ES Executive Summary

INTRODUCTION. Following approval for construction in 1928 as the region's first municipal airport, King County International Airport/Boeing Field (BFI or Airport) has grown to be one of the busiest primary non-hub airports in the nation and the primary general aviation reliever airport to Seattle-Tacoma International Airport (SEA). BFI also ranks among the most successful public investments in state history and is a major contributor to the region's economic stability and sustainability. According to the *King County International Airport Economic Impact Study*, BFI's economic impact is more than \$3.0 billion in terms of local business sales that support 18,600 jobs and generates \$1.3 billion in labor income to King County. The Airport's 150 tenant businesses, which include the Boeing Company's various civilian and military aircraft Flight Test and Delivery Center operations, directly support 5,209 jobs in the local economy.

BFI serves a wide variety of aviation users that include small commercial passenger airlines, large and small air cargo carriers, commercial general aviation Fixed Base Operators (FBOs), corporate general aviation flight departments, private aircraft owners, helicopters, and military aircraft. In 2015, BFI recorded 20,214 enplanements, 165,571 aircraft takeoffs/landings, and 390 based aircraft. For 2019, it is projected that enplanements will decrease to 17,643, but total operations will increase to just over 184,500. Also, in 2014 BFI ranked as the 27th busiest cargo airport in the country, recording a cargo landed weight of 407,629 tons. This compares to a near doubling of the recorded landed weight of 754,068 tons for 2019, which ranks 38th in the country.

The previous Airport Master Plan was completed/adopted in 2004, and significant changes in the local, regional and national aviation industry have occurred since that time. This Master Plan Update (MP Update) will assist in documenting the current state of the aviation industry at BFI, and ultimately supports the modernization and improvement of existing Airport facilities. In addition, the findings of the MP Update can serve as the strategic guide for overall economic development opportunities and sustainability recommendations over a 20-year planning horizon, as well as enhance the Airport as a major regional economic and employment center.





Public Outreach/Communication Plan

The MP Update includes a Public Involvement Plan that defines the proposed communication and community engagement process for the project including overall goals, key community audiences, information needs and messages, and proposed community engagement activities.

Communication and Outreach Goals. Throughout the MP Update process, King County and the project team strived to:

- Consult with BFI partners, stakeholders, and the broader community about the master planning process. This will help establish the purpose of the work, as well as the schedule and process by which the plan will be developed.
- Ensure that the public knows how they can be involved and understand how their input will be considered.
- Collaborate with Airport partners and a stakeholder working group to identify feedback for consideration in the master planning process.
- Solicit substantive and meaningful public input at appropriate milestones and incorporate these ideas into the plan to the greatest extent possible.
- Conduct a public outreach process that is transparent, accessible, and reflective of the County's commitment to equity and social justice.

Development Considerations and Assumptions

The Development Plan alternatives for BFI were evaluated in combination with the facility requirements of the of airport users, as well as the strategic vision established by King County. Therefore, several basic assumptions have been identified with the intent to direct the future development and maintenance of the Airport. These assumptions, which have been formulated from input provided by stakeholders, Airport Staff, and the FAA, are supported by the aviation activity forecasts and include a commitment for continued airport development that supports the economic and sustainable planning objectives of the region.

The aircraft types projected to be used at BFI during the next 20 years are for the most part the same types that presently use the Airport. They include the narrow-body commercial service aircraft associated with Boeing's 737 Delivery Center, both widebody (e.g., the B-767, MD-11, & A-300) and narrow body aircraft (e.g., B-737, B-757) that are operated by the air cargo providers, and the various military aircraft (e.g., the Boeing P-8 Poseidon, Boeing E-3 Sentry - AWACS, and the new Boeing KC-46 Pegasus) associated with Boeing's existing Military Flight Center and Test Facility. In addition, BFI is home to numerous corporate general aviation flight departments that operate all sizes of business-use aircraft (including the very large business jets such as the Gulfstream V and the Canadair Global Express).

