Appendix A – Airport Management Plan

Chapter 1 – Introduction & Project Overview

Chapter 1 – Introduction and Project Overview

The Port of Bremerton is updating the Airport Master Plan for Bremerton National Airport (PWT) in cooperation with the Federal Aviation Administration (FAA) to address the airport's needs for the next twenty years. The Airport Master Plan will provide specific guidance in making the improvements necessary to maintain a safe and efficient airport that is economically, environmentally, and socially sustainable.

Study Purpose

The purpose of the Airport Master Plan is to define the current, short-term and long-term needs of the Airport through a comprehensive evaluation of facilities, conditions and FAA airport planning and design standards. The study will also address elements of local planning (land use, transportation, environmental, economic development, etc.) that have the potential of affecting the planning, development and operation of the airport. FAA Advisory Circular 150/5070-6B Airport Master Plans defines the specific requirements and evaluation methods established by FAA for the study.

Project Need

Bremerton National Airport is included in the federal airport system—the National Plan of Integrated Airport Systems (NPIAS). Participation in the NPIAS is limited to public use airports that meet specific FAA activity criteria. The FAA recognizes NPIAS airports as being vital to serving the public needs of air transportation. In doing so, the FAA recognizes that access to the nation's air transportation system is not limited to commercial air service. There are more than 3,300 NPIAS airports, of which more than 75

percent are general aviation airports similar to Bremerton National. Bremerton National is the only NPIAS airport in Kitsap County; other nearby NPIAS airports are located in Vashon, Shelton and Tacoma. The nearest scheduled commercial air service is available at Seattle-Tacoma International Airport (SEATAC), approximately 57 driving miles from Bremerton.

NPIAS airports are eligible for federal funding of improvements through FAA programs such as the Airport Improvement Program (AIP). However, to maintain eligibility for funding, the FAA requires airports to periodically update their master plans as conditions change in order to maintain current planning.

This project updates the 2004 Airport Master Plan (Coffman), which has provided the primary airport planning guidance for the Airport over the last eight years. As many of the previous airport master plan recommendations have been implemented, the need now exists to update the long-term planning for the Airport. In addition to addressing changing local conditions, recently updated FAA standards and current trends within the aviation industry also need to be reflected in updated airport planning. When completed, the 2012-2032 Airport Master Plan and Airport Layout Plan (ALP) will replace the previous master plan and will meet the FAA's requirement to maintain current planning.

Project Funding

Funding for the Airport Master Plan Update is being provided through an FAA Airport Improvement Program (AIP) grant (90%) with a local match (10%) provided by the Port of Bremerton. The AIP is a dedicated fund administered by FAA with the specific purpose of maintaining and improving the nation's public use airports. The AIP is funded exclusively through fees paid by users of general aviation and commercial aviation and the funds can only be for eligible aviation related projects.

Airport History

According to local records, Bremerton National Airport was originally developed as an unpaved landing strip in 1936 by a local aviator group, the Bremerton Pilot's Association.[1] The association reportedly approached local land owners about developing an airfield on the site and organized a volunteer effort to construct a 600-foot landing strip. The new airfield accommodated the first air mail flight to Bremerton in 1938.[2] Beginning in 1939, the Airport, then known as Kitsap County Airport, was owned and operated by Kitsap County. During World War II, the federal government assumed ownership and operation of the Airport and significantly upgraded the airfield with two paved runways, paved taxiways and paved aircraft parking aprons. Following World War II, the Airport was deeded to Kitsap County (in 1948) through the

[1] www.historylink.com

[2] Kitsap Historical Society and Museum.

Surplus Property Act of 1944. The County owned and operated the Airport until 1963, when it was deeded to the Port of Bremerton as part of nearly 1,200 acres that included land on the west side of State Highway 3 that now includes the Olympic View Business and Industrial Park.[3] The Airport was renamed Bremerton National Airport in 1983.

Airport Ownership

As noted above, the Port of Bremerton has owned and operated Bremerton National Airport (PWT) for nearly 50 years. As the airport owner (sponsor) of record, the Port of Bremerton is responsible for conforming to all applicable FAA regulations, design standards and grant assurances.

The Port of Bremerton was established in 1913 by public vote, the fourth port district created in the state of Washington and the first in Kitsap County.[4] The Port of Bremerton Board of Commissioners consists of three commissioners, elected to six year terms. Port commissions are independent quasi-legislative bodies that are responsible for establishing policies to guide the development, growth and operation of port facilities and functions. The Board of Commissioners oversee a professional staff responsible for the Port's three primary lines of business including the Airport, business and industrial park development, and marinas in Bremerton and Port Orchard. The Director of Airport Operations is responsible for the operation of the Airport and the adjacent 348-acre Olympic View Business and Industrial Park.

History of Airport Planning and Development

As noted earlier, major components of Bremerton National Airport were constructed during World War II. Over that last 50 years, the Port of Bremerton has continued to modernize every part of the airport including the runway-taxiway system; aircraft parking aprons; airfield lighting, weather observation and navigational aids; terminal and fixed base operator (FBO) buildings; aviation fuel storage and dispensing; security fencing; drainage, stormwater, and utilities; and aircraft hangars. Private investment on the Airport has also been substantial, in particular with hangar construction and the airport restaurant. The Port has also developed the adjacent 348-acre Olympic View Business and Industrial Park which currently accommodates more than 20 tenants.

Planning for Bremerton National Airport has been updated on a regular basis since the 1970s. Projects include FAA-funded airport master plan updates completed in 2004, 1994, and 1986; a Terminal Area Plan was completed in 1976. The Port's sustained commitment to long-term planning is reflected in the condition, configuration, and functional capabilities of the airport.

[3] www.historylink.com

[4] www.historylink.com

Improvements completed since the last master plan update include a major runway shift that eliminated the north 1,190-foot displaced threshold (converted to paved overrun) and added 990 feet of new runway, parallel taxiway and a new aircraft holding area at the south end of Runway 02/20. Hangar expansion has occurred at the north and south ends of the west flightline.

On a broader basis, the Port's airport and industrial park facilities are major infrastructure components within the South Kitsap Industrial Area (SKIA) subarea that encompasses about 3,700 acres in southwest Bremerton. Development within the SKIA subarea is projected to generate significant growth in economic development and employment. Phase 1 of the Cross-SKIA Connector (Airport Way) was completed in 2010, extending from Highway 3 along the northeast section of the Airport. Phase 2 will connect Old Clifton Road and Phase 3 will connect Lake Flora Road. When completed, the Cross-SKIA Connector will significantly improve surface access and land development potential throughout the SKIA. It is noted that the completion of Phase 1 provides critically important surface access to the east side of the Airport, which was identified in the previous airport master plan as a primary development area in the future.

The previous planning studies, the 2004 ALP drawings, subsequent airfield design drawings, recent aerial photography, available mapping and survey data, and local planning studies will be used as primary information sources for preparing the updated Airport Master Plan and ALP.

Study Organization

Work in progress on the Airport Master Plan Update will be documented in a series of technical memoranda (presented as draft chapters). The chapters are prepared to document progress in the study, facilitate the review of preliminary results, and to obtain input early and throughout the master planning process. The draft chapters are not finished products. Inevitably, certain information compiled in the chapters becomes obsolete during the planning process as conditions change or new information becomes available. In these instances it is not intended to revise and re-issue the chapters, but rather, to reflect new information in subsequent chapters or in the draft and final Airport Master Plan reports.

The draft chapters and supporting documents will be prepared over a period of approximately 12 months. Each draft chapter will be reviewed locally and also by the FAA and Washington Department of Transportation - Aviation Division (WSDOT) for consistency with federal and state regulations, policies and standards.

The 2012-2032 Bremerton National Airport Master Plan will include the following chapters:

- *Chapter 1 – Introduction and Project Overview*
- *Chapter 2 – Inventory of Facilities*

- *Chapter 3 – Aviation Activity Forecasts*
- *Chapter 4 – Demand-Capacity & Facility Requirements Analyses*
- *Chapter 5 – Airport Development Alternatives*
- *Chapter 6 – Environmental Review*
- *Chapter 7 – Airport Financial Plan/CIP*
- *Chapter 8 – Airport Layout Plan*
- *Chapter 9 – Land Use Planning*
- *Chapter 10 – FAA Compliance Review*

Local Citizen Participation

The Port of Bremerton is committed to an inclusive, transparent planning process and will make all project work products available for public review. The public involvement element of the Airport Master Plan Update will provide several ways for all interested individuals, organizations, or groups to participate in the project.

First, all draft work products developed during the project will be available for public review and comment. Links to the documents will be posted on the Port's webpage to allow for convenient access, review and comment. Copies of the draft work products will also be available for public review and comment at the Port Administration office throughout the project. Comment forms will be available for both electronic and printed versions of the draft work products.

Second, a series of public meetings will be held during the project to facilitate public participation. The public meetings will include periodic study sessions and briefings with the Port of Bremerton Commissioners and separate project meetings and open houses. The project team will present information, provide updates on study progress and identify upcoming decision points during these meetings. The project team will utilize a variety of tools to encourage citizen participation, including surveys, project newsletters, and project updates posted on the Port's webpage.

Third, a local planning advisory committee (PAC) has been formed to assist the project team in reviewing draft technical working papers and to provide input into the planning process. The composition of the PAC is intended to provide an effective blend of airport users, neighbors, local business, local government representation, and other interests. Representatives from the FAA Seattle Airports District Office and the Washington Department of Transportation - Aviation Division (WSDOT) will serve as ex officio

members of the PAC. The PAC will meet throughout the project, review and comment on draft work products, discuss key project issues and provide local knowledge and expertise to the planning process.

The PAC meetings will be open to public; however, since the meetings are organized as work sessions, the time allocated for public comment will be limited. An expanded public comment period will be provided in the public meetings that coincide with specific PAC meetings when PAC and Public input is integral to the planning process to ensure that all interested stakeholders have an opportunity to participate in the project.

Summary

The FAA-defined airport master planning process requires a sequential, systematic approach which leads to selection of a preferred development option for the airport that is integrated into the Airport Layout Plan (ALP) and Airport Capital Improvement Program (ACIP). To meet this goal, the Airport Master Plan Update will:

- *Provide an updated assessment of existing facilities and activity;*
- *Forecast airport activity measures (design aircraft, based aircraft, aircraft operations, etc.) for the current 20-year planning period;*
- *Examine previous planning recommendations (2004 Airport Master Plan) as appropriate, to meet the current and projected airport facility needs, consistent with FAA airport design standards;*
- *Determine current and future facility requirements for both demand-driven development and conformance with FAA design standards;*
- *Provide consistency between airport planning and land use planning to promote maximum compatibility between the airport and surrounding areas;*
- *Prepare an updated Airport Layout Plan (ALP) drawing set to accurately reflect current conditions and master plan facility recommendations; and*
- *Develop an Airport Capital Improvement Program (ACIP) that prioritizes improvements and estimates project development costs and funding eligibility for the 20-year planning period. The Port is also developing an Airport Business Plan simultaneously with the master plan that will focus on financial management and market development. The Airport Master Plan and Airport Business Plan will use common data and financial assumptions.*
- *Evaluate airport sponsor compliance with FAA Airport Improvement Program (AIP) grant assurances.*

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration as provided under Title 49, United States Code, section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable with appropriate public laws.

Chapter 2 – Inventory of Facilities

Chapter 2 – Inventory of Existing Conditions

*The purpose of this chapter is to document the existing facilities and conditions at Bremerton National Airport (**Airport Identifier Code: PWT**). The Airport is owned and operated by the Port of Bremerton, Washington.*

This project replaces the 2004 Airport Master Plan Update[1] which will serve as a primary source for inventory data. However, where available, more current or comprehensive data have been included in the chapter to illustrate current conditions. Existing airfield facilities were examined during on-site inspections to update facility inventory data. The consultants also worked closely with Port staff to review the current facility and operational data maintained by the Port.

Airport Locale

Bremerton is located in south-central Kitsap County on the Kitsap Peninsula. Bremerton is the largest city on the Kitsap Peninsula. The Kitsap County seat is located in Port Orchard, approximately 8 miles from the Airport. Kitsap County has a land area of approximately 393 square miles, extending from western Puget Sound to Hood Canal.

Kitsap County is home to the U.S. Navy Puget Sound Naval Shipyard and Naval Base Kitsap (formerly NSB Bangor and NS Bremerton). The county has a diverse and growing economy. The 2010 U.S. Census for Bremerton (incorporated area only) was 37,729 and 251,133 for Kitsap County. The Washington

1 Bremerton National Airport Master Plan Update (Coffman Associates)

Office of Financial Management (OFM) 2012 estimate of population for Bremerton was 39,650 and 254,500 for Kitsap County.

Bremerton National Airport and the adjacent Olympic View Business and Industrial Park are located approximately nine miles southwest of downtown Bremerton, within the Bremerton city limits on State Highway 3. A location and vicinity map for Bremerton National Airport is provided in **Figure 2-1**.

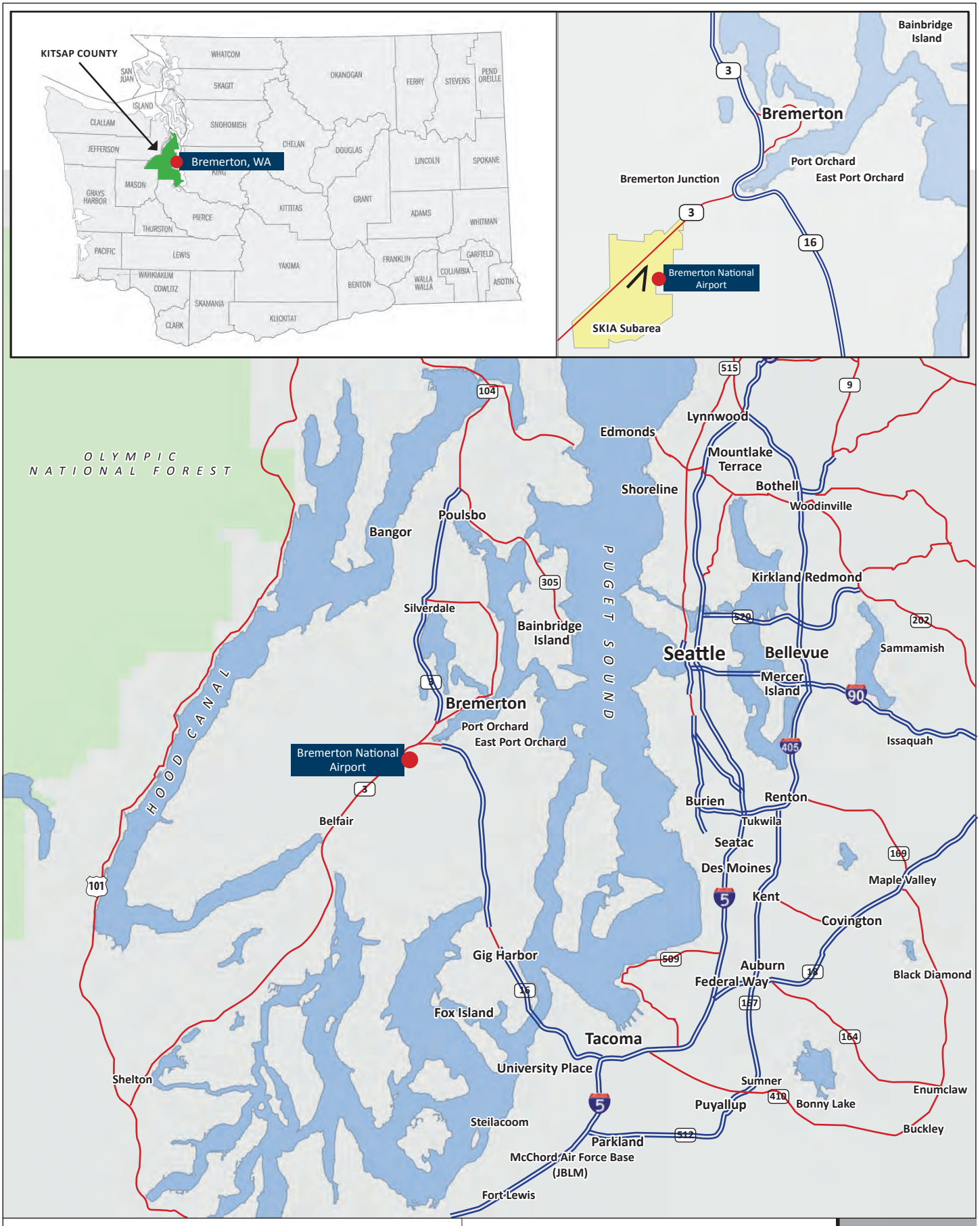
The Airport and adjacent land totaling approximately 3,700 acres, known as the South Kitsap Industrial Area (SKIA), the majority of which was annexed by the City of Bremerton in 2009. The Bremerton Raceway facility is located on the east side of the Airport, separated from the active areas of the airfield by a chain link fence and locked gates.

Surface access to the Airport is provided by State Highway 3, which connects to State Highway 16. Highway 16 extends from Tacoma to Port Orchard, where it connects with Highway 3. Bremerton National Airport is 9 miles southwest of Bremerton and 28 miles northeast of Shelton via Highway 3; Tacoma is 31 miles east of the Airport via Highways 3 and 16.

As noted in the Introduction Chapter, Bremerton National Airport has been in continuous aviation use since its initial construction as a small airstrip in 1936. The Airport serves Bremerton, Port Orchard and greater Kitsap and North Mason Counties. There are fourteen (14) public-use airports located within 35 nautical miles of Bremerton. The majority of the airports are general aviation, although several (SEATAC, Boeing Field, Paine Field, and Renton) also accommodate transport aircraft, either in commercial service or related to aircraft manufacturing. The significance of the airport service area will be discussed in detail in the aviation activity forecasts (Chapter 3).

Physical Geography

Bremerton is located on the Kitsap Peninsula, directly west of Seattle on the west side of Puget Sound. The Kitsap Peninsula is comprised of low-lying coastal forest lands, bays, inlets and forested uplands. The Peninsula is connected to the east side of Puget Sound by the Tacoma Narrows Bridge and the Washington State Ferries, with terminals located in Bremerton, Southworth, and Kingston. Hood Canal separates the Kitsap Peninsula and Olympic Peninsula. The Hood Canal Bridge provides road access to the Olympic Peninsula; Bainbridge Island is connected to the Peninsula by the Agate Pass Bridge; and direct roadway access to the south Puget Sound area is provided via Highway 3.



BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

LOCATION MAP | **FIG. 2-1**

PORT OF Bremerton Washington

CENTURY WEST ENGINEERING CORPORATION

Moderate mountainous terrain surrounds the Airport, which sits at 444 feet above mean sea level (MSL). Maximum elevation figures (MEF) depicted on aeronautical charts indicates the highest terrain elevations are found to the west, over the Olympic Peninsula, ranging from 5,400 to 8,100 feet MSL. High terrain is found to the north, reaching 4,800 feet MSL. The areas to south and east have low-lying terrain surrounding Puget Sound ranging from 1,200 to 2,800 feet MSL.

Climate

Kitsap County has a maritime climate with mild winter and warm summer temperature ranges that are characteristic of the Kitsap Peninsula and Puget Sound. The region produces moderate amounts of winter snow, usually in conjunction with periodic storm events, but does not normally experience extended periods of freezing temperatures.

Historic climatic data for Bremerton (Observation Station 450872) is available from 1899 through 2012.[2] The data indicate that July and August are typically the warmest months; December and January are the coldest. On a monthly basis, the average maximum temperature is 75.3 degrees Fahrenheit (August) and the average minimum temperature is 34.5 degrees (January). Bremerton averages 45.39 inches of precipitation and 7.7 inches of snowfall annually.

Historical Aviation Activity

Bremerton National Airport accommodates a wide variety of aeronautical activity, including small single- and multi-engine aircraft, business class turbine aircraft (business jets and turboprops), civilian helicopters, and military fixed wing aircraft and helicopters. The Airport has several commercial tenants providing aircraft maintenance, flight training, and other services which generate local flight activity and attract itinerant users.

The FAA recommends use of activity ratios for non-towered general aviation airports to estimate annual operations, when actual operations data (counts) are not available. This technique was used in previous master plans and the state aviation system planning to estimate activity at Bremerton National Airport. The **2004 Airport Master Plan** estimated that Bremerton National Airport had 160 based aircraft and approximately 49,500 aircraft operations in 2002 (309 operations per based aircraft). The 2007 WSDOT Long Term Air Transportation Study (LATS) forecast update estimated 194 based aircraft and 50,800 annual aircraft operations at Bremerton National Airport for 2005 (262 operations per based aircraft).

An updated count of 192 based aircraft was conducted by airport management staff in September 2012 (see **Table 2-1**). Based on a ratio of 250 to 300 operations per based aircraft (typical of a medium activity

[2] Western Regional Climatic Center

general aviation airport with moderate activity), the current level of annual operations at Bremerton National Airport is estimated between 48,000 and 57,600. A detailed analysis of aviation activity data will be presented in the updated Aviation Activity Forecasts (Chapter 3). Current airport activity is summarized in **Table 2-1**.

TABLE 2-1: BREMERTON NATIONAL AIRPORT (PWT) BASED AIRCRAFT AND OPERATIONS

ACTIVITY TYPE	ACTIVITY LEVEL
Based Aircraft *September 2012 Airport Management Count*	
Single-Engine Piston	173
Multi-Engine Piston	10
Turboprop	0
Turbojet	3
Rotorcraft	5
Ultralight	1
Total Based Aircraft	**192**
Annual Aircraft Operations ➢ WSDOT LATS Operations Estimate (2005) ➢ 2012 Estimate (based on FAA-defined ratio of 250 to 300 operations per based aircraft)	 50,800 48,000 to 57,600

Airfield Facilities

Bremerton National Airport has one runway (02/20) that is oriented in a north-northeast/south-southwest direction (020-200 degree magnetic heading). The runway has extensive lighting and instrumentation. The Airport has an extensive taxiway system that provides access to all developed areas of the airfield. The Airport's former crosswind runway (16/34) was closed more than 20 years ago. The southern portion of the closed runway has been fenced off and currently accommodates the Bremerton Raceway facility.

The published airfield elevation is 444 feet above mean sea level (MSL).[3] The airport traffic pattern altitude is 1,000 feet above ground level (1,444 feet MSL). The Airport utilizes a right traffic pattern for Runway 02 and a standard left traffic pattern for Runway 20. This results in both traffic patterns being

[3] Surveyed by the National Geodetic Survey. Datums: National Geodetic Vertical Datum of 1988 (NGVD 88); North American Datum of 1983 (NAD 83)

located on the east side of the runway. The left or right traffic designation indicates the direction of turns required by aircraft while operating in the pattern. Runway 20 is designated the calm wind runway.

Bremerton National Airport is an uncontrolled field and pilots use the airport Unicom/common traffic advisory frequency (CTAF) for communications on the ground and in the vicinity of the Airport. **Table 2-2** summarizes airport data. **Figures 2-2** and **2-3** provide views of existing airfield facilities and an enlarged view of terminal area facilities.

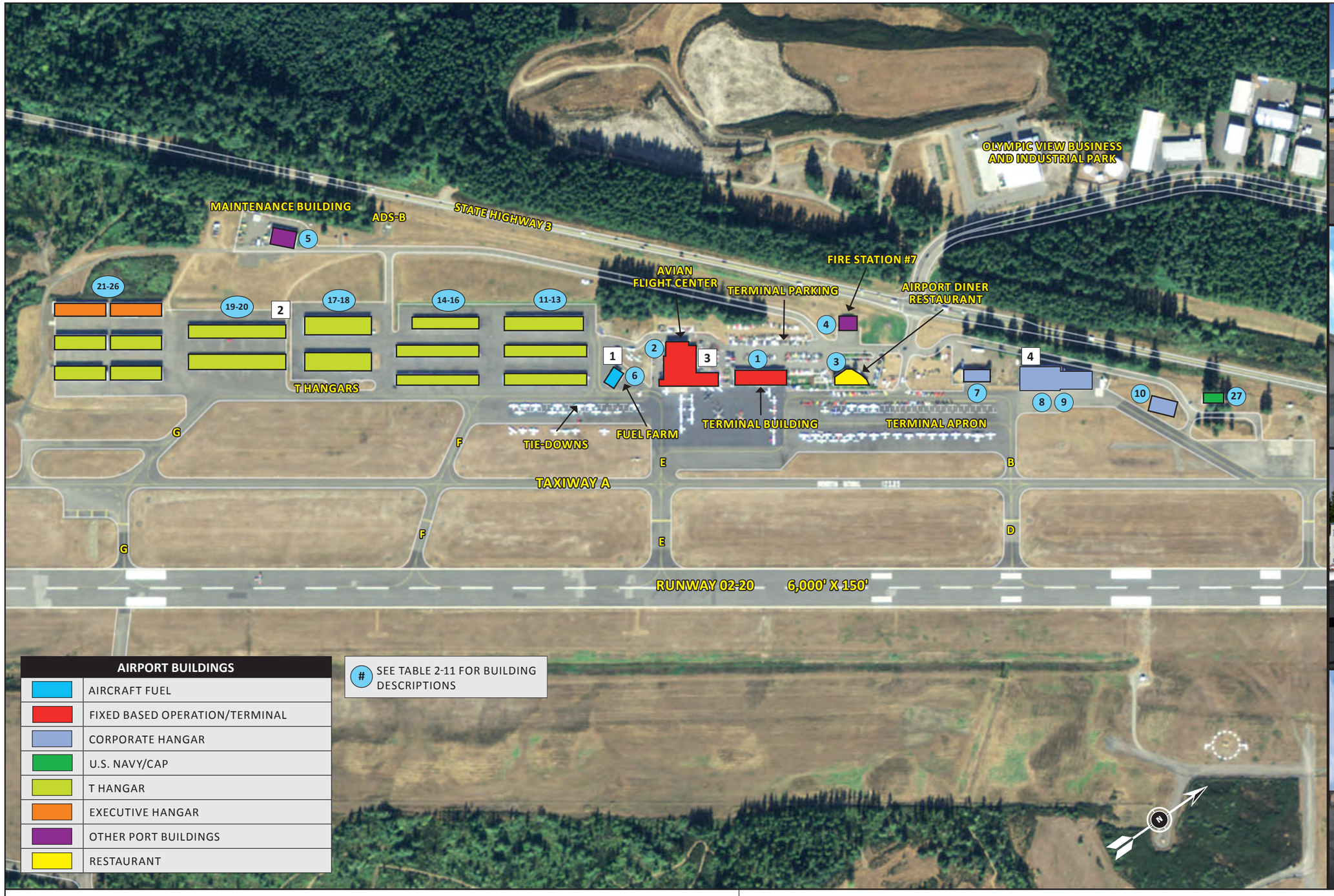
TABLE 2-2: AIRPORT DATA

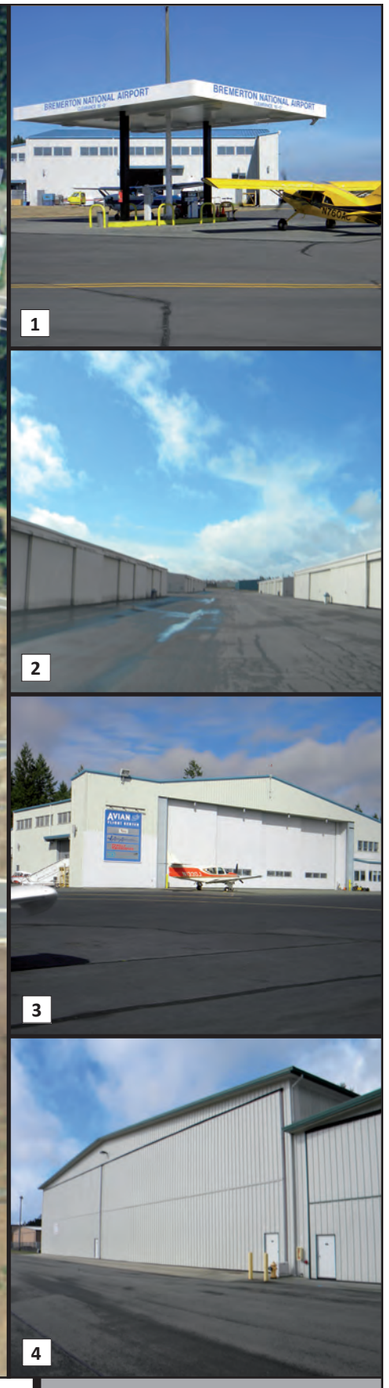
AIRPORT NAME/DESIGNATION	BREMERTON NATIONAL AIRPORT (PWT)
Airport Owner	Port of Bremerton
Date Established	1936
Airport Category	National Plan of Integrated Airport Systems (NPIAS): General Aviation FAA Airport Reference Code: B-II (as depicted on 2004 ALP) Washington State Aviation System Plan: Regional Service
Airport Acreage	Approximately 1,729 Acres as indicated on current FAA Airport Master Record Form 5010-1
Airport Reference Point (ARP) Coordinates	N 47º 29.42' W 122º 45.89'
Airport Elevation	444 feet MSL
Airport Traffic Pattern Configuration/Altitude	Right Traffic (Rwy 02)/Left Traffic (Rwy 20); 1,444 feet MSL / 1,000 feet above ground level (AGL)

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

EXISTING CONDITIONS (AIRFIELD) | **FIG. 2-2**

CENTURY WEST ENGINEERING CORPORATION





BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

EXISTING CONDITIONS (WEST LANDSIDE) | **FIG. 2-3**

CENTURY WEST ENGINEERING CORPORATION

Runway

RUNWAY 02/20

Runway 02/20 is 6,000 feet long and 150 feet wide. The southern 990 feet of the runway was constructed in 2005 as part of a runway shift that relocated the north end of the runway 1,190 feet south, eliminating the displaced threshold. The runway pavement located north of the relocated threshold was converted to a paved overrun. In 2009, the northern 5,000 feet of runway received a 2-3-inch asphalt overlay and the runway markings were repainted. The runway is equipped with a full array of lighting and electronic & visual approach aids. Table 2-3 summarizes current conditions for Runway 02/20.

The runway has an asphalt surface that is transverse-grooved to improve wet runway braking action on landings, reduce hydroplaning and improve directional control for aircraft during takeoff and landing operations. The runway has an effective gradient of 0.05 percent, with the high point (444.0 feet MSL) located at its south end (Runway 02 threshold).

The runway is served by a full length parallel taxiway (Taxiway A) on its west side with seven exit taxiways (Taxiways B-H).

The runway is equipped with five distance remaining signs (black background/white numbers) on the east side of the runway. The reflective dual-sided signs indicate the remaining useable runway to pilots in 1,000-foot increments ([5/1], [4/2], [3/3], [2/4], [1/5]).

The runway has precision instrument (PIR) markings on the Runway 20 end, which is equipped with an instrument landing system (ILS). Runway 02 has nonprecision instrument (NPI) markings, which are consistent with current nonprecision instrument approach capabilities. The runway markings (white paint) include runway designation numbers, threshold markings, touchdown zone markings (Rwy 20), aiming point markings, centerline stripe, and side stripes. The approach end of Runway 20 has a threshold bar indicating the end of usable runway and the beginning of the paved overrun, which is marked with yellow chevrons. Yellow taxiway lead-in lines are painted on the runway at each of the five interior exit taxiways. All runway markings are consistent with FAA standards for configuration, color, and approach type (precision/non-precision instrument). The markings were observed to be in good condition during a recent site visit.

condition, consistent with its age and the findings in the recent evaluations. The runway pavement strength appears to be adequate to accommodate a wide range of aircraft used in general aviation, commercial and military aviation.

The 2010 pavement evaluation also examined the parallel taxiway, runway exit taxiways, and the main aircraft parking apron. **Table 2-5** summarizes the weight bearing capacity for these pavements based on the 2010 engineering evaluation (previous ratings for these sections not published).

TABLE 2-4: RUNWAY 02/20 PAVEMENT STRENGTH (PUBLISHED IN CURRENT FAA FACILITY DIRECTORY)

AIRCRAFT LANDING GEAR CONFIGURATION	PUBLISHED PAVEMENT WEIGHT BEARING CAPACITY (LBS.)	UPDATED (2010) PAVEMENT WEIGHT BEARING CAPACITY (LBS.)
Single Wheel (S)	66,000	33,000
Dual Wheel (D)	150,000	196,000
Dual Tandem Wheel (DT)	336,000	336,000
Single Tandem Wheel (2S)	113,000	--

TABLE 2-5: TAXIWAY AND APRON PAVEMENT STRENGTH (IN LBS.) (PER 2010 ENGINEERING ANALYSIS)

PAVEMENT AREAS	SINGLE WHEEL (S)	DUAL WHEEL (D)	DUAL TANDEM WHEEL (DT)
Taxiway A (parallel txy)	21,000	86,000	192,000
Taxiway B (exit txy)	29,000	105,000	234,000
Taxiway C (exit txy)	19,000	117,000	249,000
Taxiway D (exit txy)	17,000	137,000	287,000
Taxiway E (exit txy)	33,000	114,000	336,000
Taxiway F (exit txy)	33,000	164,000	336,000
Taxiway G (exit txy)	33,000	103,000	336,000
Taxiway H (exit txy)	33,000	201,000	336,000
Terminal Apron	33,000	184,000	336,000
Parking Apron (North)	10,000	24,000	56,000
Apron Taxiway (North)	15,000	54,000	123,000

Runway Wind Coverage

It is generally preferable for aircraft to land and takeoff directly into the wind, although varying wind conditions often require crosswind operations at airports. When wind conditions exceed the capabilities of a specific aircraft, use of a crosswind runway (when available) may occur. At airports with single runways, occasional periods of strong crosswinds often limit operations until conditions improve.

The FAA-recommended planning standard is that primary runways should be capable of accommodating at least 95 percent of wind conditions within the prescribed crosswind component. This component is based on a direct crosswind (90 degrees to the direction of flight) of 10.5 knots (12 miles per hour) for small aircraft and 13 knots (15 miles per hour) for larger general aviation aircraft. Transport and larger military aircraft are typically designed to accommodate higher crosswind components. Aircraft are able to tolerate increasingly higher wind speeds as the crosswind angle is reduced and moves closer to the direction of flight.

Wind data for Bremerton National Airport tabulated for the period between 1992 and 2001[6] indicate prevailing winds are generally northeast-southwest, closely aligned with Runway 02/20. The wind roses depicted on the 2004 Airport Layout Plan graphically illustrate the favorable relationship between the runway alignment and local wind conditions. Virtually identical wind coverage is provided for each defined crosswind component under both visual and instrument conditions, indicating that local wind patterns do not change significantly as weather conditions deteriorate. **Table 2-6** summarizes the wind data for Runway 02/20 for all weather conditions (VFR and IFR combined) and for instrument (IFR) weather conditions, which exceed the FAA crosswind coverage standard for both small and large aircraft.

TABLE 2-6: RUNWAY 02/20 WIND COVERAGE

RUNWAY 02/20	CROSSWIND COMPONENTS			
WEATHER CONDITIONS	**10.5 KNOTS (12 MPH)**	**13 KNOTS (15 MPH)**	**16 KNOTS (20 MPH)**	**20 KNOTS (24 MPH)**
All-Weather Conditions	99.97%	99.99%	100.00%	100.00%
IFR Weather Conditions	99.97 %	99.99%	99.99%	99.99 %

[6] NOAA National Climatic Center Data for Bremerton National Airport (1992-2001)

Taxiways

Bremerton National Airport has an extensive taxiway system, including a full-length parallel taxiway on the west side of Runway 02/20 that provides access to the entire runway and adjacent landside facilities. A system of taxilanes provides access to aircraft parking aprons and hangar development areas on the west side of the Airport. **Table 2-7** summarizes existing taxiway facilities. **Figures 2-2 and 2-3**, presented earlier in the chapter, depict the major taxiways on the airfield.

