionally Recommended: Evaluate noise level changes by community before incentivizing airlines to climb as fast as possible to avoid unintended noise shifting



4. Ground Engine Run-ups – GBN

Purpose: Encourage airlines to follow SFO Rules and Regulations when doing aircraft engine run-up maintenance operations

Assessment: Determine compliance with SFO Rules & Regulations for engine run-ups



5. Fleet Noise Certification - DEP FLEET

Purpose: Report the relative and absolute noise-certification quality of each airline's fleet operating at SFO to recognize airlines with quieter, newer aircraft

Assessment: Determine aircraft type and engine type of each airline's fleet and estimate noise based on actual departure operations

Note: Fleet noise is noise certification data submitted by aircraft airframe and engine manufacturers (see appendix). Certification data does not represent actual noise, especially for arrival cities where aircraft configuration and thrust differ substantially from certification conditions

- Arrivals noise is covered under Arrivals Proc. Noise & Fleet FQP element
- Fleet noise is also included for future work plan consideration to evaluate the correlation between actual noise recordings and engine noise certification at different distances from SFO

6. Arrivals Procedure Noise and Fleet - ARR FLEET

Purpose: Encourage quieter ops practices and fleet using actual noise measurements

Assessment: Measure actual aircraft noise for each of 3 SFO arrival procedures using representative Peninsula noise monitor(s), including coverage of the East Palo Alto/Menlo Park area

1. Compare noise across aircraft types to inform fleet modernization (*Recommended*)
2. Compare noise across airlines for the same aircraft type to identify best-in-class operating practices (*Conditionally Recommended*)

Note: Assessment 1 is approved without condition. Assessment 2 is **Conditionally Recommended** and will be removed if data analysis does not reveal differences across airlines for same aircraft type and similar timing of operations

Evaluating actual noise levels for each of the three SFO arrival procedures (SERFR, BDEGA peninsula, and PIRAT) over Peninsula cities will provide FQP coverage for ~50% of SFO arrivals. Limit evaluation to 28L landings to reduce variability due to runway distance from the shoreline

7. Airline Engagement

Purpose: Encourage airlines to adopt FQP elements and collaborate with SFO to support continuous improvement of the Program

Assessment: Evaluate how airlines support implementation of the FQP through actions such as integrating FQP elements and NAPs into pilot training, participating in collaborative SFO discussions, and implementing operational improvements informed by FQP reporting

Scoring and Reporting of FQP Elements

Scoring Principles:

- Score each FQP element independently
 - No summing or averaging scores across FQP elements
- Use Pass/Fail scoring whenever possible to delineate results
- For noise-based comparisons, use a minimum 3 dB difference as the threshold for a meaningful distinction

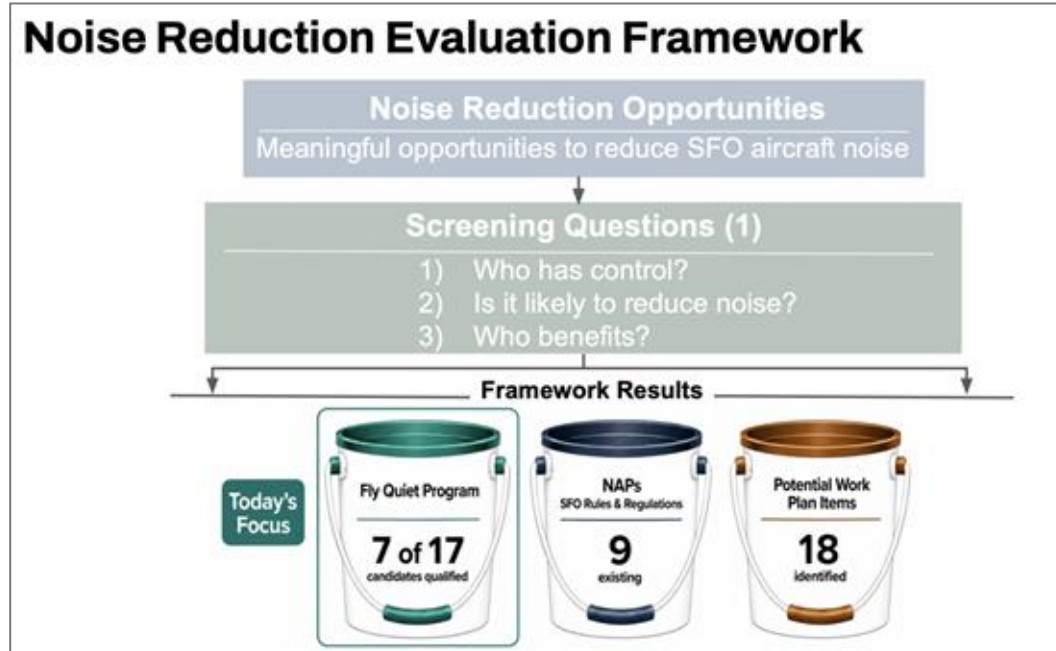
Scoring Methodology: Develop and test scoring rules using actual SFO operations data (iterate as necessary). See illustrative scoring in the Appendix.