From an aircraft operational standpoint, the number of annual aircraft operations (landings and takeoffs) at BFI is forecasted to increase from approximately 165,571 in 2015 (the base year for the forecasting effort) to over 170,956 by the end of the 20-year planning period encompassed in this Master Plan. Also, commercial passenger activity at the Airport is forecasted to increase by approximately 30 percent over the next two





decades (an average 1.3 percent annual increase), from 18,945 enplaned passengers in calendar year 2015 to 24,541 in 2035.

Development Assumptions

Assumption One. The first assumption states that the existing non-standard dimensional criteria that have been identified for Runway 14R/32L will be evaluated separately for mitigation options and integrated into the airside alternatives formulated for this Master Plan Update.

Assumption Two. Assumption Two states the future development of the Airport will continue to safely accommodate the existing variety of aviation users and activities, ranging from air cargo, commercial service passenger operations, commercial service aircraft deliveries, all sectors of the existing general aviation users, and military aircraft test operations with facilities properly sized to accommodate the projected forecast demand.

Assumption Three. The third assumption is future land acquisition priorities (i.e., fee simple and/or easement, as necessary) will be identified as they relate to airport safety, future airport development, and land use compatibility.

Assumption Four. The fourth assumption is to encourage the protection of existing public and private investment in land and facilities and advocate the resolution of any potential land use conflicts, both on and off airport property.

Assumption Five. Assumption Five is to provide effective direction for the future development of the Airport through the preparation of a rational plan and adherence to the adopted development program that incorporates the defined air transportation planning goals and objectives of King County.

Development Recommendations

The plan for the future development of BFI has evolved from an analysis of many considerations. Among these are: aviation demand forecasts, facility requirements, aircraft operational characteristics, environmental considerations, and the general direction of future airport development, as expressed by King County. The various airside and landside development options that are presented in the *Alternatives Analysis and Development Concepts* chapter provided the Airport Work Group (AWG) and the management staff of the Airport with a variety of options for future facility expansion. Following a careful assessment of the potential impacts for each development option, the airport sponsor selected components that formed the basis for an overall long-term development concept for the Airport.





Runway System

There are several development recommendations for the Airport runway system.

Runway 14R/32L

Runway Design Code (RDC) Dimensional Criteria. As the Airport's primary runway, Runway 14R/32L is currently designed to accommodate the "Design Aircraft" in consideration of approach speed and wingspan. This translates to design standards associated with RDC D-IV-4000 criteria, as specified by the FAA. The design criteria also include the Runway Visual Range (RVR) visibility minimums of 4000 feet (or not less than $\frac{3}{4}$ statute mile) published for the runway. The existing design criteria are to be maintained in the future.

Dimensions. This runway is currently 200 feet wide with an existing length of 10,007 feet [10,880 feet with the Runway 14L Prior Permission Required Pavement (PPRP)]; a 300-foot conversion of the Runway 14L PPRP will extend the runway length to 10,307 feet. Removal of the remaining Runway 14L PPRP is proposed, and the Runway 32L threshold displacement of 880 feet is to remain. As provided on the ALP, the proposed declared distance lengths are shown in **Table ES1**.

Table ES1 RUNWAY 14R/32L RUNWAY SYSTEM

Runway	TORA	TODA	ASDA	LDA	
Runway 14R	10,300'	10,300'	9,420'	9,420'	
Runway 32L	10,300'	10,300'	10,300'	9,420'	
Notes: TORA: Takeoff	Run Available.	٦	TODA: Takeoff Distance Available.		
ASDA: Accelerate Stope Distance Available.			LDA: Landing Distance Available.		

Pavement. The existing published gross weight bearing capacity of 100,000 pounds single wheel, 200,00 pounds dual wheel, and 500,000 pounds dual tandem wheel main landing gear configuration will be maintained.

Instrument Approach Criteria. The existing four instrument approach procedures (ILS or LOC, RNAV (RNP) and RNAV (GPS) approaches to Runway 14R and ILS or LOC approach to Runway 32L) will be maintained.

