Item No.	7B
Meeting Date	January 27, 2015

Sustainable Airport Master Plan (SAMP)

Update: January 27, 2015

Port of Seattle®

Briefing Outline

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

- **Overview**
- **Airport Economic Engine**
- **SEA Activity Forecast**
- **Forecast Implications/Challenges**
- **Development Constraints**
- **2034 Planning Goals & Facility Requirements**
- **Challenges, Options, & Next Steps**
  - Airfield
  - Terminal
  - Landside
- **Planning Schedule**
- **Challenges/Anticipated Actions** *(Near-Term)*
- **Sustainability**
- **Public Outreach Plan**

Overview

- Rapid growth and a constrained operational footprint requires strategic land use planning and future Commission policy decisions to provide needed capacity
- Gaining clarity regarding implications of projected growth in passengers and operations – and the necessary facility changes
- Developing and evaluating options to meet facility requirements
- Will need to utilize properties beyond those now a part of the airfield and terminal complex.
- The optimal airport layout – maintaining airfield capacity and adding terminal capacity – will require relocation of existing facilities
- Understanding these tradeoffs and the repercussions of balancing needs will be a next step

Airport Economic Engine

- **Sea-Tac serves as critical regional and national asset**
  - More than 170,000 jobs attributable to airport activity
  - $6.1 billion in total personal income
  - $16.3 billion in business revenue
- **Growth in air service supports regional economic activity**
  - Each new international flight generates an estimated $75 million annually in direct and indirect economic impact to the region
  - Keeping freight moving supports local and regional businesses
- **Connects region to the global economy**
- **Creates new jobs in local communities**
  - Aeronautical jobs – airlines, airline contractors, flight kitchens, aircraft maintenance
  - Airport and visitor jobs – dining/retail, hotels, parking
  - Construction jobs

SEA Activity Forecast

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Drivers of domestic and international passenger activity

- **Domestic originating passenger demand has strong historic correlation with key economic indicators**
  - Inflation-adjusted airfares projected to decline long-term
  - PSRC forecast: per capita income growth in Puget Sound region higher than national average
- **Domestic connecting passenger growth tied to airport's ongoing role as hub for Alaska Airlines, and development of Seattle as a Delta Air Lines domestic connecting hub and international gateway**
- **International originating passenger demand supported by Seattle economic profile and airline business plans**
  - Location of global business communities
  - Proximity to Asia
- **International connecting passenger activity driven by continued development of Airport as gateway for Delta and foreign-flag airlines.**

SEA Activity Forecast

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Passengers and operations

- **Rapid growth in recent years**
  - Passengers: up 4.7% in 2013 & 7.5% in 2014
  - Aircraft operations: up 2.5% in 2013 & 6.9% in 2014
- **Airport traffic will grow by 28.5 million annual passengers (MAP) and 190,000 aircraft operations in next 20 years**
  - 66 million annual passengers (up from 37.5 million in 2014)
  - 540,000 annual operations (up from 350,000 in 2014)

Forecast Implications/Challenges

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Airfield

- **36% more aircraft on the airfield during peak hours**
  - 2014 peak hour: 88 operations
  - 2034 peak hour: 120 operations
  - Operational delays begin at 90 operations per hour today
- **Airfield impact**
  - Efficiency exponentially decreases as the airfield reaches and exceeds capacity
  - Severe congestion along taxiway in front of terminal caused by departures queue and push back from gates
  - Departing aircraft significantly delayed due to runway crossings by arriving aircraft
  - Departures delays compounded by shift to larger aircraft

Forecast Implications/Challenges

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Terminal

- **58% more departing passengers in the terminal during peak hours**
  - 2014 peak hour: 5,180 passengers
  - 2034 peak hour: 8,170 passengers
- **70% more arriving passengers in the terminal during peak hours**
  - 2014 peak hour: 5,040 passengers
  - 2034 peak hour: 8,550 passengers
- **Terminal impact**
  - Check-in: processing has become increasingly efficient, but significant expansion of bag drop positions will be required
  - Security screening: current configuration of checkpoints is inefficient and future passenger loads will likely exceed capacity
  - Baggage claim: at or near capacity today – increased loads will cause congestion at claim devices and a low level of customer service