TAXIWAY A

Taxiway A is the parallel taxiway for Runway 02/20. Taxiway A is 40 feet wide, has a runway separation of 400 feet, and has seven exit taxiway connections to the runway. The number and location of the exit taxiways promotes efficient aircraft movement in the runway-taxiway system. Taxiway A has a centerline strip along the main section of the taxiway with connections to each exit taxiway. The airport name and Unicom radio frequency (123.05 MHz.) is painted on a section of the taxiway near the main apron. The striping and markings on the parallel taxiway are in fair to good condition. Taxiway A is equipped with medium intensity taxiway lighting (MITL) and has extensive lighted airport directional and informational signage.

Taxiway A has aircraft hold areas located at both ends of the runway and a third hold area near the south end of the runway. The hold area adjacent to the Runway 02 threshold is located on the west side of Taxiway A. A second hold area is located approximately 1,000 feet north of the end of Runway 02, south of Taxiway G on the east side of Taxiway A. The north aircraft hold area is located adjacent to the end of Runway 20 and Taxiway B on the east side of Taxiway A.

Taxiway A appears to be well maintained (vegetation control, crackfilling, etc.) and is in fair condition. However, based on the age and condition of the taxiway, pavement rehabilitation is anticipated within the next several years for all but the section constructed in 2005.

TAXIWAYS B-H (RUNWAY 02/20 EXITS)

Runway 02/20 has seven exit taxiways (B-H) that connect the runway and the west parallel taxiway (Taxiway A). Six of the taxiways are 90-degree exits (Taxiways B, C, D, E, G, and H) and one exit taxiway (Taxiway F) has an acute angle (approximately 70 degrees from Runway 02 direction of travel). The exit taxiways are equipped with blue medium intensity taxiway edge lighting (MITL).

Four of the taxiways (D, E, F, and G) extend west beyond Taxiway A, connecting to the main apron (D and E), the south tiedown area (E and F) and south hangar area (F and G). The exit taxiways vary in width from 40 to 75 feet.

As noted earlier, taxiway lead-in lines are located on the runway and connect with the exit taxiway centerlines. Aircraft hold lines are located on all taxiway connections to the runway, 250 feet from runway centerline. This lateral separation for the aircraft hold area corresponds to the edge of the ultimate runway safety area (RSA) depicted on the 2004 Airport Layout Plan (updated in 2006 following south runway extension/runway shift). The striping and markings on the exit taxiways are in fair or good condition.

A bypass taxiway is located on the west side of Taxiway A, near the south end of the runway. The taxiway has a centerline stripe and stake-mounted edge reflectors (blue).

ACCESS TAXIWAYS AND TAXILANES

Bremerton National Airport has several access taxiways and taxilanes serving landside facilities on the west side of the runway. Most of the taxiways and taxilanes are marked with centerline stripes; the condition of the markings range from good to poor (worn). The aircraft fueling area and the west side of the south aircraft tiedown area are marked with double yellow edge lines to distinguish the areas from adjacent taxilanes.

Hangar Taxilanes

The South Hangar Area is served by a system of taxilanes located between rows of multiple-unit hangars. All of the hangars in this area are oriented in rows parallel to the runway, which creates a series of north-south taxilanes with five east-west taxilanes providing access between the ends of the hangars. The taxilanes have been constructed over a period of about 40 years as the hangar area expanded southward. The spacing between hangars (taxilane object free area) varies from approximately 45 to 75 feet.

The condition of the hangar taxilanes ranges from fair to very good, consistent with age and use. The taxilanes appear to be well maintained with regular crackfilling and vegetation control. Additional crackfilling and sealcoating will be required during the current planning period. Taxilanes centerline stripes vary in condition from poor to good; some taxilanes do not have centerline stripes.

Access Taxiways

Access to the south hangar area is provided by the western sections of Taxiway G and F, which connect to Taxiway A and an access taxilane that extends from the south end of the main apron. This access taxiway serves the Avian Flight Center, the aircraft fueling area, and the south airplane tiedown apron.

The North Hangar Area is served by an access taxiway that connects to Taxiway A, just south of Taxiway C. The taxiway was re-paved after the 2005 pavement inspection and is in very good condition.

TABLE 2-7: TAXIWAY DATA (BREMERTON NATIONAL AIRPORT)

TAXIWAY	DESCRIPTION	DIMENSIONS/CONFIGURATION
Taxiway A	West Parallel Taxiway	6,000 x 40' with seven exit taxiways Asphalt surface w/ centerline stripe (yellow); MITL (Blue)
Taxiways B, C, D, E, G, H	90-degree Exit Taxiways for Runway 02/20 and Parallel Taxiway (A)	300' (Length of section between runway and Taxiway A) Taxiways D, E, F, and G continue to adjacent aprons (80 to 400 feet long) Widths Vary: 40, 50, 60 (Txy C) and 75 feet (Txy E) Asphalt surface w/ centerline stripe; taxiway lead-in lines from runway; aircraft hold lines at each runway connection (250' from runway centerline); MITL (Blue) Exit Locations (distance from runway ends 20/02): B - Rwy 20 threshold (0'/6,000') C – (420'/5,580') D – (1,550'/4,450') E – (2,900'/3,100') G - (4,980'/1,020') H – Rwy 02 threshold (6,000'/0')
Taxiway F	70-degree Exit Taxiway (Rwy 02 direction)	600 x 40' (300-foot sections on east and west sides of Taxiway A) Asphalt surface w/ centerline stripe; taxiway lead-in lines from runway; aircraft hold lines at runway connection (250' from runway centerline); MITL (Blue) Exit Location (distance from runway ends 20/02): (3,850'/2,150')
South Bypass Taxiway	South of Taxiway G, parallel (west) of Taxiway A	Approximately 650 x 35' Asphalt surface w/ centerline stripe; Reflective Edge Markers (Blue)
North Access Taxiway	Connects North Hangar facilities to Taxiway A	Approximately 600 x 50' Asphalt surface w/ centerline stripe;
North Section of Taxiway A (Closed)	Access Taxiway extending from north end of Taxiway A and Taxiway B to north end of paved overrun.	Approximately 1,300 x 40' (northern 889' is 70' wide) Asphalt surface w/ centerline stripe (yellow)
West Hangar Taxilanes *(west landside area)*	Taxilanes within south hangar areas	Widths vary from 25 to 60' Asphalt surface w/ centerline stripes on some taxilanes
Apron Taxilanes *(terminal area aprons)*	Apron Taxilanes	Taxilanes between or adjacent to tiedown rows Asphalt surface. Centerline stripes on some taxilanes; taxilanes not defined on south end of main apron used for business aircraft.

Aircraft Apron

Bremerton National Airport has three aircraft parking apron areas located on the west side of Runway 02/20. The aprons have a total capacity of 71 small airplane tiedowns and a large airplane parking area that accommodates a variety of fixed-wing aircraft and helicopters. **Table 2-8** summarizes the existing apron facilities at the Airport.

TERMINAL APRON

The terminal apron is located directly in front of the general aviation terminal and fixed base operator (FBO), Avian Flight Center. The apron accommodates aircraft loading/unloading and parking for transient aircraft. This section of apron is designed to accommodate heavy aircraft, which allows its use by military and large civilian aircraft. The apron has taxilanes around its perimeter but no parking markings or taxilanes in the parking area. The FBO provides parking assistance and aircraft are normally parked in a single row facing west. The apron can accommodate several aircraft in this configuration. The apron has one direct connection (Taxiway E) to the parallel taxiway, with additional taxilane access extending north and south. As noted earlier, it is anticipated that the apron will require rehabilitation early in the planning period.

NORTH TIEDOWN APRON

The north tiedown apron is located immediately north of the terminal apron. The apron accommodates small airplane parking and is configured with two north-south tiedown rows served by three adjacent taxilanes. The inner tiedown row is double-sided with east and west facing parking (32 tiedowns). The outer tiedown row is single-sided with west facing parking (16 tiedowns). The outer tiedown row was originally configured as double-sided row with 32 spaces; the east facing tiedowns were eliminated to provide adequate clearance from the adjacent apron taxilanes. The north tiedown apron currently has a total of 48 spaces. The apron has two direct connections (Taxiways D and E) to parallel taxiway and additional taxilane access north and south.

SOUTH TIEDOWN APRON

The south tiedown apron is located immediately south of the FBO, adjacent to the aircraft fueling area. The apron accommodates small airplane parking and is configured with one north-south tiedown row served by two adjacent taxilanes. The tiedown row is double-sided with east and west facing parking (23 tiedowns). The apron has two direct connections (Taxiways E and F) to parallel taxiway. As noted earlier, it is anticipated that the south tiedown apron will require rehabilitation/reconstruction early in the planning period.

TABLE 2-8: AIRCRAFT APRONS (BREMERTON NATIONAL AIRPORT)

North Tiedown Apron	Approximately 900 x 240' (24,000 square yards) Asphalt Concrete Current Use: Small airplane tiedowns and hangar frontage north of the terminal; adjacent to airport restaurant. Tiedowns: 48 small airplanes
Terminal Apron	Approximately 450 x 320' (16,000 square yards) Asphalt Concrete Current Use: Business and military aircraft parking; aircraft loading/unloading; FBO operations. Apron also used for large aircraft parking. Parking: No taxilane or parking markings on pavement; business aircraft typically park on apron parallel to the FBO.
South Tiedown Apron	Approximately 550 x 80' (4,900 square yards) Asphalt Concrete Current Use: Small airplane tiedowns located south of the FBO and adjacent to the fueling area. Tiedowns: 23 small airplanes

Airport Lighting and Signage

Bremerton National Airport accommodates day and night operations in both visual and instrument meteorological conditions (IMC). The runway is equipped with lighting systems that are consistent with current instrument approach requirements and runway use. The runway-taxiway system has extensive signage that conveys directional, location, and runway clearance information to pilots. **Table 2-9** summarizes the categories of airport lighting currently used at the Airport. All airfield lighting observed during recent site visits appeared to be in good condition and fully operational.

TABLE 2-9: TYPES OF AIRPORT LIGHTING USED AT BREMERTON NATIONAL AIRPORT

CATEGORY	TYPE	CONDITION
Airport Lighting	Airport Rotating Beacon (white/green dual lens)	Good
Approach Lighting	Medium Intensity Approach Lighting System (MALS) with Runway Alignment Indicator Lights (RAIL) [MALS-R]	Good
Runway Lighting	High Intensity Runway Lighting (HIRL) (white/amber lenses) Threshold Lighting (red/green lenses) Runway End Identifier Lights (REIL) (white strobes) (Rwy 02)	Good
Visual Guidance Indicators	4-Light PAPI (red/white lenses) • Rwy 02: (P4L) 3 degree glide path • Rwy 20: (P4L) 2.83 degree glide path	Good
Taxiway Lighting	Medium Intensity Taxiway Lighting (blue) on Taxiway A and runway exits (Taxiways B-H)	Good

Airfield Signage	Mandatory, Location, Directional, and Destination Signs Distance Remaining Signs (Reflective)	Good
Other Lighting	Obstruction lights, lighted wind cones (2), lighted segmented circle and wind T, lighted airport signage; flood lighting in hangar, fuel areas.	Good

AIRPORT LIGHTING: The Airport has a rotating beacon mounted on a tower support on the east side of the runway near the northeast section of the airfield. Rotating beacons are used to indicate the location of an airport to pilots at night or during reduced visibility. The beacon provides sequenced white and green flashing lights (representing a lighted land airport) that rotate 360 degrees to allow pilots to identify the airport from all directions from several miles.

Two lighted wind cones are located on the airfield; one wind cone (internally illuminated) is located on the west side of the runway near Taxiway G, and the second (overhead flood lighted) is located in the segmented circle on the east side of the runway. A lighted wind T is also located in the segmented circle. These lighting systems are Port-owned and maintained.

The rotating beacon, lighted wind cones and lighted wind T operate on a dusk-dawn automatic switch. The runway lighting, approach lighting, visual guidance indicators, and taxiway lighting are pilot-activated using the common traffic advisory frequency (CTAF) 123.05 MHz. All airfield lighting reportedly functions normally.

APPROACH LIGHTING: Runway 20 is equipped with a medium intensity approach lighting system (MALS), with runway alignment indicator lights (RAIL). The MALS-R is the standard approach lighting system for runways with Category I Instrument Landing Systems (ILS). Approach lighting assists pilots to visually identify the runway environment and align the aircraft with the runway during the final approach segment. The MALSR system is 2,400 feet long, installed along the extended runway centerline and consists of light bars, sequenced flashing lights (RAIL), and a threshold bar. The MALS-R is FAA-owned and maintained.

RUNWAY LIGHTING: Runway 02/20 has high intensity runway edge lighting (HIRL) and runway end identifier lights (REIL) on Runway 02.

- **HIRL:** The HIRL system includes white edge lights (with amber lights located near the runway ends to indicate runway remaining) and runway threshold lights. The threshold lights consist of two sets of four fixtures near each corner of the runway ends. The fixtures have split lenses (green/red) indicating the beginning and end of the runway. Port-owned and maintained.
- **REIL:** Runway 02 is equipped with runway end identifier lights (REIL), which consist of two high-intensity sequenced strobe lights that mark the approach end of the runway to assist pilots in

establishing visual contact with the runway environment during periods of darkness or reduced visibility. Port-owned and maintained.

- **Visual Guidance Indicators**: Runways 02 and 20 are equipped with a 4-light Precision Approach Path Indicators (PAPI). The PAPI projects light along a standard glide path to a runway end, with red and white colored lights indicating the aircraft's vertical position (above, below, or on glide path) relative to the defined glide path. The PAPI is the standard visual guidance indicator (VGI) for general aviation runways. The PAPI for Runway 20 is Port-owned; the PAPI for Runway 02 is FAA-owned and maintained.

- **Taxiway Lighting**: The major taxiways at Bremerton National Airport are equipped with blue medium intensity taxiway edge lighting (MITL). Stake-mounted blue reflective markers are installed on the edges of a 450-foot section of taxiway that extends south from Taxiway G and connects to Taxiway A near the end of Runway 02. Port-owned and maintained.

- **Airfield Signage:** The runway-taxiway system has internally illuminated mandatory instruction signs (red background with white letters/numbers) marking the aircraft holding positions at each of the taxiway connections with the runway [20-02, 20, 02, etc.]; the signs also include taxiway direction/designations [B, C, D, → etc.] with yellow background and black numbers/letters. The signs are located to coincide with the painted aircraft hold lines on each taxiway that connects to the runway. Port-owned and maintained. As noted earlier, Runway 02/20 is equipped with reflective distance remaining signs on the east side of the runway.

OTHER LIGHTING: Overhead lighting is available in the terminal area and main aircraft parking aprons, the aircraft fueling area, and in various hangar areas. Hangars also have exterior wall-mounted flood lights. Red obstruction lights are mounted on the tops of several structures, antennae, and other items on the airfield.

Agricultural Aircraft Facilities

Bremerton National Airport does not accommodate locally based aerial applicators and there are no designated agricultural aircraft loading areas on the Airport.

Airfield Pavement Condition

The Washington State Department of Transportation (WSDOT) Aviation Division maintains the Washington Airport Pavement Management System (APMS) for Washington airports in the Washington State Airport System Plan (WSASP) and the Federal Aviation Administration (FAA) National Plan of Integrated Airport Systems (NPIAS). Pavement Management Reports are periodically updated to assist airports in the ongoing maintenance of airfield pavements. The APMS is designed to assess the relative

condition of the airport pavement sections and to identify pavement system needs, make programming decisions for funding, provide information for legislative decision making, and assist local jurisdictions with planning decisions.

Airfield pavements are assessed using the Pavement Condition Index (PCI). The PCI inspection quantifies the types, severities, and amounts of distress observed in the pavements through a visual inspection. The evaluation is quantified using a scale from 0 (failed) to 100 (excellent) with ratings applied to individual pavement sections, providing an overall condition report for the airport. The condition is an indication of the needs for maintenance and/or repair that will be required over a seven-year period.

The most recent report available for Bremerton National Airport is based on 2012 inspections. **Table 2-10** summarizes airfield pavement conditions for Bremerton National Airport based on the 2012 inspection and the predicted conditions in 2015 and 2020. Pavement rehabilitation scheduled for 2014 will include Taxiway Alpha and the older (western) sections of the exit taxiways; Taxiway Foxtrot is being replaced with a standard 90-degree exit taxiway. Other pavements (apron, taxilane connectors, etc.) may be included depending on the availability of funding. These pavements will all have a PCI of 100 immediately following rehabilitation or construction. The south tiedown apron and sections of the south hangar taxilanes are among the lowest rated pavements and will require a combination of rehabilitation and reconstruction.

The Port of Bremerton conducted engineering analyses on airfield pavements in 2010 in order to update pavement strength and approximate remaining useful life.[7] Non-destructive testing was completed on the runway, taxiways, and aprons. As noted earlier in the chapter, the results of the testing generated slightly different weight bearing capacities, although the overall capabilities of the major airfield pavements did not change significantly. The analysis of remaining structural life on the runway accurately reflects the 2009 rehabilitation and new construction (2005). The Port's 2010 evaluation of airfield pavements found that most of the parallel taxiway, several exit taxiways, and the northern 2/3 of the main apron had a remaining structural life of less than 5 years, suggesting that rehabilitation or reconstruction of several pavement sections will be required early in the current planning period. Although this finding is not entirely consistent with the visual pavement inspections conducted in 2012, it is important to note that PCI ratings are only one of many tools used to manage airfield pavements. The PCI ratings reflect the type and age of pavement and visually observed surface conditions (weathering, cracking, other distress). The engineering analyses conducted by the Port provide an indication of anticipated pavement performance based on the composition of pavement and base sections and the quality of the underlying soils. Ideally, a combination of visual inspection and technical engineering analysis is used to provide precise assessments of pavement condition and optimal timing for rehabilitation. The condition of the airfield pavements

[7] "Final Report Evaluation of Airfield Pavements" (Duval Engineering 2010)

observed during site visits performed as part of the master plan update (Summer/Fall 2012) are generally consistent with the most recent pavement evaluations. Based on their current condition, pavement rehabilitation or reconstruction projects will be required for most of the aircraft aprons and hangar taxilanes sections on the west side of the Airport within the current 20-year planning period. Ongoing pavement maintenance will also be required for all airfield pavements.

TABLE 2-10: SUMMARY OF AIRFIELD PAVEMENT CONDITION (PWT)

PAVEMENT	SECTION DESIGN/AGE	2012 PCI RATING[1]	2015 FORECAST PCI RATING[1]	2020 FORECAST PCI RATING[1]
Runway 02/20	**Runway: 2-3" Asphalt Overlay (2009)** on existing sections (not including 2005 construction)			
	North Section (between Txy B-D): 10.5" AC; 6" Aggregate Base (1976, 1972, 1943)	99-100	97-99	93-96
	Center Section (between Txy D-F): 10" AC; 6" Aggregate Base (1976, 1943)	97-99	95-97	89-93
	South Section (between Txy F-G): 9" AC, 6" Aggregate Base (1976, 1973)	95-98	92-96	86-91
	South Runway Extension (990') 4" AC, 28.5" Aggregate Base (2005)	99-100	96-97	91-93
Runway 20 (north end) Overrun	North of Taxiway B: 5.5" AC, 6" Aggregate Base (1972, 1943)	Not Rated	Not Rated	Not Rated
Taxiway A (North of Txy B) (CLOSED)	2" AC (1979); 2.5" AC, 6" Aggregate Base (1943)	Not Rated	Not Rated	Not Rated
Taxiway A (Between Txy B-C)	7" AC; 4" Aggregate Base (1978)	75	68	64
Taxiway A (Between Txy C-E)	7" AC, 4" Aggregate Base (1978)	68	66	62
	267' section adjacent to Txy C: 8.5" AC; 6" Aggregate Base (1978, 1943)	66	63	57
Taxiway A (Between Exits E-G)	7" AC, 4" Aggregate Base (1977)	70	68	64
Taxiway A (Between Exits G-H)	4" AC, 28.5" Aggregate Base (2005)	90-98	88-95	83-90
	AC hold area: 4" AC; 8" Aggregate Base (1994)	96	93	87
Taxiway B (Exit Txy)	4" AC, 8" Aggregate Base (1994)	84-100	82-99	77-95

Taxiway C (Exit Txy)	7" AC, 4" Aggregate Base (1978)	65-100	63-99	59-95
Taxiway D (Exit Txy)	7" AC, 4" Aggregate Base (1978)	63-100	61-99	58-95
Taxiway E (Exit Txy)	9.5" AC; 6" Aggregate Base (1976, 1943)	66-100	63-99	57-95
Taxiway F (Exit Txy)	7" AC, 4" Aggregate Base (1977)	52-100	50-99	47-95
Taxiway F (Access Txy)	3" AC, 8" Aggregate Base (1980)	70-87	68-85	64-80
Taxiway G (Exit Txy)	7" AC, 4" Aggregate Base (1977)	48-100	46-99	43-95
Taxiway G (Hangar Access Txy)	3" AC, 8" Aggregate Base (1980)	76	74	70
Taxiway H (Exit Txy)	4", 28.5" Aggregate Base/Subbase (2005)	100	95	90
North Tiedown Apron	2" AC; 6" Aggregate Base (1981) Small Section 2.5" AC; 4" Aggregate Base (1976)	74 67	71 64	65 58
Terminal Apron	12" AC; Base Unknown (1968)	65	62	56
South Tiedown Apron	2" AC; 6" Aggregate Base (1978)	36	33	27
South Hangar Taxilanes (north section)	2" AC; 4-6" Aggregate Base (1971-1976)	38-76	35-73	29-67
South Hangar Taxilanes (center section)	2-4" AC; 6-9" Aggregate Base (1989-1995)	50-76	75-96	69-90
South Hangar Taxilanes (south section)	4" AC; 6" Aggregate Base (2004) Southern most hangar taxilanes	86 Not Rated	83 Not Rated	77 Not Rated

1. The Pavement Condition Index (PCI) scale ranges from 0 to 100, with seven general condition categories ranging from "failed" to "excellent." For additional details, see BREMERTON NATIONAL AIRPORT 2013 PAVEMENT MANAGEMENT REPORT.

Landside Facilities

HANGARS AND AIRPORT BUILDINGS

Bremerton National Airport accommodates a variety of aviation-related buildings including aircraft storage hangars, commercial and mixed-use hangars, and a general aviation terminal. The Airport also includes the Olympic View Business and Industrial Park on the west side of State Highway 3 that includes numerous non-aeronautical and non-aviation buildings. **Figure 2-3**, presented earlier in this chapter**,** depicts the existing buildings on the Airport. **Table 2-11** summarizes existing aviation used buildings located at the Airport.

The west side of the Airport currently accommodates all landside facilities and based aircraft in a variety of apron and hangar facilities. The Airport's west landside area is approaching its development capacity with only a handful of vacant developable areas remaining.

Terminal Area

The main terminal building houses Port offices, lease space, and a public restroom. The building is approximately 13,600 square feet, the majority of which is located on the ground floor; the airport manager office is located on the main floor.

The Avian Flight Center building is located immediately south of the terminal and accommodates fixed base operator (FBO) operations, hangar space and tenant lease space. The building houses FBO office space, passenger waiting areas, pilot facilities, and public restrooms in approximately 21,000 square feet.

Other buildings located in the terminal area include a 2-bay fire station building, restaurant, port maintenance building, and a building used by the Civil Air Patrol.

A commercial hangar, identified as the "Doug Lent Hangar," is located north of the restaurant adjacent to the north tiedown apron. The hangar has two bays on the north and dedicated office space on the south end. Two newer commercial hangars are located near the northwest corner of the north tiedown apron.

South Hangar Area

The Airport's primary hangar area is located south of the terminal area on the west side of Runway 02/20. The area currently accommodates 16 multi-unit hangars, including 12 T-hangars and 4 executive hangars with approximately 151 spaces. The southern-most group of three hangars has been constructed since the last master plan.

TABLE 2-11: AVIATION USE BUILDINGS AT BREMERTON NATIONAL AIRPORT (DEPICTED ON FIG. 2-3)

	BUILDING	USE
1	Terminal Building	Port Offices, Lease Space, Restrooms (Port Owned)
2	Avian Flight Center	FBO, Business Lease Space (Port Owned)
3	Airport Diner	Restaurant (Port Owned-building)
4	Fire Station/ARFF Building	Fire Station, Equipment Storage (Port Owned)
5	Port Maintenance Shop	Maintenance equipment and storage (Port Owned)
6	Aviation Fuel Station	Aircraft Fueling (Port Owned)
7	Doug Lent Hangar	Corporate Hangar/Office Space (Privately Owned)
8	Corporate Hangar #1 (North)	Aircraft Storage (Privately Owned)
9	Corporate Hangar #2 (North)	Aircraft Storage (Privately Owned)
10	Corporate Hangar #3 (North)	Aircraft Storage (Privately Owned)
11	Hangar 1 (South)	T-Hangar (Port Owned)
12	Hangar 2 (South)	T-Hangar (Port Owned)
13	Hangar 3 (South)	T-Hangar (Port Owned)
14	Hangar 4 (South)	T-Hangar (Port Owned)
15	Hangar 5 (South)	T-Hangar (Port Owned)
16	Hangar 6 (South)	T-Hangar (Port Owned)
17	Hangar 7 (South)	T-hangar (Port Owned)
18	Hangar 8 (South)	T-Hangar (Port Owned)
19	Condo Hangar 1 (South)	T-Hangar (Privately Owned)
20	Condo Hangar 2 (South)	T-Hangar (Privately Owned)
21	South Hangar 1	T-Hangar (Privately Owned)
22	South Hangar 2	T-Hangar (Privately Owned)
23	South Hangar 3	Executive Hangar (Privately Owned)
24	South Hangar 4	Executive Hangar (Privately Owned)
25	South Hangar 5	Executive Hangar (Privately Owned)
26	South Hangar 6	Executive Hangar (Privately Owned)
27	U.S. Navy/CAP Building (North)	Operations

Vehicle Access and Parking

Surface access to Bremerton National Airport is provided via State Highway 3. The entrance for the Airport and the adjacent Olympic View Business and Industrial Park is Imperial Way, a signalized intersection on Highway 3 with protected dedicated turn lanes. The 2011 WSDOT traffic count for Highway 3 near the Airport was 16,380 Average Daily Trips (ADT), with a weekday ADT of 17,104.

The road system serving the west landside area of the Airport has one connection to Highway 3 at Imperial Way. A frontage road provides access to the terminal area and the North Hangar Area. A south access road extends from the terminal area parking lot, providing access to the South Hangar Area, fuel storage areas, and the Port's maintenance shop. All main access roads on the Airport are paved.

Access to the east side of Airport is provided by Harry Earl Road and a roundabout that connects to Airport Way. Airport Way currently extends approximately 0.9 miles from the roundabout, however, the roadway will be extended in phases to Old Clifton Road and Lake Flora Road, significantly expanding surface access in the area. Airport Way is a paved two-lane roadway, with porous pavement shoulders and an adjacent non-motorized path.

VEHICLE PARKING

The terminal area parking lot has approximately 132 paved and striped spaces adjacent to the main terminal and Avian Flight Center for employee and customer parking. The restaurant has an additional 23 paved and striped parking spaces.

Additional vehicle parking is available adjacent to individual hangars. There are no improved vehicle parking areas in the south hangar area. Vehicles are parked inside hangars, and adjacent to hangars, although parking on paved areas adjacent to hangars (taxilanes) is not permitted.

Airspace and Navigational Aids

AIRSPACE CLASSIFICATIONS

Airspace within the United States is classified by the FAA as "controlled" or "uncontrolled" with altitudes extending from the surface upward to 60,000 feet above mean sea level (MSL). Controlled airspace classifications include Class A, B, C, D, and E. Class G airspace is uncontrolled.

Aircraft operating within controlled airspace are subject to varying levels of positive air traffic control that are unique to each airspace classification. Requirements to operate within controlled airspace vary, with the most stringent requirements associated with very large commercial airports in high traffic areas.

Uncontrolled airspace is typically found in remote areas or is limited to a 700 or 1,200-foot AGL layer above the surface and below controlled airspace. **Figure 2-4** illustrates and describes the characteristics of the airspace classifications defined by the FAA.

LOCAL AREA AIRSPACE STRUCTURE

Figure 2-5 depicts nearby airports, notable obstructions, special airspace designations and instrument flight rules (IFR) routes in the vicinity of Bremerton National Airport, as identified on the Seattle Terminal Area Chart (TAC) and the IFR Enroute Low Altitude Chart (L-1/L-2).

Bremerton National Airport is located in an area of Class E airspace that begins at the ground surface. The local Class E airspace consists of a 4-nautical mile radius surrounding the airport with southwest and northeast rectangular sections that extend approximately 13 nautical miles overall. Radio communication is not required for visual flight rules (VFR) operations in Class E airspace, although pilots are encouraged to use the common traffic advisory frequency (CTAF) when operating at the airport. Aircraft are required to obtain an air traffic control (ATC) clearance prior to operating in Class E airspace during instrument flight rules (IFR).

Bremerton National Airport is located within the 30-nautical mile veil of Mode C transponder airspace that surrounds Seattle-Tacoma International Airport. The Mode C airspace extends from the surface upward to 10,000 feet above mean sea level (MSL). Aircraft operating in the airspace are required to be equipped with a Mode C Transponder, with only a few exceptions. A transponder is an electronic device that produces a response that enables aircraft to be identified on radar and aircraft collision avoidance systems.

Large areas of Class E airspace associated with enroute instrument airways and transition to terminal airspace extend in all directions beyond the Class E airspace associated with local area airports. This category of Class E airspace has a floor established at 700 feet MSL.

The nearest low altitude enroute instrument airway is Victor 165-287 (V165-287), which passes within 2 nautical miles west of the Airport. The minimum enroute altitude (MEA) for this airway is 6,000 feet MSL.

The Olympia VORTAC[8], located 31.6 miles south of the Airport supports nearby enroute air navigational routes and instrument approach procedures to several area airports. Seven separate enroute airways converge in this area. Local airport operations and flight activity is not directly affected by the enroute airspace due to the minimum enroute altitudes that are well above the local airport traffic pattern altitude.

[8] Very high frequency Omnidirectional Radio range (VOR) combined with UHF frequencies (Tactical Air Navigation – TACAN)

Tacoma Narrows Airport (15 nm SE) has an area of Class D airspace that is in effect when the airport's air traffic control tower (ATCT) is in operation (0800-2200 local). The Class D airspace extends in a 4-mile radius from the airport from the surface to 2,800 feet MSL. Aircraft operation in Class D airspace requires two-way radio contact with the Tacoma Narrows control tower. When the tower is not in operation, the airspace surrounding Tacoma Narrows reverts to Class G. Tacoma Narrows Airport also has two rectangular sections of Class E (extending upward from the surface).

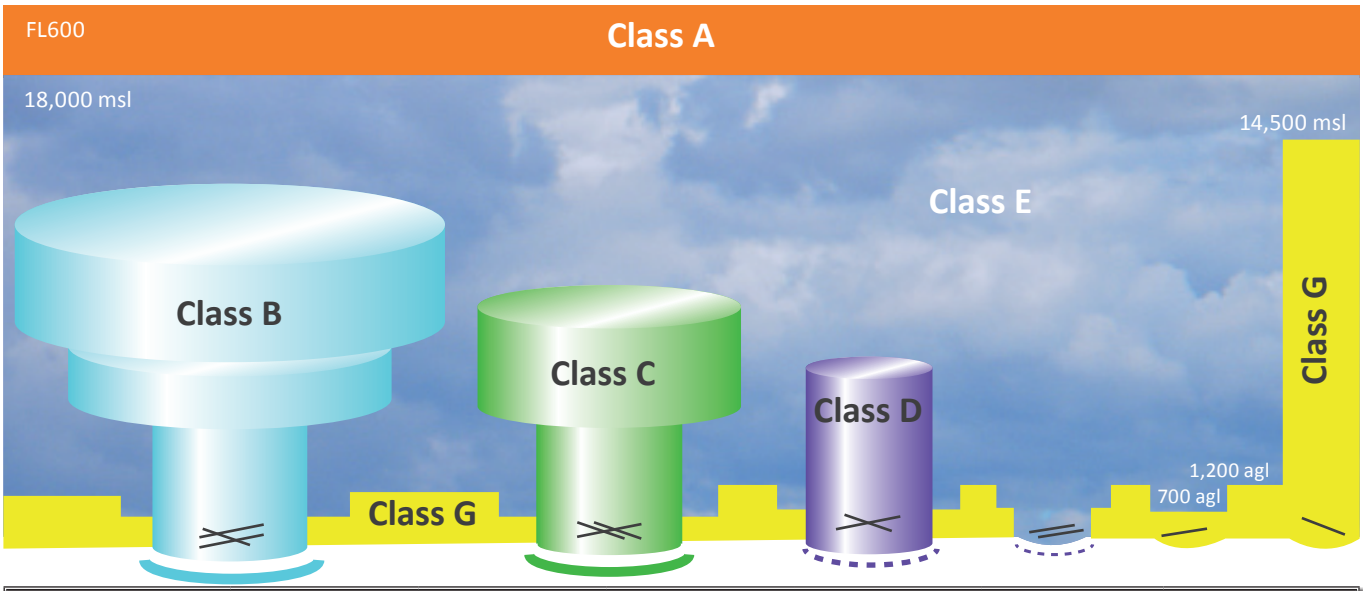
The local fixed-wing traffic pattern altitude at Bremerton National Airport is 1,000 feet above ground level (AGL) (1,444' MSL) with right traffic on Runway 02 and standard left traffic on Runway 20. Both traffic patterns are located on the east side of the runway, as depicted in **Figure 2-6.** A separate helicopter traffic pattern is located on the west side of Runway 02/20 with an elevation of 500 feet AGL (944' MSL)**.**

SPECIAL USE AIRSPACE

Areas of special use airspace (SUA) in the vicinity of Bremerton National Airport include the Prohibited Area 51 (P-51) associated with the Bangor submarine base, located 12.5 nautical miles north. For national security reasons no aircraft are allowed to fly through the defined airspace. The restrictions associated with P-51 are continuous and extend upward from the surface to 2,500 feet MSL.