Runway Protection Zones (RPZs). The size of both the approach and departure RPZs for Runway 14L are to be maintained at 1,000 feet x 1,510 feet x 1,700 feet and 500 feet x 1,010 feet x 1700 feet, respectively. The Runway 32 approach and departure RPZs will be maintained at 500 feet x 1,010 feet x 1,700 feet.

Runway Lighting and Navigational Aids. The Airport plans to maintain the runway's existing High Intensity Runway Lights (HIRLs) and Precision Approach Path Indicators (PAPIs) at both runway ends. The existing Medium Intensity Approach Lighting System with Sequenced Flashers (MALSF) serving Runway 14R is to be relocated and the existing Runway End Indicator Lights (REILs) serving Runway 32L will be upgraded to High Intensity Approach Light System with Sequenced Flashing lights (ASLF-1).





Future in-pavement runway Centerline Lights (CL) and Touchdown Zone Lights (TDZL) are planned for each runway end, including the install of in-pavement runway guard lights at each taxiway connector. Additionally, the ground-based Navigation Aids (NAVAIDS) associated with the ILS approaches will be maintained (i.e., the Localizer and glide slope antennas for Runway 14R; the Localizer antenna for Runway 32L).

Runway 14L/32R

Runway Design Code (RDC) Dimensional Criteria. As the Airport's secondary runway, Runway 14L/32R is currently designed to RDC B-I (Small Aircraft)-Visual criteria, as specified by the FAA. It is recommended that this runway will be maintained to these criteria.

Dimensions. This runway is currently 100 feet wide and 3,710 feet long. The Runway 14L threshold displacement of 250 feet and the Runway 32R threshold displacement of 375 feet are to remain. As provided on the ALP, the existing and future declared distance lengths are shown in Table ES2.

Table ES2 RUNWAY 14L/32R RUNWAY SYSTEM

Runway	TORA	TODA	ASDA	LDA
Runway 14L	3,709'	3,709'	3,709'	3,459'
Runway 32R	3,709'	3,709'	3,709'	3,334'
Notes: TORA: Takeoff Run Available.		TODA: Takeoff Distance Available.		

ASDA: Accelerate Stope Distance Available. LDA: Landing Distance Available.

Pavement. The existing published gross weight bearing capacity of 120,000 pounds single wheel, 250,00 pounds dual wheel, and 550,000 pounds dual tandem wheel main landing gear configuration will eventually be reduced to greater than 100,000 pounds single wheel main landing gear configuration.

Instrument Approach Criteria. The existing visual approaches will be maintained with no implementation of future approaches planned.

Runway Protection Zones (RPZs). The size of both the approach and departure RPZs for this runway are to be maintained at 250 feet x 450 feet x 1,000 feet.

Runway Lighting and Navigational Aids. The existing Medium Intensity Runway Lights (MIRLs), PAPIs, and REILs are to be maintained.





Taxiway System

BFI has historically been planned and designed with an efficient taxiway system that serves both runways. The recommendations for the Airport's taxiway system design and geometry improvements are presented below.

Runway 14R/32L Taxiway System

Taxiway Dimensional Criteria. Taxiway B, the parallel taxiway serving the west side of Runway 14R/32L, is designed in accordance with ADG IV and TDG 5 design criteria, as specified by the FAA. These criteria are to be maintained and upgrades to exit and connector taxiways are planned as shown on the drawing. Exit and connector taxiways providing access to the east of Runway 14R/32L are designed in accordance with ADG II, III, or IV and TDG 2, 3, or 5 design criteria, as specified by the FAA. These criteria are also to be maintained or upgrades provided as shown on the drawing.

Dimensions. TDG 5 standards specify a taxiway width of 75 feet and shoulder width of 30 feet.

Pavement. The proposed taxiway improvements will be designed, engineered, and constructed commensurate with the existing Runway 14R/32L pavement strength.