Forecast Implications/Challenges

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

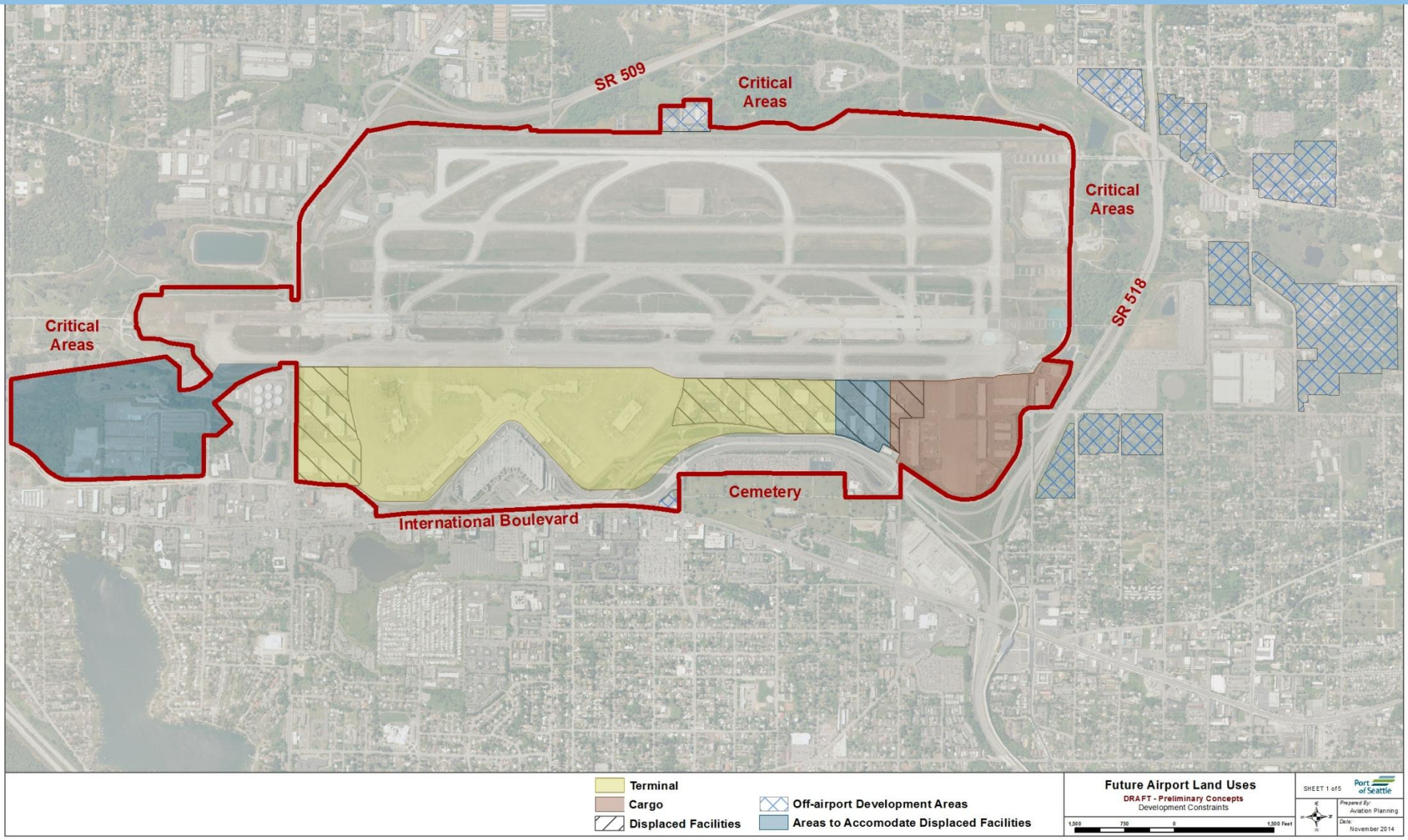
Landside

- **42% more vehicles on Upper Drive during morning peak**
  - 2014 peak hour: 1,240 vehicles
  - 2034 peak hour: 1,760 vehicles
- **61% more vehicles on Lower Drive during evening peak**
  - 2014 peak hour: 1,170 vehicles
  - 2034 peak hour: 1,880 vehicles
- **Landside impact**
  - Upper drive sidewalk congestion creates a low level of service today – passenger safety and access to the terminal will be severely compromised in 2034 without improvements
  - Traffic accessing terminal drives backs-up to control tower and occasionally onto SR 518 today – roadways will gridlock by 2034 without significant capital improvements

Development Constraints

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Environmental, airspace, and land use constraints severely limit expansion options



Development Constraints

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Airport Comparison

- **No US airport handles comparable passenger volumes with as small an operational footprint as SEA**

2013 Airport PAX rank	Airport name	Airport code	2013 PAX	Developed Acreage	PAX/acre
14	**Seattle-Tacoma**	**SEA**	**34,800,000**	**1,500**	**23,200**
7	San Francisco	SFO	44,900,000	2,000	22,450
13	Newark	EWR	35,000,000	1,700	20,590
19	Boston	BOS	30,200,000	1,600	18,880
9	Las Vegas	LAS	40,900,000	2,400	17,040

Development Constraints

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Land Allocation

- **Western operational boundary of airfield is 16R-34L** *(no 4th runway)*
- **Three runways are needed in 2034** *(cannot push terminal edge west)*
- **No terminal facilities west of 16R/34L** *(topography, wetlands)*
- **Limited footprint requires prioritization of land uses and complex phasing plan. Functional priorities for property allocation:**
  - Passenger terminal
  - Airfield
  - Landside
  - Cargo
  - Airline support
  - Airport support
  - General aviation

2034 Planning Goals

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

- **Gates**
  - Accommodate all planned, peak hour activity at aircraft parking positions with direct terminal access *(no remote busing operations)*
- **Minimum Connect Time (MCT)** *(people & baggage)*
  - 60 minute MCT with 20-year SAMP improvements
- **Dining and Retail**
  - Adequate concessions and amenities space to optimize revenue and meet customer expectations
- **Cargo**
  - Sufficient warehouse and hardstand facilities to meet demand
- **Roadways**
  - Reliable terminal access with minimal delay
- **Parking** -- TBD

2034 Facility Requirements – *What We Know Now*

- **35 additional aircraft parking positions with direct terminal access** *("gates")* **– after eight new gates at NSAT**
  - Providing gates will drive overall airport plan, toppling dominoes airport wide
- **International Arrival Facility (IAF)**
  - 27 international widebody gates *(vs 11 in 2014 & 18 in 2019)*
  - 2,200 passengers per hour processing capacity
- **400,000-500,000 total square feet of cargo warehouse** *(based on SAMP forecasted growth)*
  - Warehouse space will need to be consolidated and potentially mechanized to accommodate projected growth
  - Currently assessing ramp space requirements
  - Analyzing potential to accommodate Century Agenda growth

