DATE: December 21, 2016

TO: Mark Reichin
    Propeller Airports LLC

FROM: Paul Dunholter, P.E.
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SUBJECT: Snohomish County Airport (Paine Field) AEDT Noise Contour Update

BACKGROUND

The following memo presents the results of the update of the 2018 noise contours from the Commercial Air Service Environmental Assessment. The noise contours were update using the latest FAA noise model, AEDT 2c. The AEDT (Aviation Environmental Design Tool) is the most recent evolution of the noise models developed by the FAA (Federal Aviation Administration). It replaces the INM (Integrated Noise Model) that was used in the EA (Environmental Assessment) study. The new model was developed by the FAA in order to combine into one model all their environmental modelling requirements. This includes single airport noise analysis, multi airport airspace noise analysis, air quality emissions, greenhouse gases and fuel consumption. The model also advanced the aircraft noise prediction process, added the ability to import and utilize radar data, weather and GIS information that was not supported in the previous model.

The new AEDT model uses the same underlying acoustic principals and aircraft base data as the INM, with more advanced features, parameter adjustments and plotting capabilities. For the same assumptions, the noise contours from the two models are generally similar but there can be some differences in the size and shape of the contours.

The scope of this project is to use the assumptions from the EA study and update the noise contours with the new noise model. The study updated the future year 2018 model runs for the
Base No Action conditions, the With Commercial Service Project conditions and the With Commercial Service Conditions at the Maximum Thruput conditions.

The contour modeling update uses the same modeling assumptions presented in the EA with the following differences. At the time of the study, the INM noise modeling database did not yet have some of the new generation Boeing aircraft (747-8 and 787) being flown at Paine Field so substitute aircraft were used. The updated modeling study will use the actual aircraft as they are in the new AEDT noise model database. The modeling study also evaluated the potential of different aircraft to be used for the proposed commercial service. The original study assumed DASH8-Q400 and MD83 aircraft. The updated modeling study also evaluated the noise assuming EMB175 and 737800 aircraft would be used for the commercial service instead. The number of operations for both the With Project and Maximum Thruput remained the same as presented in the EA. The EA used the term “No Action Alternative” for the “Base Case” conditions in 2018, and used the term “Preferred Alternative” for the “With Project” conditions in 2018.

**MODELING RESULTS**

The following noise model runs were completed using the AEDT 2c noise model. These runs are the same as the final year (2018) evaluated in the EA, and used the operational assumptions that were presented in the EA, unless noted below. As with the EA, DNL noise contours for the 70 and 65 DNL noise level were developed. Each of the model runs are listed below, along with the assumptions used. The noise contour results are presented in Figures 1 through 4. Figure 1 and 2 present individual contours. Figures 3 and 4 present the contours for the No Action, With Project and With Project with Max Thruput combined into one figure. Figure 3 assumes that the revised commercial aircraft are used, while Figure 4 assumes that the original commercial aircraft are used. For comparative purposes, the 2018 noise contours from the EA are presented at the end of this document.

*Figure 1 - 2018 Original Assumptions No Action*
  - Original Boeing Aircraft Substitutions

*Figure 2 - Updated 2018 No Action*
  - Updated Actual Boeing Aircraft, No Substitutions

*Figure 3 - Updated 2018 No Action, With Project and Max Thruput (Revised Commercial Aircraft)*
  - Updated Actual Boeing Aircraft, No Substitutions
  - Revised Commercial Operations (EMB175 and 737800)

*Figure 4 - Updated 2018 No Action, With Project and Max Thruput (Original Commercial Aircraft)*
  - Updated Actual Boeing Aircraft, No Substitutions
  - Original Commercial Operations (Q400 and MD80)
The results of the noise contour analysis show that the noise contours are similar in size and shape to those that were generated in the EA. These results are presented in Table 1. This table presents the noise contour area for each of the model runs for acres within the 65 DNL noise contour. These AEDT noise contours are slightly larger than the INM contours with the change more associated with the run-up and general aviation runway, then operations on the main runway. Note that General Aviation operations and run-up activity is airport operational activity that is not affected by the potential commercial service.