Taxiway Lighting. The existing system of Medium Intensity Taxiway Lights (MITLs) will be maintained. Installation of in-pavement taxiway centerline lights is planned for Taxiways serving Runway 14L/32R.

Recommended Taxiway Improvements.

- Design and re-designate 300 feet to the north of existing Taxiway Z PPRP as an extension of Taxiway
 B in conjunction with the conversion of the 300-foot 14L PPRP to useable runway pavement
- Construct future Taxiway B-1
- Remove existing Taxiway Z north of the Taxiway B extension
- Remove existing Taxiway B-1 pavement
- Widen Taxiway B-2 to 90 feet
- Extend Taxiway A 300 feet to the north in conjunction with the conversion of 300 feet of the Runway 14L PPRP to useable runway pavement
- Construct future Taxiway A-1
- Remove existing Taxiway A-1
- Widen Taxiway A-2 from 45 to 75 feet
- Construct future Taxiway A-3 and remove existing Taxiway A-4 to eliminate acute-angled taxiway
- Remove existing Taxiway A-8 (between the runways)





Runway 14L/32R Taxiway System

Taxiway Dimensional Criteria. Taxiway A, the parallel taxiway serving the east side of Runway 14L/32R, is designed in accordance with ADG II, III, or IV and TDG 2, 3, or 5 design criteria, as specified by the FAA. These criteria are also to be maintained or upgrades provided as shown on the drawing.

Dimensions. TDG 2 standards specify a taxiway width of 35 feet and shoulder width of 15 feet. TDG 3 standards specify a taxiway width of 50 feet and shoulder width of 20 feet. TDG 5 standards specify a taxiway width of 75 feet and shoulder width of 30 feet.

Pavement. Existing Taxiways A-7, A-9, and A-10 pavement strengths will be maintained and the proposed improvements to Taxiways A-1, A-2, and A-3 will be designed, engineered, and constructed commensurate with the existing Runway 14R/32L pavement strengths. Future Taxiway A-4 and existing Taxiways A-8 and A-11 pavement strengths are anticipated to be commensurate with the existing Runway 14L/32R pavement strengths.

Taxiway Lighting. The existing system of Medium Intensity Taxiway Lights (MITLs) will be maintained. Installation of in-pavement taxiway CL lights are planned for future Taxiways A-1, A-2, A-3, and existing Taxiways A-10 and A-11.

Recommended Taxiway Improvements.

- Realign and extend segment of Taxiway A north of future Taxiway A-1
- Widen Taxiway A-2 from 45 to 75 feet
- Construct future Taxiway A-3 and remove existing Taxiways A-3 and A-4 to eliminate acute-angled taxiways
- Construct future Taxiway A-4 and remove existing Taxiway A-5 to eliminate acute-angled taxiway
- Remove existing Taxiway A-8 west of the Runway 32R end

Property/Easement Acquisition

King County presently owns the property associated with the existing runway/taxiway system and inner approach areas, including most of the Runway Protection Zones (RPZs) at each end of the runways. However, additional property acquisition is needed to control the balance of the existing Runway 14R departure RPZ (south of the Runway 32L end), the future repositioning of the Runway 14R approach RPZ, for additional aviation development within the southwest quadrant of the Airport, and for additional aviation support development west of the Airport. The specified property acquisition projects are summarized in the following text.

Future Property Acquisition:

- Runway 14R departure RPZ 7.4 acres
- Runway 14R approach 1.0 acres

Future RPZ Use Agreement:

Runway 14R approach RPZ – 1.3 acres

- Airside/Landside Development 3.6 acres
- Airport Support Facilities 21.6 acres





Landside Development Area Plans

Based on input received from the AWG, the FAA and Airport Staff, an overall landside development concept for BFI was formulated from the alternatives presented in the *Alternatives Analysis and Development Concepts* chapter. The key components of this landside conceptual plan, as well as the site-specific area plans, are described in the following narrative and identified on the ALP illustration, at the end of this Executive Summary.