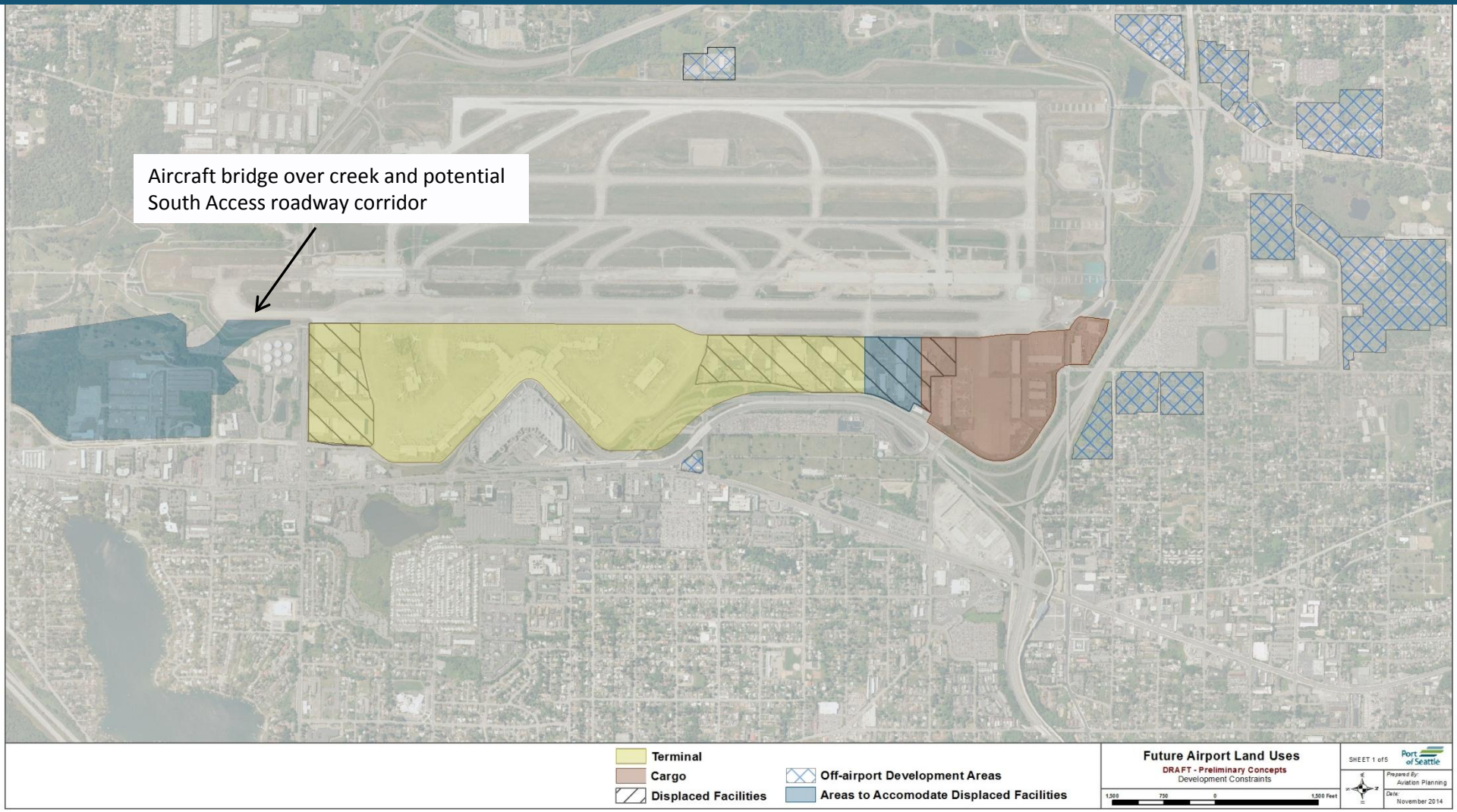
2034 Facility Requirements – *Still Evaluating*

- **Airport access roadways, terminal drives and parking**
- **Terminal**
  - — Check-in – Expanded current terminal or additional terminal?
  - — Security screening
  - — Holdrooms
  - — Dining & retail
  - — Baggage systems
- **Campus-wide "Automated People Mover" (APM)** *(RCF to terminal; between terminals; terminal(s) to remote concourses)*
- **Airline support**
  - — Aircraft maintenance & Ground Run-up Enclosure (GRE)
- **Airport support**
  - — Airport Rescue and Firefighting station (ARFF)
  - — Ground Service Equipment (GSE) maintenance

Airfield

Challenges

- **Additional airfield connected land required to meet demand**



Airfield

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Challenges

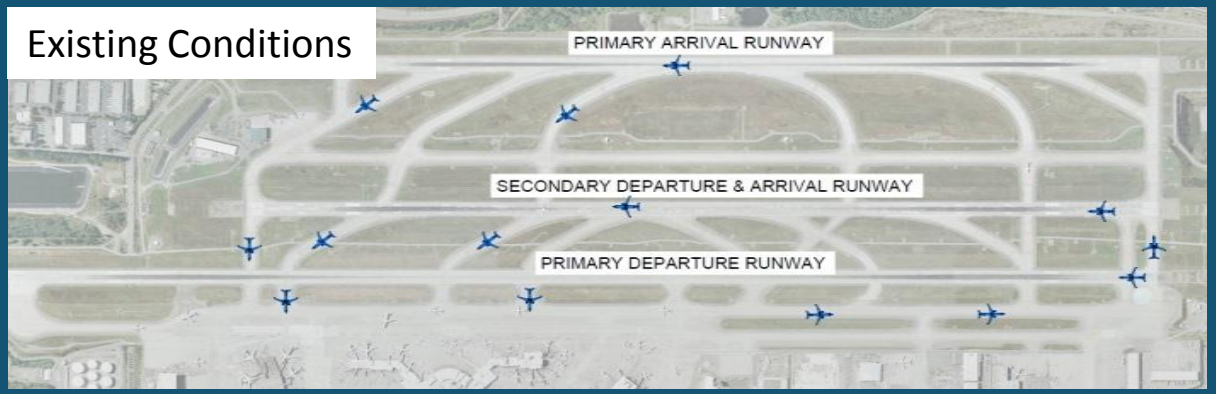
- **Accommodate 120 peak hour operations** *(up from 88 - with no airfield expansion)*
- **Increase airfield efficiency to make full use of three runway system**
  - Minimize runway crossings
  - Reduce congestion on Taxiway B and improve access to/from south end gates in north flow
- **Other factors that impact airfield capacity**
  - Closely spaced runways require staggered arrivals
  - Interactions with Boeing Field create departure and arrival delays

