Summary of San Francisco International Airport Ground Based Noise Modeling Study

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Outline

- Project Description
- Noise Model Inputs
- Summary of Results
- Next Steps

Project Description

Motivation:

Based upon the direction of the subcommittee, a project study area was developed to incorporate SFO and areas directly adjacent and to the southwest of Runways 1L and 1R of SFO. The project study area encompasses SFO and the cities/towns of San Bruno, Millbrae, Burlingame and Hillsborough. The majority of the project study area contains the City of Millbrae which is the closest adjacent city southwest of SFO.

Goals:

1. *To better understand how ground based noise propagates through the communities adjacent to SFO from aircraft departures.*
2. *To assess vegetation as a means to reducing ground based noise from SFO aircraft departures.*

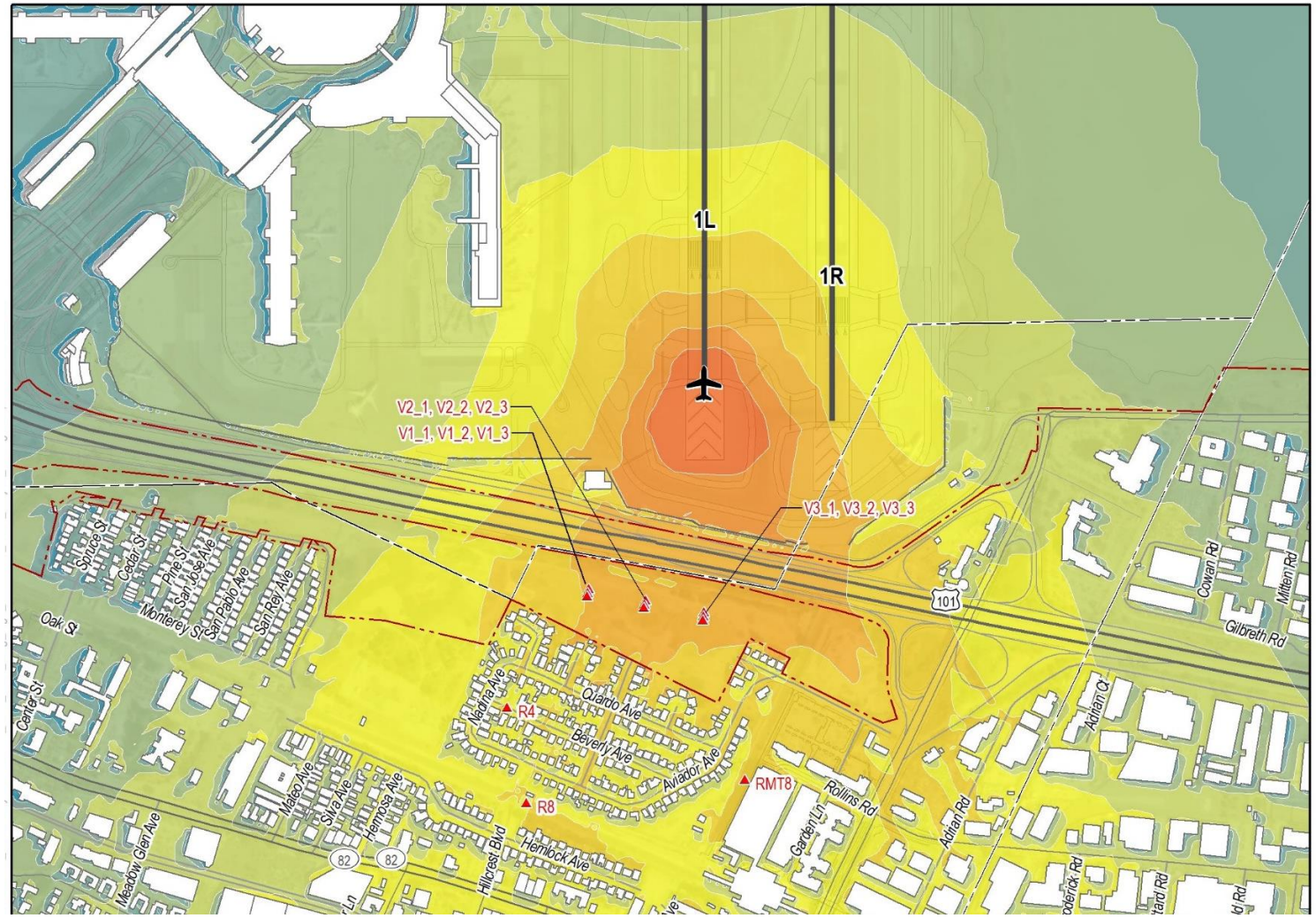
Noise Model Inputs

- Geographic and Land Use Data Sourced From:
  - San Mateo County: location and description of local municipal boundaries
  - ESRI: location of all roadway/highway centerlines
  - Microsoft via GitHub: three-dimensional building footprints with elevations
  - CalTrans: roadway/highway right of way boundaries
  - USGS: three-dimensional digital elevation data; 3-meter resolution
  - SFO: digital Airport Layout Plan (ALP)
  - NearMap USA: aerial photography
- 28 Receptor Locations (Increase of 16 from Scope of Work)
- Three Aircraft Types
  - Boeing 737-800
  - Airbus A320
  - Boeing 77W
- Vegetation
  - 50 feet thick
  - Located on CalTrans right of way, 4,511 feet long
  - 46 feet tall