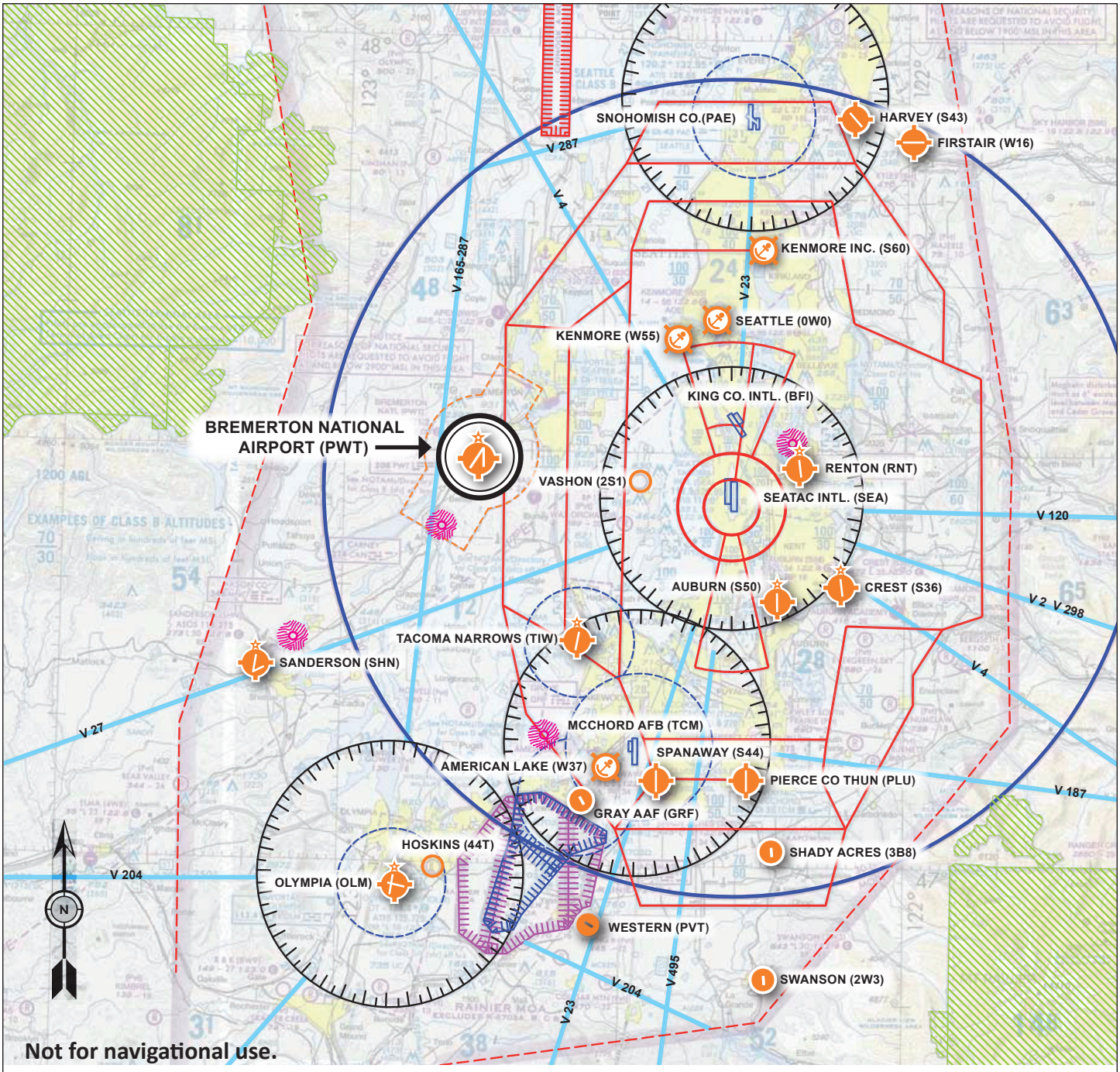
The nearest Military Operations Areas (MOA) are the Chinook A MOA (23 miles north) and the Rainer 1/2/3 MOA (25 miles south). MOAs are designated to segregate VFR and IFR traffic from military operations. When a MOA is active, IFR traffic may be cleared through the area when air traffic control can ensure IFR separation; otherwise traffic will be rerouted. Although VFR operations are not restricted in an MOA, pilots are advised to exercise extreme caution while flying within, near, or below an active MOA. Prior to entering an active MOA, pilots are encouraged to contact the controlling agency for traffic advisories due to the frequently changing status of these areas.

Pilots are requested to maintain a minimum altitude of at least 2,900 feet MSL over the Bremerton waterfront naval facilities approximately 6 nautical miles northeast of the Airport, and at least 2,000 feet AGL over national parks, wilderness areas, wildlife refuges and other sensitive areas. The nearest protected natural area is the Nisqually National Wildlife Refuge, located 23 nautical miles SSE.

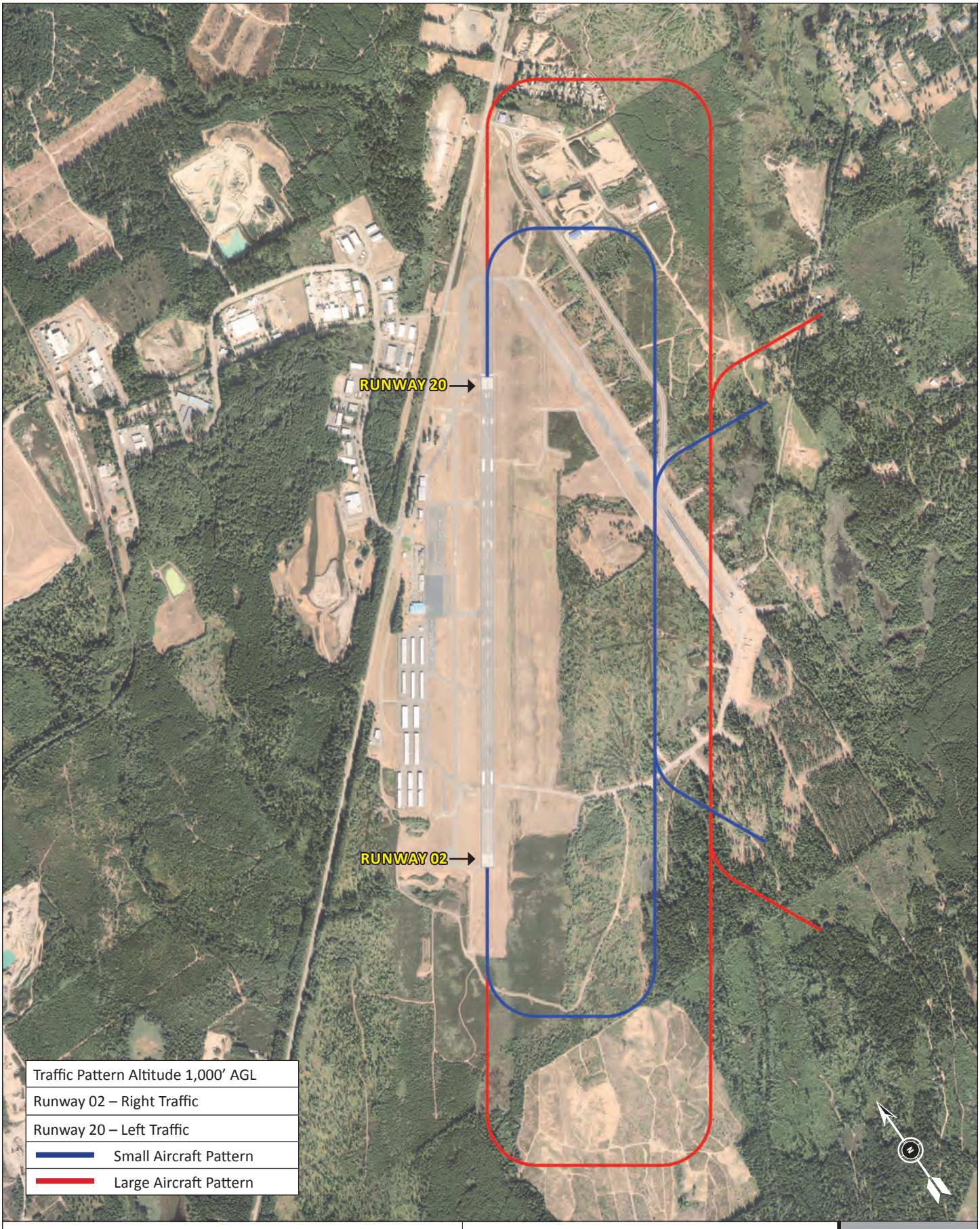


Airspace Class Definition						
Minimum Pilot Qualifications						
Entry Requirements						
VFR Visibility Below 10,000 msl**						
VFR Cloud Clearance Below 10,000 msl						
VFR Visibility 10,000 msl and Above**						
VFR Cloud Clearance 10,000 msl and Above						

*Prior to operating within Class B, C or D airspace (or Class E airspace with an operating control tower), student, sport, and recreational pilots must meet the applicable FAR Part 61 training and endorsement requirements. Solo student, sport, and recreational pilot operations are prohibited at those airports listed in FAR Part 91, appendix D, section 4.
**Student pilot operations require at least 3 statue miles visibility during the day and 5 statute miles visibility at night.
***Class G VFR cloud clearance at 1,200 agl and below (day); clear of clouds.



LEGEND			
	Airport with other than hard-surfaced runways		Class B Airspace
	Seaport		Class D Airspace
	Airports with hard-surfaced runways 1,500 ft. to 8,069 ft.		Class E Airspace
	Airports with hard-surfaced runways greater than 8,069 ft.		Mode C Veil
	Non-Directional Radiobeacon (NDB)		Class E Airspace with floor 700' above surface
	Compass Rose		Military Operations Area (MOA)
	Victor Airways		Prohibited, Restricted, Warning, and Alert Areas


RUNWAY 20
RUNWAY 02
Traffic Pattern Altitude 1,000' AGL
Runway 02 – Right Traffic
Runway 20 – Left Traffic
Small Aircraft Pattern
Large Aircraft Pattern

NAVIGATIONAL AIDS

Ground based navigational aids located on the Airport include the localizer and glide slope components of the instrument landing system (ILS) and the Kitsap nondirectional beacon (NDB).

The localizer (LOC) transmits a high frequency electronic signal (111.1 MHz) that provides runway centerline (inbound course) guidance to aircraft. The localizer transmitter is located beyond the far end of the ILS runway (approximately 1,000 feet south of the end of Runway 02). The glide slope transmits an electronic signal that provides a defined glide path to the runway end. The glide slope transmitter is located on the east side of the runway, approximately 1,000 feet south of the end of Runway 20. Both the localizer and glide have FAA-defined critical areas to protect signal integrity. The glide slope and localizer are FAA-owned and maintained.

The Kitsap NDB is located on the east side of the Airport. The NDB transmits a low frequency 360-degree signal (206 LHz). The NDB supports a nonprecision instrument approach and is also used by pilots for VFR navigation. The NDB is owned and maintained by the Port and is scheduled for shutdown in July 2014.

Ground based navigational aids in the area include the Olympia VORTAC[9] located 31.6 miles south of the Airport and the Carney NDB, located 5.7 nautical miles south. The Carney NDB is used as a holding point for the missed approach procedure for the Runway 20 ILS approach and it is also used by pilots for VFR navigation. Other nearby navigational aids include the Seattle-Tacoma VORTAC, located 19 miles east and the Paine Field VOR/DME, located 32 miles northeast.

Bremerton National Airport has an automated weather observation system (AWOS-3) that provides 24-hour weather information. The AWOS is co-located with the ILS glide slope transmitter on the east side of Runway 02/20, near its north end. The AWOS-3 provides altimeter setting, wind data, temperature, dewpoint, density altitude, visibility, precipitation and cloud/ceiling data. The AWOS is FAA-owned and maintained.

An FAA ADS-B transmitter is located on the west side of the Airport, south of the terminal area. ADS-B is a new generation ("NextGen") system that is designed to replace radar as the primary method for identifying aircraft in flight.

Table 2-12 summarizes existing navigational aids and related items.

[9] Very high frequency Omnidirectional Radio range (VOR) combined with UHF frequencies (Tactical Air Navigation – TACAN)

TABLE 2-12: NAVIGATIONAL AIDS AND RELATED ITEMS

TYPE	FACILITIES
Electronic Navigational Aids	Localizer and Glide Slope (I-PWT) 111.1 MHz Kitsap Non-directional Beacon (NDB) (on field) 206 LHz Olympia VORTAC (31.6 nm SSW) 113.4 MHz Carney Non-directional Beacon (NDB) (5.7 nm SW) 274 LHz
Weather Observation	AWOS-3 on Field (Co-located with ILS glideslope) (121.2 MHz) (360-674-2811)
Communication	Unicom/Common Traffic Advisory Frequency (CTAF)(123.05 MHz) Seattle App/Dep Control (127.1 MHz)
Other	ADS-B (regional air traffic surveillance system)

Instrument Procedures

Instrument approach and departure procedures are developed by the FAA using electronic navigational aids to guide aircraft through a series of prescribed maneuvers in and out of an Airport's terminal airspace. The procedures are designed to enable continued airport operation during instrument meteorological conditions (IMC), but are also used during visual conditions, particularly in conjunction with an instrument flight plan. The capabilities of each instrument approach are defined by the technical performance of the procedure platform (ground based navigational aids or satellite navigational aids) and the presence of nearby obstructions, which may affect the cloud ceiling and visibility minimums for the approach, and the routing for both the approach and missed approach procedure segments. The aircraft approach speed and corresponding descent rate may also affect approach minimums for different types of aircraft.

Bremerton National Airport currently has four published instrument approaches, including a precision Instrument Landing System (ILS) approach to Runway 20. When coupled with an approach lighting system, an ILS provides the best approach capabilities typically found at general aviation airports. The Runway 20 ILS approach provides electronic vertical (descent) and horizontal (course) guidance to the runway end that allows aircraft to descend as low as 204 feet above the ground before visually recognizing the runway environment.

The Airport also has two global positioning system (GPS) procedures and one NDB procedure that utilizes the Kitsap NDB located on site. The RNAV (GPS) RWY 20 approach supports a procedure that provides vertical guidance to the runway end for aircraft equipped with the appropriate FAA-certified GPS receiver; the other approaches provide electronic course guidance only. All of the instrument approaches are authorized for category A-D aircraft, with varying approach minimums for both straight-in and circling procedures. The existing instrument approach capabilities for Bremerton National Airport

are summarized in **Table 2-13.** Copies of the instrument approach procedure charts are included in **Appendix B**.

TABLE 2-13: INSTRUMENT PROCEDURES (BREMERTON NATIONAL AIRPORT)

APPROACH	APPROACH CATEGORY A		APPROACH CATEGORY B		APPROACH CATEGORY C		APPROACH CATEGORY D	
	Ceiling	**Vis.**	**Ceiling**	**Vis.**	**Ceiling**	**Vis.**	**Ceiling**	**Vis.**
ILS LOC RWY 20								
Straight-In ILS	204	.5	204	.5	204	.5	204	.5
Straight-In LOC	759	.5	759	.75	759	1.75	759	2
Circling	756	1	756	1.25	756	2.25	756	2.5
RNAV/GPS RWY 1								
Straight-In	436	1	436	1	436	1.25	436	1.5
Circling	496	1	496	1	496	1.5	556	2
RNAV/GPS RWY 20								
LPV DA	322	.5	322	.5	322	.5	322	.5
LNAV MDA	1159	1.25	1159	1.5	1159	2.5	1159	2.5
Circling	1156	1.25	1156	1.5	1156	3	1156	3
NDB RWY 1								
S-1	541	1	541	1	541	1.5	541	1.75
Circling	541	1	541	1	541	1.5	561	2

Approach Categories are based on the approach speed of an aircraft in the landing configuration (typically 1.3 times the stall speed Vso). Approach Categories:

***Category A**: 0-90 knots (Cessna 172, Beechcraft Bonanza, Piper Seneca)*

***Category B**: 91-120 knots (Beechcraft King Air, Cessna Citation, deHavilland Q400)*

***Category C**: 121-140 knots (Learjet 45, Canadair Challenger, Boeing 737, MD80)*

***Category D**: 141-165 knots (Gulfstream 550)*

Ceiling: Lowest permitted height of clouds in feet above ground level (AGL)

Vis: Minimum visibility required in statute miles

Source: National Ocean Service Instrument Approach Plates

Airport Support Facilities/Services

AIRCRAFT FUEL

Bremerton National Airport has 100-octane low lead (100LL) aviation gasoline (AVGAS) and jet fuel (Jet-A) available for sale through the local fixed base operator (FBO), Avian Aeronautics/Avian Flight Center. The Port owns the primary fuel storage and dispensing system that includes three underground single-wall tanks, the fixed point fueling island, and three mobile fuel trucks. Avian Flight Center leases the mobile fuel trucks for their operations.

24 hour self-fueling (credit card payment) is available for AVGAS at the fueling island and Avian also provides full service AVGAS fueling by truck. Avian provides jet fueling exclusively by truck.

The underground AVGAS and jet fuel storage tanks are located in separate areas in the west landside area. Two (2) 12,000 gallon AVGAS tanks are located adjacent to the fueling island; these tanks are hard-piped to the fuel island and also have fixed point fueling to supply mobile fuel trucks. One (1) 10,000 gallon Jet-A fuel tank is located adjacent the Port's maintenance building, west of the Airport's main T-hangar area. This tank is equipped with a pump system to supply mobile fuel trucks.

The Airport has one fixed-point fueling island located at the south end of the terminal apron and FBO. The fueling island includes two AVGAS pumps covered by an overhead roof structure to provide protection from weather.

The Airport has one private aviation fuel storage tank owned and operated by a tenant in the north hangar area. The 10,000 gallon double-wall aboveground tank contains Jet- A.

Bremerton National Airport maintains a Spill Prevention Control & Countermeasure Plan (SPCCP) that addresses all aviation and non-aviation fuels stored and dispensed on the Airport. **Table 2-14** summarizes existing aviation fueling facilities on the Airport.

TABLE 2-14: AVIATION FUEL STORAGE (BREMERTON NATIONAL AIRPORT)

STORAGE TYPE	LOCATION/FACILITIES
Fixed Point Fuel Tanks and Dispensing Facilities	2 - Underground 12,000 gallon tank (AVGAS) (Port owned) 1 - Underground 10,000 gallon tank (Jet-A) (Port owned) Fueling Island 24-hour Card Lock System – 2 AVGAS pumps (Port owned) 1 - Aboveground 10,000 gallon tank (Jet-A) and pump (North Hangar Area) (Tenant owned)
Mobile Fuel Trucks	Port Owned #1 – 2,000 gal. AVGAS (single wall) #2 – 3,000 gal. Jet-A (single wall) #3 – 2,000 gal. Jet-A (single wall)

FIXED BASE OPERATORS (FBO)

Bremerton National Airport has one full service fixed base operator (FBO), Avian Flight Center. Avian provides aircraft fueling, major airframe and powerplant repairs, flight training, aircraft rental, and a range of services for business and general aviation customers. Avian is located in the Avian Flight Center building, south of the terminal building. The building was constructed by the Port in 2003. Peninsula Helicopters provides helicopter flight training with Robinson 22 and 44 helicopters and is located in the north section of the terminal building.

PUBLIC RESTROOMS

Public, ADA-accessible restrooms are located on the ground floor of the Port's administrative offices/airport terminal building and in the Avian Flight Center. Portable chemical toilets are located adjacent to the aircraft fueling area and near some hangar areas on the Airport. Several individual hangars and the airport restaurant have private restroom facilities.

FENCING

The Airport has an extensive fencing and gate system that covers the entire operations area of the airfield. The fencing is standard 7-foot chain link with numerous swing gates (locked) located around the perimeter. There are two electronic controlled (key card) sliding vehicle gates located in the terminal area, providing controlled access to the main apron and south hangar area.

UTILITIES

The developed areas of Bremerton National Airport have water, natural gas, sanitary sewer, electrical, and telephone/internet service. **Figure 2-7** depicts the locations of the major utilities serving Bremerton National Airport.

WATER

Water service for the airport property is provided by the City of Bremerton. The water system was previously owned and maintained by the Port of Bremerton, but the system was sold to the City of Bremerton in 1999. The water mains enter the property on the west and north. The western entrance is at the intersection of the main airport entrance with Highway 3. As the main enters the property it is split and runs generally parallel to Runway 02/20. To the southwest, the main extends along the taxiway providing water service to hangars and the commercial buildings. To the northwest, the main extends to serve the hangars north of the main entrance and then continues to the north end of Runway 02/20, turns southwest and connects to the main extended from Harry Earl Road.

- The system serves 18 hydrants
- The water main is 12" AC
- Booster pumps provide adequate fire flow

Fire protection on the Airport is provided by the local fire district from a station in Gorst. The on-airport fire station is used as a backup facility.

SANITARY

The Port of Bremerton owns and operates the sanitary sewer system serving the Airport and the adjacent business and industrial park. The sewer serves the commercial buildings located in the terminal area on the west side of the airfield. The sewer system on the airport property is a pressure system, with grinder pumps at each of the four buildings served. The sewage is pumped across Highway 3 where it enters a gravity system that flows to a Large On-Site Septic (LOSS) system drain field. The LOSS is permitted through the Washington State Department of Health. The sewer force main runs generally parallel to Highway 3 under the vehicular parking areas in front of the commercial buildings. The sewer force main exits the airport property at the main airport entrance, crosses under Highway 3, and extends down Imperial Way.

STORMWATER

The Airport has a storm water drainage system that utilizes a series of ditches, catch basins, culverts, engineered piping, and detention ponds for collection and conveyance of storm water runoff to discharge points located at the north and south ends of the airfield. The Port of Bremerton maintains a Stormwater Pollution Prevention Plan (SWPPP) for Bremerton National Airport and is covered under the General Industrial Stormwater Permit, in compliance with the requirements of the U.S. Environmental Protection Agency (EPA) under the federal Clean Water Act.

POWER

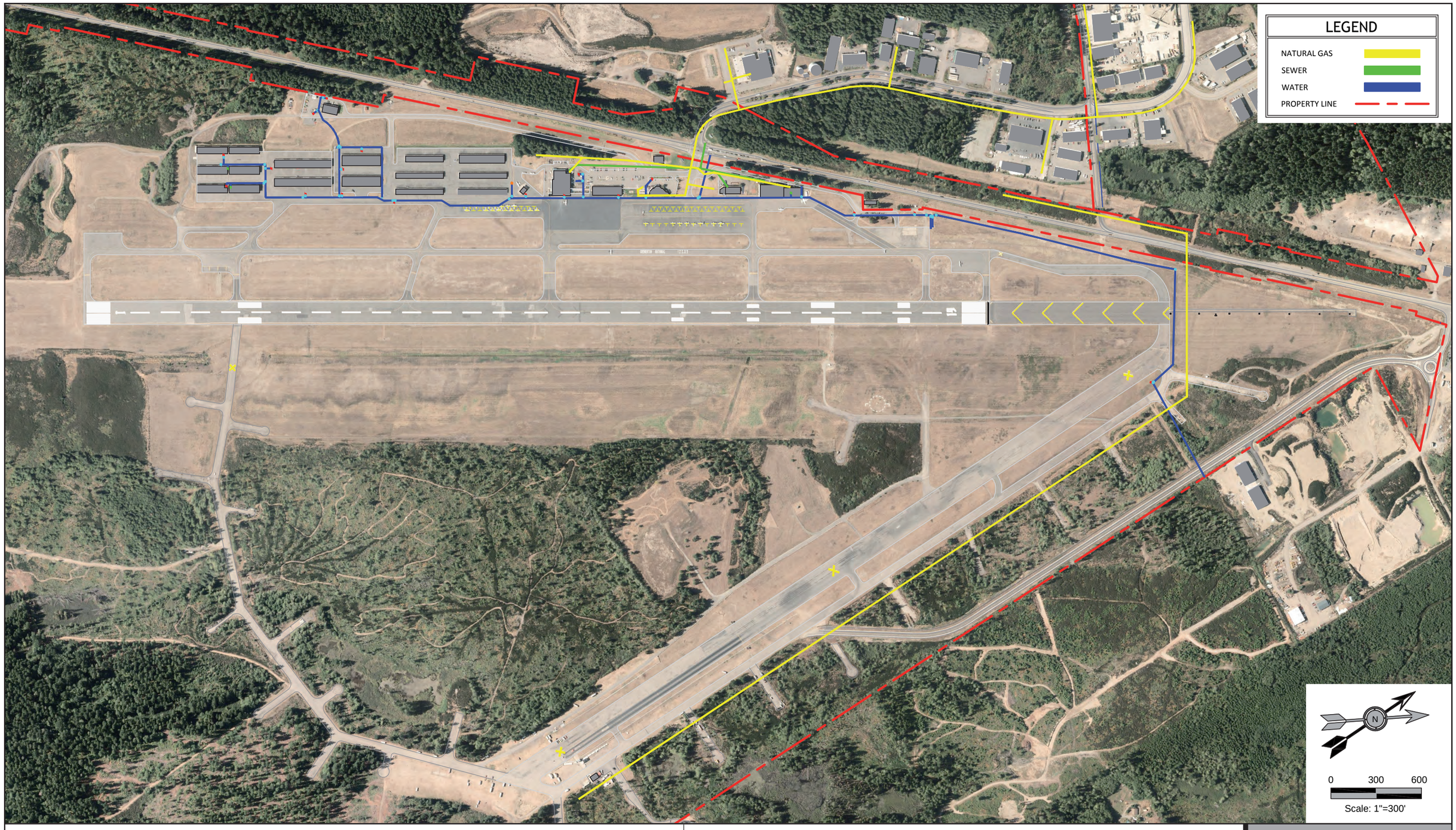
Electrical service is provided by Puget Sound Energy and enters the Airport and business/industrial park property at points along Highway 3. Underground electrical lines encircle Runway 02/20. The Port maintains an emergency generator capable of powering primary airfield lighting systems,

GAS

Natural gas service is provided by Cascade Natural Gas and enters the airport property at the main site entrance from Highway 3. The gas main branches after entering the Port property with service lines running to the commercial buildings on the west side of the airfield and in the business and industrial park.

TELEPHONE/INTERNET

Telephone and high speed internet service is provided by CenturyLink.



BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

EXISTING UTILITIES | **FIG. 2-7**

CENTURY WEST ENGINEERING CORPORATION

Land Use Planning and Zoning

The City of Bremerton has land use authority for Bremerton National Airport and its immediate surroundings. In conjunction with the 2009 annexation of the Airport and the surrounding industrial land base, known as the South Kitsap Industrial Area (SKIA), the City of Bremerton formally created the SKIA Subarea to enable focused land use planning and development, consistent with the City code.

The City of Bremerton adopted the SKIA Subarea Plan August 1, 2012 as Ordinance 5188. The Subarea Plan provides comprehensive land use controls that integrate wide ranging policies and strategies intended to promote sustainable industrial employment while preserving the area's natural environmental setting.

Beyond the SKIA Subarea and the Bremerton city limits, unincorporated areas of Kitsap and Mason County are located in the vicinity of Bremerton National Airport. Portions of the airport's FAR Part 77 Airspace extend into these adjacent jurisdictions, which also extends land use responsibilities.

COMPREHENSIVE PLAN LAND USE DESIGNATION

The 2009 City of Bremerton Official Land Use Map has "**Manufacturing/Industrial Center**" land use designation assigned to the airport within the Bremerton city limits. An earlier City of Bremerton land use map identified Bremerton National Airport as "Urban Industrial" within the SKIA UGA. This designation appeared to reflect the intended use within the City's urban growth area (UGA) prior to annexation. These current and previous land use designations are complimentary and compatible with airport operations. Beyond the SKIA Subarea, the areas of unincorporated Kitsap and Mason County in the vicinity of the Airport have a variety of rural land use designations, including rural residential, rural protection, rural wooded, and forest resource lands.

ZONING

The zoning within the SKIA Subarea is industrial and commercial, which provides a high degree of land use compatibility with airport operations. **Figure 2-8** depicts the surface zoning and airport overlay zoning associated with the SKIA Subarea.

The airfield portion of Bremerton National Airport is zoned **Aviation Business (AB)**. The AB zone accommodates aviation related business, manufacturing and service-related uses, while ensuring compatibility with aircraft operations. The Port's Olympic View Business and Industrial Park is recognized by the Federal Aviation Administration (FAA) as part of Bremerton National Airport. The business and industrial park area accommodates exclusively non-aeronautical (no direct aircraft access to the adjacent airfield) land uses and is zoned **Port Industrial Mix (PIM)**. The PIM zone accommodates light industrial, support retail and service uses, government uses and compatible service uses within a

business park built form, as well as recreational facilities that are designed and operated in a manner that is compatible with industrial uses. Heavy industrial uses are also allowed in this zone, with restrictions. Large areas of property north and east of the airport is zoned **General Industrial (GI)**. The GI zone accommodates light and heavy industrial uses and compatible support retail and service uses. A large area of property located southwest of the Airport and southwest of SW Lake Flora Road is zoned **Mixed Employment (ME)**. The ME zone accommodates commercial, office and light industrial uses.

AIRPORT VICINITY ZONING

The zoning in the vicinity of the Airport (beyond the SKIA Subarea) is primarily located in unincorporated Kitsap County with public facility, resource, industrial, rural and low density residential uses in both city and county jurisdictions. Immediately west of Bremerton National Airport is unincorporated Mason County with predominantly resource and low density residential land uses.

AIRPORT OVERLAY ZONE

The City of Bremerton adopted airport overlay zoning for Bremerton National Airport as part of the SKIA Subarea Plan. The overlay zoning is consistent with the Airports and Compatible Lane Use Guidelines, published by the WSDOT Aviation Division. The SKIA Subarea zoning includes Airport Compatibility Overlay (ACO) zoning based on WSDOT Aviation Airport Safety Zones 1-6.[10] Per the requirements of the SKIA Subarea Plan, defined in City of Bremerton Ordinance 5188 (August 1, 2012), "All applicants proposing work in ACO zones 1 through 6 shall consult the Port of Bremerton after submitting a land use, site development, or building permit application."

Olympic View Business and Industrial Park

The Port of Bremerton Olympic View Business and Industrial Park is located on the west side of Highway 3, opposite the airfield. The facility is fully serviced with utilities and has rail spur access. The close proximity of the airport and business & industrial park provides an excellent facility for attracting and accommodating a wide range of business tenants. A list of business & industrial park tenants is provided in **Table 2-15**.

[10] WSDOT Aviation Division Airports and Compatible Land Use Guide

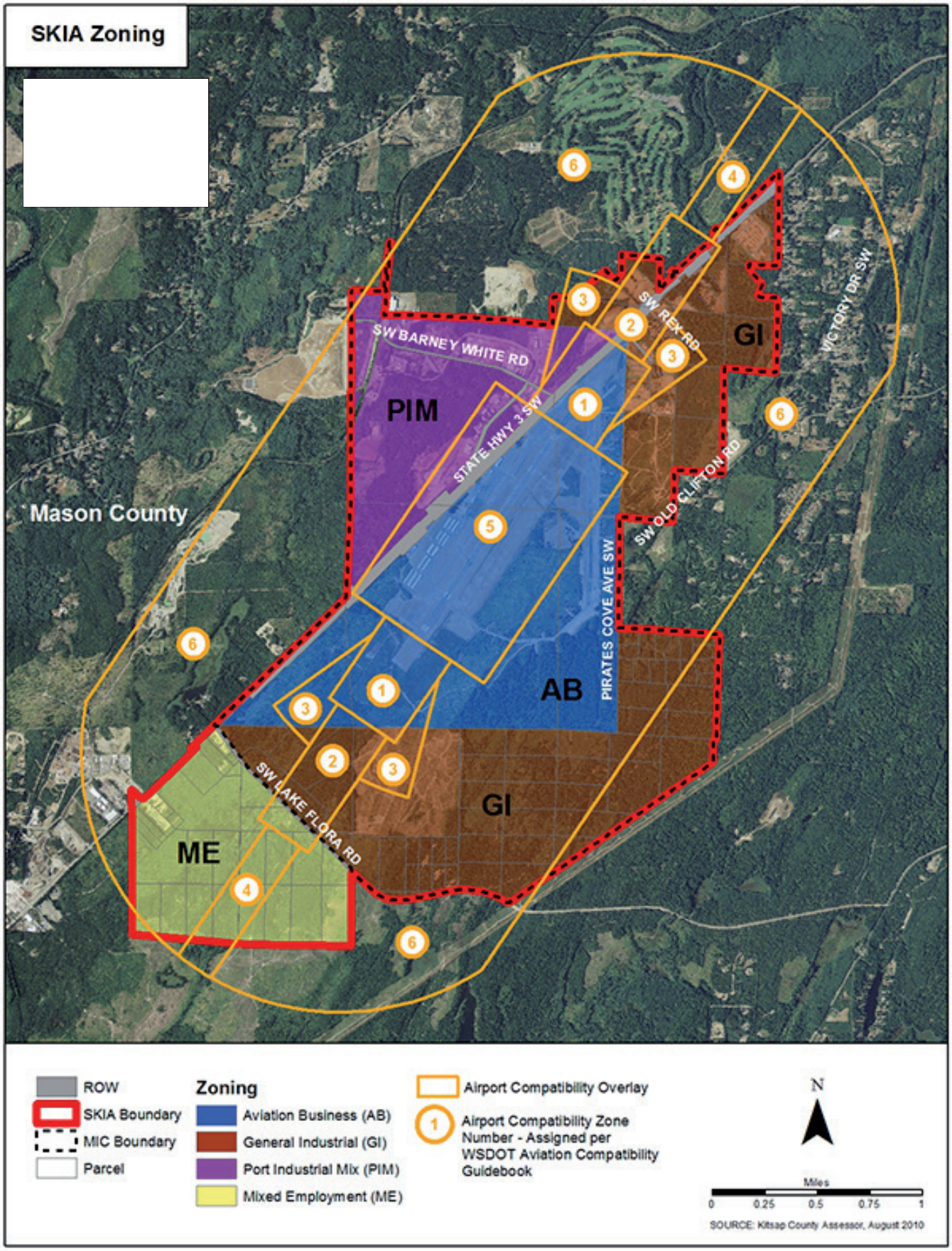

SKIA Zoning
SW BARNEY WHITE RD
SW REX RD
VICTORY DR SW
STATE HWY 3 SW
SW OLD CLIFTON RD
PIRATES COVE AVE SW
SW LAKE FLORA RD
Mason County
PIM
GI
AB
GI
ME
ROW
SKIA Boundary
MIC Boundary
Parcel
Zoning
Aviation Business (AB)
General Industrial (GI)
Port Industrial Mix (PIM)
Mixed Employment (ME)
Airport Compatibility Overlay
Airport Compatibility Zone Number - Assigned per WSDOT Aviation Compatibility Guidebook
N
Miles
0 0.25 0.5 0.75 1
SOURCE: Kitsap County Assessor, August 2010

TABLE 2-15: OLYMPIC VIEW BUSINESS AND INDUSTRIAL PARK/PORT TENANTS (MAY 2014)

All Season Energy	Coastal Marine
Amerigas	Electric Boat
Cenex Harvesting States	FedEx
Miles Sand & Gravel	Pacific Western Timbers
Olympic M&S	Bremerton T&S Special Trees
Paul Davis Restoration	Turnfig
Trident M&S	Romark
Evergreen M&S	PacShips
Kitsap County Public Works Annex	Safe Boats Intl.
Kitsap County HHW Facility	Tracy Family Trust
Imperial Custom Body & Diesel	Bremerton Air
Stripe Rite	Waste Management
Belfair House & Hydraulics	Arts Custom Chrome LLC
Westech Aerosol	*Viking Fence
Nova	
*Robert Harey's Yacht Sales	

*Not located in OVIP

Data Sources:

- Port of Bremerton airport records
- **Bremerton National Airport – Evaluation of Airfield Pavements** (Duvall Engineering, August 2010)
- **Bremerton National Airport – Airport Master Plan** (Coffman Associates, May 2004)
- **Bremerton National Airport – Airport Layout Plan** (Coffman Associates, June 2006)
- **Bremerton National Airport - Master Plan Update 1992-2012** (W&H Pacific, November 1994)
- **Bremerton National Airport - 2013 Pavement Management Report** (Applied Pavement Technology, Inc., February 2013)
- Airfield Design Drawings and Engineering Reports (various projects) (CH2M Hill)
- **FAA Airport Master Record Form (5010-1)**
- **Airport/Facility Directory (AFD) –Northwest U.S.** (U.S. DOT, Federal Aviation Administration, National Aeronautical Charting Office)
- **Seattle Sectional Aeronautical Chart and Terminal Area Chart; IFR Enroute Low Altitude (L-1/L-2) Chart** (U.S. DOT, Federal Aviation Administration, National Aeronautical Charting Office)
- **Instrument Approach Procedure Charts (FAA NACO)**
- **South Kitsap Industrial Area Environmental Impact Statement** (City of Bremerton, March 2012)
- City of Bremerton Zoning and Land Use Plan Mapping
- Kitsap County Zoning and Land Use Plan Mapping
- Local land use planning documents, zoning ordinances and mapping
- Local and regional socioeconomic data

A glossary of aviation terminology and a list of acronyms have also been provided to describe technical items and aviation jargon commonly in use.

Chapter 3 – Aviation Activity Forecasts

Chapter 3 – Aviation Activity Forecasts

The overall goal of aviation activity forecasting is to prepare forecasts that accurately reflect current conditions, relevant historic trends, and provide reasonable projections of future activity, which can be translated into specific airport facility needs anticipated during the next twenty years and beyond.