Airfield

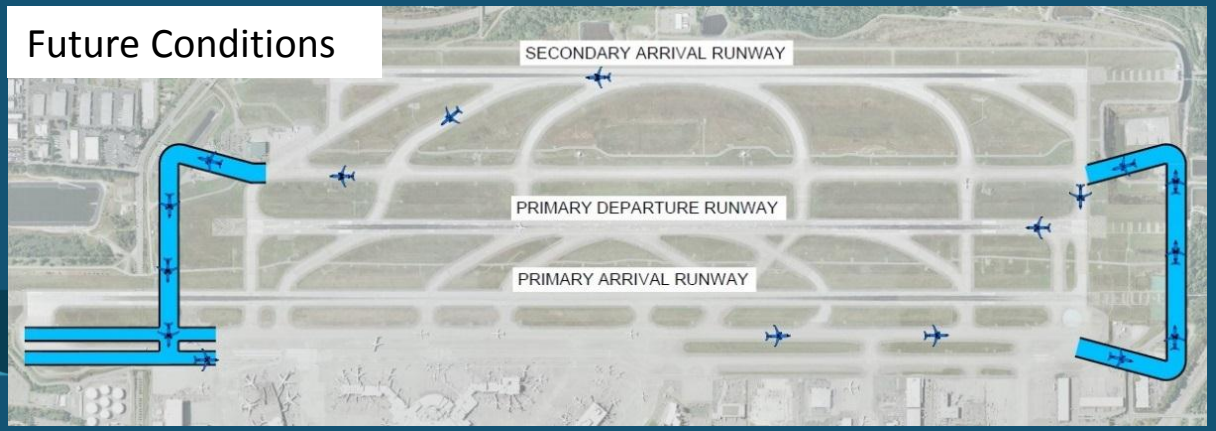
Options

- **End-around taxiways**
  - 70% of operations (all Group III) could avoid crossing departures runways
  - Minor reduction in take-off weight for large, long-haul international flights
  - Center runway could become primary departure runway – significant increase in efficiency/capacity
- **Taxiway A extension**
  - Doubles queuing capacity
  - Provides a bypass on south end taxiway system
  - Improves access to/from south end gates & SASA

Existing Conditions



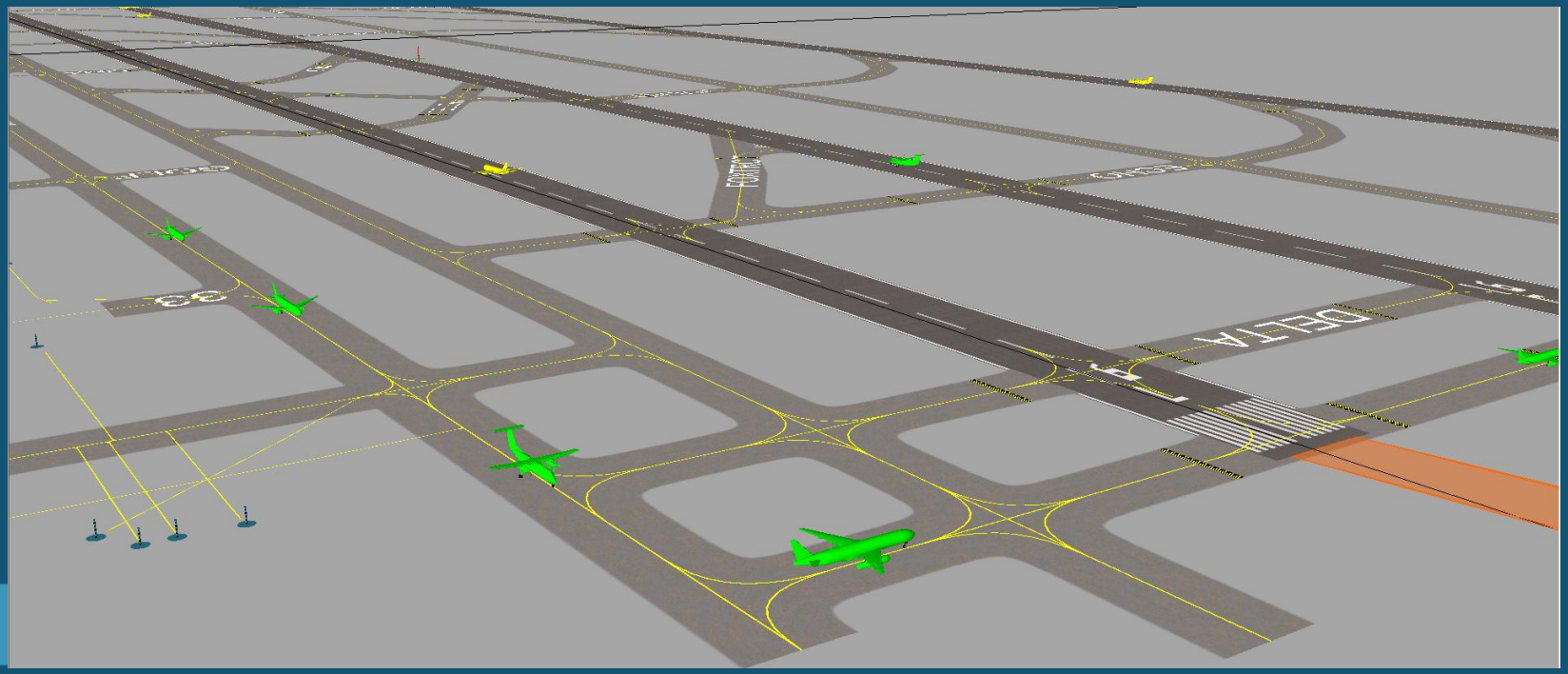
Future Conditions



Airfield

Next Steps

- **Alternatives analysis** *(detailed modeling will determine efficiency benefits of airfield improvements)*
  - Further develop potential capital and operational fixes
  - Airfield and terminal ramp modeling
  - Feasibility and cost/benefit
- **Coordination with FAA**



Terminal: Gates & Check-in

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Challenges

- **Aircraft parking positions with direct terminal access** *("gates")*
  - — Provide 35 additional gates
  - — Expand terminal in manner that:
    - Will be operationally efficient
    - Will connect widebody gates to IAF with good customer service
    - Can be phased with least disruption to existing facilities
- **Remain Over Night (RON) aircraft parking positions**
  - — Locate required RON north and south of the expanded terminal to minimize operational impacts of towing
- **Passenger processing capacity**
  - — Can we support 35 additional gates with a single, expanded terminal?
    - Or is a second terminal needed to supporting new gates to north?
    - How do we connect passengers between new concourses and terminal(s)?