The 65 DNL noise contour for the 2018 No Action alternative from the EA using the INM noise model was 696 acres in size. Using the same assumptions, the size of the contour using the AEDT noise model was 732 acres. A 5% increase in size. For Updated No Action using actual Boeing aircraft, the noise contours are slightly smaller, 709 acres. This is because the actual aircraft are quieter than the aircraft used as substitutes. The with project noise contours (for both the preferred alternative forecast conditions along with the maximum thruput conditions) are slightly larger for the revised commercial aircraft then those assumed in the EA. The MD83 is a louder aircraft than the 737800, however the EMB175 is a louder aircraft than the DASH8-Q400, and there are more of those aircraft assumed than with the MD83.

As with the EA contours, there are no population or noise sensitive land uses within the noise contours.
Table 1
Noise Contour Size (65 DNL)
Using AEDT 2C Noise Model

<table>
<thead>
<tr>
<th>Figure</th>
<th>MODEL RUN</th>
<th>CONTOUR AREA Acres (65 DNL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>2018 Original Assumptions No Action (Original Boeing Aircraft Subs)</td>
<td>732</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Updated 2018 No Action (Actual Boeing Aircraft, No Substations)</td>
<td>709</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Updated 2018 With Project (Revised Commercial Aircraft)</td>
<td>744</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Updated 2018 With Max Thruput (Revised Commercial Aircraft)</td>
<td>798</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Updated 2018 With Project (Original Commercial Aircraft)</td>
<td>732</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Updated 2018 With Max Thruput (Original Commercial Aircraft)</td>
<td>791</td>
</tr>
</tbody>
</table>

OPERATIONAL ASSUMPTIONS

The noise contours were generated based upon the EA 2018 forecast operations assumptions. These forecast operations predicted future activity levels in terms of total operations and operations by different categories and types of aircraft. These categories include general aviation, corporate jets, Boeing, air taxi and military. These 2018 forecast operations were compared to the most recent 12 months of activity at the airport. The results show that the current operations and the forecast 2018 operations are similar in terms of total activity and types of activity. It is our opinion that noise contours developed based upon current activity would be similar to those predicted based upon the 2018 forecast activity level.
Assumptions:
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Original Boeing Aircraft Substitutions

Source: BridgeNet International 2016

Figure 1
2018 Original Assumptions Base Case Noise Contours (65 and 70 DNL)
Figure 2
Updated 2018 Base Case Noise Contours (65 and 70 DNL)

**Assumptions:**
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions

Source: BridgeNet International 2016
Figure 3
Updated 2018 No Action, With Project and Max Thruput Noise Contours
Revised Commercial Operations -- (65 and 70 DNL)

Assumptions:
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions
- Revised Commercial Operations (EMB175 and 737800)

Source: BridgeNet International 2016
Figure 4
Updated 2018 No Action, With Project and Max Thruput Noise Contours
Original Commercial Operations -- (65 and 70 DNL)

Assumptions:
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions
- Original Commercial Operations (DASH8-Q400 and MD83)

Source: BridgeNet International 2016
Assumptions:

- AEDT Noise Model
- EA 2018 Operational Assumptions
- Original Boeing Aircraft Substitutions

Source: BridgeNet International 2016
Figure 2a
Updated 2018 Base Case Noise Contours (65 and 70 DNL)

Assumptions:
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions

Source: BridgeNet International 2016
Figure 3a
Updated 2018 No Action, With Project and Max Thruput Noise Contours
Revised Commercial Operations -- (65 and 70 DNL)

Assumptions:
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions
- Revised Commercial Operations (EMB175 and 737800)

Source: BridgeNet International 2016
Figure 4a
*Updated 2018 No Action, With Project and Max Thruput Noise Contours*
*Original Commercial Operations -- (65 and 70 DNL)*

**Assumptions:**
- AEDT Noise Model
- EA 2018 Operational Assumptions
- Updated Actual Boeing Aircraft, No Substitutions
- Original Commercial Operations (DASH8-Q400 and MD83)

Source: BridgeNet International 2016
Environmental Assessment Figures
Figure D4 Future Noise Contours (2018) without Project

Source: Google Maps-June 2010.
Figure D6 Future Noise Contours (2018) with Project

Source: Google Maps-June 2010.
Figure D2 Future Noise Contours (2018) with and without Project

Source: Google Maps-June 2010.
Figure 1  Future Noise Contours (2018) Max Thruput

Source: Google Maps-June 2010.