Airport capacity profile estimates were created using a standard set of performance characteristics and do not take into account non-runway constraints, unless otherwise noted. The capacity estimates developed for this report are not intended to replace the results of any detailed analysis that would precede an environmental, investment, or policy decision.

The list of Future Improvements and their expected effects on capacity does not imply FAA commitment to, or approval of, any item on the list.
About this Airport Capacity Profile

• The capacity profile shows the hourly throughput that an airport is able to sustain during periods of high demand, represented as the range between the model-estimated capacity and the ATC facility-reported rate (called rate). Each weather condition has a capacity rate range.

• For each weather scenario, capacity estimates are based on information provided by ATC, including reported arrival and departure rates.

• A Marginal North Flow configuration was not included in this profile because it is not frequently used.

Recent Capacity Improvements at SEA

• Time-Based Flow Management (TBFM) helps to improve the flow of arrivals to the runways.

• Reduced Diagonal Spacing for arrivals of 1NM for runways with centerline spacing of 2,500 feet or greater provides an increase in arrival capacity.

Future Improvements at SEA

• Improved Runway Delivery Accuracy: The combined effects of several new capabilities, including Automatic Dependent Surveillance-Broadcast (ADS-B) Out, Cockpit Display of Traffic Information (CDTI), and Terminal Sequencing and Spacing (TSAS) in the terminal area, will improve the ability of controllers to deliver aircraft to the runway with the desired separation from the preceding aircraft. This will reduce the average spacing between arrivals and boost arrival capacity.

• Wake Recategorization Phase 2 assigns aircraft to new wake turbulence classifications based on their wake turbulence characteristics, such as wake generation, wake decay, and encounter effects. This results in closer longitudinal separation for certain aircraft types without sacrificing safety.
Seattle-Tacoma International Airport Overview - 2

Current Operations Capacity Rate Range

Annual Weather Conditions

Data Sources

- Throughout the profile, actual hourly SEA operations, weather and configuration data were obtained from the FAA ASPM database, and represent operational hours from 7am to 11pm local time for December 15 2015 through December 14 2016. Actual configuration usage is determined by multiple operational factors, including weather conditions.
- Facility-reported rates were provided by ATC personnel at SEA.
- Model-estimated rates are derived from operational information provided by ATC.
Visual Approaches, Visual Separation

<table>
<thead>
<tr>
<th>Type Operations</th>
<th>Arrival Runways</th>
<th>Departure Runways</th>
<th>Hourly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Operations</td>
<td>16L, 16R</td>
<td>16C, 16L</td>
<td>96</td>
</tr>
<tr>
<td>Future Improvements</td>
<td>16L, 16R</td>
<td>16C, 16L</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- **Future improvements**: Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Visual conditions in South flow is currently 95-96 operations per hour.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity; limited departure fanning is conducted from Runways 16C and 16L for non-jet aircraft.
- Additional spacing between arrivals to Runway 16L and between departures on Runways 16C and 16L may be employed in order to allow taxiing aircraft to cross the runways.
Actual traffic counts shown are for all Visual hours, all configurations. For data source information, see page 3.
### Visual – North Flow

<table>
<thead>
<tr>
<th>Type Operations</th>
<th>Arrival Runways</th>
<th>Departure Runways</th>
<th>Hourly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Operations</strong></td>
<td>34L, 34R</td>
<td>34C, 34R</td>
<td>88</td>
</tr>
<tr>
<td><strong>Future Improvements</strong></td>
<td>34L, 34R</td>
<td>34C, 34R</td>
<td>N/A 96</td>
</tr>
</tbody>
</table>

- **Future improvements**: Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Visual conditions in North flow is currently 88-93 operations per hour.
- Use of Runway 34C for departures is limited due to lack of queueing space.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity; Limited departure fanning is conducted from Runways 34C and 34R for non-jet aircraft.
- Additional spacing between arrivals to Runway 34R and between departures on Runways 34C may be employed in order to allow taxiing aircraft to cross the runways.
Visual Approaches, Visual Separation

Visual – North Flow

Visual Weather Conditions

Actual traffic counts shown are for all Visual hours, all configurations. For data source information, see page 3.
### Marginal – South Flow

#### Dependent Instrument Approaches, Visual Separation

<table>
<thead>
<tr>
<th>Type Operations</th>
<th>Arrival Runways</th>
<th>Departure Runways</th>
<th>Hourly Rate ATC Facility-Reported</th>
<th>Model-Estimated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Operations</td>
<td>16L, 16R</td>
<td>16C, 16L</td>
<td>84</td>
<td>87</td>
</tr>
<tr>
<td>Future Improvements</td>
<td>16L, 16R</td>
<td>16C, 16L</td>
<td>N/A</td>
<td>88</td>
</tr>
</tbody>
</table>

- **Future improvements**: Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Marginal conditions in South flow is currently 84-87 operations per hour.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument approaches to Runway 16R.
- Arrivals to Runways 16L and 16R are dependent and staggered by 1.0 NM diagonally.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 16L and departures on Runways 16C and 16L may be employed in order to allow taxiing aircraft to cross the runways.
Marginal – South Flow

Marginal Weather Conditions

Dependent Instrument Approaches, Visual Separation

Actual traffic counts shown are for all Marginal hours, all configurations.
For data source information, see page 3.
## Instrument – South Flow