Reporting: Publish results for each FQP element, including airline rankings. Provide an airline summary listing its results for each FQP element

Next Step: Convene TWG to review and finalize scoring of each element

Recommended Action

■ Approve the Seven Fly Quiet Program Elements



Appendix

- Evaluation Framework for FQP Elements
- Community Coverage by FQP Element
- Illustrative FQP Scoring of Each Element
- Community Coverage by NAPs, and SFO Rules & Regulations
- Potential Work Plan Items
- Aircraft Noise Certification Background Information
- Evaluating Fly Quiet Programs and NAPs

Evaluation Framework for Fly Quiet Program Elements

Element		SECTION 1: Control		SECTION 2: Effectiveness & Benefits				Potential Work Plan	NAP or SFO R&Rs
Name	Type	ATC Control	Pilot/Airline Control	Time of Day	How It Reduces Noise	Usage Volume	Communities Benefiting		
Shoreline (TRUKN)	DEP	TBD	TBD	Day	See Note 1	M	See Note 2	Yes	No
Gap SNTNA - Day	DEP	Primary	Partial - L	Day	""	L	""	Yes	NAP
Gap Oceanic	DEP	Primary	Partial	Both	""	M	""		No
Ground Engine Run-Ups	GBN	None	Full	Both	""	M	""	Yes	SFO
Fleet Noise Certification	DEP FLEET	None	Full	Both	""	H	""	Yes	No
ARR Proc. Noise & Fleet	ARR FLEET	Some	Some	Both	""	H	""	Yes	No
Airline Engagement	ALL	NA	Full	NA	NA	NA	ALL		No

7 TOTAL

Note 1: See FQP Element slides in August 5, 2026 SFO-RT Presentation

Note 2: See Community Coverage by FQP Element chart in the August 5, 2026 SFO-RT Presentation Appendix

Gold Color = Conditionally Recommended, ARR Proc. Noise & Fleet is Partial Conditionally Recommended

Community Coverage by FQP Element

City	Shoreline TRUKN	Gap SNTNA Day	Gap Oceanic	Ground Engine RUs	Fleet Noise Cert	ARR Proc Noise & Fleet	Airline Engmt	TOTAL
	DEP	DEP	DEP	GBN	DEP FLEET	ARR FLEET	ALL	
Atherton						X	X	2
Belmont				X			X	2
Brisbane	X	X			X		X	4
Burlingame				X	X		X	3
Colma		X			X		X	3
Daly City		X	X		X		X	4
East Palo Alto						X	X	2
Foster City						X	X	2
Half Moon Bay							X	1
Hillsborough				X	X		X	3
Menlo Park						X	X	2
Millbrae				X	X		X	3
Pacifica		X	X		X		X	4
Portola Valley						X	X	2
Redwood City						X	X	2
San Bruno	X	X	X	X	X		X	6
San Carlos				X			X	2
San Francisco		X			X		X	3
San Mateo				X		X	X	3
SS Francisco	X	X	X	X	X		X	6
Woodside						X	X	2
# Covered	3	7	4	8	10	8	21	

Illustrative FQP Scoring of Each Element

- **Shoreline TRUKN:** Points based on turn location
 - Good: most points. Marginal: some points. Poor: no points.
 - Is $\frac{1}{8}$ of a mile east or west of 101 a reasonable reference distance for the turn? Actual turn data should inform the distance selected for the ratings.
- **GAP SNTNA Day:** Points based on pilot requests for early turns
 - Negative points based on % of early turn requests. No positive points for not requesting. Use % of early turn requests per airline's usage of the procedure
 - 2 separate requests: before Ocean, before north end of Golden Gate Bridge
- **GAP Oceanic:** based on aircraft type and destination (short-haul, medium-haul, long-haul, ultra long-haul)
 - Points for using specified NADP: 100% usage: most points, 50-75% usage: some points; <50% usage: no points
 - Points based on airline's noise levels per gate. Most points: within 3 dB of least noisy; Some points: within 3-6 dB of least noisy; No points: At least 6 dB higher than least noisy. Number of gates along departure path should be based on meaningful noise reductions (min 3 dB) between gates.