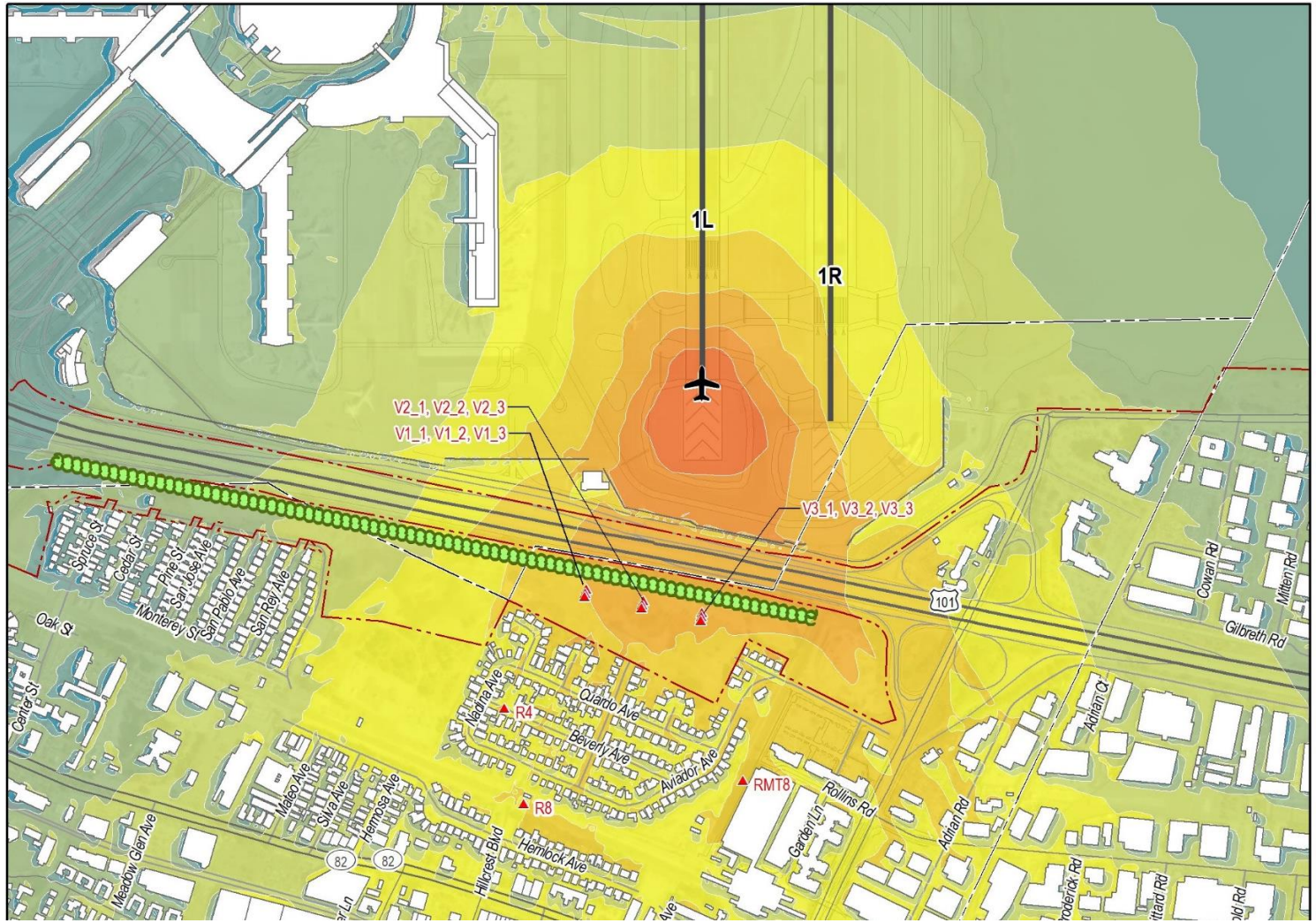
Noise Model Scenarios

- **Scenario 1** consisted of two aircraft types, a B738 and an A320 departing Runway 1L, with noise modeled at the start of takeoff roll.
- **Scenario 2** consisted of two aircraft types, a B738 and an A320 Departing Runway 1R, with noise modeled at the start of takeoff roll.
- **Scenario 3** consisted of two aircraft types, a B738 and an A320 departing Runway 1L, with noise modeled at a secondary takeoff point; the point of rotation where a departing aircraft becomes airborne from the runway.
- **Scenario 4** consisted of two aircraft types, a B738 and an A320 departing Runway 1R, with noise modeled at a secondary takeoff point; the point of rotation where a departing aircraft becomes airborne from the runway.
- **Scenario 5** consisted of two aircraft types, a B738 and an A320 departing at the same time but with staggered starting takeoff roll locations on Runway 1L and 1R.
- **Scenario 6** consisted of two aircraft types, a B77W departing Runway 28L and an B738 departing Runway 28R with noise modeled at secondary takeoff points; the point of rotation where a departing aircraft becomes airborne from the runway.

Scenario 1 A320 w/out Vegetation



Scenario 1 A320 w/ Vegetation



Summary of Results

- The effectiveness of vegetation at reducing noise from aircraft departing SFO was shown as delta changes throughout the results tables. Only receptor locations “V”, which are behind the vegetation, had reductions in noise from vegetation; both in terms of Lmax dB and unweighted spectral Leq dB noise levels.
- As seen in the noise contour figures (especially the enlarged figures of Appendix H), the highest levels of noise reduction occur when the receptors are directly behind the vegetation.