### Dependent Instrument Approaches, Radar Separation

<table>
<thead>
<tr>
<th>Type Operations</th>
<th>Arrival Runways</th>
<th>Departure Runways</th>
<th>Hourly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ATC Facility-Reported</td>
</tr>
<tr>
<td>Current Operations</td>
<td>16L, 16R</td>
<td>16L</td>
<td>72</td>
</tr>
<tr>
<td>Future Improvements</td>
<td>16L, 16R</td>
<td>16L</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- **Future improvements**: Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Instrument conditions in South flow is currently 72-81 operations per hour.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument approaches to Runway 16R.
- Arrivals to Runways 16L and 16R are dependent and staggered by 1.0 NM diagonally.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 16L may be employed in order to allow taxiing aircraft to cross Runway 16L.
Dependent Instrument Approaches, Radar Separation

Instrument – South Flow

Instrument Weather Conditions

Actual traffic counts shown are for all Instrument hours, all configurations. For data source information, see page 3.
### Instrument – North Flow

#### Dependent Instrument Approaches, Radar Separation

<table>
<thead>
<tr>
<th>Type Operations</th>
<th>Arrival Runways</th>
<th>Departure Runways</th>
<th>Hourly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ATC Facility-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reported</td>
</tr>
<tr>
<td>Current Operations</td>
<td>34L, 34R</td>
<td>34R</td>
<td>56</td>
</tr>
<tr>
<td>Future Improvements</td>
<td>34L, 34R</td>
<td>34R</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- **Future improvements**: Improved Runway Delivery Accuracy, Wake
  Recategorization Phase 2.
- The capacity rate range in Instrument conditions in North flow is currently 56-59
  operations per hour.
- The adversely staggered thresholds between Runways 34R and 34L cause
  departures and arrivals on the runways to operate dependently.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument
  approaches to Runway 34L.
- Arrivals to Runway 34R are limited to aircraft requiring additional runway length
  for operational necessity.
- Consecutive departures are generally restricted to a single flow for noise
  abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 34R may be employed in order to
  allow taxiing aircraft to cross the runway.
Dependent Instrument Approaches, Radar Separation

Instrument – North Flow

Instrument Weather Conditions

Actual traffic counts shown are for all Instrument hours, all configurations.
For data source information, see page 3.
Historical Called Rate and Configuration Usage by Flow
**Historical Usage – South Flow**

**Called Rates**

- **AAR of 48 rare unless using 16L,16R|16C,16L**
- **ADR of 42 common in South Flow, but ADR of 44 is possible**
- **Lower rates tend to be called for single departure runway South Flow configurations**

- **Other rates: 26.6%**
  - Rates for all hours regardless of configuration, minimum 2% of time

**Key**

- **Arrivals/Departures (percent of time in configuration)**
- **90,90 (90%)** Rates called at least 5% of time when configuration used
- **Wind & Weather** Wind speeds increase away from center (3 knot increments)
  - More common winds are darker
  - Percent of time spent in VMC/MMC/IMC when configuration used

---

**South Flow Facility Reported Rates**

<table>
<thead>
<tr>
<th></th>
<th>48,48 (VMC)</th>
<th>42,42 (MMC)</th>
<th>36,36 (IMC)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATES</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*36,36 called 0.6% of time

All data for hours from 15 Dec 2015 – 14 Dec 2016, 7 AM to 11 PM. Excludes variable winds and missing or incomplete data. Only shows rates called at least 2% of all hours.
**Configuration Usage**

- **34L,34R | 34C,34R (9%)**
  - **Rates**
    - 44,44 (41%)
    - 46,42 (17%)
    - 46,44 (9%)
    - 46,40 (7%)
    - 44,42 (6%)
    - 44,40 (6%)
  - **Wind & Weather**
    - VMC: 97%
    - MMC: 3%
    - IMC: 0%

- **34L,34R (9%)**
  - **Rates**
    - 44,40 (22%)
    - 44,44 (13%)
    - 44,36 (12%)
    - 42,40 (6%)
    - 38,42 (5%)
  - **Wind & Weather**
    - VMC: 89%
    - MMC: 10%
    - IMC: 1%

- **Other North Flow > 2%**
  - 34C,34L | 34R
  - 34C,34L | 34C,34R
  - 34C,34L | 34C

- **South Flow Configurations**
- **Other Configurations**

---

**Key**

**Arrivals | Departures (percent of time in configuration)**

- **Rates**
  - 90,90 (90%) Rates called at least 5% of time when configuration used
- **Wind & Weather**
  - Wind speeds increase away from center (3 knot increments)
  - More common winds are darker

Percent of time spent in VMC/MMC/IMC when configuration used

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**NORTH FLOW FACILITY REPORTED RATES**

<table>
<thead>
<tr>
<th>Arrivals</th>
<th>Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td>44,44 (VMC)</td>
<td>28,28 (IMC)*</td>
</tr>
</tbody>
</table>

*28,28 called 0.1% of time*

All data for hours from 15 Dec 2015 – 14 Dec 2016, 7 AM to 11 PM. Excludes variable winds and missing or incomplete data. Only shows rates called at least 2% of all hours.

---

**Historical Usage – North Flow**

- **Called Rates**
  - AARs of 44 and 46 are common in North Flow
  - ADR of 44 called more often in North Flow than in South Flow

- **Other rates: 26.6%**
  - Rates for all hours regardless of configuration, minimum 2% of time

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**SEA Airport Capacity Profile**