Introduction

This chapter provides updated forecasts of aviation activity for Bremerton National Airport (PWT) for the twenty-year master plan horizon (2012-2032). The forecasts presented in this chapter are consistent with Bremerton National Airport's current and historic role as a regional general aviation airport.

Unless specifically noted, the forecasts of activity are unconstrained and assume that the Port of Bremerton will be able to make the facility improvements necessary to accommodate anticipated demand. Through the evaluation of airport development alternatives later in the master plan, the Port of Bremerton will consider if any unconstrained demand will not or cannot be reasonably met.

The FAA-defined airport master plan forecasting process for general aviation airports is designed to address elements critical to airport planning by focusing on two key activity segments: based aircraft and aircraft operations (takeoffs and landings). Detailed breakdowns of these are also provided including aircraft fleet mix, activity peaking, distribution of local and itinerant operations, and the determination of the critical aircraft, also referred to as the design aircraft.

The design aircraft represents the most demanding aircraft type or family of aircraft that uses an airport on a regular basis (a minimum of 500 annual takeoffs & landings). The existing and future design aircraft are used to define the airport reference codes (ARC) to be used in airfield planning. FAA airport design standards are organized into several different ARC groupings, each reflecting the physical requirements of that aircraft type. The activity forecasts also provide consistency in evaluating future demand-based facility requirements such as runway and taxiway capacity, aircraft parking and hangar capacity, and other planning evaluations such as airport noise.

FORECAST PROCESS

The Federal Aviation Administration (FAA) provides guidance on forecasting aviation activity in airport master planning projects. **FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans**, outlines seven standard steps involved in the forecast process:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2) **Review Previous Airport Forecasts**: May include the FAA Terminal Area Forecast (TAF), state or regional system plans, and previous master plans.
3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.
6) **Summarize and Document Results**: Provide supporting text and tables as necessary.
7) **Compare Forecast Results with FAA's TAF**: Follow guidance in FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems. In part, the Order indicates that forecasts should not vary significantly (more than 10 percent) from the TAF. When there is a greater than 10 percent variance, supporting documentation should be supplied to the FAA. The aviation demand forecasts are then submitted to the FAA for their approval.

   Master Plan forecasts for operations and based aircraft for general aviation airports are considered to be consistent with the TAF if they meet the following criteria: Where the 5- or 10-year forecasts exceed 100,000 total annual operations or 100 based aircraft:
   a. Forecasts differ by less than 10 percent in the 5-year forecast and 15 percent in the 10-year period, or
   b. Forecasts do not affect the timing or scale of an airport project, or

c. Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3C.

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over twenty years with any certainty. In addition, major unexpected events such as the terrorist attacks of 9/11 2001 or the recent economic recession have the potential to render any forecast obsolete when the effects of these events are deep or prolonged. In many instances the subsequent rebound does not quickly return to pre-event conditions and activity that remains well below previous long-term forecasts for an extended period. Therefore, it is important to remember that aviation activity forecasts are to serve only as guidelines. Planning must be flexible enough to respond to a range of unforeseen developments -- either positive or negative. The use of development reserves for demand-driven facility needs such as hangar space or aircraft parking provides airport management with the ability to respond to unanticipated demand and preserve long-term aviation use areas on the airport.

The following forecast analysis for Bremerton National Airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for Bremerton National Airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility that meets the area's air transportation needs.

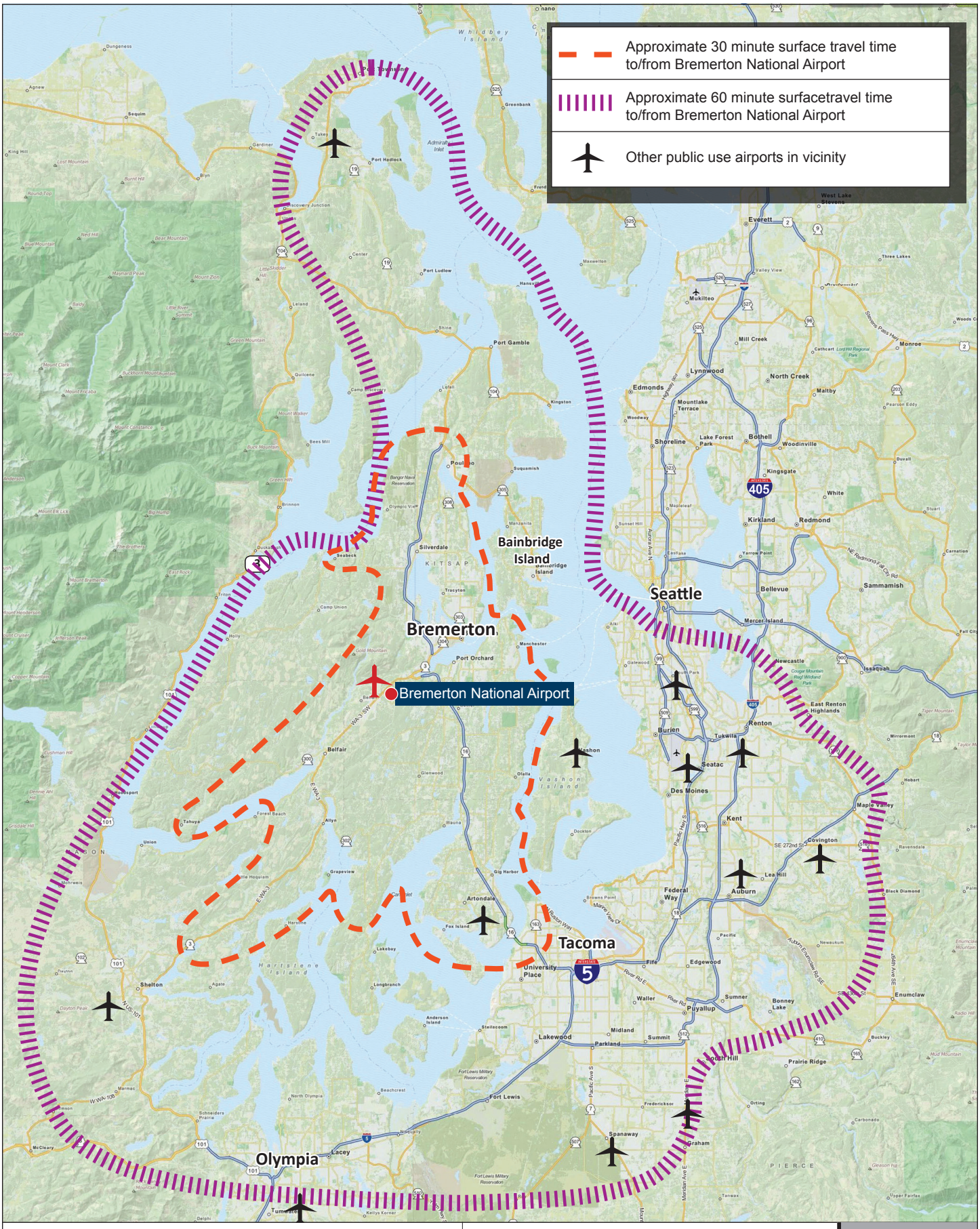
Airport Service Area

The airport service area refers to the geographic area surrounding an airport that generates most "local" activity. The population, economic characteristics and number of competing airports within an airport's service area are important factors in defining locally-generated demand for aviation facilities and services. With numerous airports nearby, service areas often overlap, creating competition between airports for items such as hangar space, fuel and aviation services. These items are sensitive to cost, convenience and the quality of facilities or services. Demand generated by transient users can also be influenced by competition from nearby airports and can usually be measured in terms of cost, convenience or capabilities.

The quality of facilities available at Bremerton National Airport provides competitive strength needed to attract new aircraft, including aircraft currently located at other airports in the service area. Several airports in the Puget Sound region are facing development constraints that may limit future expansion or significantly increase the cost of new development for tenants. In addition, increased surface travel times in the I-5 corridor are anticipated as the region continues to grow, suggesting that Bremerton National Airport will be an increasingly viable alternative, particularly for those individuals or businesses located in the south Puget Sound area. Looking forward, the ability to offer competitive land lease rates and ready-

to-build hangar sites will be significant competitive factors. The availability of services that cater to business aircraft owners/operators such as deicing and aircraft servicing are also important for both locally based and transient aircraft. Development within the South Kitsap Industrial Area (SKIA) and the ongoing efforts of the Kitsap Aerospace and Defense Alliance (KADA) are complimentary components that also have the potential to generate new transient and locally-based business aviation activity at Bremerton National Airport.

A 30- or 60-minute surface travel time is used to approximate the boundaries of a service area for a typical general aviation airport. Bremerton National Airport is the only FAA funded (National Plan of Integrated Airport Systems – NPIAS) airport in Kitsap County, which creates a large geographic service area. **Figure 3-1** illustrates the approximate boundary of an approximate 30- and 60-minute drive from the local area, which encompasses Kitsap County, and areas of adjacent Jefferson, Mason, Pierce and King Counties.



BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

AIRPORT SERVICE AREA | **FIG. 3-1**

Table 3-1 lists the publicly-owned, public use airports within a 30 nautical mile (air miles) radius of Bremerton National Airport. It is noted that each of the public use airports listed provide competitive facilities and services with master plans that provide for future facility expansion. Competing airports located beyond a 30-minute travel time typically have less impact on local airport activity due to the redundancy provided by closer facilities. In contrast, the service area for a commercial airport often extends beyond two hours due the relatively small number of airports with scheduled airline service.

TABLE 3-1: PUBLIC USE AIRPORTS IN VICINITY OF BREMERTON NATIONAL AIRPORT *(WITHIN 30 NAUTICAL MILES)*

AIRPORT	LOCATION	RUNWAY DIMENSION (FEET)	SURFACE	LIGHTED RUNWAY?	FUEL AVAILABLE?
Tacoma Narrows	15 NM SE	5,002 x 150	Asphalt	Yes	Yes
Sanderson Field (Shelton)	22 NM SW	5,005 x 100	Asphalt	Yes	Yes
Vashon Airport	12 NM E	2,001 x 60	Turf	Yes	No
Seattle Tacoma Int'l.	19 NM E	11,901 x 150 (primary runway)	Asphalt	Yes	No GA services
Boeing Field – King County Int'l.	19 NM E	10,000 x 200 (primary runway)	Asphalt	Yes	Yes
Renton Municipal	22 NM E	5,382 x 200	Asphalt	Yes	Yes
Auburn Municipal	24 NM E	3,400 x 75	Asphalt	Yes	Yes
Pierce County - Thun Field (Puyallup)	30 NM SE	3,650 x 60	Asphalt	Yes	Yes

In addition to the local and regional dependence typically associated with a general aviation airport serving a large area, Bremerton National Airport also has two unique service features:

Emergency Response: The primary surface access route to the Kitsap Peninsula from the east side of Puget Sound is via the Tacoma Narrows Bridge and Highway 16. Additional surface access is provided via Highway 3 & US 101 (Shelton) and via Washington State Ferry routes. In the event of a natural disaster or any event that could result in an extended closure of the Tacoma Narrows Bridge, Bremerton National Airport is positioned to play a critical role in providing immediate access to the Peninsula for coordinated response support, transportation of relief supplies, medical evacuation and other related functions.

National Security: Naval Base Kitsap and the Puget Sound Naval Shipyard are facilities with significant national security implications and established overflight restrictions. Bremerton National Airport provides the nearest air transportation access to these facilities for both normal operations and during any coordinated emergency response.

The existing airfield facilities and capabilities at Bremerton National Airport are critical in performing these functions.

Socioeconomic Trends and Forecasts

AREA ECONOMY

Historically, downturns in general aviation activity often occur during periods of weak economic conditions and growth typically coincides with favorable economic conditions. It is evident that the recent economic recession and the slow recovery that followed, has constrained general aviation activity locally, statewide and throughout the national airport system. However, as indicated in the FAA's national long term aviation forecasts, the overall strength of the U.S. economy is expected to sustain economic growth over the long-term, which will translate into modest to moderate growth in aviation activity.

In November 2012, Kitsap County's unemployment rate was 6.5 percent, down from 7.8 percent in January 2012 and below the statewide unemployment rate. In February 2010, the unemployment rate in Kitsap County was 9.3 percent, a recent high. Employment within Kitsap County is heavily influenced by government. Approximately 30 percent of county employment is associated with federal, state or local government. Roughly 1 in 5 jobs in Kitsap County are federal civilian or military employment, most associated with Naval Base Kitsap or the Puget Sound Naval Shipyard and Intermediate Maintenance Facility. The per capita income in Kitsap County in 2010 was $42,300, just below Washington's per capita income level of $42,589 and fourth among all Washington counties. The high percentage of government employment provides some stability for the area and avoids deep seasonal swings typically found in heavily resource-dependent counties.

The leading employment sectors in Kitsap County include:

1) Federal Government (21%)
2) Services (29%)
3) Trade (19%)
4) State & Local Government (10%)
5) Finance, Insurance & Real Estate (8%)
6) Construction (6%)
7) Manufacturing (3%)
8) Natural Resources (2%)
9) Transportation/Utilities (1%)

POPULATION

In broad terms the population within an airport's service area affects the type and scale of aviation facilities and services that can be supported. Although a large number of airport-specific factors can affect activities at an airport, changes in population often reflect other broader economic conditions which may also affect airport activity. Since it is difficult to identify specific connections between airport activity and individual economic indicators such as growth in personal income, unemployment rates, or business spending, population trends generally provide a broad measure of an area's economic health. Regions with flat or declining populations often have weak underlying economic conditions. In contrast, higher rates of population growth often characterize a growing economy that can stimulate individual and business use of general aviation.

HISTORIC POPULATION

As noted earlier, the airport service area for Bremerton National Airport extends beyond the Bremerton and Port Orchard urban areas and includes all of Kitsap County and portions of several adjacent counties. An examination of Kitsap County historic population provides a basis for comparing the area's growth with historic activity at the airport.

Annual estimates of population for Washington counties are developed by the Washington Office of Financial Management (OFM) to support local planning. The annual OFM estimates, coupled with the U.S. Census, conducted every ten years, provide an indication of local area population trends over an extended period. Population growth for Kitsap County has been moderate (averaging 2.21 percent annual growth rate) over the last forty years, typically growing at a rate slightly higher than Washington's statewide population, which has averaged about 1.66 percent annually since 1970. Historic population data for Kitsap County and Washington are summarized in **Table 3-2.**

TABLE 3-2: HISTORIC POPULATION – KITSAP COUNTY AND WASHINGTON

	1970	1980	1990	2000	2010	2012	AVERAGE ANNUAL GROWTH RATE
Kitsap County	101,732	147,152	189,731	231,989	251,133	254,500	2.21% AAR (1970-2012)
Washington	3,413,244	4,132,156	4,866,692	5,894,121	6,724,540	6,817,770	1.66% AAR (1970-2012)
Kitsap County % of WA Population	2.98%	3.56%	3.90%	3.94%	3.74%	3.73%	

Source: U.S. Census data; Washington Office of Financial Management annual estimate (2012).

POPULATION FORECASTS

Washington Office of Financial Management (OFM)

Long-term population forecasts are prepared by the Washington Office of Financial Management (OFM) to support local and statewide planning. The OFM forecasts are developed through three growth scenarios (Low, Intermediate, High) reflecting a range of growth assumptions ranging from very conservative to very optimistic. The Intermediate projections are routinely used by local governments for comprehensive planning due to their balanced, mid-range outlook. Anticipated growth within Kitsap County is considered to be an indicator of future economic strength that will affect activity at Bremerton National Airport. The OFM forecasts are summarized in **Table 3-3**.

TABLE 3-3: KITSAP COUNTY & WASHINGTON POPULATION FORECASTS

	2010	*2012 OFM April 1 Estimate*	2015	2020	2025	2030	2035
Kitsap County							
OFM Low Forecast[1] *(-0.1% AAR 2010-2035)*	251,133[2]	254,500	232,674	236,712	240,929	243,931	244,823
OFM Intermediate Forecast[1] *(0.87% AAR 2010-2035)*	251,133[2]	254,500	262,032	275,546	289,265	301,642	311,737
OFM High Forecast[1] *(2.2% AAR 2010-2035)*	251,133[2]	254,500	297,455	326,510	355,786	383,613	432,873
Washington							
OFM Forecast of State Population[3] *(0.85% AAR, 2010-2035)*	6,724.540	6,817,770	7,029,758	7,182,231	7,570,617	7,951,595	8,301,547

1. Washington Office of Financial Management (OFM)
2. 2010 U.S. Census Data
3. Office of Financial Management (OFM) Forecast of State Population (November 2012)

The 2010-2040 OFM Intermediate forecast for Kitsap County projects sustained modest growth through 2040 (0.87 percent average annual rate of growth). The OFM 2012 Forecast of The State Population[1] projects Washington's annual statewide growth to average 0.85 percent through 2040. A comparison of the OFM Intermediate forecast and the recently updated statewide population forecast shows that Kitsap County is expected to account for about 3.7 percent of Washington population through 2040.

[1] Forecast of The State Population (Washington Office of Financial Management, November 2012)

The 2012 OFM estimate for Kitsap County (254,500) falls between the 2010 and 2015 Intermediate projection, indicating that forecast is currently providing an effective projection of growth

National General Aviation Activity Trends

The first decade of the 21st Century was tumultuous for General Aviation. The industry was battered by poor economic conditions and steadily rising fuel prices that slowed growth and negatively impacted elements such as aircraft manufacturing, on-demand air travel, aircraft ownership, and aircraft utilization levels. Ongoing concerns over the potential replacement and future availability of aviation gasoline (AVGAS) have also created uncertainty within general aviation. On a national level, most measures of General Aviation activity declined sharply through the second half of the decade and have only recently started to show modest signs of improvement.

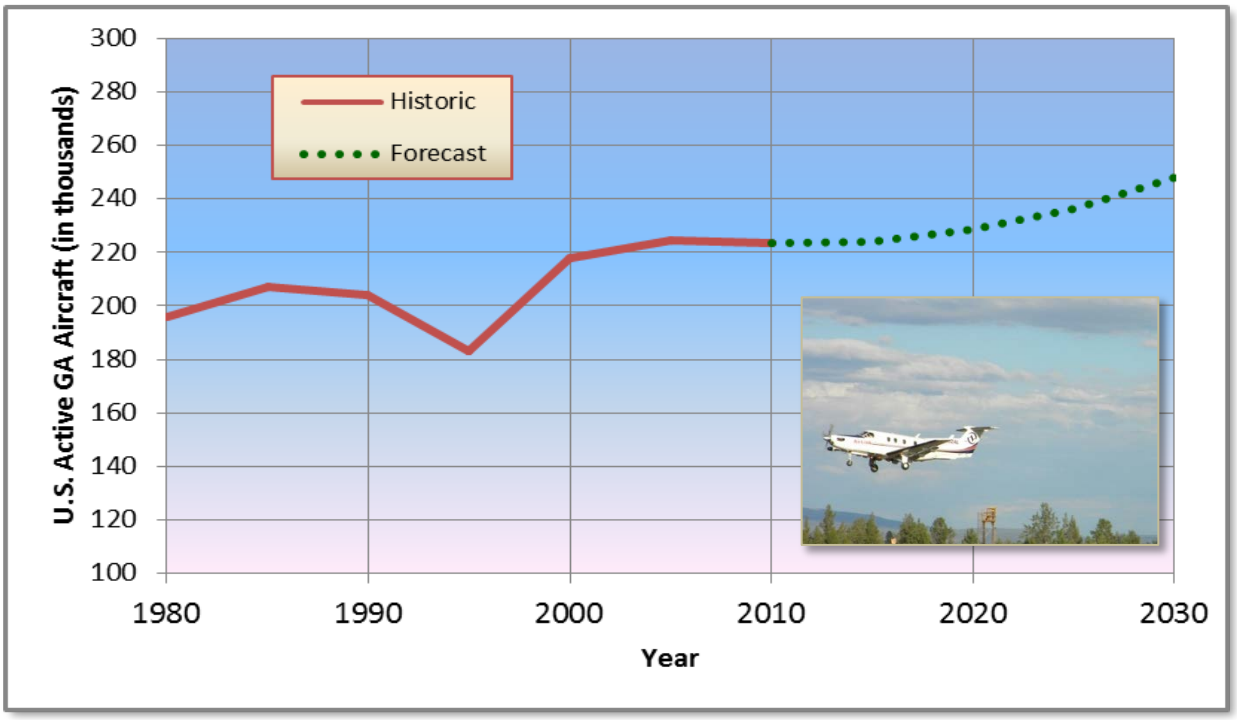
Data maintained by the FAA show significant system-wide declines of several key general aviation activity indicators between 2000 and 2011 (AVGAS consumption -36%; piston aircraft hours flown -36%; active piston aircraft -9%; active GA pilots -2%). The FAA's updated long term forecasts are significantly tempered to reflect current and recent historic conditions. Although the FAA maintains a favorable long-term outlook, many of the activity segments associated with piston engine aircraft and AVGAS consumption are not projected to return to "pre-recession" levels until the 2020 to 2030 timeframe.

These expectations reflect a variety of industry specific factors and broad-based measures and forecasts of economic health such as gross domestic product (GDP), consumer price index, oil prices and interest rates. The FAA acknowledges several risks to its forecast assumptions related to rising oil prices, public perceptions of business and corporate aviation, broad national and international governmental fiscal policy concerns, and environmental concerns. The FAA notes that improvement for business and corporate aviation is largely based upon the future prospects of economic growth and corporate profits.

The FAA indicates that the 2012 general aviation forecasts have been updated to rely heavily on discussions with industry experts conducted at a workshop co-hosted by FAA and the Transportation Research Board (TRB) in July 2011 along with the results of the 2010 General Aviation and Part 135 Activity Survey. The forecast assumptions have been updated by FAA analysts to reflect more recent data and developing trends, as well as further information from industry experts. Although some segments of general aviation are expected to grow at moderately high rates, most measures of the general aviation industry suggest modest, sustained growth in the range of 1 to 2 percent annually is expected over the next 20 years. The FAA's annual growth assumptions for individual general aviation activity segments are summarized in **Table 3-4.**

The FAA's long term forecasts predict that the U.S. active general aviation aircraft fleet will grow modestly at an average annual rate of 0.6 percent between 2012 and 2032. The active fleet is expected to increase from 222,520 aircraft in 2011 to 253,205 in 2032 (+30,685) which is an overall increase of approximately 14 percent. However, within that overall growth is a projected decline in active single engine piston aircraft (-2.3%) and multi-engine piston aircraft (-9.2%). These declines reflect attrition of an aging fleet which is not fully offset by new aircraft production. Encouraging areas within the general aviation fleet are found in experimental aircraft (+29%), sport aircraft (+53%), and business jet (+129%) growth through 2032. The very light jet (VLJ) [2] portion of the business jet segment is expected to overcome several early setbacks and depressed market demand to become a growing percentage of the business jet fleet. **Figure 3-2** depicts the FAA forecast for active general aviation aircraft in the United States between 2012 and 2032.

FIGURE 3-2: US ACTIVE GENERAL AVIATION AIRCRAFT FORECAST



[2] Very Light Jets (VLJ) are small jet-powered aircraft (weighing less than 12,500 pounds) with airport-related performance characteristics (takeoff weight, approach speed, runway length requirements, physical dimensions, passenger load, etc.) comparable to a high-performance light twin-engine aircraft.

TABLE 3-4: FAA LONG RANGE FORECAST ASSUMPTIONS (U.S. GENERAL AVIATION)

ACTIVITY COMPONENT	FORECAST ANNUAL AVERAGE GROWTH RATE (2012-2032)
Components with Annual Growth Forecast < 0%	
Single Engine Piston Aircraft in U.S. Fleet	-0.2%
Multi-Engine Piston Aircraft in U.S. Fleet	-0.5%
Hours Flown - GA Fleet (Piston AC)	-0.1%
Student Pilots (Indicator of flight training activity)	-0.1%
Components with Annual Growth Forecast < 1%	
Private Pilots	0.1%
Commercial Pilots	0.4%
Airline Transport Pilots	0.6%
Instrument Rated Pilots	0.4%
Active Pilots (All Ratings, excluding Airline Transport)	0.3%
GA Operations at Towered Airports (all AC types)	0.3%
AVGAS (Gallons consumed - GA only)	0.2%
Active GA Fleet (# of Aircraft)	0.6%
Turboprop Aircraft in U.S. Fleet	0.9%
Components with Annual Growth Forecast 1% 2%	
Experimental Aircraft in U.S. Fleet	1.2%
Components with Annual Growth Forecast >2%	
Sport Pilots	6.0%
Turbine Helicopters in U.S. Fleet	3.0%
Piston Helicopters in U.S. Fleet	2.7%
Light Sport Aircraft in U.S. Fleet	2.1%
Turbojet Aircraft in U.S. Fleet	4.0%
Hours Flown - GA Fleet (Turbine AC)	4.0%
Hours Flown – Experimental AC	2.6%
Hours Flown – Light Sport AC	3.5%
Jet Fuel (Gallons consumed – GA only)	3.9%

Source: FAA Long Range Aerospace Forecasts (FY 2012-2032)

Overview of Recent Local and National Events

Bremerton National Airport was affected by the same conditions that affected airports across the country during the recent economic recession and sluggish recovery. As noted above, moderate unemployment continues to be a drag on the local economy. A review of events at the airport over the last ten years underscores the impact of the economic recession that effectively created a "pre-recession" period that included hangar construction and growth in aircraft activity followed by a recession and post-recession period that is marked with a decline in aircraft utilization (hours flown, fuel used, etc.) and slower hangar construction.

BASED AIRCRAFT

Between 2002 and 2012, the number of based aircraft at Bremerton National Airport increased from 160 to 192 (+20%) and three locally-based business jets were added to the fleet that consists primarily of single- and multi-engine piston aircraft. During the same period, the number of active general aviation aircraft in the U.S. fleet increased by about 2 percent. Flight training at the airport also expanded with the addition of helicopter flight training by Peninsula Helicopters to compliment the fixed wing flight training provided by Avian Flight Center. A number of new hangars were constructed including several multi-unit buildings in the south hangar area and new corporate hangars north of the main apron.

AVIATION FUEL

A review of aviation fuel delivery volumes at Bremerton National Airport was conducted to help evaluate the impact of activity trends on airport operations. **Table 3-5** summarizes AVGAS and jet fuel deliveries at the airport during the last six years (2007-2012) and from 2002, the base year used for the previous airport master plan.

TABLE 3-5: BREMERTON NATIONAL AIRPORT - AVIATION FUEL (ANNUAL GALLONS DELIVERED)

YEAR	AVGAS	NET CHANGE FROM PREVIOUS YEAR/PERIOD	JET FUEL	NET CHANGE FROM PREVIOUS YEAR/PERIOD	TOTAL	NET CHANGE FROM PREVIOUS YEAR/PERIOD
2012	73,051	+28.3%	149,247	+29.3%	222,298	+29.0%
2011	56,951	-24.0%	115,406	+12.4%	172,357	-3.0%
2010	74,965	+1.8%	102,706	+75.1%	177,671	+34.3%
2009	73,649	-7.2%	58,665	+23.2%	132,314	+4.2%
2008	79,337	-21.4%	47,635	-25.0%	126,972	-22.8%
2007	100,947	-8.1%	63,535	-30.1%	164,482	-18.4%
2002	109,840	--	91,791	--	201,631	--

Source: Airport fuel records

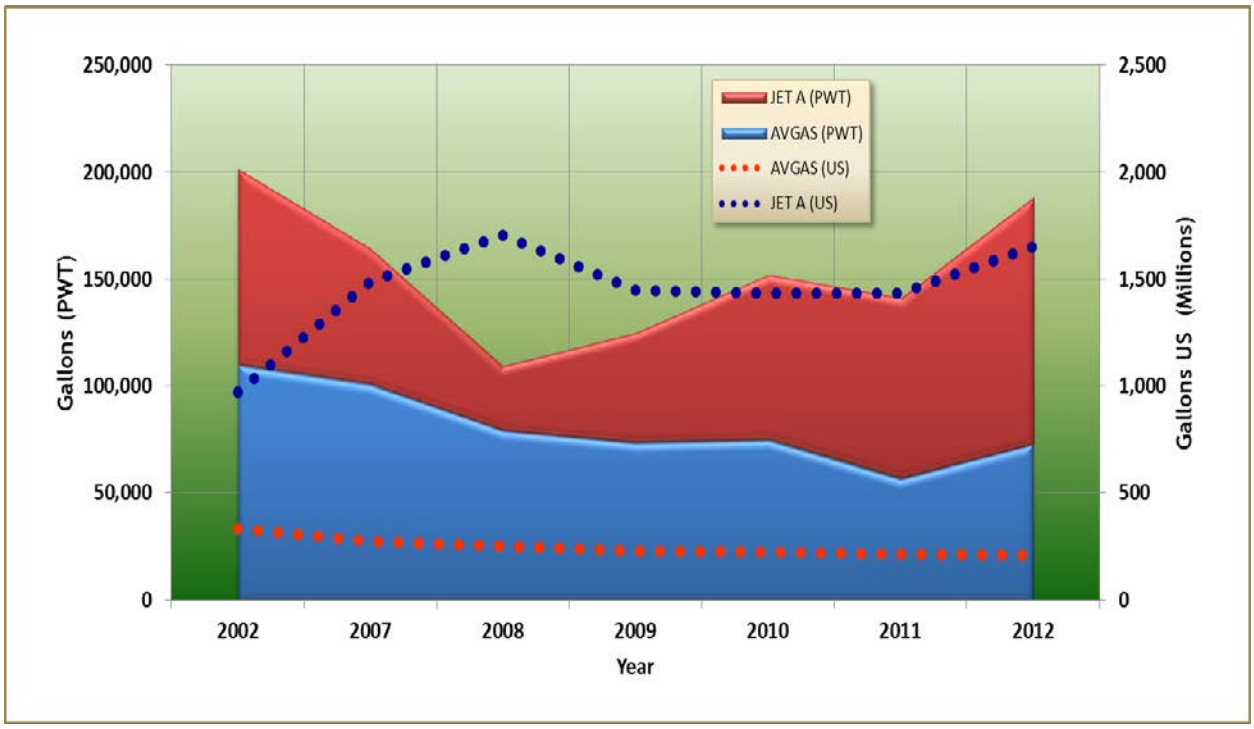
Despite an increase in based aircraft, annual deliveries of aviation gasoline (AVGAS) at the airport declined significantly between 2002 and 2011 (-48%). In 2012 AVGAS deliveries began to show significant improvement, increasing by 28 percent over the previous year, but remained well below 2002 levels (-34%). However, during the same ten-year period, jet fuel volumes at the airport increased by more than 60 percent. The increase in jet fuel volumes is attributed to the addition of three locally-based business jets (no turbine aircraft previously based at the airport) and growth in transient turbine aircraft activity associated with military and business use. The success of Avian Flight Center and the new fixed base operator (FBO) building are also positive factors. As a result of the recent fueling trends, jet fuel delivery at the airport surpassed AVGAS for the first time in 2010 and quickly increased to double the volume of AVGAS in 2011 and 2012. In 2002, the AVGAS/Jet Fuel distribution was 55%/45% at Bremerton National Airport. In 2012, the distribution was 33%/67% AVGAS/Jet Fuel.

The fueling trends at Bremerton National Airport are generally consistent with general aviation fuel consumption trends documented by the FAA throughout the U.S. during the same period. **Figure 3-3** illustrates the 10-year historic aviation fuel trends for Bremerton National Airport (left axis) and the U.S. (right axis) between 2002 and 2012.

Nationally, AVGAS consumption levels dropped every year between 2000 and 2011, ending 35 percent below 2000 levels. Contributing factors include economic recession, rising fuel prices, the ever-increasing cost of aircraft operation, use of alternative fuels (auto gas), and a shrinking piston-engine fleet (-9% between 2000 and 2011). The latter factor does not appear to have influenced AVGAS fueling trends at Bremerton National, although the economic factors have broad impacts that are evident at virtually every general aviation airport.

U.S. general aviation jet fuel volumes rose steadily between 2000 and 2008 (+76% increase by 2008), until the weight of the economic recession drove consumption down about 16 percent over the next three years. Jet fuel consumption in 2011 was 48 percent higher than 2000 levels and the FAA projected jet fuel consumption to increase in 2012 from 2011 levels, the first year-to-year increase since 2007-2008. A major factor in the jet fuel consumption trend is found in a growing general aviation turbine (jet fuel) aircraft fleet that grew by 62 percent between 2000 and 2011.

FIGURE 3-3: BREMERTON (PWT) AND US GENERAL AVIATION FUEL VOLUMES (2002-2012)



Historic Aviation Activity

For Bremerton National Airport, aircraft operational data (takeoffs and landings, touch and go landings, etc.) are limited to estimates. As a non-towered airport, no record of activity is regularly maintained. However, a review of estimates contained in state aviation system plans, previous airport master plans, and FAA Terminal Area Forecast (TAF) data provides a general indication of activity at the airport over time. Based aircraft counts are updated periodically either as part of a master plan or by airport management for other purposes.

FAA TERMINAL AREA FORECAST (TAF) DATA

The Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) is maintained for airports that are included in the National Plan of Integrated Airport System (NPIAS). **Table 3-6** summarizes recent historic based aircraft and aircraft operations estimates for the airport from the TAF. The TAF is periodically updated and adjusted as more specific airport activity data are available. When reviewing FAA TAF data, it is important to note that when there is no change from year to year it often indicates a lack of data, rather than no change in activity. Similarly, a large change in data in a single year may follow updated reporting that captures changes that occurred over several years. Small changes in year-to-year activity that extend through the forecast typically reflect

assumed growth rates that are not frequently updated. TAF aircraft operations estimates in the ten years prior to 2002 ranged from 89,847 to 107,000. As noted in the 2002 Airport Master Plan, these estimates were unable to be validated and are not considered to have accurately reflected actual activity. The TAF data in 2002 was revised to reflect the base year (2002) documented in the 2002 Airport Master Plan forecasts. The growth reflected in the data since 2002 is assumed based on a pre-defined annual growth rate and may reflect updated based aircraft counts approximated in FAA airport record form updates. It is noted that the TAF based aircraft estimate for 2012 (216) is 24 higher (+12.5%) than the 2012 airport management count (192). Based on recent fuel delivery records, it appears that the TAF estimates of aircraft operations are also well above current activity levels.

TABLE 3-6: FAA TAF DATA – BREMERTON NATIONAL AIRPORT

YEAR	AIRCRAFT OPERATIONS	BASED AIRCRAFT	RATIO: GA OPERATIONS PER BASED AIRCRAFT
2002	49,500	160	309
2003	49,500	160	309
2004	51,728	157	329
2005	53,956	157	344
2006	55,685	196	284
2007	57,470	196	293
2008[1]	59,312	200	297
2009[1]	61,214	204	300
2010[1]	63,175	208	304
2011[1]	65,202	212	308
2012[1]	67,290	216	312

1. FAA Terminal Area Projected (Forecast) Activity; previous years are presented as historical

CURRENT ESTIMATE OF ACTIVITY

Based Aircraft

Based aircraft counts associated with the current and previous master plans indicate an increase from 160 to 192 (20%)between 2002 and 2012, which reflects average annual growth of **1.84 percent**. Bremerton National Airport has traditionally accommodated primarily single- and multi-engine aircraft, although the airport now also has three locally-based business jets. The addition of business jets to the based aircraft fleet has occurred since the last master plan was completed in 2002. The three locally based business jets each weigh more than 12,500 pounds; the remaining based aircraft at the airport weigh less than 12,500 pounds. The business jets are included in Airplane Design Group II (ADG II), while the

remaining fixed wing aircraft are included in Airplane Design Group I (ADG I). A portion of the locally based helicopter fleet is used in flight training. A description of aircraft classifications is provided later in the chapter.