    - HMMH recommends that if vegetation is planned to be utilized as a mitigation measure, that it be located as close to the noise sensitive receptor as possible.
- The change in noise levels from without and with vegetation vary by frequency but are all well below 3 dB and therefore are likely not discernable by a human ear; a change of 3 dB is a barely perceivable change in noise level.
- However, if vegetation is to be utilized as a means to provide some ground based noise reduction, it should have a minimum thickness between 33 and 66 feet. It should also have a height that breaks line of sight to the source and be located as close to the noise sensitive receptor as possible.

Next Steps

- Outreach and Communication with Local Planning Departments
  - Share the results of this GBN study and provide a general level of understanding of how ground based noise propagates through their community, and
  - Discuss how they may be able to effectively incorporate noise mitigation principals (such as with vegetation) into the design of new or re-development project.
- Create a GBN handout
- Ongoing Communication with SFO
  - Keep updated on items that could affect ground based noise, i.e.
    - New terminal and other construction
    - Runway modifications or improvements
    - Other new construction such as sea walls
- Future modeling efforts
  - Some of the conditions that may warrant additional modeling efforts include but are not limited to:
    - Other possible mitigation measures (not vegetation) such as walls, berms or sound barriers that may include variables such as location, height, construction details, etc.
    - Updates to terrain and/or buildings at SFO or within local municipalities to the southwest of SFO based on future building plans or other local input
    - Additional vegetation locations, thickness, and heights

Questions?