Terminal: Gates & Check-in

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Options

- **Expansion is needed north and south to provide additional gates**
- **Early decisions:**
  - Concourse A extension or additional south satellite, and
  - Piers north of existing terminal or North Satellite extension
- **Based on decision above, then decide:**
  - Expand current terminal and/or build additional terminal to the north

Terminal: Gates -- South

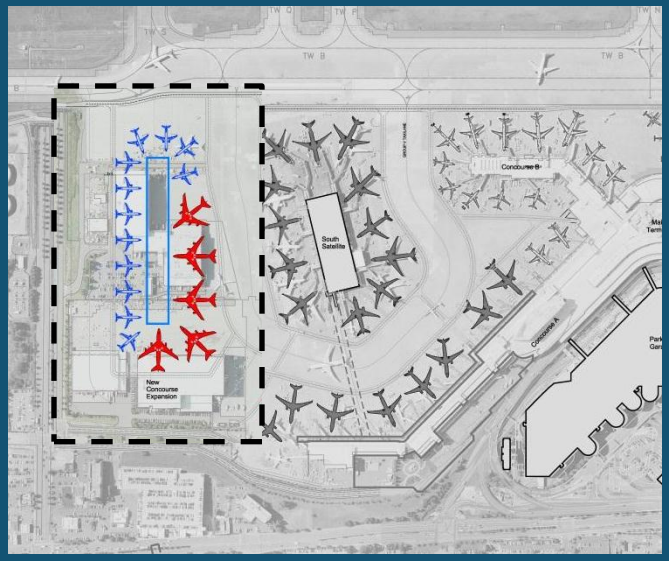
Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Concourse A Extension

- **Pros**
  - Meets international gate requirement
  - Widebody gate connection to IAF through Concourse appears better
  - Does not require lidding over S 188th ST
  - Dual taxilanes between new gates and SSAT
- **Cons**
  - Yields fewer gates

Additional South Satellite

- **Pros**
  - Meets international gate requirement
  - Yields more gates
- **Cons**
  - Difficult widebody gates connection to IAF
  - Requires lidding over S 188th ST
  - Single taxilane between new gates and SSAT



Terminal: Gates -- North

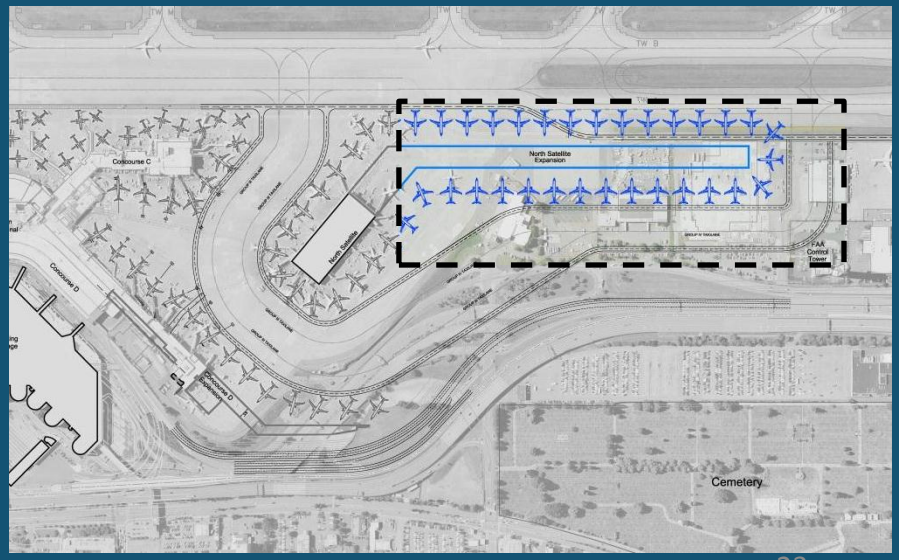
Sustainable Airport Master Plan
Seattle-Tacoma International Airport

North Piers

- **Pros**
  - Meets domestic gate requirement
  - Straightforward opportunity for second terminal *(if required)*
  - May not require relocation of southbound lanes of North Airport Expressway *(if no second terminal)*
  - Can more easily phase gates additions
  - Easier to accommodate widebody aircraft
- **Cons**
  - Challenge connecting passengers to the north

North Satellite Extension

- **Pros**
  - Meets domestic gate requirement
- **Cons**
  - Pushback onto taxiway impacts operations
  - Limited opportunity for second terminal if required
  - Requires relocation of southbound lanes of the North Airport Expressway (NAE)
  - Gate phasing has more impact to existing facilities
  - Limited ability to accommodate widebody aircraft
  - Challenge connecting passengers to the north