Aircraft Operations

FAA GUIDANCE FOR ESTIMATING AIR TRAFFIC AT NON-TOWERED AIRPORTS

The FAA provides planning guidance for estimating activity at general aviation airports without control towers, including the use of activity ratios to project aircraft operations from the number of based aircraft at the airport. In the absence of actual aircraft operations counts, the ratios of activity are generally adequate for airport planning purposes. The FAA developed "typical" operations ratios for general aviation airports based on their observations at airports throughout the United States. The recommended ratios are 250 operations per based aircraft for small airports with low activity; 350 operations per based aircraft for airports with moderate local and itinerant activity; and 450 operations per based aircraft for high activity airports in urban areas. The ratios are intended to reflect operations from both locally-based and transient aircraft. However, the presence of unique activities such as a large flight school can increase traffic volumes due to significantly higher aircraft utilization levels (annual flight hours per aircraft, etc.). Conversely, the absence of aviation fuel or a fixed base operator (FBO) at an airport can contribute to lower activity levels.

The 2002 Airport Master Plan estimate of general aviation operations (49,500) with 160 based aircraft reflect an operations to based aircraft ratio of 309, which is well within the normal range of activity found at similarly sized general aviation airports and provides a reasonable "normal" activity ratio.

The significant decline in AVGAS fueling volumes experienced at Bremerton National Airport in recent years suggest a decline in average aircraft utilization has also occurred, which would result in a decline in aircraft utilization. The connection between reduced AVGAS consumption and reduced piston aircraft hours flown has been well documented by the FAA within the U.S. fleet during the last decade. A conservative reduction of roughly 1/3 (-32%) in the 2002 operations per based aircraft ratio (309 x .68 = 209) appears to correlate to the actual decline measured in AVGAS deliveries and approximate current conditions.

The strength in jet fuel volume in recent years at the airport tempers the piston trend somewhat, although the number of operations per gallon of fuel pumped is significantly lower for turbine aircraft based on significantly larger fuel capacities of business class aircraft. As a result, relatively large volumes of jet fuel generate fewer aircraft operations than the equivalent volume of AVGAS.

Fixed wing and helicopter flight training activity at the airport reflects significantly higher aircraft utilization compared to private aircraft. Based on information provided by the two flight training operations on the airport, the average ratio of operations per flight training aircraft is estimated at 1,200 for fixed wing aircraft and 7,200 for helicopters. For fixed wing flight training aircraft, an average of 4 operations per flight hour logged was applied to the estimated 2,100 annual flight hours logged by seven or eight aircraft in the training fleet. A significantly higher ratio was used for helicopter flight training based on the ability to conduct multiple "touch and go" landings along the runway or parallel taxiway for each circuit in the airport traffic pattern. Peninsula Helicopters indicates that they can conduct up to 10 circuits in the traffic pattern per flight hour logged in addition to multiple practice landings associated with hover training or other maneuvers. Averaging 30 hours of instruction per month with one aircraft, the activity extrapolated over 12 months translates into approximately 7,200 annual operations.

By combining flight training aircraft and non-flight training aircraft, an operations-per-based aircraft ratio of 282 is produced:

A. Non Flight Training Based Aircraft (184) x 209 operations per based aircraft ratio (captures local and transient aircraft activity)

B. Fixed Wing Flight Training Aircraft (7) x 1,200 operations ratio

C. Helicopter Flight Training Aircraft (1) x 7,200 operations

A. 184 x 209 = 38,463 Operations

B. 7 x 1,200 = 8,400 Operations

C. 1 x 7,200 = 7,200 Operations

2012 Total (A-C): 54,063 General Aviation Operations

54,063/192 (Based Aircraft) = 282 GA Operations per Based Aircraft

The 2012 estimate of general aviation operations is approximately 9 percent higher than the 2002 estimate of activity (49,500). A detailed distribution of current traffic is provided in the forecast of aircraft operations later in the chapter.

Aviation Activity Forecasting

EXISTING FORECASTS

Several existing aviation activity forecasts are available for comparison with current activity, recent historic trends, and the updated forecast scenarios prepared for the master plan. However, it is noted that

all of the existing aviation activity forecasts for Bremerton National Airport were completed before the start of the recent economic recession that began in the 4th quarter of 2007. Five years after the beginning of the recession, many segments of general aviation activity have not returned to pre-recession levels. As an example, the precipitous declines in piston aircraft hours flown and AVGAS consumption documented by FAA throughout the national aviation system during the last decade were not anticipated in forecasts commonly produced between 2000 and 2007.

The existing forecasts are presented unmodified and therefore do not reflect recent events and may be obsolete (in actual numbers). However, the long-term growth rates reflected in the existing forecasts are typically within the range found at many general aviation airports and provide a useful basis of comparison.

The existing forecasts provide a useful gauge of future growth rates that are generally consistent with national and statewide expectations for defining general aviation activity. The existing forecasts and their respective average annual growth rates are summarized below and later in **Table 3-7**.

2002-2022 AIRPORT MASTER PLAN

The 2002-2022 Airport Master Plan forecasts projected based aircraft at Bremerton National Airport to increase from 160 to 260 between 2002 and 2032, which reflects an average annual growth rate of **2.46 percent**. General aviation operations were projected to increase from 49,500 to 91,000 during the same period, reflecting an average annual growth rate of **3.53 percent**.

The airport's 2012 based aircraft count (192) is 8 aircraft (4%) below the 2012 forecast of 200 based aircraft. The 2012 operations estimate of 54,063 is 18 percent (11,937) lower than the 2012 forecast of operations (66,000).

FAA TERMINAL AREA FORECAST (TAF)

The FAA's 2008 TAF forecast update projects based aircraft at Bremerton National Airport to increase from 196 to 276 (+41%) between 2007 and 2025, which represents average annual growth of **1.92 percent**. The 2012 TAF forecast for based aircraft (216) is 24 aircraft (13%) above the 2012 based aircraft count for the airport.

General aviation aircraft operations are projected to increase from 57,470 to 101,412 between 2007 and 2025, which represents average annual growth of **3.21 percent**. The 2012 operations estimate of 54,063 for the airport is approximately 25 percent (13,227) lower than the 2012 operations forecast (67,290).

2007 WSDOT AVIATION LONG TERM AIR TRANSPORATION STUDY (LATS)

The 2007 WSDOT Aviation Long Term Air Transportation Study (LATS) contains based aircraft and operations forecasts for Washington's public use airports for the 2007-2030 timeframe. The LATS forecasts used the 2002-2022 Airport Master Plan forecasts without revision through 2022 then extrapolated based aircraft and operations to 2030 using comparable annual growth rates.

Based aircraft are projected to increase from 160 to 319 (+99%) between 2002 and 2025, which represents average annual growth of **2.49 percent**. General aviation aircraft operations are projected to increase from 50,400 to 117,654 during the same period, reflecting an average annual growth rate of **3.07 percent**.

Since common data (previous master plan) was used to develop the early year LATS forecasts, the airport's 2012 based aircraft count and operations estimates are tracking precisely the same as with the master plan noted above.

Updated Forecasts

BASED AIRCRAFT

Several updated projections of based aircraft at Bremerton National Airport have been prepared based on a review of recent socioeconomic data, existing aviation activity forecasts and current conditions. The existing and updated forecasts are summarized in **Table 3-7**. and depicted in **Figure 3-4**. Note that the previously prepared forecasts are not adjusted to reflect the 2012 based aircraft count (192).

KITSAP COUNTY FAA-REGISTERED AIRCRAFT MARKET SHARE (1.51% AND 1.83% ANNUAL GROWTH)

There are currently 360 active aircraft registered in Kitsap County. Although the address of owner registration does not always indicate the physical location of an aircraft during the year, the measure provides a stable basis from which to project Bremerton National Airport's share of the local market. For forecasting purposes, Kitsap County FAA-registered aircraft were projected to increase at an average rate of 1.49 percent, the rate used to project growth in based aircraft for the Puget Sound Regional Council (PSRC) in the WSDOT LATS study.

Two market share projections were developed using the Kitsap County FAA-Registered Aircraft forecast model. The first projection assumes that current market share of 53.3 percent (192 Bremerton based aircraft/360 Kitsap County based aircraft) is maintained through the planning period. Based aircraft are projected to increase from 192 in 2012 to 259 in 2032, which represents an average annual growth rate of **1.51 percent.** The second projection assumes that Bremerton's market share will increase from 53 to 57 percent by the end of the planning period. In this projection, based aircraft increase from 192 in 2012 to 276 in 2032, which represents an average annual growth rate of **1.83 percent.**

U.S. ACTIVE GENERAL AVIATION FLEET MARKET SHARE (0.64% AND 1.08% ANNUAL GROWTH)

Bremerton National Airport accounted for approximately 0.086 percent of the U.S. active general aviation fleet in 2012, up from 0.074 percent in 2002. This trend is reflective of both local population growth and the airport's ability to attract new users over time at a rate slightly higher than the national average.

Two market share projections were developed using the U.S. general aviation fleet forecast model. The first projection assumes that current market share of 0.086 percent is maintained through the planning period. Based aircraft are projected to increase from 192 in 2012 to 218 in 2032, which represents an average annual growth rate of **0.64 percent.** The second projection assumes that Bremerton's market share will gradually increase from 0.086 to 0.094 percent by the end of the planning period. This upward movement is comparable to the airport's recent historic trend of growing market share. In this projection, based aircraft increase from 192 in 2012 to 238 in 2032, which represents an average annual growth rate of **1.08 percent.**

Summary

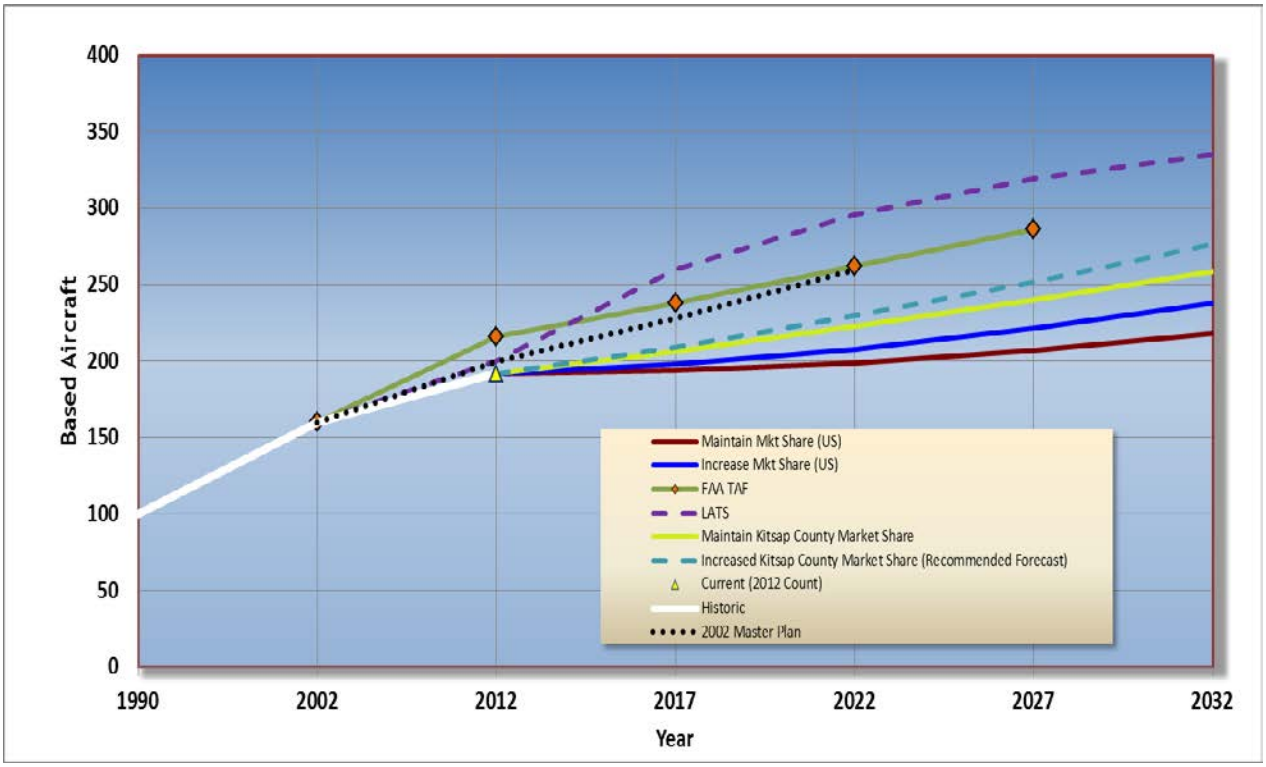
This Kitsap County Increasing Market Share projection is recommended as the preferred based aircraft forecast for use in the airport master plan based on significance of regional growth expectations and the relevance for Bremerton National Airport.

TABLE 3-7: SUMMARY OF BASED AIRCRAFT FORECASTS (BREMERTON NATIONAL AIRPORT)

EXISTING FORECASTS	2007	2012	2017	2022	2027	2030
2002-2022 Airport Master Plan (2.46% AAR 2002-2022)	175	200	228[1]	260	--	--
WSDOT LATS (2.65% AAR 2007-2030)	175	200	228 [1]	260	296	319
FAA Terminal Area Forecast (1.92% AAR 2007-2025)	196	216	238	262	283[1]	--
UPDATED BASED AIRCRAFT FORECASTS		**2012**	**2017**	**2022**	**2027**	**2032**
Kitsap County Market Share (Maintain Current Share)(1.51% AAR 2012-2032)	--	192	206	223	240	259
Kitsap County Market Share (Increasing Share)(1.83% AAR 2012-2032) (Recommended Forecast)	--	**192**	**209**	**230**	**252**	**276**
U.S. Market Share - Maintain % (0.64% AAR 2012-2032)	--	192	194	199	207	218
U.S. Market Share – Increase % (1.08% AAR 2012-2032)	--	192	198	208	221	238

1. Interpolated/Extrapolated to fit forecast year

FIGURE 3-4: BREMERTON NATIONAL AIRPORT - BASED AIRCRAFT FORECASTS



AIRCRAFT OPERATIONS

Updated aircraft operations projections have been developed for comparison with existing forecasts in order to identify a selected forecast for the master plan. The updated operations forecasts utilize the 2012 estimate (54,063) as the base for new projections.

Two methods were selected for use in developing updated operations forecasts:

CONSTANT AND INCREASING OPERATIONS RATIO PROJECTIONS (1.84% AND 2.51% ANNUAL GROWTH)

These projections were developed using an FAA-recommended methodology for estimating airport operations at non-towered general aviation airports. This method was also selected as the preferred forecast in the 2002-2022 Airport Master Plan that yielded a ratio of 309 general aviation operations per based aircraft. For the updated projection, the revised ratio of 282 operations per based aircraft developed to estimate 2012 activity was used as the benchmark from which to move forward. The current ratio reflects recent fuel trends and current flight training activity at the airport.

The **constant ratio projection** maintains the 282 operations per based aircraft ratio through the twenty-year planning period. The projection assumes that current aircraft utilization will remain at current levels

and growth in aircraft operations will be driven primarily by a net increase in based aircraft. The **increasing ratio projection** assumes a gradual increase from 282 to 321 operations per based aircraft through the planning period. The range of operations ratios is consistent with the FAA's current guidance on estimating activity at medium size general aviation airports and is tempered to reflect the FAA's modest long term growth expectations for general aviation activity. This projection reflects the assumption that as the recent economic downturns ease, the airport will be capable of sustaining significantly stronger growth in activity both in terms of growth in based aircraft and increased utilization per aircraft.

The constant ratio projection results in general aviation aircraft operations increasing from 54,063 to 77,848 by 2032, which represents an average annual growth rate of **1.84 percent.** The increasing ratio projection results in general aviation aircraft operations increasing from 54,063 to 88,740 by 2032, which represents an average annual growth rate of **2.51 percent.**

MARKET SHARE U.S. TOWERED AIRPORTS (0.45% AND 2.01% ANNUAL GROWTH)

These projections were developed as a market share projection (general aviation operations) for airports with FAA and contract air traffic control towers. The basis for this projection is that the characteristics of Bremerton National Airport are similar to several towered northwest airports with predominantly general aviation activity. Examples include Tacoma Narrows Airport, Felts Field (Spokane), Olympia Regional Airport, Renton Municipal Airport, Portland Troutdale, Portland-Hillsboro and Aurora State Airport (tower being constructed in 2013).

Two market share projections were developed based on the FAA forecast of general aviation operations at towered airports. This activity segment is forecast to increase from 25.96 to 27.76 million operations between 2011 and 2032.

The **maintain market share projection** assumes that Bremerton National Airport's 2012 market share (0.021) will continue through 2032. The **increasing market share projection** assumes that the current market share will gradually increase from 0.021 to 0.029 percent by 2032.

The maintain ratio projection results in general aviation aircraft operations increasing from 54,063 to 59,113 by 2032, which represents an average annual growth rate of **0.45 percent.** The increase market share projection results in general aviation aircraft operations increasing from 54,063 to 80,520 by 2032, which represents an average annual growth rate of **2.01 percent.**

Summary

The increasing ratio projection is recommended as the preferred aircraft operations forecast for use in the airport master plan based on the expectation that the airport has the competitive elements necessary to resume recent historic levels of aircraft utilization, which is driven in part by local economic strength, access to a large user base, growing business aviation activity and continued levels of fixed wing and helicopter flight training.

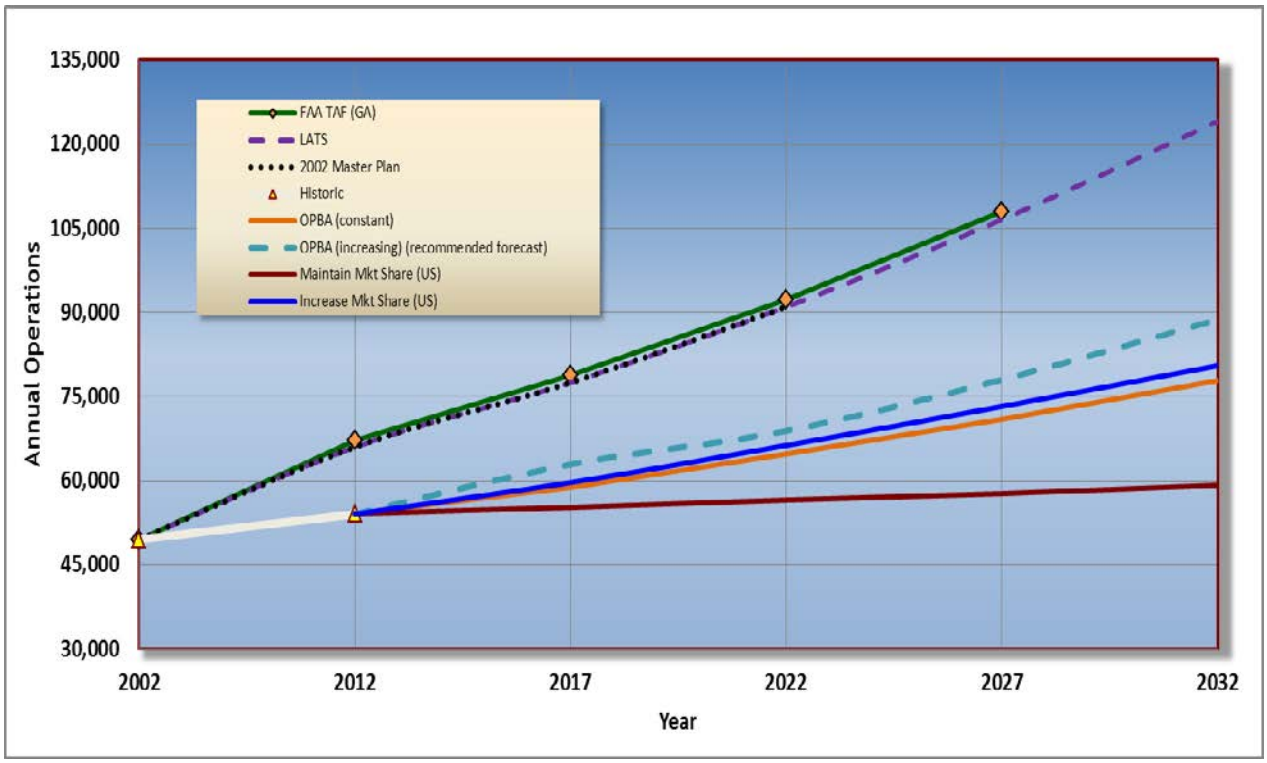
The existing and updated aircraft operations forecasts are summarized in **Table 3-8** and depicted in **Figure 3-5**. It is recognized that the range of updated operations forecasts for the airport are lower than the existing forecasts, due in large part to the impact of economic conditions and the current long-term growth expectations nationally, which have been tempered significantly compared to "pre-recession" forecasts.

TABLE 3-8: SUMMARY OF GENERAL AVIATION OPERATIONS FORECASTS (BREMERTON NATIONAL AIRPORT)

EXISTING FORECASTS	2007	2012	2017	2022	2027	2030
2002-2022 Airport Master Plan (3.09% AAR 2002-2022)	56,000	66,000	77,483[1]	91,000	--	--
WSDOT LATS (3.21% AAR 2007-2030)	56,900	66,900	77,483[1]	91,900	107,460	117,654
FAA Terminal Area Forecast (3.21% AAR 2007-2025)	57,470	67,290	78,790	92,252	108,018[1]	--
UPDATED AIRCRAFT OPERATIONS FORECASTS		**2012**	**2017**	**2022**	**2027**	**2032**
Operations Per Based Aircraft Ratio Constant (1.84% AAR 2012-2032)	--	54,063	58,849	64,740	70,963	77,848
Operations Per Based Aircraft Ratio Increasing (2.51% AAR 2012-2032) (Recommended Forecast)	--	**54,063**	**62,903**	**68,901**	**78,019**	**88,740**
U.S. Market Share - Maintain % (0.45% AAR 2012-2032)	--	54,063	55,236	56,467	57,758	59,113
U.S. Market Share – Increase % (2.01% AAR 2012-2032)	--	54,063	59,672	66,307	73,249	80,520

1. Interpolated based on 2015 and 2025 forecasts.

FIGURE 3-5: BREMERTON NATIONAL AIRPORT GENERAL AVIATION OPERATIONS FORECAST



Local and Itinerant Operations

The FAA TAF and the 2002-2022 master plan forecasts reflect a 60 percent local and 40 percent itinerant traffic distribution for forecast operations. Local operations are conducted in the vicinity of an airport and include flights that begin and end the airport. These include local area flight training, touch and go landings, flightseeing, and other flights that do not involve a landing at another airport. Itinerant operations include flights between airports, including cross country flights.

For forecasting purposes, maintaining a 60%/40% split between local and itinerant operations at Bremerton National Airport appears to be reasonable. Local and itinerant data for each forecast year are summarized in **Table 3-14**.

Design Aircraft

As noted earlier, the selection of design standards for airfield facilities is based upon the characteristics of the aircraft that are expected to use the airport. The **design aircraft** is defined as the most demanding aircraft type operating at the airport with a minimum of 500 annual itinerant operations, as described by the Federal Aviation Administration (FAA):

"Substantial Use Threshold. Federally funded projects require that critical design airplanes have at least 500 or more annual itinerant operations at the airport (landings and takeoffs are considered as separate operations) for an individual airplane or a family grouping of airplanes. Under unusual circumstances, adjustments may be made to the 500 total annual itinerant operations threshold after considering the circumstances of a particular airport. Two examples are airports with demonstrated seasonal traffic variations, or airports situated in isolated or remote areas that have special needs."

The FAA groups aircraft into five categories (A-E) based upon their approach speeds. Aircraft Approach Categories A and B include small propeller aircraft, many small or medium business jet aircraft, and some larger aircraft with approach speeds of less than 121 knots (nautical miles per hour). Categories C, D, and E consist of the remaining business jets as well as larger jet and propeller aircraft generally associated with commercial and military use with approach speeds of 121 knots or more. The FAA also establishes six airplane design groups (I-VI), based on the wingspan and tail height of the aircraft. The categories range from Airplane Design Group (ADG) I, for aircraft with wingspans of less than 49 feet, to ADG VI for the largest commercial and military aircraft.

A list of typical general aviation and business aviation aircraft and their respective design categories is presented in **Table 3-9. Figure 3-6** illustrates representative aircraft in various design groups. The current based business jets at the Airport are identified in bold in the table.

TABLE 3-9: GENERAL AVIATION AIRCRAFT & DESIGN CATEGORIES

AIRCRAFT	AIRCRAFT APPROACH CATEGORY	AIRPLANE DESIGN GROUP	MAXIMUM GROSS TAKEOFF WEIGHT (LBS)
Grumman American Tiger	A	I	2,400
Cessna 182 (Skylane)	A	I	3,100
Cirrus Design SR22	A	I	3,400
Cessna Corvallis TT	A	I	3,600
Cessna 206 (Stationair)	A	I	3,614
Beechcraft Bonanza A36	A	I	3,650
Socata/Aerospatiale TBM 700	A	I	6,579
Beechcraft Baron 58	B	I	5,500
Cessna 340	B	I	5,990
Cessna Citation Mustang	B	I	8,645
Embraer Phenom 100	B	I	10,472
Cessna Citation CJ1+	B	I	10,700

Beech King Air B200	B	I	11,800
Beechcraft 400A/Premier I	B	I	16,100
Piper Malibu (PA-46)	A	II	4,340
Cessna Caravan 675	A	II	8,000
Pilatus PC-12	A	II	10,450
Cessna Citation CJ2+	B	II	12,500
Cessna Citation II	B	II	13,300
Cessna Citation CJ3	B	II	13,870
Beech King Air 350	B	II	15,000
Cessna Citation Bravo	B	II	15,000
Cessna Citation CJ4	B	II	16,950
Embraer Phenom 300	B	II	17,968
Cessna Citation XLS+	B	II	20,200
Cessna Citation VII (Based at PWT)	**B**	**II**	**23,000**
Dassault Falcon 20	B	II	28,660
Dassault Falcon 50 (Based at PWT)	**B**	**II**	**38,800**
Dassault Falcon 900 (based part time at PWT)	**B**	**II**	**45,503**
Bombardier Learjet 55	C	I	21,500
Beechcraft Hawker 800XP	C	II	28,000
Gulfstream 200	C	II	34,450
Cessna Citation X (Based at PWT)	**C**	**II**	**36,100**
Bombardier Challenger 300	C	II	37,500
Gulfstream III	C	II	69,700
Learjet 35A/36A	D	I	18,300
Gulfstream G450	D	II	73,900
Bombardier Global Express 5000	C	III	92,750

Source: AC 150/5300-13, as amended; aircraft manufacturer data.

The combination of airplane design group and aircraft approach speed for the design aircraft creates the Airport Reference Code (ARC), which is used to define applicable airfield design standards. Aircraft with a maximum gross takeoff weight greater than 12,500 pounds are classified as "large aircraft" by the FAA; aircraft 12,500 pounds and less are classified as "small aircraft."

Current and Future Design Aircraft

Based on existing and forecast activity levels, the existing and future design aircraft for Runway 02/20 is a medium size business jet included in Aircraft Approach Category B and Airplane Design Group II (Airport Reference Code: B-II). However, the airport currently accommodates a wide range of local and transient Approach Category C & D aircraft and those numbers are expected to steadily increase during the current planning period, nearing the FAA's substantial use threshold by the end of the planning period. Due to the potential for the number of Approach Category C & D aircraft operations to increase beyond current expectations, in addition to the unique and strategic service area needs identified earlier in the chapter, it is recommended that development reserves and setbacks consistent with Airport Reference Code C-II be maintained for the runway–taxiway system. The reserves would effectively maintain current airfield capabilities and do not represent an upgrade or expansion in facilities. A detailed discussion of design aircraft considerations will be provided in the Facility Requirements chapter.

A-I

12,500 lbs. or less (small)

Beech Baron 55
Beech Bonanza
Cessna 182
Piper Archer
Piper Seneca

B-I

12,500 lbs. or less (small)

Beech Baron 58
Beech King Air 100
Cessna 402
Cessna 421
Piper Navajo
Piper Cheyenne
Cessna Citation I

A-II, B-II

12,500 lbs. or less (small)

Super King Air 200
Cessna 441
DHC Twin Otter
Cessna Caravan
King Air C90

B-II

Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
Jetstream 31
Falcon 20, 50
Falcon 200, 900
Citation II, Bravo XLS+
Citation CJ3

A-III, B-III

Greater than 12,500 lbs.

DHC Dash 7
DHC Dash 8
Q-300, Q-400
DC-3
Convair 580
Fairchild F-27
ATR 72
ATP

C-I, D-I

Lear 25, 35, 55, 60
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
Canadair 600
Canadair Regional Jet
Lockheed JetStar
Citation X
Citation Sovereign
Hawker 800 XP

C-III, D-III

Boeing Business Jet
B 727-200
B 737-300 Series
MD-80, DC-9
Fokker 70, 100
A319, A320
Gulfstream V
Global Express

C-IV, D-IV

B-757
B-767
DC - 8-70
DC - 10
MD - 11
L 1011

D-V

B - 747 Series
B - 777

Air Taxi and Military Operations

Air taxi activity includes operations regulated by the FAA under FAR Part 135, including on-demand passenger service (charter and fractional), small parcel transport (cargo), and air ambulance activity. The FAA surveys general aviation and air taxi activity on an annual basis. The information obtained from the survey enables the FAA to monitor the general aviation fleet so that it can:

- Track trends within the industry;
- Anticipate demand for national airspace facilities and services;
- Evaluate the impact of safety initiatives and regulatory changes;
- Improve accuracy of measures of safety in general aviation.

The data collected are also used by other government agencies, the general aviation industry, trade associations, and private businesses to pinpoint safety problems and to form the basis for critical research and analysis of general aviation issues. This data is consolidated in the annual FAA Aerospace Forecasts. The FAA forecasts air taxi operations to increase at an annual growth rate of 1.5 percent between 2011 and 2032.

Air taxi activity at Bremerton National Airport currently includes daily package express flights, charter and fractional on-demand passenger service, and occasional air ambulance flights. For 2012, air taxi operations are estimated at 625 operations, which is approximately 1.2 percent of total general aviation (GA) operations. The current level of air taxi operations provides a reasonable baseline for developing future projections, with activity expected to remain at about 1 percent of GA operations during the planning period. The current level of small package express flights (1 flight per day/5 days per week) is expected to remain steady during the planning period and on-demand passenger service is expected to increase in response to increased demand and increasingly longer surface travel times to the nearest commercial service airport (SEATAC). Air taxi operations at Bremerton National Airport are projected to remain at approximately 1 percent of general aviation operations through the current planning period.

Military operations at Bremerton National Airport consists primarily of business class aircraft used for personnel transport to local facilities, occasional larger transport aircraft such as the C130 Hercules, and helicopter training flights from Joint Base Lewis-McChord (JBLM). Previous estimates of 900 annual military operations appear to be reasonable when fixed wing and rotor activity is combined. The 2002-2022 Airport Master Plan concluded that regular use of the airport by C130 and C-9 (DC9) large military transports would resume once the runway integrity issues that existed at the time were resolved. Airport management reports that this activity has since been accommodated at JBLM due in part to significant upgrades in their airfield facilities.

Operational Peaks

It is estimated that peak month activity at Bremerton National Airport occurs during the summer (typically July or August) and accounts for approximately 10 percent of annual aircraft operations. This level of peaking is consistent with the mix of airport traffic and is expected to remain relatively unchanged during the planning period. Peak day operations are defined by the average day in the peak month (design day) and the busy day in the typical week during peak month (busy day); the peak hour within the design day represents the design hour. The design day is calculated by dividing peak month operations by 30. The busy day is estimated to be 25 percent higher than the average day in the peak month (design day x 1.25). The design hour operations are estimated to equal 15 percent of design day operations. Operational peaks for each of the forecast years are summarized in **Table 3-10**.

TABLE 3-10: PEAK GENERAL AVIATION OPERATIONS FORECAST

ACTIVITY	2012	2017	2022	2027	2032
Annual Operations	54,063	62,903	68,901	78,019	88,740
Peak Month Operations (10%)	5,400	6,290	6,890	7,800	8,870
Design Day (average day in peak month)	180	210	230	260	296
Busy Day	225	262	288	325	370
Design Hour Operations (assumed 15% of design day)	27	32	35	39	44

Instrument Flight Activity

Flight activity data for aircraft operating under instrument flight rules in the national airspace system is tracked by FlightAware, a company that developed live flight tracking services for commercial and general aviation. Instrument flight plan data for calendar years 2006 and 2012 (see **Table 3-11**) were acquired to help gauge both instrument activity and to provide verification of business class aircraft operating (commonly operating under IFR flight plans) at Bremerton National Airport. The data captures all civil aircraft filing instrument flight plans listing Bremerton National Airport either as the originating airport or the destination airport. Military aircraft are not included in the FAA instrument flight plan data. The 2006 data was selected to represent a typical "pre-recession" level of activity and the 2012 data represents current activity, which appears to reflect the depressed market levels associated with the current slow recovery. It is noted that 2012 activity was 12% lower than 2006 despite having new locally based business jets currently generating approximately 220 annual operations. This suggests that transient business activity will continue to increase as economic conditions improve. In addition, a fourth business jet (Falcon 900) will operate at the airport on a part time basis beginning in 2013 once planned hangar construction is completed. Based on current traffic estimates, instrument operations currently appear to

account for about 5 percent of overall operations. The level of instrument approaches (in actual instrument weather conditions) appears to be approximately 4 percent of total itinerant landings.

TABLE 3-11: INSTRUMENT OPERATIONS - BREMERTON NATIONAL AIRPORT (2006/2012)

ARC	Representative Aircraft	2006	2012
A-I	Cessna 182/Beechcraft Baron 55/TBM700	1,896	1,409
B-I	Beechcraft Baron 58/Beechcraft King Air 90/Cessna Citation ISP	212	222
A-II	Cessna Caravan/Pilatus PC12	209	481
B-II	Cessna Citation Bravo/Beechcraft King Air 200/Falcon 50	158	161
C-I	Hawker HS125, Learjet 31	56	17
C-II	Bombardier Challenger	13	15
D-I	Learjet 35	9	10
D-II	Gulfstream IV, V	10	10
C-III	Bombardier Global Express	0	4
A-III	DC-3	1	0
--	Blocked (assumed to be 70% B-I/B-II Jet and 30% C-I/D-I/D-II Jet)	97	112
--	Helicopter	138	18
	Total Instrument Operations	**2,779**	**2,459**

Source: FlightAware

Aircraft Fleet Mix

BASED AIRCRAFT

The airport's current mix of based aircraft is projected to become more diverse during the current planning period reflecting growth in turbine aircraft (turboprop, very light jet, business jet), helicopters and light sport aircraft. The projected changes in the based aircraft fleet mix at Bremerton National Airport are generally consistent with broader trends identified by FAA regarding the composition of the general aviation fleet as a whole. The forecast based aircraft fleet mix is summarized in **Table 3-12**.

Figures 3-7 and 3-8 depict the current (2012) and long term (2032) distribution of based aircraft by type, which is predominantly single-engine piston, followed by multi-engine piston, helicopter, business jet, and ultralight.