Illustrative FQP Scoring of Each Element, Cont.

- **Ground Engine Run-Ups:** Points based on compliance with SFO Rules & Regulations during the day and at night.
 - Points if 100% of run-ups done during the day (7am-10pm)
 - Negative points for unauthorized at night or longer than 5 min in daytime or not in designated area
- **Fleet Noise Certification:** Points based on actual DEP operations and aircraft type/engine type configuration
 - Set maximum standard based on certification data. The quieter value at the takeoff measurement, the more points. Double points for each 3 dB reduction. Negative points for Stage 3 aircraft. Normalize results to each airline's actual operations.
- **Arrivals Procedure Noise and Fleet:** Procedure-specific points for Runway 28L arrival operations for SERFR, BDEGA Peninsula, and PIRAT
 - Based on actual noise recordings across the Peninsula, including the East Palo Alto/Menlo Park area
 - Points for the best-in-class op practice (same aircraft type, different airlines). Look at noise distribution in 3 dB increments and normalize results to each airline's actual procedure usage.
 - Points for quieter aircraft types (across airlines). Look at noise distribution in 3 dB increments and normalize results to each airline's actual procedure usage. Set maximum standard

Illustrative FQP Scoring of Each Element, Cont.

- **Airline Engagement:** Evaluate engagement using multiple metrics with different point values
 - High points: Demonstrate integration of SFO FQP and NAPs in initial and recurring pilot training:
 - Content (provide copy of materials)
 - Frequency (provide training dates)
 - Volume/duration (provide time spent)
 - Pilot coverage
 - High points: Implement operational improvements such as FMS reprogramming and policy changes when requested by SFO
 - Medium points: Participate in FQP Focus Group virtual briefings
 - Medium points: Participate in collaborative FQP meetings when requested by SFO
 - Low points: Review the FQP dashboard/reporting site at least once per quarter

Community Coverage by Noise Abatement Procedures and SFO Rules & Regulations

Community Coverage by Noise Abatement Procedures (NAP) and SFO Rules & Regulations

City									SFO Rules & Regulations			TOT FQP	TOT*
	Gap Early Turns	Gap SNTNA Day#	Gap SNTNA Night	Heading 050	NIITE HUSSH	Offset Appr 28R	Prefer Night 28R	TOT NAPs	Ground Engine RUs#	APUs	TOTAL R&R		
	DEP	DEP	DEP	DEP	DEP	ARR	ARR		GBN	GBN			
Atherton												2	2
Belmont						X		1	X			2	3*
Brisbane		X	X	X	X			4				4	8
Burlingame									X	X	2	3	4*
Colma		X	X	X	X			4				3	7
Daly City	X	X	X	X	X			5				4	9
East Palo Alto												2	2
Foster City						X	X	2				2	2
Half Moon Bay												1	1
Hillsborough									X	X	2	3	4*
Menlo Park												2	2
Millbrae									X	X	2	3	4*
Pacifica	X	X	X	X	X			5				4	9
Portola Valley												2	2
Redwood City							X	1				2	3
San Bruno	X	X	X	X	X			5	X	X	2	6	12*
San Carlos						X		1	X			2	3*
San Francisco		X	X	X	X			4				3	7
San Mateo							X	1	X	X	2	3	5*
SS Francisco	X	X	X	X	X			5	X	X	2	6	12*
Woodside												2	2
# Covered	4	7	7	7	7	3	3		8	6			

Includes noise abatement procedures documented in NCT 7110.65K, May 14, 2026

= NAPs also FQP elements with some pilot control

* = Ground Engine RUs counted 1x in Total given exact same definition is repeated in FQP and SFO R&R

Potential Work Plan Items
Opportunities Identified Through TWG Fly Quiet Program Workshops 1.0 & 2.0
 August 5, 2026

Items are not listed in priority order. They are organized by DEP, ARR, GBN, and ALL ITEMS.