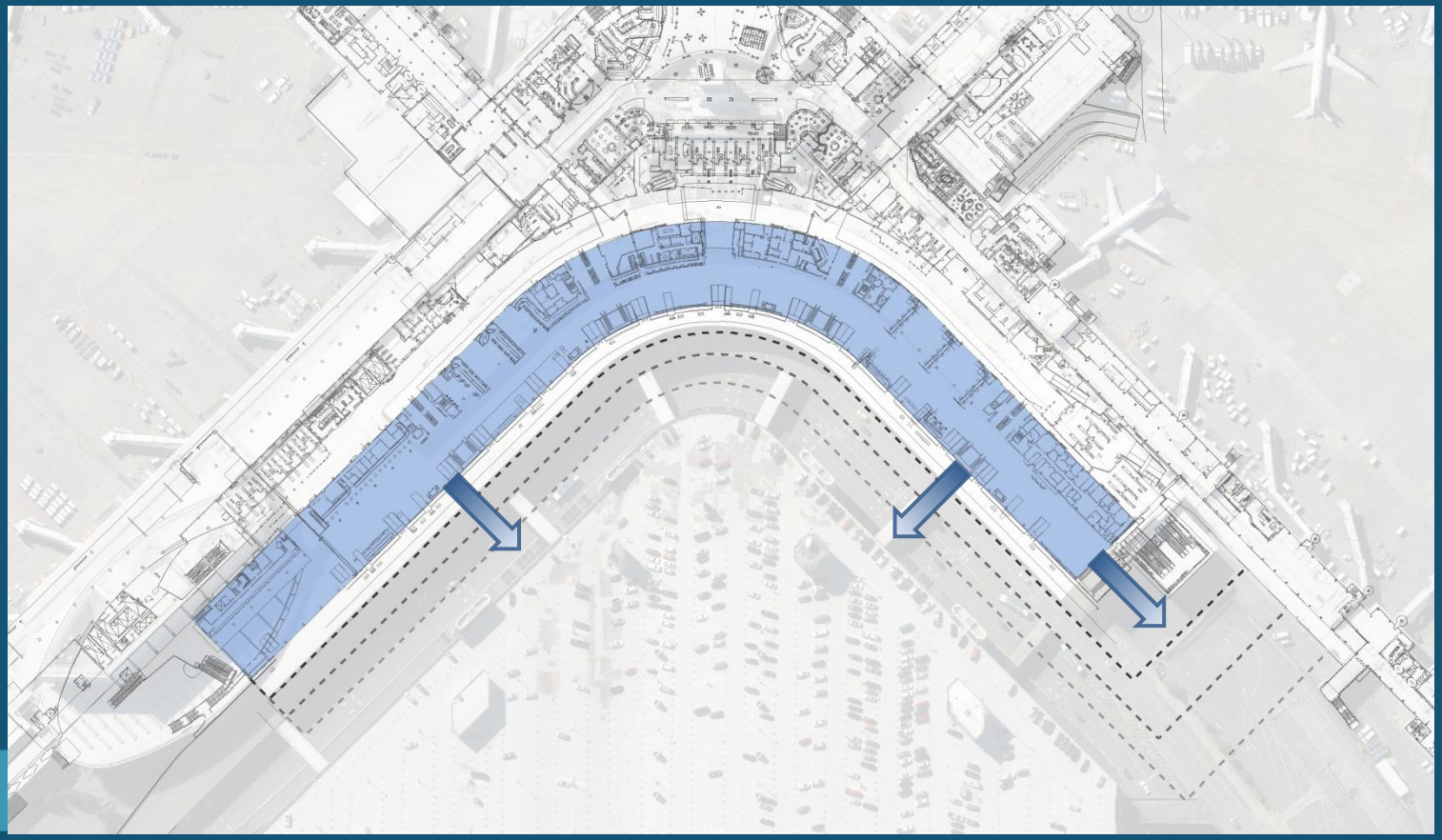


Terminal: Check-in

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Options – Main Terminal Expansion

- **Expand Main Terminal to the east and north**
  - Expand check-in lobby to the east and north
  - Link screening check-points to APM access to remote gates
  - Expand bag claim to the north



Terminal: Check-in

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Options – Additional Terminal to the North

- **Construct second terminal to support north gates**
  - Connect existing terminal and north terminal with APM
  - Provide landside access, curb, and parking
  - Provide pedestrian connection to gates over/under North Airport Expressway

Terminal

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Next Steps

- **Detailed analysis of expansion options**
  - Cost/benefit of south and north expansion options
  - Cost/benefit and feasibility of terminal expansion to the east/north
  - Capacity analysis to determine if second terminal is needed
- **Incorporate non-terminal functions into overall terminal plan**
- **Coordinate terminal-related facilities planning**
  - Check-in/Bag drop
  - Curbside
  - Security screening
  - Automated People Mover (APM)
  - Baggage systems
  - Holdrooms; Dining & retail; vertical circulation
- **Airfield and terminal ramp modeling**