FIGURE 3-7: BREMERTON NATIONAL AIRPORT - BASED AIRCRAFT FLEET MIX (OCTOBER 2012)

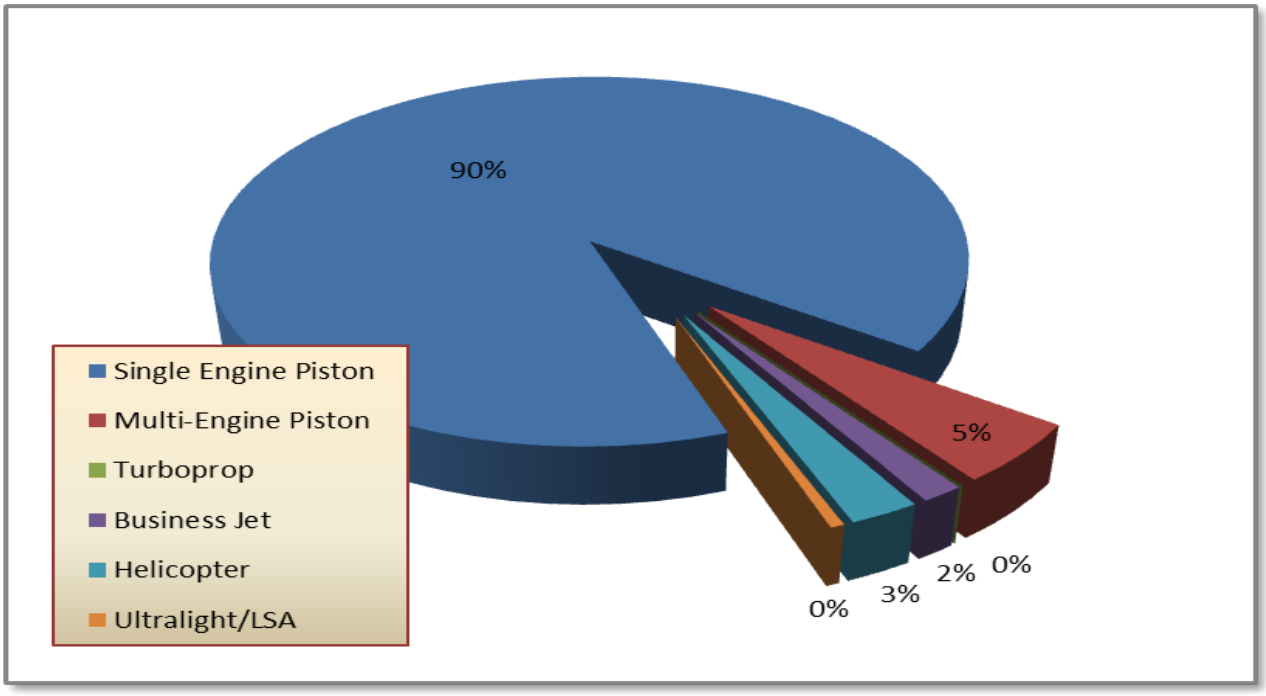


FIGURE 3-8: BREMERTON NATIONAL AIRPORT – FORECAST BASED AIRCRAFT FLEET MIX (2032)

TABLE 3-12: GENERAL AVIATION FORECAST BASED AIRCRAFT FLEET MIX

Activity	2012	2017	2022	2027	2032
Single Engine Piston	173 (90%)	182 (87%)	193 (84%)	204 (81%)	215 (78%)
Multi-Engine Piston	10 (5%)	12 (6%)	13 (6%)	15 (6%)	16 (6%)
Turboprop	0 (0%)	2 (1%)	4 (2%)	5 (2%)	8 (3%)
Business Jet/VLJ	3 (<3%)	4 (2%)	5 (2%)	6 (2%)	8 (3%)
Light Sport Aircraft/Ultralights	1 (<1%)	3 (<2%)	7 (3%)	12 (5%)	17 (6%)
Helicopter	5 (<2%)	6 (3%)	8 (3%)	10 (4%)	12 (4%)
Total Based Aircraft (100%)	**192**	**209**	**230**	**252**	**276**

Note: Percentages may not sum due to independent rounding

AIRCRAFT OPERATIONS

The current aircraft operations fleet mix is estimated to closely follow the airport's based aircraft composition, with new turbine aircraft and helicopter operations that will complement the airport's established base of single-engine and multi-engine piston aircraft. Currently, single and multi-engine piston aircraft account for approximately 82 percent of airport operations followed by helicopter operations (primarily flight training) (15 percent) and fixed wing turbine aircraft (turboprop and business jet) (2+ percent). Although single engine piston aircraft will continue to generate the majority of aircraft operations at Bremerton National Airport through the planning period, their portion of overall traffic is expected to gradually decline as other aircraft types become more common. The general aviation forecast aircraft operations fleet mix is summarized in **Table 3-13**. Air taxi and military operations forecasts are summarized in Table 3-14.

TABLE 3-13: GENERAL AVIATION FORECAST AIRCRAFT OPERATIONS FLEET MIX

Aircraft Type	2012	%	2017	%	2022	%	2027	%	2032	%
Single Engine Piston	43,991	81.4	50,780	81	54,556	79	61,479	79	68,570	77
Multi Engine Piston	540	1	630	1	690	1	780	1	890	1
Turboprop	713	1.3	850	1.4	960	1.4	1,070	1.4	1,200	1.4
Jet	602	1.1	753	1.2	865	1.3	1,020	1.3	1,180	1.3
Helicopter	8,217	15.2	9,890	15.7	11,830	17.2	13,670	17.5	16,900	19
Total Operations (100%)	**54,063**	**100**	**62,903**	**100**	**68,901**	**100**	**78,019**	**100**	**88,740**	**100**

Note: Percentages may not sum due to independent rounding

Forecast Summary

The recommended based aircraft forecast for Bremerton National Airport is the **Kitsap County Increasing Market Share** projection, based on the airport's ability to build on its role as the only FAA-funded airport in Kitsap County and continue to represent the majority of FAA-registered aircraft in Kitsap County. The **Increasing Activity Ratio Projection** (operations per based aircraft) is recommended as the preferred aircraft operations forecast based on the expectation that the airport has the competitive elements necessary to return to recent historic levels of aircraft utilization.

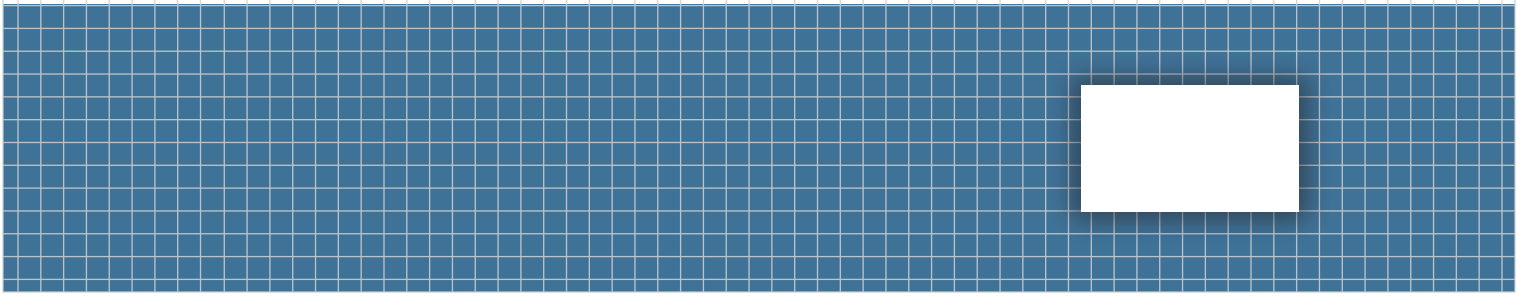
The recommended based aircraft forecast reflects an average annual growth rate of **1.83 percent**. The recommended forecast for aircraft operations applies a gradual increase in based aircraft to operations ratio of 282 to 321 over the 20-year planning period. The recommended aircraft operations forecast reflects an average annual growth rate of **2.51 percent**. The preferred forecasts are summarized in additional detail in **Table 3-14.**

As with any long term facility demand forecast, it is recommended that long term development reserves be protected to accommodate demand that may exceed current projections. For planning purposes, a reserve capable of accommodating a doubling of the 20-year preferred forecast demand should be adequate to accommodate unforeseen facility needs during the current planning period. However, should demand significantly deviate from the airport's recent historical trend, updated forecasts should be prepared to ensure that adequate facility planning is maintained.

TABLE 3-14: FORECAST SUMMARY

Itinerant Operations					
General Aviation	21,625	25,161	27,560	31,208	35,496
Air Taxi	625	689	737	796	863
Military	900	900	900	900	900
Total Itinerant Operations	**23,150**	**26,750**	**29,197**	**32,904**	**37,259**
Local Operations (all GA)	32,438	37,742	41,341	46,811	53,244
Total Local & Itinerant Operations	**55,588**	**64,492**	**70,538**	**79,715**	**90,503**
Based Aircraft	**192**	**209**	**230**	**252**	**276**
Operations Per Based Aircraft (GA)	**282**	**301**	**300**	**310**	**321**
Design Family Aircraft Operations					
B-I Jet	94	120	150	170	200
B-II Jet	326	400	450	520	570
C-I Jet	34	50	70	90	120
C-II Jet	100	114	120	140	160
D-I Jet	20	30	34	44	56
D-II Jet	22	30	33	44	56
C-III Jet	6	9	8	12	18
Total All Jet Operations	**602**	**753**	**865**	**1,020**	**1,180**

Chapter 4 – Demand-Capacity & Facility Requirements Analyses



Chapter 4 – Airport Facility Requirements

Introduction

The evaluation of airport facility requirements uses the results of the inventory and forecasts contained in Chapters Two and Three, as well as established planning criteria, to determine the future facility needs for Bremerton National Airport through the current twenty year planning period. **Airside** facilities include runways, taxiways, navigational aids and lighting systems. **Landside** facilities include hangars, fixed base operator (FBO) facilities, aircraft parking apron, aircraft fueling, surface access and automobile parking, utilities, and other related items. All airfield items are evaluated based on established standards from the Federal Aviation Administration (FAA).

The facility requirements evaluation is used to identify the adequacy or inadequacy of existing airport facilities and identify what new facilities may be needed during the planning period based on forecast demand. Potential options and preliminary costs for providing these facilities will be evaluated in the Airport Development Alternatives (Chapter Five), to determine the most cost effective and efficient means for meeting projected facility needs.

Organization of Materials

This chapter evaluates facility requirements from two perspectives: (1) conformance of existing facilities with Federal Aviation Administration (FAA) airport design and airspace planning standards; and (2) new demand based facility needs that reflect the updated aviation activity forecasts presented in Chapter Three.

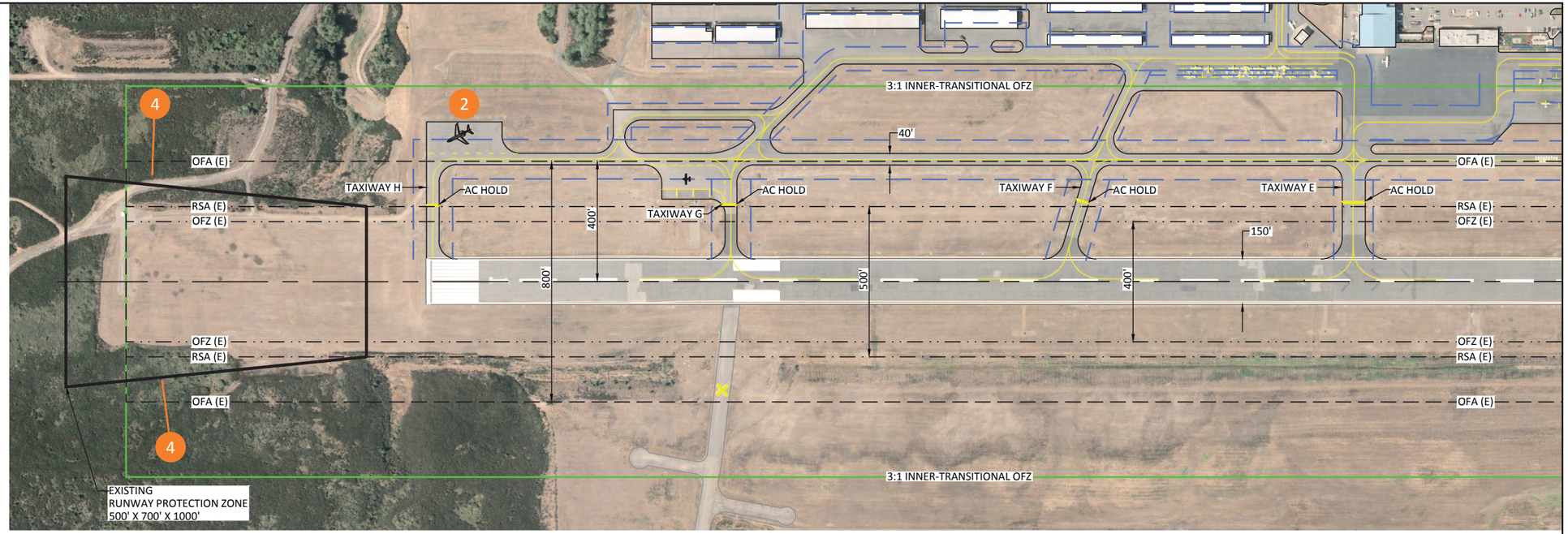
The evaluation of current and future conformance with FAA airport design standards and airspace planning criteria will be reflected on the updated FAA approved Airport Layout Plan. The evaluation of demand driven items will reflect in gross numbers, new facility needs such as runway length requirements, hangar spaces and aircraft parking positions based on forecast demand and the needs of the design aircraft. Items such as lighting and navigational aids are evaluated based on the type of airport activity, airport classification and capabilities.

The updated inventory of existing facilities presented in Chapter Two, is used to evaluate conformance with FAA standards. **Figures 4-1, 4-2, and 4-3** illustrate the location of the non-conforming items identified for the airport design standards described in this chapter. **Figure 4-1** depicts the runway-taxiway system and the runway protection zones at each runway end. **Figure 4-2** depicts the north section of the west landside area. **Figure 4-3** depicts the south section of the west landside area.

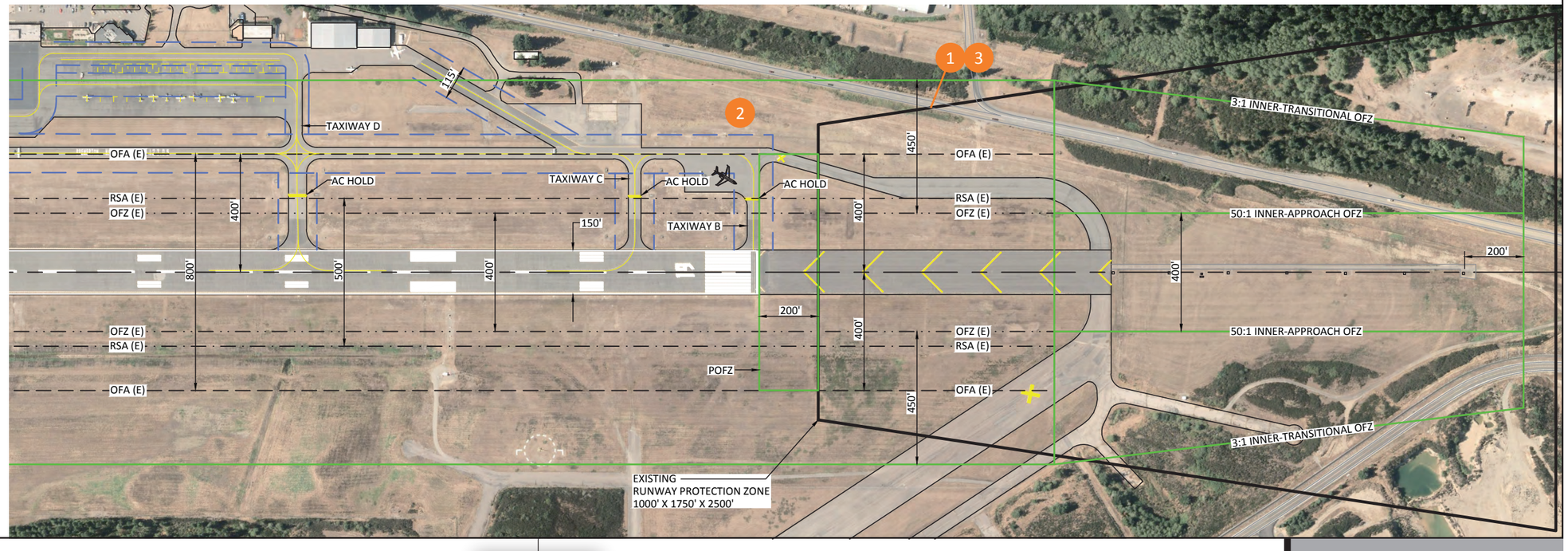
The most common nonstandard items identified in this evaluation are aircraft (wingtip) obstruction clearances for taxilanes located in hangar areas and in the terminal apron area. Although the clearances vary, most aircraft movements occur without incident. However, as facilities are updated or replaced (aircraft parking or hangars), new facilities should be designed to conform to appropriate design standards. The runway and west parallel taxiway meet, or exceed all applicable FAA design standards. Detailed definitions of the standards and their application at the Airport are provided throughout the chapter. The reader is encouraged to consult the Glossary of Aviation Terms provided previously to clarify technical information.

1. RPZ - ROAD
2. TAXIWAY OFA (AC HOLD)
3. RUNWAY APPROACH SURFACE PENETRATION IDENTIFIED (11 FEET) ON 2006 INNER APPROACH SURFACE DRAWING.
4. RUNWAY OFA (TERRAIN, VEGETATION) (TO BE VERIFIED)

TAXILANE/TAXIWAY OBJECT FREE AREA



Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.



1 TAXILANE OFA (BUSHES)

2 TAXILANE OFA (PARKED AC)

TAXILANE/TAXIWAY OBJECT FREE AREA

SW IMPERIAL WAY

STATE HIGHWAY 3

STATE HIGHWAY 3

AIRCRAFT PARKING AREA

TAXILANES NOT DEFINED

APRON

115'

79'

79'

79'

115'

115'

126'

38'

OFA (E)

131'

TAXIWAY A

BREMERTON NATIONAL

12305

TAXIWAY OBJECT FREE AREA

TAXIWAY A

131'

OFA (E)

AC HOLD

TAXIWAY D

AC HOLD

TAXIWAY C

RSA (E)

131'

RSA (E)

131'

OFZ (E)

OFZ (E)

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

WEST LANDSIDE (NORTH AREA) CONFORMANCE | **FIG. 4-2**

CENTURY WEST ENGINEERING CORPORATION

NOTE:
FOR HANGAR DOOR SIZES (<45') TAXILANE OFA CLEARANCE BASED ON ALT. FAA FORMULA (1.2 X AC WINGSPAN + 20 FEET) PROVIDES AN ACCEPTABLE LEVEL OF SAFETY FOR 72' + SPACING.

1 TAXILANE OFA (HANGARS)
2 TAXILANE OFA (PARKED AC)
3 TAXIWAY OFA (AIRCRAFT HOLD)
4 TAXILANE OFA (PARKED VEHICLES) *

TAXILANE/TAXIWAY OBJECT FREE AREA

* PARKED VEHICLES OBSERVED IN VARIOUS HANGAR ROWS.

STATE HIGHWAY 3

TAXILANE OBJECT FREE AREA

TAXIWAY G

TAXIWAY F

TAXIWAY E

TAXIWAY A

OFA (E)

RSA (E)

OFZ (E)

AC HOLD

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

WEST LANDSIDE (SOUTH AREA) CONFORMANCE | **FIG. 4-3**

PORT OF Bremerton Washington

CENTURY WEST ENGINEERING CORPORATION

2004 Airport Master Plan Overview

The 2004[1] Bremerton National Airport Master Plan provided recommendations for airport facility improvements for a twenty-year planning period that extended to 2022. As noted in the Inventory Chapter, the south runway and parallel taxiway extension coupled with the elimination of the Runway 20 displaced threshold (runway shift), various lighting and drainage upgrades, the first phase of the SKIA connector road, and continued hangar development in the west landside area represent significant facility upgrades that were key elements in the previous planning for the airport.

The projects summarized in **Table 4-1** were included in the twenty year capital improvement program (CIP) for the 2004 Airport Master Plan. The projects that have been completed are noted in the table. The previously recommended improvements which have not been implemented will be revalidated, modified or eliminated based on the updated assessment of facility needs, current FAA guidelines and the elements of the Airport Master Plan preferred development alternative. Note: The runway was renumbered 2/20 in 2013 based on a change in magnetic declination.

TABLE 4-1: 2004 AIRPORT MASTER PLAN RECOMMENDED PROJECTS AND CURRENT STATUS

COMPLETED? YES/NO	PROJECTS
	Short Term (2004-2008)
Yes	Construct Runway 2-20/Taxiway A Shift
Yes	Add REILS and PAPI to Runway 1
Yes	Establish ROW for East Side Access
No	Environmental – Apron and Taxiway F Drainage *(taxiway design project to be completed in 2013)*
Yes	Upgrade PAPI-2 to PAPI-4 on Runway 20
No	Expand Aircraft Parking Apron (West Side) *(tiedown located opposite aircraft fueling area and T-hangars)*
No	Realign Taxiway F/Remove Old Pavement *(taxiway design project to be completed in 2013)*
Yes	Update Airport Layout Plan Drawings
Yes	Runway 2-20 Drainage Improvements
No	Pavement Removal
Yes	Equipment Replacement
	Intermediate Term (2009-2013)
Yes*	Environmental – Road and Hangar Development *(*environmental completed for SKIA connector road, but not for proposed east side hangar development)*
Yes	Construct Public Road (Phase 1) to East Side
No	Extend Utilities to East Side Hangar Area

1 Final Airport Master Plan Adopted in July 2004; the defined master plan planning period is 2002-2022.

No	Extend Taxiway B to East Side
No	Hangar Site Preparation *(east side)*
No	Hangar Construction *(east side)*
No	Construct Airport Perimeter Road to East Side
Yes	Rehabilitation (Overlay) Runway 02-20
No	Expand Aircraft Parking Apron (West Side)
No	Hangar Site Preparation
No	Hangar Construction *(east side)*
No	Upgrade MALSR on Runway 20
No	Add LAAS for GPS Approaches
Yes	Update Airport Master Plan
No	Pavement Removal
No	Airfield Pavement Rehabilitation
No	Equipment Replacement
	Long Term (2014-2023)
No	Complete East Side Access Road (Phase 2)
No	Expand General Aviation Terminal Building
No	Terminal Parking Expansion Vehicles
No	Remove Old Airfield Pavements
No	Grade West Side for Parallel Runway/Taxiway
No	Extend Taxiways D and F to East Side
No	Construct Parallel Taxiway on East Side
No	Hangar Site Preparation
No	Hangar Construction
No	Expand Aircraft Parking Apron
No	Update Airport Master Plan
No	Airfield Pavement Rehabilitation
No	Equipment Replacement

In addition to the master plan recommended items noted above, several other projects have been completed since 2004 including construction of several corporate and smaller storage hangars and the installation of the ADS-B transmitter.

FUTURE PARALLEL RUNWAY

The 2004 Airport Master Plan recommended adding a second runway to accommodate future flight training activity. The current Airport Layout Plan (last revised in 2006) depicts a future 2,400-foot parallel runway 700 feet west of Runway 02/20. Planning for the runway was based on small aircraft and its length would limit use to primarily small single engine aircraft. It appears that the second runway was added as a placeholder and other facilities on the east side of Runway 02/20 (taxiways, hangars, etc.) were planned to be compatible. Although a site grading project for the second runway was included in the 2014-2023 period of master plan's 20-year CIP, no projects were included for actual runway construction in the CIP.

Based on the updated aviation activity forecasts presented in Chapter Three, air traffic demand projected over the next twenty years is expected to remain below the current capacity provided by Runway 02/20. Normally, planning for a second runway is initiated when projected demand is expected to reach 60 percent of annual capacity, which is not anticipated in the current twenty-year planning period (see Airfield Capacity section at the end of this chapter). Based on an updated demand-capacity analysis, a second runway will not be required during the current planning period. However, the previous master plan recommendation should be discussed to determine if benefits other than additional capacity justify continuing to include a future second runway in long-term planning.

It is important to note that FAA funding for second runways is limited to airports with significant capacity needs or the need for noise abatement (when new runways are used to redirect aircraft arrival and departure routes away from noise sensitive areas). Neither of these scenarios appear to be consistent with future planning requirements at Bremerton National Airport. The ability to locally fund the initial construction cost and the life cycle costs for a new runway is an important element in the discussion.

Another practical consideration for maintaining a second runway in long term planning is the impact on near term planning and development of landside facilities (hangars, aircraft parking, etc.). As previously planned, the second runway and its protected areas require approximately 50 acres of prime developable land and the lateral clearances for the second runway pushes future landside facilities further east into rising terrain.

Design Aircraft

As indicated in Chapter Three (Aviation Activity Forecast), the current and future design aircraft identified for Bremerton National Airport is medium size business jet, included in **Aircraft Approach Category B** and **Airplane Design Group II (Airport Reference Code - ARC: B-II)**. The design aircraft represents the most demanding aircraft using the airport on a regular basis that meets the FAA's substantial use threshold (minimum of 500 annual itinerant operations). A variety of medium business jets and larger multi-engine turboprops are included in ARC B-II, including two of the three locally-based

business jets (Cessna Citation VII and Dassualt Falcon 50); the third jet (Cessna Citation X) is included in ARC C-II. **Figure 3-6** (see Chapter 3, Page 29) depicts common aircraft for each ARC.

Bremerton National Airport also accommodates regular Approach Category C or D aircraft activity (Airplane Design Groups I and II), although activity is projected to remain below the required 500 annual operations during the current planning period. However, historic activity, the current mix of locally-based business jets, and forecast growth in jet activity suggest that this segment of business aviation activity has the potential to increase beyond current projections. Based on these factors, it would be prudent to protect the runway's ability to accommodate this activity in the future by establishing long-term development reserves based on ARC C-II/D-II design standards.

The 2004 Airport Master Plan identified B-II as the existing Airport Reference Code (ARC) for Runway 02/20, but forecast sufficient large military fixed wing transport activity to justify a future upgrade to ARC C-III However, as described in Chapter Three, airport management indicates that upgrades in facilities at Joint-Base Lewis McChord eliminated the need to operate large military transport aircraft at Bremerton National Airport on a regular basis and the projected levels of military transport activity have not occurred. As a result, the previous recommendation (future ARC C-III) is no longer supported by updated aviation activity forecasts and is not valid for use in the master plan. However, the existing ½-mile instrument approach visibility minimums for Runway 02/20 require the same dimensional standards for several runway protected areas (runway safety area, object free area, obstacle free zone, etc.) for ARC C/D-II and C-III. As a result, maintaining development reserves based on ARC C/D-II preserves most of the clearances previously defined by future ARC C-III.

Airport Design Standards

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13A, Airport Design, serves as the primary reference in planning airfield facilities. Federal Air Regulation (FAR) Part 77.25, Objects Affecting Navigable Airspace, defines airport imaginary surfaces which are established to protect the airspace immediately surrounding a runway. The airspace and ground areas surrounding a runway should be free of obstructions (i.e., structures, parked aircraft, trees, etc.) to the greatest extent possible to provide a safe operating environment for aircraft. FAA Order 8260.3B - United States Standard for Terminal Instrument Procedures (TERPS) defines protected airspace surfaces associated with instrument approaches and departures.

A comparison of existing conditions for Runway 02/20 and the B-II and C/D-II design standards are summarized in **Table 4-2**. A summary of Bremerton National Airport's current conformance with these various standards is presented in **Table 4-3**. Detailed narrative descriptions of design standards are presented in the following sections of the chapter.

TABLE 4-2: AIRPORT DESIGN STANDARDS SUMMARY (DIMENSIONS IN FEET)

FAA STANDARD	RUNWAY 02/20 *EXISTING CONDITIONS*[1]	AIRPLANE DESIGN GROUP II[2] *A&B AIRCRAFT APPROACH VISIBILITY < ¾ MILE*	AIRPLANE DESIGN GROUP II[2] *C&D AIRCRAFT APPROACH VISIBILITY < ¾ MILE*
Runway Length	6,000	5,310/6,740 [7]	5,310/6,740 [7]
Runway Width	150	100	100
Runway Shoulder Width	10	10	10
Runway Safety Area • Width • Beyond Rwy End • Prior to Landing Threshold)	 500 1,000 600	 300 600 600	 500 600 1,000
Obstacle Free Zone • Width • Beyond Rwy End • Prior to Landing Threshold)	 400 200 200	 400 200 200	 400 200 200
Object Free Area • Width • Beyond Rwy End • Prior to Landing Threshold	 800 1,000 600	 800 1,000 600	 800 1,000 600
Primary Surface Width	1,000	1,000	1,000
Primary Surface Length (Beyond Rwy End)	200	200	200
Runway Protection Zone Length	2,500 (Rwy 19) 1,000 (Rwy 01)	2,500 (Rwy 19) 1,000/1,700 (Rwy 01) [10]	2,500 (Rwy 19) 1,000/1,700 (Rwy 01) [10]
Runway Protection Zone Inner Width	1,000 (Rwy 19) 500 (Rwy 01)	1,000 (Rwy 19) 500 (Rwy 01)	1,000 (Rwy 19) 500 (Rwy 01)
Runway Protection Zone Outer Width	1,750 (Rwy 19) 700 (Rwy 01)	1,750 (Rwy 19) 700/1,510 (Rwy 01) [10]	1,750 (Rwy 19) 700/1,510 (Rwy 01) [10]
Runway Centerline to: Parallel Taxiway/Taxilane Centerline Aircraft Parking Line (APL) Building Restriction Line (BRL)	 400 559 [3] 790 [4]	 300 556 [8] 626/745 [9]	 400 556 [8] 626/745 [9]
Taxiway Width	40	35	35
Taxiway Shoulder Width	10	10	10
Taxiway Safety Area Width	79	79	79
Taxiway Object Free Area Width	131	131	131
Taxiway Centerline to Fixed/Movable Object	65.5 Except for AC Hold Areas[5]	65.5	65.5
Taxilane OFA Width (ADG I/II)	< 79 [6] / 115	79/115	79/115
Taxilane CL to Fixed/Movable Object (ADG I/II)	< 39.5 [6] / 57.5	39.5/57.5	39.5/57.5

Table 4-2 Notes:

1. Airfield dimensions as depicted on 2006 Airport Layout Plan (ALP).
2. Based on Other than Utility precision instrument runway (Per FAR Part 77). Runway Protection Zone dimensions based on approach visibility minimums lower than ¾-mile for all aircraft (Rwy 19) and not lower than 1-mile (Rwy 01 Existing)/as low as ¾-mile (Rwy 01 Future) (Per AC 150/5300-13A) based on 2006 ALP.
3. Nearest aircraft parking (Main Apron) is located approximately 575 feet west of runway centerline.
4. No existing BRL depicted on the 2006 ALP drawing. The nearest structure on the west side of the runway (U.S. Navy/CAP building) is approximately 710 feet from runway centerline. All other structures located at least 780 feet from runway centerline.
5. Parallel taxiway centerline to adjacent aircraft hold areas at runway ends (portion of holding aircraft may be located within Taxiway OFA).
6. Apron and hangar taxilane clearances with hangars and parked aircraft vary (See figure 4-2 and 4-3)..
7. Per FAA Runway Length Model: Runway lengths required to accommodate 75 percent of large airplanes (60,000 pounds or less) at 60 and 90 percent useful load at Bremerton National Airport. 75.3 degrees F, 3-foot change in runway centerline elevation.
8. Distance required to accommodate an 8-foot aircraft tail height without penetrating the 7:1 Transitional Surface extending from a 1,000-foot wide Primary Surface (precision instrument approach). This distance also clears the existing parallel taxiway OFA and the runway OFA. Setbacks for larger aircraft types (i.e., large business jets, etc.) would be based on tail height clearance of Transitional Surface slope. For example, a Gulfstream 650 (25.7-foot tail height) would require a 680-foot parking separation from the runway centerline, which is approximately 100 feet in front of the Avian Flight Center and Terminal buildings.
9. Distances required to accommodate 18-foot and 35-foot structures (typical T-Hangar and large conventional hangar roof heights) without penetrating the 7:1 Transitional Surface extending from a 1,000-foot wide Primary Surface (precision instrument approach) when ground elevation is the same for the runway and building. Setbacks for larger hangars or for hangars constructed in areas with terrain elevated above runway elevation would depend on roof elevation and actual clearance of Transitional Surface slope.
10. Existing Runway 02 RPZ based on approach visibilities of 1 mile/ Future Runway 02 RPZ based on approach visibilities not lower than 3/4-mile per 2006 ALP drawing,

All of the locally-based business jets and the majority of transient business jets operating at the Airport are classified as "large" general aviation airplanes based on their maximum takeoff weights above 12,500 pounds. The use of standards consistent with "large aircraft" and "other than utility" runways, as defined in FAR Part 77, is appropriate for Runway 02/20.

TABLE 4-3: BREMERTON NATIONAL AIRPORT CURRENT CONFORMANCE WITH FAA DESIGN STANDARDS

ITEM	AIRPLANE DESIGN GROUP II *A&B AIRCRAFT* *APPROACH VISIBILITY < ¾ MILE*	AIRPLANE DESIGN GROUP II *C&D AIRCRAFT* *APPROACH VISIBILITY < ¾ MILE*
Runway Safety Area	Yes	Yes[4]
Runway Object Free Area	Yes	Yes[4]
Runway Obstacle Free Zone	Yes	Yes
Taxiway Safety Area	Partial[1]	Partial[1]
Taxiway Object Free Area	Yes	Yes
Taxilane Object Free Area	No[2]	No[2]

Building Restriction Lines	Yes (west)	Yes (west)
	Yes (east)	Yes (east)
Aircraft Parking Lines	Yes	Yes
Runway Protection Zones	No[3]	No[3]
Runway - Parallel Taxiway Separation	Yes (E)	Yes
Runway Width	Yes (E)	Yes (E)
Runway Length	Yes	Yes
Taxiway Width	Yes (E)	Yes (E)

Table 4-3 Notes:

(E) Indicates facility dimension currently exceeds standard

1. Parallel Taxiway OFA is free of obstructions except where aircraft located in holding areas at both ends of the runway may partially penetrate OFA. The amount of penetration depends on size of aircraft.
2. Several existing taxilanes within aircraft parking aprons and hangar areas have less than 79 feet of unobstructed OFA; parked vehicles located in taxilanes adjacent to hangar rows create obstructions in taxilane OFA.
3. State Highway 3 is located within the existing Runway 20 RPZ. Portion of Runway 20 RPZ extends beyond airport property (Avigation Easements acquired). ARC C/D-II RSA for existing 6,000-foot runway can be accommodated within existing airport property, although some grading and compaction would be required.
4. ARC C/D-II OFA and RSA for existing 6,000-foot runway can be accommodated within existing airport property.

Airport Planning & Design Standards Note:

The following FAA standards are recommended for use in evaluating Runway 02/20 and its taxiway system:

***Runway 02/20 (Existing/Future)** – Airport Reference Code (ARC) B-II. Runway design standards for aircraft approach category A & B runways with **lower than 3/4-statute mile** approach visibility minimums.*

*Existing and Future Runway Protection Zone (RPZ) for Runway 20 based on **lower than 3/4-mile approach visibility minimums**. Existing RPZ for Runway 02 based on **not lower than 1-mile approach visibility**. Future RPZ for Runway 02 based on approach visibility standard **not lower than 3/4-mile**.*

FAR Part 77 airspace planning criteria based on "other than utility runways" with precision instrument approach (Rwy 19) and nonprecision instrument approach (Rwy 01) with visibility minimums as low as 3/4-statute mile.

***Runway 02/20 (Reserve)** – Airport Reference Code (ARC) C/D-II. Runway design standards for aircraft approach category C & D runways with **lower than 3/4-statute mile** approach visibility minimums. No change in future RPZs for Runway 02 and 19. No change in FAR Part 77 airspace planning criteria.*

All references to the "standards" are based on these assumptions, unless otherwise noted (Per FAA Advisory Circular 150/5300-13A and FAR Part 77.25)

RUNWAY SAFETY AREA (RSA)

The FAA defines runway safety area (RSA) as "A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." Runway safety areas are most commonly used by aircraft that inadvertently leave the runway environment during landing or takeoff.

By FAA design standard, the runway safety area "shall be:

(1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;

(2) drained by grading or storm sewers to prevent water accumulation;

(3) capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and

(4) free of objects, except for objects that need to be located in the runway safety area because of their function. Objects higher than 3 inches above grade should be constructed on low impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches. Other objects such as manholes, should be constructed at grade. In no case should their height exceed 3 inches."