Terminal Area Plan

The major improvements identified in the vicinity of the passenger terminal building (east side of the Airport) are summarized here:

- Expands Terminal Area Courtyard Apron to approximately 6.0 acres to accommodate larger passenger charter aircraft and provide flex space for overflow cargo aircraft parking
- Realigns outbound segment of the Terminal looped roadway with Othello Street
- Removes the South Arrivals building and adjacent auto parking
- Retains the former King County Agencies building
- Widens Orchard Street to accommodate two-way auto traffic
- Relocates the existing traffic light at the Othello Street/Airport Way South intersection to the existing Orchard Street
- Reserves approximately 10.4 acres of landside development area improvements for UPS cargo processing, storage, and auto parking
- Closes a segment of Perimeter Road South to public access and installs a traffic signal at the Airport Way S. and Portland Street intersection

Terminal Area Plan – Area Plan South

The major improvements identified at the south end of the Airport (both east and west sides) are summarized here:

- Removes the existing T-hangars and tie-down apron in the southeast corner of the Airport and develops Modern Aviation Fixed Based Office (FBO) facilities
- Redevelops the Kenmore Aero Services FBO facilities in the southeast corner of the Airport
- Proposes acquiring approximately 3.6 acres of the Woods Meadows property, and combined with the removal of the existing T-hangars and tie-down apron, reserves approximately 14.0 acres of additional cargo processing, storage, and transfer development west of Taxiway B and south of the corporate hangars.
- Proposes acquiring approximately 21.2 acres west of East Marginal Way S. for relocation of the ATCT and the fuel storage facility, among other facilities
- Provides additional Boeing aircraft parking apron to the north of the existing ATCT





Terminal Area Plan – Area Plan North

The major improvements identified at the north end of the Airport (both east and west sides) are summarized here:

- Decommissions the existing northeast GA apron tiedown area
- Relocates the existing fuel storage facility
- Relocates the existing Airport maintenance building
- Refurbishes previous FAA building for Airport Offices
- Constructs new Steam Plant access road
- Modifies approximately 9.3 acres of existing National Guard leasehold property and redevelops with airport maintenance and administration facilities

Aviation Support Development

Support facilities provide those services and functions that are necessary for an airport to operate safely and efficiently, but are not part of the runway/taxiway system and are not related to the passenger terminal building, air cargo facilities, aircraft storage, or aircraft maintenance. The aviation support facilities at BFI that require development recommendations include the Airport's maintenance facilities, fuel storage facility, and Airport Traffic Control Tower (ATCT).

Airport Maintenance Facility Development Area. Due to the proposed relocation of the Runway 14R threshold and associated RPZ development restrictions, future plans for the site include renovation of the existing FAA Flight Service Station for Airport Offices, including relocation of the Airport's Maintenance Building and construction of a Snow Removal Equipment (SRE) Building to a new Airport Maintenance Development Area located west of the Steam Plant. In addition, construction of a new access road is planned to serve the existing Steam Plant facility.

Fuel Storage Facility. Due to BFI's existing fuel storage facility being partially located within the existing Runway 14R RPZ, which is considered an incompatible land use, and the fact that the existing Jet A fuel storage facility is potentially undersized, a future development site has been identified. The selected redevelopment site for the facility is located west of East Marginal Way South, on the former Jorgensen Forge property that is to be acquired for Airport facility expansion. It is estimated that the future fuel storage facility will require a development footprint of approximately two acres.

Airport Traffic Control Tower (ATCT). The Airport's existing ATCT is located at midfield, on the west side of the Airport, adjacent to the ARFF facility. Due to the age and condition of the existing ATCT, it has been determined that a facility upgrade may be necessary during the timeframe of this Master Plan Update. Airport Staff have identified a potential new development site, also located west of East Marginal Way South, on the former Jorgensen Forge property. At this new location, King County would have the option to construct a new ATCT with conventional facilities or evaluate an upgrade/replacement of existing ATC facilities with new remote/virtual Air Traffic Control (ATC) technology.