Item	Current Profile	Exploration
Shoreline TRUKN	DEP Not NAP FQP?	- Consider restoring old conventional Shoreline procedure (ATC discussion) - Assess FMS encoding practices across carriers if SFO/consultant data analysis of the turns shows pattern differences across airlines (TWG discussion) - Review oper. considerations for modifying procedure (TWG discussion)
050 Heading	DEP NAP Not FQP	Explore opportunities to extend noise benefits beyond periods when NIITE/HUSSH is available (NAP between 1-5 am), including: (1) establishing an ATC waypoint (fix) in the center of the Bay to support pilot-requested 050 departures, and then (2) evaluating opportunities to expand the use of 050 departures (ATC discussion)
SSTIK	DEP Not NAP Not FQP	Assess FMS encoding of the RNAV SSTIK departure turns for daytime and nighttime operations across carriers, and consider interest in nighttime noise abatement procedure given that NIITE-HUSSH does not start until 1 pm even though this may concentrate traffic (TWG discussion)
Gap Early Turns	DEP NAP FQP	Investigate what triggers early turns (pilot request, traffic, etc.) given the existing 6 nmile DME NAP. Evaluate operationally feasible opportunities to reduce early turns, including ATC denying (ATC discussion)
Gap SNTNA Day	DEP Partial NAP FQP?	- SFO to assess noncompliance levels before the Ocean and GG bridge. If <95%, communicate to ATC to remind controllers of requirements. - Evaluate optyps to expand daytime use of GAP SNTNA procedur., including potential modifications to daytime vectoring, and explore building a daytime NAP beyond the 6 nmile DME gate (ATC discussion)
Fleet Noise Actual	DEP Not NAP Not FQP	Evaluate actual fleet noise performance by measuring aircraft noise at representative monitors for selected departure procedures. Compare the measured noise of the same aircraft type across airlines to identify operational differences, and across aircraft types for the same carrier to better understand the actual fleet noise performance. This complements certification-based fleet noise metrics by using measured operational noise rather than aircraft noise certification data (TWG discussion)
BDEGA Down the Bay (DTB)	ARR Not NAP Not FAQ	Monitor operational usage, consider inclusion in the Noise Abatement Program, and evaluate opportunities for a Down-the-Bay arrival procedure that is not tied to the BDEGA arrival (TWG discussion)
ARR Procedure Noise and Fleet	ARR FLEET Not NAP FQP?	Explore opportunities to strengthen noise monitoring coverage to support measurement of actual aircraft noise for Peninsula arrival procedures

Item	Current Profile	Exploration
Oceanic Woodside	ARR Not NAP Not FQP	- Explore opportunities for a quieter arrival profile, including optimized descent operations (TWG discussion) - Evaluate impacts on downstream communities of current 3/26/2020 NAP for Oceanic arrivals crossing ARGGG at or above 8000 ft
Offset Approach 28R	ARR NAP FQP?	- Explore opportunities to increase use of the Quiet Bridge Offset (Day) - Track usage trend once the Offset RANV is implemented after July 30, 2026 - Evaluate feasibility of restoring FMS Bridge Visual Offset Approach to 28R (as is or modified version Day and Night) (TWG discussion)
Preferential Night 28R	ARR NAP Not FQP	Evaluate opportunities to increase usage of Runway 28R arrivals at night time when operationally feasible, including through operational tools that support runway sequencing (e.g., ghost target tool), advertising 28R landing, and proposing offset to 28R (ATC discussion)
Early Turns 28L/R	ARR Not NAP Not FQP	Review opportunities to improve compliance with the 9-mile lineup for Runway 28L/R arrivals, including reporting to assess current performance, and identify op. strategies to improve consistency (ATC discussion)
Ground Engine Run-Ups	GBN SFO R&R FQP	Review implementation of the SFO Ground Engine Run-Up Rules and Regulations, including compliance, data collection, reporting needs, and opportunities for program enhancements (TWG discussion)
Auxiliary Power Units (APUs)	GBN SFO R&R FQP	Review implementation of the SFO APU's Rules and Regulations, including compliance, data collection, reporting needs, and opportunities for program enhancements (SFO discussion)
NAP and R&R Compliance Reporting	NAP SFO R&R	Track compliance with Noise Abatement Procedures and SFO Rules & Regulations (Run-ups, APUs) through the Airport Director's Report
Airport Director's Report	ALL ITEMS	Explore opportunities to enhance the Airport Director's Report to improve communication of SFO operational performance and noise-related information in support of Roundtable decision-making
Roundtable Member City Profiles	ALL ITEMS	Develop profiles for each Roundtable member city summarizing relevant overflights, procedures, FQP elements, Noise Abatement Procedures (NAPs), SFO Rules & Regulations, and noise monitoring to support community understanding and informed Roundtable decision-making
Roundtable Training	ALL ITEMS	Explore opportunities to enhance Roundtable member education on the Fly Quiet Program, Noise Abatement Procedures (NAPs), SFO Rules & Regulations, and related topics