The recommended transverse grade for the RSA located along the sides of a runway ranges between 1½ and 5 percent from runway shoulder edges. The recommended longitudinal grade for the first 200 feet of RSA beyond the runway end is 0 to 3 percent. The remainder of the RSA must remain below the runway approach surface slope. The maximum negative grade is 5 percent. Limits on longitudinal grade changes are plus or minus 2 percent per 100 feet within the RSA.

The B-II RSA for Runway 02/20 appears to meet required geometric footprint and surface gradient standards and is free of physical obstructions, except for items with locations required by function (runway edge and threshold lights, information/directional signs, runway end identifier lights and precision approach path indicators, etc.). These items are mounted on frangible (break away) supports (per FAA standard). The RSA extending beyond the north end of the runway includes the former displaced threshold/paved overrun (150 feet wide) for its full length.

The 2006 Airport Layout Plan depicts an ultimate RSA for Runway 02/20 (500 feet wide and 1,000 feet beyond each runway end) which is consistent with the C/D-ARC II reserve noted above. Based on review of recent aerial photography, it appears that the outer edges of the C/D-II reserve RSA near the south end of the runway may require clearing and grading to its full width (250 feet from runway centerline) if development was pursued.

Airport management inspects runway and exit taxiway pavement edges to ensure that grass, dirt or gravel build ups do not exceed 3 inches and the RSA is cleared of brush or other debris and periodically graded and/or compacted to maintain FAA standards, as needed.

Any future runway extensions will require corresponding RSA improvements based on the applicable design standard. A summary of the RSA requirements based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

Existing/Future Standard	***Reserve***
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Runway Safety Area (RSA) 300 feet wide and extends 600 feet beyond each departure end of runway.	500 feet wide and extends 1,000 feet beyond each departure end of runway.
The RSA appears to be free of built items except those with locations fixed by function on break-away mounts. The RSA surface appears to meet gradient and compaction standards. Periodic maintenance and clearing is required. The RSA extending beyond the north end of the runway includes a 150-foot wide paved overrun. The center section of the RSA at the south end of the runway coincides with the localizer clear area, which prohibits terrain and physical items that could interfere with navigational aid electronic signal.	The RSA reserve can be accommodated within existing airport property. The same surface gradient and condition standards apply.

RUNWAY OBJECT FREE AREA (OFA)

Runway object free areas are two dimensional surfaces intended to be clear of ground objects that protrude above the runway safety area edge elevation. Obstructions within the object free area may interfere with aircraft flight in the immediate vicinity of the runway. The FAA defines the object free area clearing standard:

"The object free area clearing standard requires clearing the object free area of above ground objects protruding above the runway safety area edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the object free area for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the object free area. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the object free area. This includes parked airplanes and agricultural operations."

Based on review of recent aerial photography, it appears that the outer edges of the B-II runway object free area (OFA) near the south end of the runway may require clearing/grading to its full width (400 feet

from runway centerline, 800 feet overall). The Inner Portion of Runway 1 Approach Surface Drawing (sheet 8 of 12), updated in 2006 following the south runway extension, identifies small areas of elevated terrain within the boundaries of the OFA beyond the RSA. Both the terrain elevation and height of vegetation within the OFA require site verification to determine if future improvements are needed. The remainder of the B-II OFA appears to be free of physical obstructions (excluding navigational aids, lighting, airfield signs, etc.) and meets FAA dimensional standards. Airport management periodically inspects the object free area and removes any protruding objects and clears vegetation.

The 2006 Airport Layout Plan depicts an ultimate OFA for Runway 02/20 (800 feet wide and 1,000 feet beyond each runway end) which is consistent with the C/D-ARC II reserve noted above. The ultimate OFA is depicted as being located entirely within airport property, however, the northwest corner of the OFA is located on the airport property line with a small section extending over the airport perimeter fence on the east side of Highway 3.

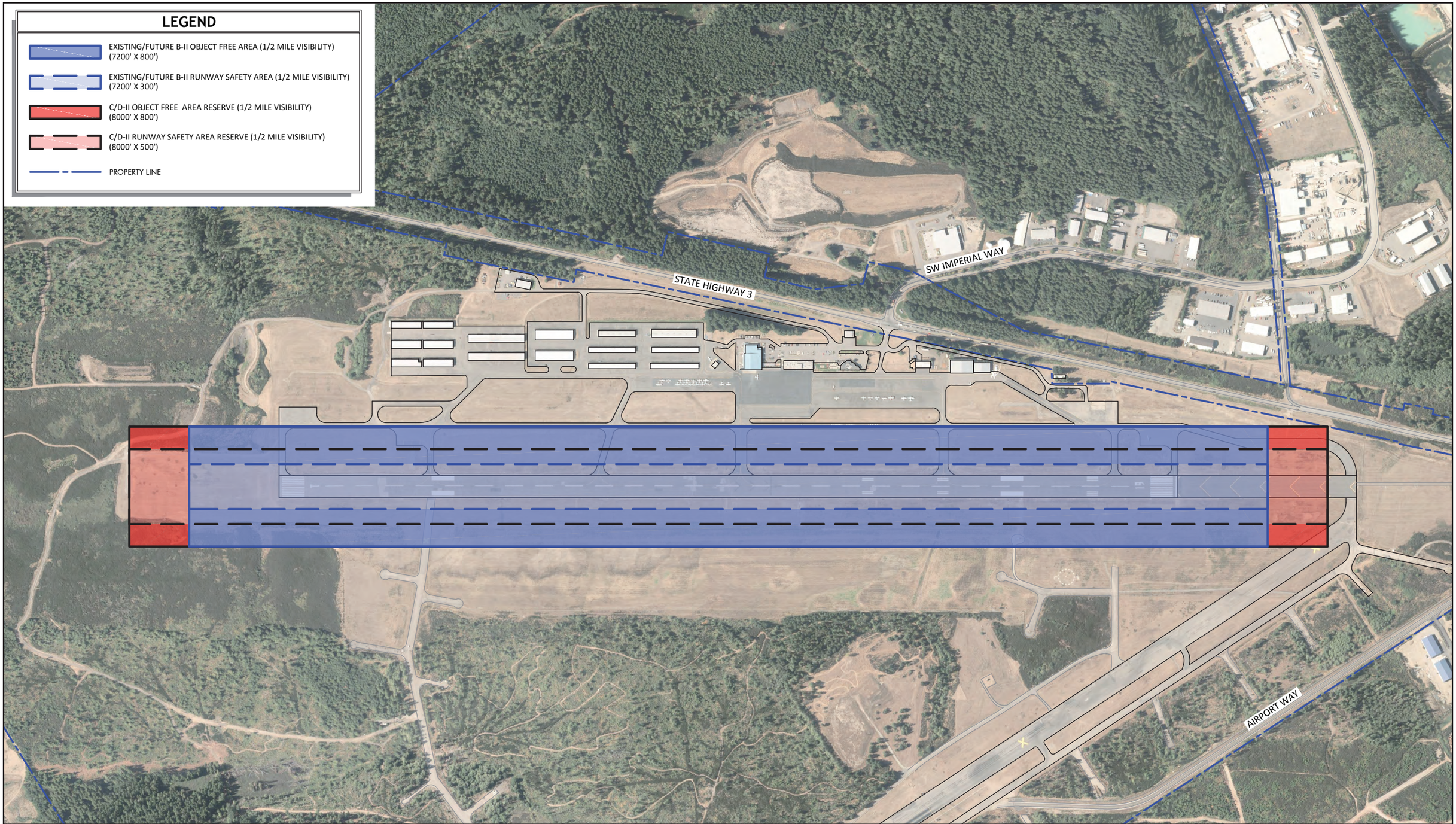
As with the RSA noted earlier, any future runway extensions will require corresponding object free area improvements based on the applicable design standard. A summary of the OFA requirements based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

Existing/Future Standard	***Reserve***
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Runway Object Free Area (OFA) 800 feet wide and extends 600 feet beyond each departure end of runway.	800 feet wide and extends 1,000 feet beyond each departure end of runway.
The south end of the OFA may require clearing and minor grading to meet obstruction clearing standards (to be verified). The remainder of the OFA appears to meet FAA standards. The center section of the OFA at the south end of the runway coincides with the localizer clear area, which prohibits terrain and physical items that could interfere with navigational aid electronic signal.	The OFA reserve can be accommodated within existing airport property, although its unobstructed length may be limited at the NW corner by an existing fence. The same surface gradient and obstruction clearance standards apply.

Figure 4-4 depicts the footprints of the runway object free area and runway safety area that are associated with both the current ARC B-II and reserve C/D-II based on the existing ½-mile approach visibility minimums.

LEGEND

- EXISTING/FUTURE B-II OBJECT FREE AREA (1/2 MILE VISIBILITY) (7200' X 800')
- EXISTING/FUTURE B-II RUNWAY SAFETY AREA (1/2 MILE VISIBILITY) (7200' X 300')
- C/D-II OBJECT FREE AREA RESERVE (1/2 MILE VISIBILITY) (8000' X 800')
- C/D-II RUNWAY SAFETY AREA RESERVE (1/2 MILE VISIBILITY) (8000' X 500')
- PROPERTY LINE



BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

RUNWAY 02/20 RUNWAY SAFETY AREA & OBJECT FREE AREA CLEARANCES | **FIG. 4-4**

CENTURY WEST ENGINEERING CORPORATION

OBSTACLE FREE ZONE (OFZ)

The obstacle free zones (OFZ) are planes of clear airspace extending upward above runway elevation that are intended to protect close-in obstructions that may create hazards for aircraft. The FAA defines the following clearing standard for the OFZ:

"The obstacle free zone clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs [navigational aids] *that need to located in the obstacle free zone because of their function."*

The FAA defines the Runway Obstacle Free Zone as:

"The runway OFZ [obstacle free zone] *is a defined volume of airspace centered above the runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway."*

The FAA recommended runway OFZ width for Runway 02/20 is 400 feet, based on its ability to serve large airplanes. Based on a recent visual inspection conducted during the master plan inventory, no penetrations to the existing runway OFZ were observed, other than the runway lights, precision approach path indicator units, runway end identifier lights, directional signage, and distance remaining signs which have locations fixed by function. All items currently located within the runway OFZ meet the FAA frangibility (break away) standard. Aircraft hold lines are located 250 feet from runway centerline on each of the exit taxiways connecting to the runway, which keeps holding aircraft entirely outside the runway OFZ; the aircraft holding areas located adjacent to Taxiways Bravo and Hotel are located outside the runway OFZ.

Based on current instrument approach capabilities, approach visibility minimums and approach lighting for Runway 20, one additional OFZ is defined for the runway (**Inner-transitional OFZ)** and two additional OFZs are defined for the Runway 20 end only (**Inner-approach OFZ** and **Precision OFZ**). They are summarized below:

The FAA defines the Inner-transitional Obstacle Free Zone as:

"The inner-transitional OFZ [obstacle free zone] *is a defined volume of airspace along the sides of the runway OFZ and the inner-approach OFZ. It applies only to runways with lower than ¾-statute mile approach visibility minimums.*

(1) For runways serving large airplanes, separate inner-transitional OFZ [obstacle free zone] *criteria apply for Category (CAT) I and CAT II/III runways.*[2]

(a) For CAT I runways, the inner transitional OFZ [obstacle free zone] *begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet above the established airport elevation."*[3]

The FAA defines the Inner-approach Obstacle Free Zone as:

"The inner-approach OFZ [obstacle free zone] *is a defined volume of airspace centered on the approach area. It applies only to runways with an approach lighting system. The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the approach lighting system. Its width is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning."* The FAA defines the Precision Obstacle Free Zone as:

"The Precision OFZ [obstacle free zone] *is defined as a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide."*

"The surface is in effect only when all of the following operational conditions are met:

(1) Vertically guided approach

(2) Reported ceiling below 250 feet and/or visibility less than 3/4 –statute mile (or RVR [runway visual range] *below 4,000 feet)*[4]

(3) An aircraft on final approach within two (2) miles of the runway threshold.

When the Precision OFZ [obstacle free zone] *is in effect, the wing of an aircraft holding on a taxiway waiting for runway clearance may penetrate the Precision OFZ; however, neither the fuselage nor the tail may infringe on the Precision OFZ."*

The existing aircraft holding area adjacent to Taxiway Alpha and Bravo is entirely clear of the Precision OFZ on Runway 20. The Inner Approach and Inner-Transitional OFZs appear to be free of obstructions, although portions of the sloped surfaces extend beyond airport property. The combined OFZ surfaces

[2] Runway Categories (I, II, III) refer the level of precision available, with Category I being the most typical for general aviation and smaller commercial runways; Categories II and III are more sophisticated and require special aircraft equipment and/or crew training.

[3] (1) In U.S. customary units, $H_{feet} = 61 - 0.094\ (S_{feet}) - 0.003\ (E_{feet})$. S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level.

[4] RVR: Runway Visual Range. A measurement (in feet) of visibility along the runway with transmissometer installed on the side of a runway.

define similar protected surfaces as the FAR Part 77 airspace surfaces for Runway 2/20. A summary of the runway obstacle free zones for current/future approach capabilities is presented below:

Existing/Future Standard	***Reserve***
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Runway OFZ: 400 feet wide and extends 200 feet beyond each runway end.	Same dimensions and clearing standards
Inner Approach OFZ (Rwy 19 only): 400 feet wide, extending 200 feet beyond last approach light fixture at a slope of 50:1 **Inner Transitional OFZ**: Extends outward from edges of Runway OFZ at a slope of 6 to 1 to an elevation 150 feet above airport elevation **Precision OFZ** (Rwy 19 only): 800 feet wide and 200 feet long, beginning at runway threshold The OFAs for Runway 2/20 appear to be free of obstructions	Same dimensions, slope configurations, and clearing standards

TAXIWAY SAFETY AREA

Taxiway safety areas serve a similar function as runway safety areas and use the same design criteria for surface condition (see description of runway safety area provided earlier in this chapter), with varying dimensions based on airplane design group. The taxiway safety area standards are not affected potential changes in design aircraft (B-II to C/D-II (reserve)) discussed earlier.

It is noted that safety area standards do not apply to *taxilanes* typically located within hangar developments or aircraft parking aprons. Taxilanes provide aircraft access within a parking or hangar area; taxiways provide aircraft access between points on the airfield and serve runways (e.g. parallel taxiways and exit taxiways).

The main taxiways on the airfield (west parallel taxiway and exit taxiways) are designed to accommodate the same design aircraft as the runway (Airplane Design Group II). The sections of Taxiways Foxtrot, Golf and Hotel, west of Taxiway A, that provide access to adjacent hangar areas are designed to accommodate small airplanes (Airplane Design Group I).

The ADG II standard taxiway safety area dimension is 79 feet, centered on the taxiway, extending 39.5 feet each side of centerline. The ADG I taxiway safety area standard is 49 feet (24.5 feet from taxiway centerline). Items within the safety area that have locations fixed by function (taxiway reflectors, edge lights, signs, etc.) must be mounted on frangible (break away) mounts. Based on a recent visual inspection

conducted during the master plan inventory, all existing taxiways appear to meet the surface condition and obstruction clearing standards required for taxiway safety areas.

As with runway safety areas, the ground surface located immediately adjacent to the taxiways periodically requires maintenance or improvement to adequately support the weight of an aircraft or an airport vehicle. Grading and/or soil compaction within taxiway safety areas should be completed as needed, and grass, brush or other debris should be regularly cleared to maintain FAA standards. Taxiway pavement edges should be periodically inspected to ensure that grass, dirt or gravel build ups do not exceed 3 inches.

TAXIWAY/TAXILANE OBJECT FREE AREA

Taxiway and taxilane object free areas (OFA) are intended to provide unobstructed taxi routes (adequate wingtip clearance) for aircraft. The outer edge of the OFA defines the recommended standard distance from taxiway or taxilane centerline to a fixed or moveable object. The FAA clearing standard prohibits service vehicle roads, parked aircraft, and above ground objects (hangars, other built items, etc.), except for objects with locations that are fixed by function (navigational aids, airfield signs, etc.). The applicable design standard (ADG I or ADG II) is determined by the largest size of aircraft that may be accommodated in aircraft parking areas or hangars served by that taxiway/taxilane. The taxiway/taxilane OFA standards are not affected potential changes in approach visibility minimums discussed earlier.

Major Taxiways

The major taxiways (parallel taxiway and exits) at Bremerton National Airport are designed to meet or exceed ADG II standards. The ADG II taxiway OFA width dimension is 131 feet. All existing built items or parked aircraft located along the taxiways have a minimum setback of 65.5 feet, which corresponds to the outer edge of the taxiway OFA. However, the aircraft holding areas located adjacent to Taxiway Alpha have limited space to accommodate aircraft beyond the taxiway OFA (65.5 feet from centerline). Options for addressing taxiway OFA clearance will be included in the alternatives analysis. The aircraft hold area located on the runway side of Taxiway Alpha near the Runway 20 threshold at Taxiway Bravo is identified to be removed on the 2006 Airport Layout Plan. As with the taxiway safety area, any items within the taxiway OFA that have locations fixed by function, must be frangible (break away mount) to meet the FAA clearing standard.

Taxilanes

The Airport has taxilanes that are used by small airplanes (ADG I) and larger aircraft (ADG II). These include taxilanes within the main apron area and in the various aircraft hangar areas on the airport. The taxilanes located adjacent to T-hangars and smaller conventional hangars are typically intended for use by ADG I aircraft. Taxilanes providing access to small airplane tiedowns also accommodate ADG I aircraft. Taxilanes located adjacent to larger hangars (door openings of 50 feet and larger) typically accommodate

both ADG I and ADG II aircraft. The ADG I taxilane OFA standard dimension is 79 feet wide, extending 39.5 feet from centerline. The ADG II taxilanes OFA standard dimension is 115 feet wide, extending 57.5 feet from centerline.

West Hangar Area Taxilanes

The clearances provided on these taxilanes (measured as the opening between hangar rows) vary from approximately 70 to 90 feet and are generally less than the corresponding ADG I taxilane OFA standard of 79 feet. **Figures 4-2** and **4-3** presented earlier in the chapter illustrate the existing and standard taxilane OFA clearances.

Since the type of aircraft located within a particular hangar can change over time, the appropriate method for determining taxilane clearance standards is based on the largest aircraft that can be physically accommodated within the hangar. ADG II standards are applied to taxilanes serving larger hangars (door openings 50 feet and larger) and ADG I standards are applied to taxilanes serving small individual hangars or T-hangars.

The FAA allows a modification to standards for Taxilane OFA clearance based the following formula: 1.2 x airplane wingspan plus 20 feet. Using this formula, a taxilane with a 60-foot wide clearance could accommodate airplanes with wingspans up to 33 feet (33.3' x 1.2 + 20' = 60'). For comparison, a Cessna 172 and 182 both have wingspans of 36 feet; a Cessna 150 has a wingspan of 33.3 feet.

While relocation of most hangars is not considered highly feasible, any new hangars (and the associated taxilanes) planned should meet the applicable ADG I or II taxilane object free area clearance standard. A modification to FAA standards should be noted for these hangars, with the recommended disposition (reconfiguration) to be addressed when the hangars reach the end of their useful lives.

Apron Taxilanes

Taxilanes on the main apron provide access to aircraft parking, circulation within the apron and serve hangars, the airport administration building, Avian Flight Center, and the airport restaurant located along the back edge of the apron. The main apron has two direct taxilane connections to the parallel taxiway at its north and south ends (aligned with Taxiways Delta and Echo). North and south access taxilanes extend from the ends of the apron providing access to adjacent landside facilities. The north taxilane connects the row of corporate hangars to the main apron and parallel taxiway between Taxiways Charlie and Delta. The south taxilane provides access to the aircraft fueling area, the southern tiedown area, and the south hangar area. The south access taxilane connects to the parallel taxiway via the western sections of Taxiway Foxtrot and Hotel.

It appears that taxilanes adjacent to small airplane tiedowns are designed to provide 79 feet of clearance between adjacent tiedown anchors (39.5 feet from taxilane centerline to tiedown anchor). While this

dimension is consistent with the ADG I taxilane OFA standard, the actual use of the tiedowns results in the front portion of a parked aircraft extending 3 to 6 feet into the adjacent taxilane, in effect creating an opening approximately 68 to 70 feet wide. **Figure 4-2** and **4-3** presented earlier in the chapter illustrates the nonstandard taxilane clearances created by parked aircraft (visible in the aerial photo). The OFA clearance on the western-most taxilane on the main apron appears to be limited by landscaping. Changes to existing aircraft parking configurations will be addressed in the alternatives analysis that can be implemented when the apron areas are rehabilitated, reconfigured, or expanded. All new aircraft parking aprons should be designed to provide standard taxilane OFA clearances to the adjacent parked aircraft, rather than tiedown anchors. Another issue related to taxilane OFA clearance in the south hangar area is the practice of parking vehicles on the taxilanes adjacent to hangar rows. Vehicle parking on hangar taxilanes is not consistent with FAA standards and creates a potential hazard for taxiing aircraft. Options for providing additional vehicle parking in the hangar area will be examined in the alternatives.

The section of the main apron located directly in front of the fixed base operator (FBO) (Avian Flight Center) is not marked with taxilanes or defined aircraft parking positions. Transient aircraft are directed during business hours by FBO staff to the desired parking position on the apron. Business aircraft are typically directed to park in a row facing the FBO building, which allows unassisted movement in and out of the parking area, passenger loading, and fueling. The perimeter of the FBO apron has a defined taxilane that provides access to the FBO apron and also routes other taxiing aircraft (to north tiedown area, fuel area, hangars) clear of the transient parking area in front of the FBO. The perimeter taxilane is designed to accommodate ADG II aircraft.

The south aircraft tiedown area is located near the south end of main apron, opposite the aircraft fueling area. The apron is configured with one double-sided row of tiedowns that are accessed directly from adjacent taxilanes. The west-facing tiedowns directly abut the south access taxilane that connects the main apron, fueling area, and south hangar area. Portions of parked aircraft in the west-facing tiedowns penetrate the adjacent taxilane OFA. A similar situation exists for the row of west facing tiedowns and the stub access taxilane used to access the tiedowns. Changes in apron and taxilane configuration will be addressed in the alternatives analysis.

BUILDING RESTRICTION LINE (BRL)

A building restriction line (BRL) identifies the minimum setback required to accommodate a typical building height, such as a T-hangar or large conventional hangar, based on the ability to remain clear of all runway and taxiway clearances on the ground, and the protected airspace surrounding a runway. Taller buildings are located progressively farther from a runway in order to remain beneath the 7:1 Transitional Surface slopes that extend laterally from both sides of a runway. By using this standard, adequate clearance for the runway inner-transitional obstacle free zone (6:1 slope), described earlier can also be met.

The 2006 Airport Layout Plan and Airfield Facilities Drawing do not depict existing or future BRLs for Runway 02/20 (included in drawing legends only). However, as noted earlier, it appears that a common building setback of 750 to 780 feet has been observed for all recently constructed buildings on the west side of the runway. The only building located closer to the runway (approximately 710 feet) is the small Civil Air Patrol/U.S. Navy building located at the north end of west landside area. No existing structures were identified as obstructions to any FAR Part 77 airspace surface on the 2006 Airspace Plan or associated drawings. Please see the FAR Part 77 Airspace section later in the chapter for a description of the transitional surface and the other protected airspace surfaces.

A 750-foot BRL can accommodate structures with roof heights up to 35.7 feet above runway elevation (at the BRL) without penetrating the runway transitional surface associated with the existing precision instrument approach. At 780 feet from runway centerline, a structure height 40 feet above runway elevation can be accommodated. Taller structures require increased setback distances from the runway in order to avoid penetrating the runway transitional surface.

There are no existing structures on the west side of the runway, except for housings used for the instrument landing system glideslope and weather observation station. The nearest planned structures (hangars) on the west side of Runway 02/20 depicted on the 2006 Airport Layout Plan are located approximately 1,180 feet from runway centerline on slightly elevated terrain.

All new construction on or in the immediate vicinity of the Airport should routinely involve FAA review for airspace compatibility. FAA Form 7460-1, Notice of Proposed Construction or Alternation, should be prepared and submitted to FAA at least 60 to 90 days prior to planned construction. The 7460 form should be submitted by the Port for any projects located on the Airport and submitted by the applicant for any projects located off airport property (coordinated with City of Bremerton and Kitsap County, if outside Bremerton city limits). The FAA reviews all proposed development to determine if the proposed action would create any obstructions to FAR Part 77 airspace surfaces. In general, the FAA will object to proposals that result in a penetration to any FAR Part 77 airspace surfaces on the basis of safety.

A summary of the BRL requirements based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

Existing/Future Standard	*Reserve*
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Building Restriction Line (BRL) 1,000-foot wide primary surface used to define building setback distances. BRL locations can be adjusted to accommodate different building heights. As a general planning rule, no structures permitted within the primary surface or penetrating the 7:1 transitional surface. The existing 750-foot building setback observed on the west side of the runway allows structures up to 35.7 feet above runway elevation. This distance also minimizes the potential for ILS signal reflection on metal sided hangars located closer to the runway. Structures with lower roof heights could be accommodated with reduced setbacks if desired by the Airport, however any proposed development should meet all FAA technical requirements for ground based electronic navigational aid performance and air safety. No existing structures penetrate airspace surface associated with Runway 02/20.	Same dimensions and clearing standards

RUNWAY PROTECTION ZONES (RPZ)

The FAA provides the following definition for runway protection zones:

"The RPZ's [runway protection zone] *function is to enhance the protection of people and property on the ground. This is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The RPZ's begins 200 feet beyond the end of the area useable for takeoff or landing." The central portion and controlled activity area are the two components of the RPZ. The central portion of the RPZ extends from the beginning to the end of the RPZ, centered on the* [extended] *runway centerline and is equal to the width of the runway OFA.*

The FAA also distinguishes between approach and departure RPZs. However, in most cases, the approach RPZ provides the more stringent requirements and is typically larger than departure RPZs for runways with lower approach visibility minimums.

Runway protection zones (RPZ) with buildings, roadways, or other items do not fully comply with FAA standards. It is recognized that realigning major surface roads located within the RPZs may not always be feasible. As noted earlier, the FAA recommends that airport sponsors control the RPZs through ownership whenever possible, although avigation easements[5] are commonly used when outright purchase is not feasible.

The 2006 Airport Layout Plan depicts existing and future RPZs for both runway ends based on existing and future approach capabilities. For Runway 20, the existing and future RPZ is consistent with approach visibility minimums lower than 3/4-mile. The RPZ dimensions are 2,500 feet long, 1,000 feet wide on the inner end, and 1,750 feet wide on the outer end, totaling 78.9 acres. Areas in the outer portion of the Runway 20 RPZ extend beyond airport property. The current Airport Property Map indicates that avigation easements were acquired for these areas through prior FAA-funded projects.

The existing Runway 1 RPZ is consistent with approach visibility minimums not lower than 1-mile. The RPZ dimensions are 1,000 feet (length), 500 feet (inner end), and 700 feet (outer end), totaling 13.8 acres. The future Runway 02 RPZ is consistent with a reduction in approach visibility minimums to not lower than 3/4-mile. The future RPZ dimensions are: 1,700 feet long, 1,000 feet wide (inner end), and 1,510 feet (outer end), totaling 49 acres. The existing and future RPZ dimensions noted above would be unchanged except for the existing RPZ for Runway 1. Both the existing and future RPZs identified for Runway 1 are located entirely on airport property.

Note: FAA Guidance of RPZs and Roads (Fall 2012)

In October 2012, the FAA released new guidance regarding runway protection zones and roads. In short, the policy directs airport sponsors to evaluate any planned changes to existing RPZs that introduce or increase the presence of roads in RPZs. Existing roads within RPZs are also to be evaluated during master planning to determine if feasible alternatives exist for realignment of roads outside RPZs or for changes to the RPZs themselves. Any proposed changes in the length or configuration of Runway 02/20 that changes the location of existing RPZs evaluated in this study are subject to review by FAA headquarters in Washington D.C.

A summary of the BRL requirements based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

[5] An avigation easement (*avigation = aviation + navigation*) involves the purchase of airspace rights over a particular defined ground area. The easement normally limits the maximum height of any natural or built items (to coincide with the runway approach surface slope) and may include provisions restricting the type of activities permitted. Compensation is negotiated between the airport owner and property owner.

Existing/Future Standard	*Reserve*
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Runway Protection Zone (RPZ) RPZ dimensions determined by runway category and approach visibility minimums. Runway 20: Not lower than ¾-mile visibility minimums Runway 02: Not lower than 1-mile approach visibility minimums (current) and not lower than ¾-mile approach visibility minimums (future) The majority of existing and future RPZs are located on airport property. The Port has acquired avigation easements for the outer end of the Runway 20 RPZ located off airport property.	Runway 20: Same dimensions and clearing standards Runway 02: Upgrade to ARC C/D-II would require increase in RPZ dimension for "not lower than 1-mile" although the dimension required for "not lower than ¾-mile" for ARC B-II or C/D-II is the same

AIRCRAFT PARKING LINE

The aircraft parking line (APL) represents the minimum setback required for locating aircraft parking in order to clear the adjacent runway-taxiway system. The location of the APL is generally determined by the more demanding of runway airspace clearance and taxiway obstruction clearance.

The nearest aircraft tiedowns on the west side of Runway 02/20 are located approximately 575 feet from runway centerline. The west facing row of tiedowns located near the aircraft fueling area is approximately 600 feet from runway centerline. At 575 feet from runway centerline, an aircraft tail height of approximately 10.7 feet can be accommodated without penetrating the runway transitional surface, assuming the same elevation between the runway and apron. Tail heights of 10 feet and lower are typical of most small aircraft. Larger aircraft (business jets, turboprops, etc.) have tail heights typically ranging from 12 to 26 feet and require increased setback distances to avoid penetrating the transitional surface. Please see the FAR Part 77 Airspace section later in the chapter for a description of the transitional surface. This distance is also beyond the west edge of the Taxiway A object free area (OFA), which is 465.5 feet from runway centerline.

The updated Airport Layout Plan will depict recommended aircraft parking setbacks based on the preferred alternative for all existing and future aircraft parking areas on the Airport based on applicable FAA standards. A summary of the APL requirements based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

Existing/Future Standard	*Reserve*
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Aircraft Parking Line (APL) 1,000-foot wide runway primary surface and Taxiway A OFA used to define aircraft parking setback distances. As a general planning rule, no parked aircraft permitted within the primary surface or penetrating the 7:1 transitional surface. The existing 575-foot aircraft parking setback observed on the west side of the runway allows aircraft tail heights up to 10.7 feet above runway elevation.	Same dimensions and clearing standards; no change in existing runway-to-parallel taxiway separation is required.

RUNWAY - PARALLEL TAXIWAY SEPARATION

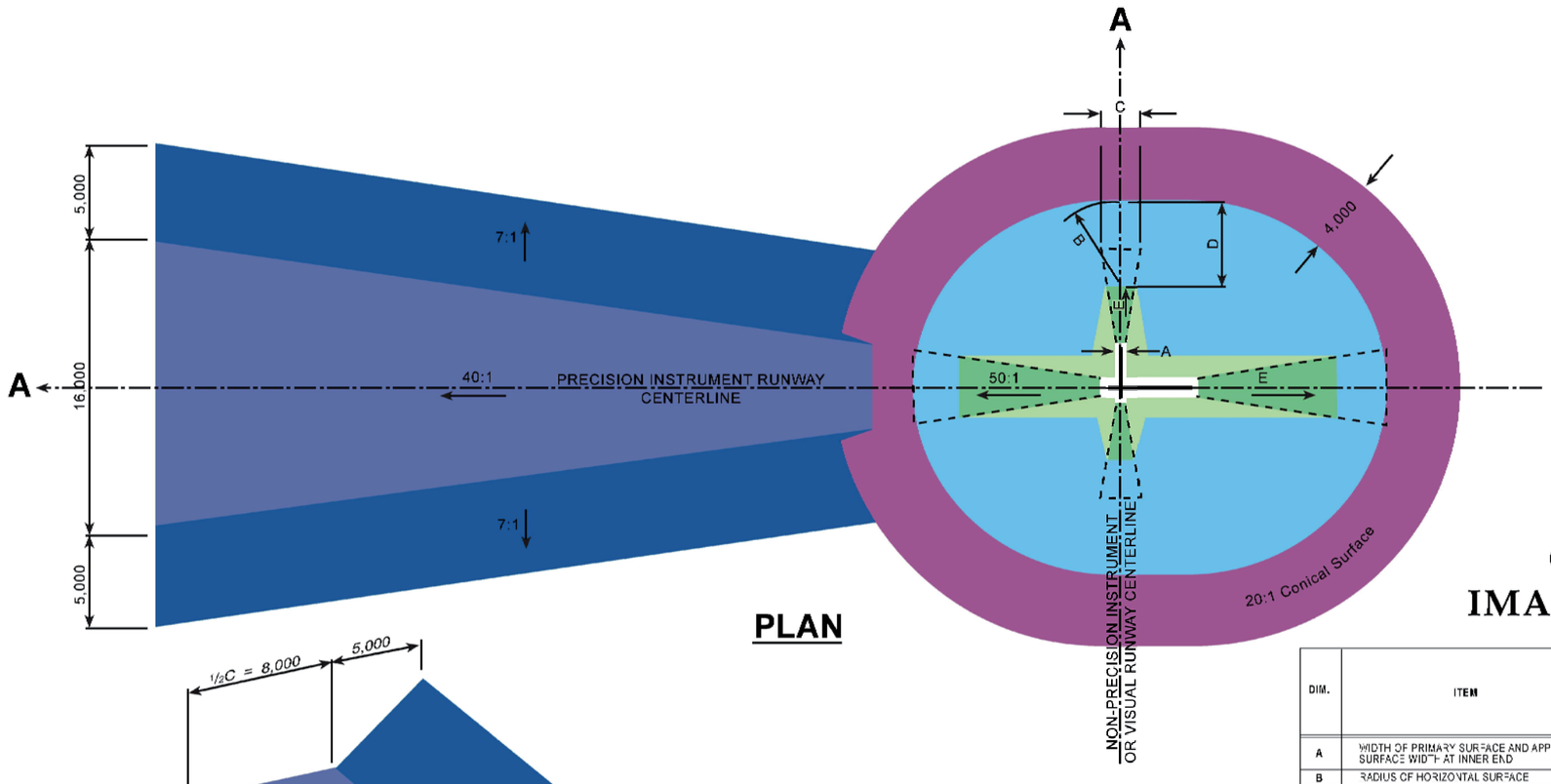
Runway 02/20 has a full-length west parallel taxiway (Taxiway A) with a runway separation of 400 feet. The separation exceeds the B-II dimensional standard for runways with lower than ¾-mile approach visibility minimums and meets the standard for C-II (reserve) with the same visibility minimums. A summary of the parallel taxiway separation standards based on the existing/future B-II ARC and the reserve C/D-II ARC is presented below:

Existing/Future Standard	*Reserve*
ARC B-II - 1/2-mile Approach Visibility Minimums	***ARC C/D-II - 1/2-mile Approach Visibility Minimums***
Runway-Parallel Taxiway Separation B-II: 300 feet	C/D-II (reserve): 400 feet

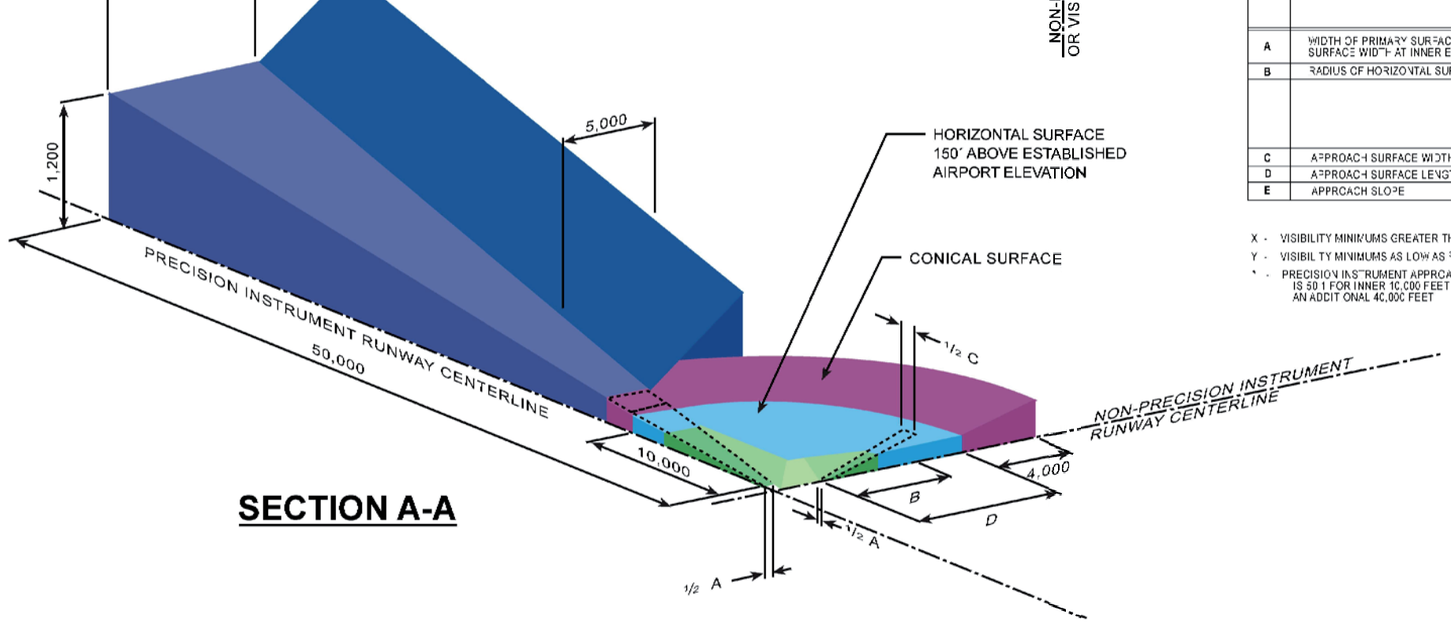
FAR Part 77 Surfaces

Airspace planning for U.S. airports is defined by Federal Air Regulations (FAR) Part 77 – Objects Affecting Navigable Airspace. FAR Part 77 defines imaginary surfaces (airspace) to be protected surrounding airports. **Figures 4-5 and 4-6** on the following pages illustrate plan and isometric views of generic Part 77 surfaces. **Table 4-4** summarizes the airspace surface dimensions for Bremerton National Airport based on current and future approach/visibility options.