Landside

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

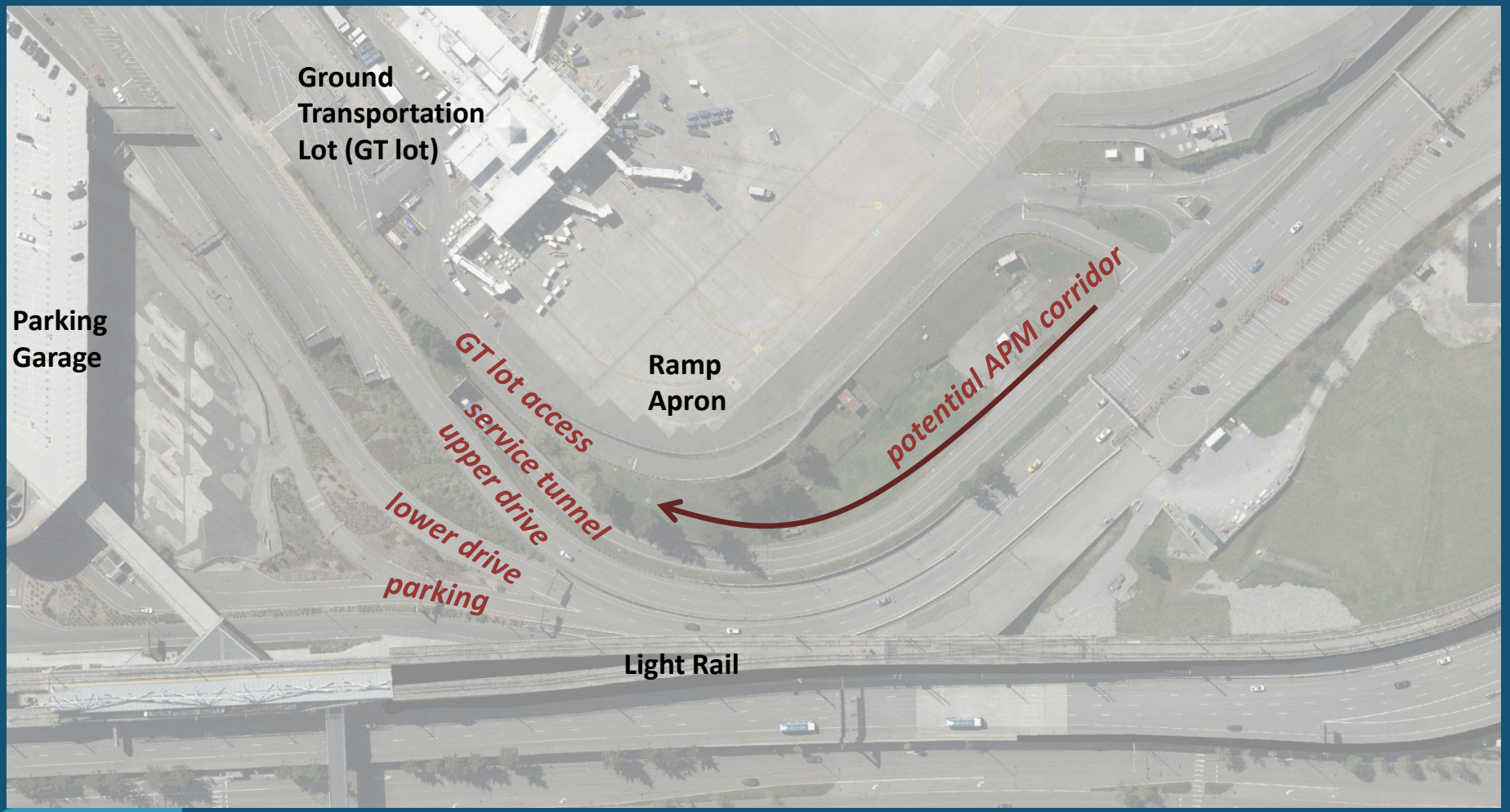
Challenges

- **Upper and Lower Drive expansion difficult**
  - Expensive
  - Construction impacts on operations
- **Expressway access to parking / Upper/Lower Drives exceedingly narrow**
- **Regional roadways outside of direct Port control**
  - SR 509 extension has been delayed for decades
  - Phasing of South Access needs to be modeled and evaluated
- **RCF bus traffic contributes to congestion accessing the drives**
  - Anticipated eventual automated people mover when RCF was built

Landside

Challenges

- **All traffic accessing the airport funnels through a bottleneck on the North Airport Expressway (NAE)**



Landside

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

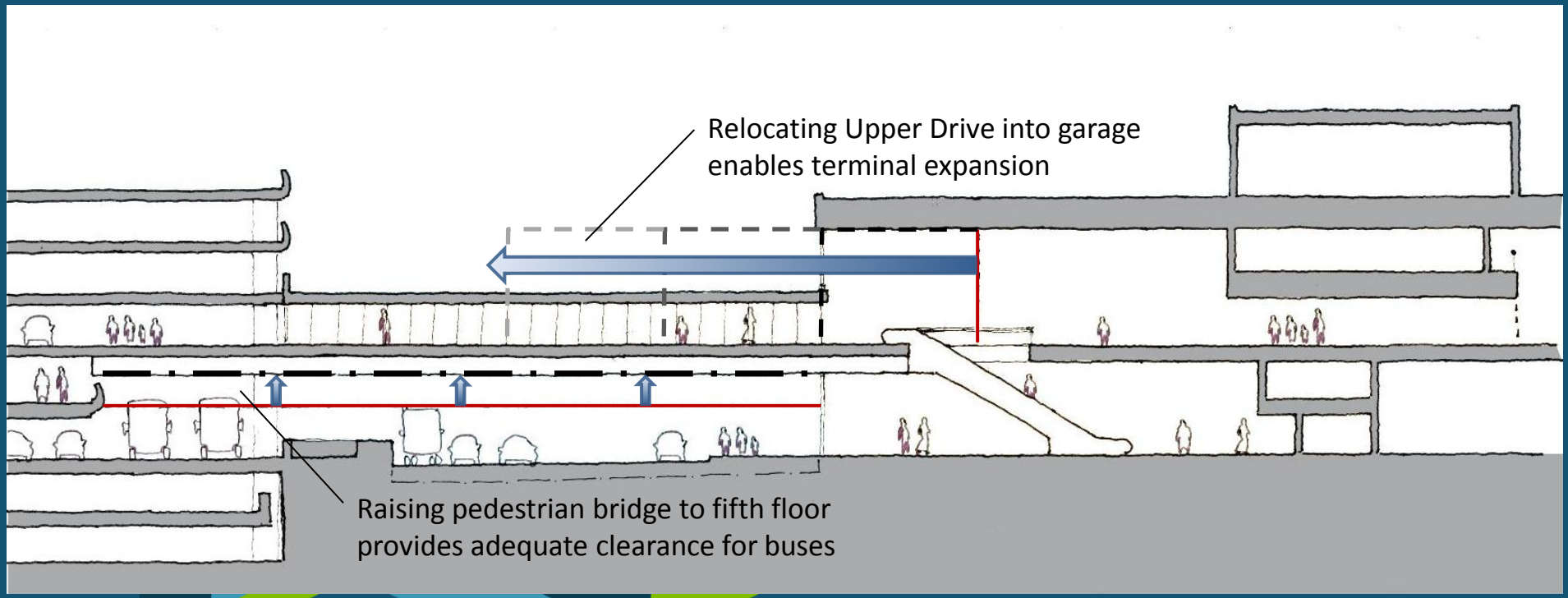
Options - Upper Drive Expansion

- **Widen Upper Drive**
- **Add 3rd lane to Upper and Lower Drive access**
- **Potentially divert demand to alternate drop-off locations**
- **Complex interaction with terminal expansion options**