Environmental Overview & Land Use Plan

Utilizing information that was gathered/documented in the Inventory of Existing Conditions chapter of this document, an environmental screening review of the Airside and Landside Conceptual Development Plan (CDP) proposal was prepared to identify any significant environmental issues that may be of concern with the proposed improvements. The general environmental resource categories associated with the recommended CDP were summarized in a non-quantified fashion to identify the likely environmental processing necessary for the improvements. These categories include:

- Noise/Compatible Land Use
- Air Quality •
- Farmlands
- Floodplains
- Hazardous Materials, Solid Waste, and **Pollution Prevention**
- Historical, Architectural, Archaeological, and Cultural Resources
- Section 4(f) Property
- **Threatened and Endangered Species**
- Water Resources
- Wetlands
- Wildlife Hazard Attractants

Each improvement specified in the CIP for this Airport Master Plan Update that receives Federal funding or necessitates a change to the ALP requires environmental clearance prior to implementation on a projectspecific basis. The environmental documentation required to receive the clearance differs with the complexity of the project and the anticipated level of environmental impacts. This documentation can range from a Categorical Exclusion (CAT-EX) for simple projects to a full Environmental Impact Statement (EIS) for projects with potentially significant impacts. The purpose of this Environmental Overview is to attempt to identify any potentially significant environmental concerns that might greatly influence the ability to implement one or more of the recommended improvement projects and determine the level of environmental documentation required. Based upon this initial assessment, it appears that the potential environmental impacts associated with the identified development projects could likely be addressed or mitigated below significant thresholds through the appropriate environmental documentation process.

Conceptual Development Plan

The major improvement considerations described above for the BFI have been organized and graphically represented in the following illustration entitled AIRPORT LAYOUT PLAN (ALP). In short, the development concept as illustrated by the ALP provides the King County with a long-term development plan for BFI that will continue to accommodate a wide range of aviation user groups and operational activities. As with any airport planning document, the ultimate build-out of the various aviation development areas will be demand driven, and could exceed that which is projected for the 20-year planning period of this Master Plan Update.





Development Program

The long-term development program or Capital Improvement Program (CIP) for BFI is intended to establish a strategy to fund airport improvements and maximize the potential to receive federal grant funds, while also establishing a financially prudent plan for improvement funding on a local level. From the FAA's perspective, the CIP provides a detailed listing of projects and costs that is critical for their use in establishing priorities and budgeting expenditures at BFI, when compared with the needs of other airports. From the local sponsor's perspective, the CIP identifies improvement needs and allows budgeting/financial decisions to be made with a comprehensive understanding of financial implications.

The overall concept is to maximize the opportunities to receive federal grants, within the context of, and in recognition of, the amount of local funds that are available for capital needs. Although the CIP will be used for programming by the FAA, there is no financial commitment for the federal government or the sponsor to provide funding for the CIP. If federal matching funds are unavailable for a certain project during the specified time frame, the project will almost certainly be unaffordable using only local money, and the improvement project will not go forward until appropriate funding is available.

The potential improvements necessary to accommodate the future needs of BFI have been placed into three phases: Phase I (0-5 years), Phase II (6-10 years), and Phase III (11-20 years). The suggested Capital Improvement Program (CIP) for the phasing of these projects is provided in the *Financial Implementation Plan* chapter of this document, and the estimated total cost for each development phase is presented as follows:

- Phase I (0-5 years) @ \$98,954,596
- Phase II (6-10 years) @ \$95,803,000
- Phase III (11-20 years) @ \$64,478,000

In the past, the Airport has used a combination of FAA Airport Improvement Program (AIP) entitlement funding (both passenger and cargo entitlements) and discretionary grants, private third-party financing, and cash reserves/net operating revenue to fund capital improvements. These funding sources will continue as the Airport's primary sources to finance Capital Improvements in the future.