Community Coverage by Potential Work Plan Items

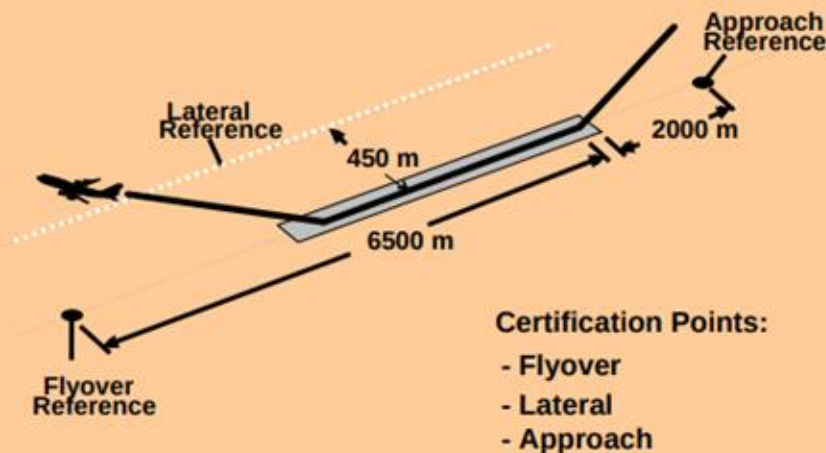
Items are not listed in priority order. They are organized by DEP, ARR, GBN, and ALL ITEMS.

City	Shore. TRUKN	Heading 050	SSTIK	Gap Early Turns	Gap SNTNA Day	Fleet Noise Actual	BDEGA DTB	ARR Proc. Noise & Fleet	Oceanic Wood.	Offset 28R	Prefer Night 28R	Early Turns 28L/R	Engine RUs	APUs	NAP R&R Rpts	Dir. Rpt.	TOT
	DEP	DEP	DEP	DEP	DEP	FLEET	ARR	ARR FLEET	ARR	ARR	ARR	ARR	GBN	GBN		ALL	
Atherton						X	X	X								X	4
Belmont													X			X	2
Brisbane	X	X	X		X	X									X	X	6
Burlingame						X							X	X	X	X	5
Colma		X	X		X	X									X	X	6
Daly City		X	X	X	X	X									X	X	7
East Palo Alto						X	X	X	X							X	5
Foster City						X		X		X	X	X			X	X	7
Half Moon Bay			X													X	2
Hillsborough						X							X	X	X	X	5
Menlo Park						X	X	X	X							X	5
Millbrae						X							X	X	X	X	5
Pacifica		X	X	X	X	X									X	X	7
Portola Valley						X	X	X								X	4
Redwood City						X	X	X			X	X			X	X	7
San Bruno	X	X		X	X	X							X	X	X	X	9
San Carlos												X?	X			X	2+1?
San Francisco		X	X		X	X									X	X	6
San Mateo						X		X			X		X	X	X	X	7
SS Francisco	X	X	X	X	X	X							X	X	X	X	10
Woodside						X	X	X	X							X	5
# Covered	3	7	7	4	7	18	6	8	3	1	3	2+1?	8	6	13	21	

Aircraft Noise Certification Background Information

Aircraft Noise Certification Measurement Points

Trajectory and Certification Locations



Source: [ICAO Noise Certification workshop 2006](#)

Measurements done close to runways:

- Flyover (DEP): 4 miles from beginning of runway
- Lateral: $\sim \frac{1}{4}$ mile from runway centerline
- Approach (ARR): 1.25 miles from beginning of runway

SFO runway lengths:
between 1.45 and 2.25
miles

Evaluating Fly Quiet Programs and NAPs

Fly Quiet elements are distinct from Noise Abatement Procedures (NAPs).

Evaluation Criterion	Fly Quiet Program	Noise Abatement Procedures
Primary purpose	Incentivize voluntary noise-reducing actions by pilots and airlines	Reduce aircraft noise
Meaningful pilot/airline influence	Essential	Not a defining requirement
Type of measure	Performance-based measure	Procedure compliance
Evaluation approach	Score airline performance	Track operational compliance

Source: AICA