Landside

Options - Upper Drive in Parking Garage

- **Relocate Upper Drive into garage**
  - Enables expansion of main terminal to the east
  - Provides additional clearance on 3rd floor ground transportation curb for buses
  - Provides opportunities for APM connection to main terminal



Landside

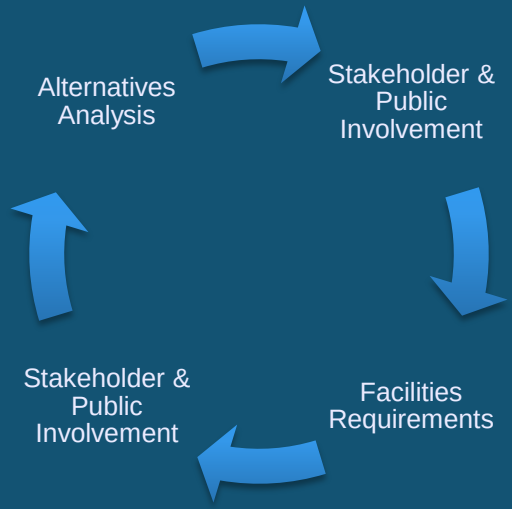
Sustainable Airport Master Plan
Seattle-Tacoma International Airport

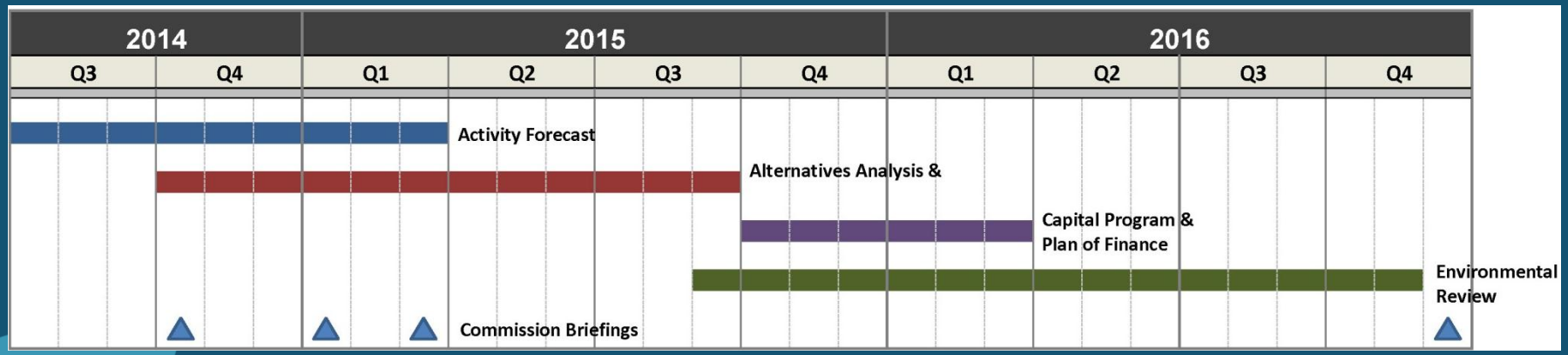
Next Steps

- **Critical and organic interaction between possible terminal expansion and curb/garage options**
- **Continue refining curbside relocation/expansion alternatives**
  - Feasibility of required modifications to curbs and garage
  - Cost/benefit
- **Landside modeling**
  - Drives capacity/demand analysis
  - Connections to regional roadway system
- **Integration of opportunities, costs, and impacts of terminal and landside options**

Planning Schedule

- **Activity forecast** (completed Q3 2014 – in FAA review Q1 2015)
- **Alternatives analysis & plan development** (Q4 2014 – Q3 2015)
  - Iterative process, finalizing facility requirements and developing preferred development alternative
  - Commission engagement at key decision points
  - Constructability assessment
  - Phased implementation plan
  - Planning level cost estimates
- **Program plan of finance** (Q4 2015 – Q1 2016)
- **Environmental review** (Q3 2015 – Q4 2016)





Challenges/Anticipated Actions

Sustainable Airport Master Plan
Seattle-Tacoma International Airport

Near-Term

- **Challenges**
  - Shortage of gates over the next 5 to 10 years
  - Where/when to build interim remote gate lobby?
  - Additional gate capacity will be needed soon after completion of IAF & NorthSTAR
  - Check-in processing becoming increasingly efficient, but nearly all existing positions will be utilized in 2015
  - Security screening rates have increased with implementation of PreCheck, but current configuration of checkpoints is inefficient

- **Anticipated actions prior to completion of SAMP environmental**
  - Remote hardstand operations and busing starting in 2016
  - Potentially construct interim remote gate lobby
  - Expand check-in and reconfigure security checkpoint in zone 7
  - Provide additional bag drop on promenade level in zone 6

Sustainability

- **Draft Strategy for a Sustainable Sea-Tac (S3)**
  - Builds on our Environmental Strategy Plan 2009 – 2014
  - Includes sustainability objectives, social responsibility and economic sustainability
  - Commission briefing February 10th
  - Draft strategy Spring 2015
- **S3 integration into SAMP**
  - S3 objectives and initiatives evaluated throughout the SAMP process to ensure that capital development is planned in the most sustainable manner possible
    - Environmental sustainability objectives used as part of screening criteria in evaluating concepts
    - Environmental sustainability objectives will be evaluated extensively in proposed new buildings and renovations of existing buildings
    - Final, long-term plan will include management initiatives (in addition to capital improvements) to ensure airport meet its sustainability goals and objectives in future years

Public Outreach

- **Public outreach planning**
  - Phase I: Series of meetings with local officials and stakeholders
  - Phase II: Conduct 3 public outreach & comment meetings
    - 1st Public Meeting (February-March 2015): SAMP process, goals, forecast, and development concepts
    - 2nd Public Meeting (Spring 2015): Preliminary development alternatives
    - 3rd Public Meeting (Summer 2015): Preferred development alternative