CIVIL AIRPORT IMAGINARY SURFACES



PLAN



SECTION A-A

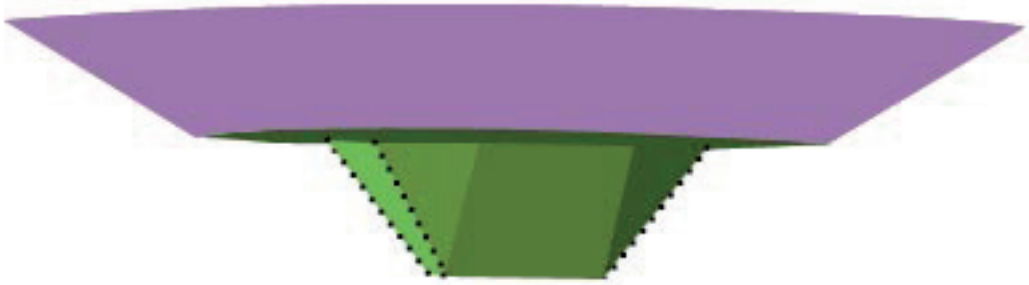
SURFACE SLOPE KEY

- HORIZONTAL SURFACE
- 20:1
- 7:1
- 7:1
- VARIES (SEE "E" VALUE IN TABLE BELOW)
- 40:1 (PRECISION INSTRUMENT RUNWAY ONLY)

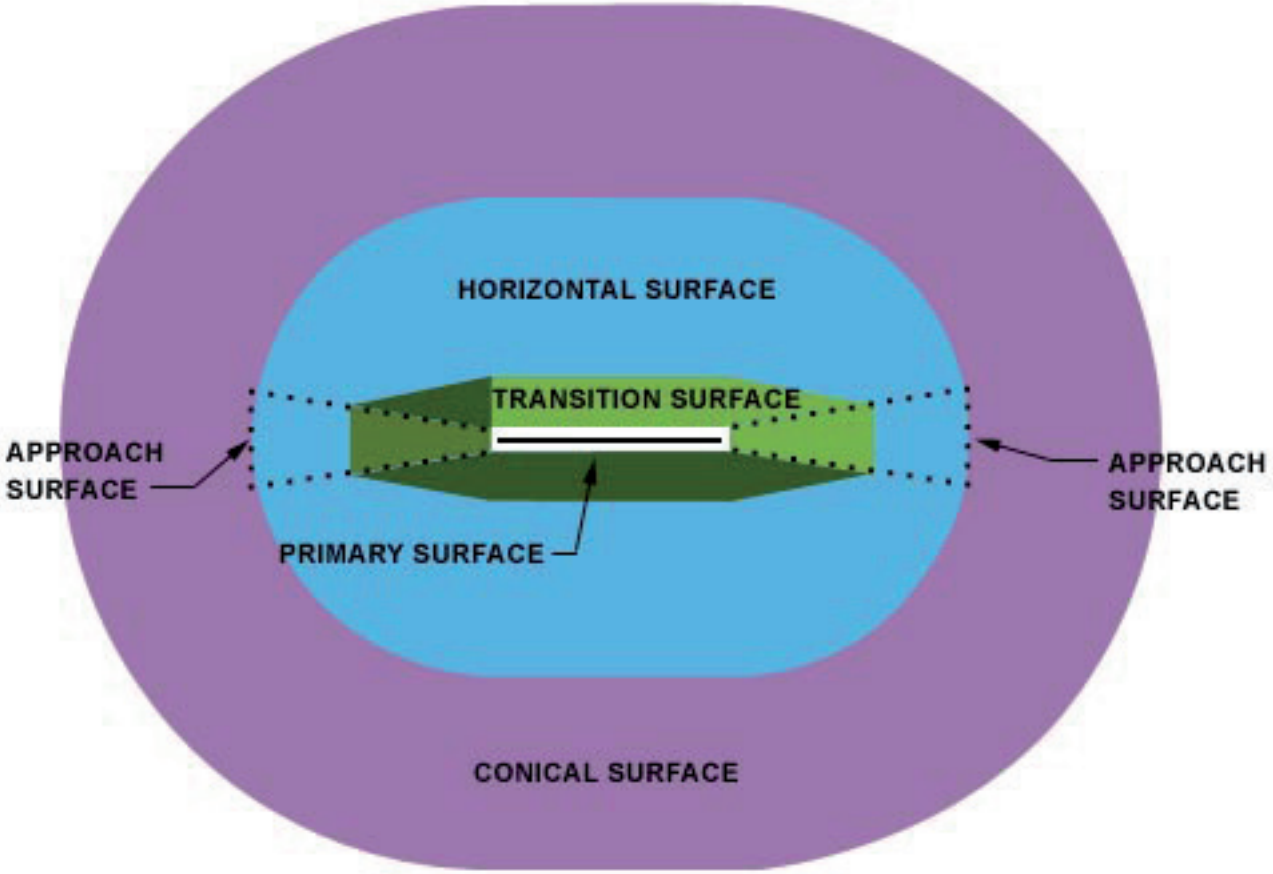
DIM.	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
					X	Y	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
					X	Y	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

X - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
Y - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

HEIGHT HAZARD AIRSPACE SURFACES



PROTECTED AIRSPACE



OVERHEAD VIEW

TABLE 4-4: FAR PART 77 AIRSPACE SURFACES

ITEM	RUNWAY 02/20 *Other than Utility (Precision)* *(Standard Based on Ultimate Airspace Configuration, as depicted on 2006 Airspace Plan)*
Width of Primary Surface	1,000 feet
Transitional Surface	7:1 Slope to 150 feet above runway
Horizontal Surface Elevation/Radius	150 feet above airport elevation/10,000 feet
Conical Surface	20:1 for 4,000 feet
Approach Surface Length	Rwy 19: 50,000 feet Rwy 01: 10,000 feet
Approach Surface Slope	Rwy 19: 50:1 - Inner 10,000 feet Rwy 19: 40:1- Outer 40,000 feet Rwy 01: 34:1
Approach Surface Width at End	Rwy 19: 16,000 feet Rwy 01: 4,000 feet

The 2006 Airspace Plan depicts "ultimate" airspace surfaces based on "other than utility" precision instrument approach for Runway 20 and nonprecision instrument approach (visibility as low as ¾ mile) for Runway 02. The ultimate airspace surfaces also depict a future "utility" visual runway, the parallel general aviation runway recommended in the last master plan. Utility visual runways have 5,000-foot long approach surfaces with a slope of 20:1 and a 250-foot wide primary surface.

The Airspace Plan identified 47 items in the obstruction table (17 of these items are repeated on the extended approach surface drawing for Runway 20). The majority of obstructions were identified in the horizontal, transitional and conical surfaces, with a small number in the runway approach surfaces. The obstructions included 39 "tree/trees," 5 "ground," 2 "Rods" (for obstruction lights mounted on glide slope and a tower), and 1 "transmission towers." Disposition for the obstructions includes tree trimming or removal (or adding an obstruction light on a pole), ground excavation, and aeronautical study for the electrical transmission towers.

It should be noted that the current obstructions to airspace surrounding Runway 02/20 has been factored into current instrument approach minimums, although mitigation is recommended whenever possible to improve obstruction clearance for aircraft in both instrument and visual flight conditions.

APPROACH SURFACES

Runway approach surfaces extend outward and upward from each end of the primary surface, along the extended runway centerline. As noted earlier, the dimensions and slope of approach surfaces are

determined by the type of aircraft intended to use the runway and most demanding approach planned for the runway.

In accordance with FAA standards, threshold siting surfaces (TSS) were utilized for both runway ends to obtain required obstruction clearance within prescribed FAA limits based on approach type and visibility minimums. A 34:1 TSS was used on Runway 20 and a 20:1 TSS was used on Runway 20. The recommended obstruction dispositions (terrain excavation, etc.) are based on clearing the threshold siting surfaces. The use of the appropriate TSS for obstruction clearance provides an acceptable level of safety without necessarily requiring displacement or relocation of a runway threshold. The 20:1 TSS for Runway 02 is compatible with the current 1-mile instrument approach visibility minimums and the planned future reduction to ¾-mile.

The Inner Approach Surface drawings for Runway 20 and 01 identified a total of 15 additional items in their obstruction tables. With two notable exceptions (roads), the items and their dispositions were generally similar to the obstructions listed on the Airspace Plan. For Runway 20, Highway 3 (15-foot high vehicles traveling on the road) are identified as an obstruction (11 foot penetration). The recommended disposition was excavation. Future roads were also identified as potential obstructions. The Phase 1 of the SKIA connector road was identified with 23 to 39-foot penetrations to the TSS for Runway 20. The updated Airspace Plan will include elevation data from the actual road construction to determine the extent of obstruction, if any. A proposed airport service road that would extend beyond the north end of the runway to connect with the east side of the airfield was identified with a potential 11-foot penetration approximately 65 feet from the beginning of the Runway 20 approach surface and TSS. The alignment of the proposed airport service road will be reviewed in the alternatives analysis to determine if new FAA standards discouraging roads in runway protection zones (RPZ) are feasible.

PRIMARY SURFACE

The primary surface is a rectangular plane of airspace, which rests on the runway (at centerline elevation) and extends 200 feet beyond the runway end. The primary surface should be free of any penetrations, except items with locations fixed by function (i.e., PAPI, runway or taxiway edge lights, etc.). The primary surface end connects to the inner portion of the runway approach surface.

The 2006 Airspace Plan depicts a 1,000-foot wide primary surface for Runway 02/20 that is consistent with the runway category, existing approach capabilities and approach visibility minimums. The Airspace Plan identified 4 obstructions in the primary surface, including 3 to 6-foot ground penetrations on the east side of the runway, mid-runway-south (recommended to be excavated) and a 30-foot penetration on the glideslope antennae (no action required, equipped with obstruction light).

TRANSITIONAL SURFACE

The transitional surface is located at the outer edge of the primary surface, represented by a plane of airspace that rises perpendicularly at a slope of 7 to 1, until reaching an elevation 150 feet above runway elevation, where it connects to the runway horizontal surface. The transitional surface should be free of obstructions (i.e., parked aircraft, structures, trees, etc.).

The Airspace Plan identified 18 obstructions (17 trees, 1 ground) in the runway transitional surface. No building or other built item penetrations were identified in the runway transitional surfaces.

HORIZONTAL SURFACE

The horizontal surface is a flat plane of airspace located 150 feet above runway elevation with its boundaries defined by the radii (10,000 feet for other than utility instrument runways) that extend from each runway end. The outer points of the radii for each runway are connected to form an oval, which is defined as the horizontal surface.

The 2006 Airspace Plan depicts the horizontal surface elevation at 604 feet above mean sea level (MSL), based on a future published airport elevation of 454 feet (high point on future parallel runway). Areas of terrain/tree penetrations are identified east and northeast of the runway. The recommended disposition was to trim and/or place obstruction lights on poles, presumably to identify representative obstructions on high terrain, rather than individual trees. In the event that the previously recommended parallel runway is not maintained on the updated Airport Layout Plan, the elevation of the horizontal surface will be adjusted based on the high point on the airfield (currently 444 feet MSL at the Runway 02 end).

CONICAL SURFACE

The conical surface is an outer band of airspace, which abuts the horizontal surface. The conical surface begins at the elevation of the horizontal surface and extends outward 4,000 feet at a slope of 20:1. The 2006 Airspace Plan depicts the top elevation of the conical surface 804 feet MSL, 200 feet above the horizontal surface and 350 feet above airport elevation. Areas of terrain/tree penetrations are identified northwest and northeast of the runway (same recommended disposition as horizontal surface).

Airside Requirements

Airside facilities are those directly related to the arrival and departure and movement of aircraft:

- Runways
- Taxiways
- Airfield Instrumentation and Lighting

Runways

The adequacy of the existing runway system at Bremerton National Airport was analyzed from a number of perspectives including runway orientation, airfield capacity, runway length, and pavement strength.

RUNWAY ORIENTATION & WIND COVERAGE

The orientation of runways for takeoff and landing operations is primarily a function of wind velocity and direction, combined with the ability of aircraft to operate under adverse wind conditions. A runway's wind coverage is measured by an aircraft's ability to operate with a "direct" crosswind, which is defined as 90 degrees to the direction of travel. For runway planning purposes, the maximum direct crosswind for small aircraft is 12 miles per hour (10.5 knots); for larger general aviation aircraft, a 15-mile per hour (13 knot) direct crosswind is used. Aircraft are able to operate safely in progressively higher wind speeds as the crosswind angle decreases and the wind direction turns more closely to the direction of flight. In addition, some aircraft are designed to safely operate with higher crosswind components. Ideally, an aircraft will take off and land directly into the wind or with light crosswind. The FAA recommends that primary runways accommodate at least 95 percent of local wind conditions; when this level of coverage is not provided, the FAA recommends development of a secondary (crosswind) runway.

The wind rose depicted on the 2006 Airport Layout Plan (cover sheet), indicates that Runway 02/20 accommodates approximately 99.97 percent of local wind conditions for small aircraft and 100 percent of local wind conditions for larger aircraft. The wind rose reflects eleven years of wind data collected between 1992 and 2001.

RUNWAY LENGTH

Runway length requirements are based primarily upon airport elevation, mean maximum daily temperature of the hottest month, runway gradient, and the critical aircraft type expected to use the runway. For general aviation airport runways used by large aircraft (typically aircraft with maximum takeoff weights between 12,500 pounds and 60,000 pounds), the FAA recommends an evaluation based on the "family of aircraft" approach which captures the most common aircraft within a particular category. For Bremerton National Airport, the future design aircraft identified in the updated aviation activity forecasts is a medium size business jet (above 12,500 pounds), such as a Cessna Citation Excel. FAA Advisory Circular (AC) 150-5324-4B, Runway Length Requirements for Airport Design identifies a group of "airplanes that make up 75 percent of the fleet." **Table 4-5** summarizes representative aircraft within this "family of aircraft," which includes the design aircraft for Bremerton National Airport. Based on the FAA-recommended methodology, planning for Runway 02/20 should be consistent with the requirements of this segment of activity.

The potential to accommodate commercial air service with transport category aircraft in the future does exist based on general market conditions and periodic inquires fielded by airport management. However, the ability to accurately quantify this type of activity or predict a potential timeline is premature based on current information. Airline inquires directed to airport management have indicated a preferred runway length of approximately 7,000 feet at Bremerton National Airport to accommodate an MD80 class of aircraft, although shorter runway lengths may be adequate for some operations. The feasibility and operating limitations of increasing useable runway length to 7,000 feet will be briefly examined later in the master plan as a "place holder" for the Port in the event that demand materializes, creating the need to examine the options in greater detail.

TABLE 4-5: AIRPLANES THAT MAKE UP 75% OF THE FLEET (LARGE AIRPLANES LESS THAN 60,000 POUNDS)

- British Aerospace – Bae 124-700
- Beechcraft/Mitsubishi/Raytheon - Beechjet – 400A, Premier I
- Bombardier – Challenger 300
- Cessna – Citation I/II/III/V/VII, CJ-2, Bravo, Excel, Encore, Sovereign
- Dassault – Falcon 10, 20, 50
- Israel Aircraft Industries – Jet Commander 1121, 1123, 1124
- Learjet - 20 series, 30 series, 40, 45
- Raytheon Hawker – Hawker 400, 600
- Rockwell - Saberliner 75

It is noted that the 2004 Airport Master Plan recommended an ultimate runway length of 6,000 feet for an ADG III transport category design aircraft (military version of the DC-9, predecessor to the MD-80 series). However, the runway length analysis also indicated that use of the 75 percent of the large airplane fleet at either the 60 or 90 percent of useful load, was an appropriate methodology to reflect the requirements for current and forecast business jet traffic at the Airport.

A summary of FAA recommended runway lengths for planning based on the requirements of small aircraft and large general aviation aircraft in a variety of load configurations is presented in **Table 4-6**. The runway length requirements for a variety of business aircraft are summarized in **Table 4-7** for comparison to the output from the FAA model.

TABLE 4-6: FAA RECOMMENDED RUNWAY LENGTHS FOR PLANNING (FROM FAA COMPUTER MODEL)

Runway Length Parameters for Bremerton National Airport • Airport Elevation: 444 feet MSL • Mean Max Temperature in Hottest Month: 75.3 F • Maximum Difference in Runway Centerline Elevation: 3 Feet • Wet Runway • Existing Runway Length: 6,000'	
Small Airplanes with less than 10 seats	
75 percent of these airplanes	2,490 feet
95 percent of these airplanes	3,020 feet
100 percent of these airplanes	3,610 feet
Small airplanes with 10 or more seats	4,090 feet
Large Airplanes of 60,000 pounds or less	
75 percent of these airplanes at 60 percent useful load	**5,310 feet**
(Consistent with Current/Future Design Aircraft)	
75 percent of these airplanes at 90 percent useful load	6,740 feet
(Consistent with C/D-II Aircraft that define long term development reserves)	
100 percent of these airplanes at 60 percent useful load	5,500 feet
100 percent of these airplanes at 90 percent useful load	7,350 feet
Airplanes of more than 60,000 pounds	5,170 feet

Based on local conditions and the methodology outlined in **AC 150/5324-4B,** the existing runway length of 6,000 feet is adequate to accommodate 75 percent of large airplanes (60,000 pounds or less maximum gross takeoff weight) at 60 percent useful load under typical operating conditions.[6] Some aircraft may experience operational limits (payload or fuel) on warmer days during the summer months. Larger or more complex business jets may experience operational constraints more frequently either during warmer summer months or when the runway has a thin accumulation of snow or ice after a winter storm event.

The FAA indicates that the selection of the 60- or 90-percent of useful load curves is based on the haul lengths and service needs of critical design aircraft. Assuming a typical haul length of 500 miles or less, it appears that 60 percent of useful load profile for the 75 percent of the fleet is most consistent with current and forecast activity. Reasonable justification would be required to demonstrate to FAA that the typical operational requirements of the design aircraft family are consistent with the higher useful load assumptions. As noted earlier, the FAA establishes a "substantial use threshold" of 500 annual itinerant takeoffs and landings for the design aircraft or family of design aircraft. To pursue a runway extension

[6] Useful load is generally defined as passengers, cargo, and usable fuel.

based on the higher demand profile, the Port would need to document sufficient activity (either aircraft currently using the airport that are regularly constrained by current runway length or new aircraft unable to operate at the airport due to runway length) to meet the FAA substantial use threshold.

The runway length requirements summarized in **Table 4-7** suggest that the majority of medium business jets are able operate on the current 6,000-foot Runway 02/20 without significant operational limits in the most common local weather conditions. However, at higher temperatures, passenger and/or fuel load limitations may occur for aircraft in this category and for some multi-engine turboprop aircraft and larger business jets may be more limited by available runway length.

TABLE 4-7: TYPICAL BUSINESS AIRCRAFT RUNWAY REQUIREMENTS

AIRCRAFT	PASSENGERS (TYPICAL CONFIGURATION)	MAXIMUM TAKEOFF WEIGHT	RUNWAY LENGTH REQUIRED FOR TAKEOFF[1]	RUNWAY LENGTH REQUIRED FOR LANDING[2]
Cessna Citation CJ1+	4-6	10,700	3,530	2,660
Cessna Citation CJ2+	6-7	12,500	3,590	3,060
Cessna Citation CJ3	6-7	13,870	3,610	3,140
Cessna Citation CJ4	6-7	16,950	3,440	2,740
Cessna Citation Bravo	6-9	14,800	3,920	3,310
Cessna Citation Excel	7-8	20,000	3,750	3,260
Cessna Citation VII	7-8	22,450	4,950	3,000
Citation Sovereign	9-12	30,300	3,750	2,710
Cessna Citation X	8-12	36,100	5,340	3,530
Learjet 45	7-9	20,500	5,660(a)	3,060(a)
Challenger 300	8-15	37,500	6,440(a)	2,990(a)
Gulfstream 100 (Astra)	6-8	24,650	7,010(a)	3,360(a)
Gulfstream 200 (G-II)	8-10	35,450	7,900(a)	3,770(a)
Gulfstream 300 (G-III)	11-14	72,000	6,630(a)	3,670(a)

1. FAR Part 25 or 23 Balanced Field Length (Distance to 35 Feet Above the Runway); Sea Level, 77 degrees F; Zero Wind, Dry Level Runway, 15 degrees flaps, except otherwise noted.
2. Distance from 50 Feet Above the Runway; Flaps Land, Zero Wind.

(a) For general comparison only. Manufacturer runway length data based on sea level and standard day temperature (59 degrees F) at maximum takeoff/landing weight;

Source: Aircraft manufacturers operating data, flight planning guides.

Runway Width

Runway 02/20 is 150 feet wide which exceeds the 100-foot minimum width dimensional standard for current and forecast general aviation activity, runway approach capabilities and approach visibility minimums. However, as noted earlier, Runway 02/20 is capable of accommodating large military or commercial transport aircraft in a variety of missions critical to both national security and regional emergency response. This capability was preserved in the most recent runway extension/shift and rehabilitation completed in 2006.

Airfield Pavement

As noted in the Inventory Chapter, an updated airfield pavement maintenance and management study for Bremerton National Airport will be completed by WSDOT Aviation in 2013. The updated pavement plan, along with other engineering analyses will be the primary decision making tools for the ongoing maintenance and replacement of airfield pavements. Pavement rehabilitation for Taxiway Alpha and exit taxiways is planned for 2014. Some aircraft apron areas and hangar taxilanes will require rehabilitation or reconstruction during the current planning period. All airfield pavements will require ongoing maintenance. For planning purposes, rehabilitation of asphalt pavements is typically assumed on a 15- to 25-year cycle, depending on use and pavement design. Crack filling and fog/slurry seals should be performed on a regular basis for all asphalt sections to maximize the useful life of the pavement. A prioritized list of pavement rehabilitation or reconstruction projects will be provided in the updated capital improvement program.

Ideally, airfield pavements designed to accommodate all aircraft operating at an airport should have the same weight bearing capacity as the primary runway. Pavements accommodating small aircraft (hangar taxilanes, etc.) are normally designed based on 12,500 pound aircraft weight. In 2010, the pavement strength for Runway 02/20 was evaluated and determined to be 196,000 pounds for dual wheel aircraft landing gear configurations. Taxiway A was rated at 86,000 pounds for dual wheel aircraft and the exit taxiway ratings ranged from 103,000 to 201,000 pounds. The majority of dual wheel aircraft operating at the Airport have maximum operating weights of 100,000 pounds or less, with the majority of business jets weighing less than 75,000 pounds. The appropriate design parameters for the Taxiway A and exit taxiway rehabilitation will be determined in design. However, an asphalt overlay or combination surface grind and overlay may provide a marginal increase in current pavement strength for each section.

Taxiways

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between apron and runways, while other taxiways become necessary as activity increases and safer and more efficient use of the airfield is needed. The existing

taxiway system at Bremerton National Airport provides aircraft access to the runway and all landside facilities.

PARALLEL TAXIWAY

The parallel taxiway (Alpha) serving Runway 02/20 provides efficient access to the runway from the west landside area. No major capacity or service related improvements are anticipated during the current 20-year planning period. The parallel taxiway has six 90-degree connecting exit taxiways and one angled exit taxiway (Foxtrot) that has previously been recommended for replacement with a 90-degree exit. Taxiway Alpha is 40 feet wide, which exceeds the minimum dimensional width standard for ADG II (35 feet). The exit taxiways vary in width, but all meet or exceed the ADG II width standard.

Recent FAA guidance on runway-taxiway connections suggests that direct, unbroken taxiway routes extending from aircraft parking aprons directly to a runway have the potential of creating hot spots for runway safety/incursion. Currently, Taxiways Delta and Echo are configured with direct access from each end of the main apron to the runway, after crossing Taxiway Alpha. A taxiway rehabilitation project is programmed for 2014 and the configuration of the exit taxiways will be examined for possible modification.

As noted earlier in the chapter, the parallel taxiway has aircraft holding areas located near each end of the runway that may require modification to meet the ADG II taxiway object free area (OFA) clearance. Large aircraft located in the hold areas may partially penetrate the parallel taxiway OFA, which by FAA standard should be clear of parked or holding aircraft.

TAXILANES

The future development of new hangars and aircraft parking on the east side of the airport will require additional taxilanes. Access taxiways and taxilanes serving small hangar development are 25 feet wide for ADG I aircraft and 35 feet wide for ADG II aircraft. As noted earlier in this chapter, several existing hangar taxilanes do not meet FAA taxilane object free area clearing standards. While it may not be feasible to relocate existing hangars, new hangars should be configured to meet FAA standards.

The taxilanes located within the main aircraft apron should be configured to provide the standard object free area clearances for the specific aircraft types. Light airplane tiedown rows and adjacent taxilanes are typically designed to accommodate (ADG) I aircraft; parking positions for larger, business class aircraft should be designed based on ADG II taxilane clearing standards. The taxilane centerline to the nearest fixed/moveable object (parked aircraft) of 39.5 and 57.5 feet, correspond to the object free area dimensions for ADG I and II.

Taxiway Echo currently provides primary taxiway access to the main apron for larger business and military aircraft. Taxiway Delta, located at the north end of the main apron provides access to the north

tiedown apron. The option of adding a second ADG II taxilane connection between the main apron and Taxiway Alpha, near mid apron should be considered as a future option to improve ground movement for larger aircraft on the apron.

Airfield Instrumentation, Lighting and Marking

NAVIGATIONAL AIDS

Runway 02/20 currently supports a straight-in precision (ILS) instrument approach to Runway 20 and straight-in nonprecision approaches to Runway 02, including a back course ILS procedure.

Runway 02/20 is equipped with a Category I instrument landing system that includes a glide slope located near the Runway 20 end and a localizer located beyond the end of Runway 02. Both navigation aids have FAA-defined critical areas designed to protect the integrity of the electronic transmission signals. It is noted that all existing exit taxiways for Runway 02/20 are located on the west side of the runway. Future expansion of landside facilities on the east side of the airport will require additional taxiway access. New east side taxiways, particularly taxiways at the north end of the runway, will need to meet all FAA location and "ILS hold" requirements to protect the glide slope, which is located approximately 1,000 feet from the end of Runway 20. The FAA's long range plan for maintaining conventional ground based navigation aids, particularly ILS equipment, remains unclear. However, it is possible that the next generation replacement for the ILS that provides comparable approach capabilities will be based entirely or largely on satellite navigation. However, until a clear replacement platform is identified by FAA, the airspace and protected ground areas associated with the ILS must continue to be protected.

The Port-owned nondirectional beacon (NDB) located on the east side of the airfield was recommended for relocation/removal in the previous master plan based on a need to accommodate future hangar and taxiway development. The decommissioning of the NDB is scheduled for July 2014.

Runways with Category I instrument landing systems (ILS) are often equipped with Runway Visual Range (RVR) instrumentation. Automated RVR systems provide pilots with distances (in feet) where runway markings are visible, compared to normal AWOS visibility measurements in increments of a mile. The RVR sensors are installed adjacent to the runway at one or more points in order to provide accurate, unbroken line of sight measurements along the entire length of the runway. The addition of RVR on Runway 02/20 may be considered to improve the operational capabilities of the current instrument approaches and weather reporting.

RUNWAY/TAXIWAY LIGHTING

As noted in the Inventory Chapter, the lighting systems associated with Runway 02/20 and the major taxiways are all in good operating condition. Normal replacement of lighting systems is usually assumed

between 20 and 30 years, although installations in marine environments often have shorter useful lives. For planning purposes, the updated capital improvement program will include replacement for any existing lighting system that reaches 25 years old during the current planning period.

The previous master plan recommended installation of runway end identifier lights (REIL) on Runway 02 (done) and replacement of the 2-light precision approach path indicator (PAPI) on Runway 20 with a 4-light PAPI (done). The 2006 Airport Layout Plan (ALP) identifies a future runway protection zone (RPZ) for Runway 02 based on approach visibility minimums "not lower than ¾-mile." This normally requires installation of an approach lighting system (ALS), similar to the MALS-R on Runway 20. However, the ALP does not depict a future ALS and the capital improvement program does not include an ALS project for Runway 02. This recommendation will be evaluated in the alternatives analysis.

RUNWAY MARKINGS

Runway 02/20 has precision instrument markings on the Runway 20 end and non-precision markings on the Runway 02 end, consistent with existing instrument approach capabilities (threshold marking bars, runway end numbers and aiming point markings located approximately 1,000 feet from each end of the runway). The markings were applied during the runway shift and rehabilitation projects and will require periodic repainting as they wear. The runway exit taxiways have yellow aircraft hold line markings located 250 feet from runway centerline, which meets the runway obstacle free zone (OFZ) and runway safety area (RSA) clearing standard.

The runway designation numbers (02/20) will be changed to "02/20" in an upcoming project due to changes in magnetic declination.

AIRFIELD SIGNAGE

The lighted airfield signage (location, mandatory, directional, destination, and distance remaining signs) are internally illuminated and are in generally good condition.

AIRFIELD LIGHTING

The airfield lighting systems (airport beacon, wind cones) are in good condition and reportedly function normally.

On Field Weather Data

The airport has an Automated Weather Observation System (AWOS-3), which allows aircraft licensed under FAR Part 135 (air taxi/charter) and private aircraft operating under FAR Part 91 to operate in IFR conditions. The AWOS provides weather data to support airport operations in both visual and instrument conditions. Local pilots have indicated that a need exists to upgrade the existing AWOS unit to provide

additional weather data. Options for adding sensors to the existing system or upgrading the entire system will be examined.

Landside Facilities

For general aviation airports, landside facilities are generally defined as those that serve aircraft, passenger needs and their related functions. At Bremerton National Airport, landside facilities include aircraft aprons, hangars, fixed base operator (FBO), and aircraft fueling facilities.

The airport currently has one full service FBO (Avian Flight Center) that provides a variety of services to local and transient aircraft and flight training. Currently, all aviation services are provided on the west side of the runway. Future development of landside facilities on the east side of the runway should include space to accommodate additional FBO and aircraft fueling facilities. The development of landside facilities on both sides of a runway often results in split operations for FBO and fueling services, which in turn, creates additional demand for hangar and aircraft parking space. To the extent feasible, it is preferable to minimize taxiing distances and reduce the frequency of runway crossings by providing adequate landside facilities, such as aircraft parking and hangars, capable of supporting each development area. However, local market conditions generally dictate the economic feasibility of serving physically separated landside facility areas with services such as fuel.

The 2006 Airport Layout Plan depicts a future airport service road extending from the north end of the west landside area to the east landside area. New FAA guidance on roads within runway protection zones (RPZ) is now being applied to on-airport service roadways in addition to public roadways. Current FAA airport design standards recommend routing airport service roads around the perimeter of RPZs when possible. Options for providing future on-airport service roads for airport maintenance, emergency and service vehicles will be included in the alternatives analysis.

As noted in the Inventory chapter, the west landside area of the Airport has reached a development limit based on capacity limitations of existing stormwater basins and readily developable sites. As a result, it is anticipated that most new hangar development and other support facilities will be located on the east side of Runway 02/20. In order to accommodate new east side development, extensions or upgrades will be required to existing surface access, utilities and stormwater systems.

The 2006 Airport Layout Plan does not depict a future FBO or aircraft parking apron on the east side of runway, although for long-term planning purposes, options for establishing development areas or reserves to accommodate business and general aviation aircraft should be considered.

AIRCRAFT PARKING AND TIEDOWN APRON

Aircraft aprons provide parking for locally based aircraft that are not stored in hangars and for transient aircraft visiting the airport and for specialized ground operations such as aircraft fueling or air cargo. At Bremerton National Airport, the main apron area accommodates parking for large and small fixed wing aircraft and helicopters. Additional small airplane parking is provided in the south tiedown area, near the Avian Flight Center and fueling area. The Airport's aircraft fueling island is located immediately south of the Avian Flight Center.

The main apron area currently has 48 small airplane tiedowns in two west-facing rows and the south tiedown area has 23 small airplane tiedowns in one dual-sided row. As noted earlier, the spacing of the taxilanes serving the tiedowns does not fully conform to FAA taxilane object free area standards. Options for reconfiguring the existing aircraft parking aprons to meet FAA taxilane design standards will be evaluated in the airport development alternatives. The current capacity of 71 small airplane tiedowns may change, depending on the need for reconfiguration to meet FAA design standards.

In order to address the uncertainty associated with predicting long term demand, aircraft apron reserve areas should be identified to preserve the Airport's ability to accommodate user needs. A development reserve area equal to 50 to 100 percent of the net twenty year parking demand (net demand above available capacity) will provide a conservative planning guideline to accommodate unanticipated demand, changes in existing apron configurations, and demand beyond the current planning period. The location and configuration of the development reserves will be addressed in the alternatives analysis.

Light Aircraft Parking Demand (Local and Itinerant)

For planning purposes, it is assumed that 85 percent of forecast based aircraft will be stored in hangars and 15 percent will use apron parking. Based on the projected increase over the twenty year planning period, **41 light aircraft tiedowns will be required for locally based aircraft by 2032**. These estimates may prove to be overly optimistic in gauging apron parking demand for based aircraft as additional hangar space is developed at the Airport. However, this approach will ensure that adequate apron is preserved for long term use.

FAA **Advisory Circular 150/5300-13** suggests a methodology by which itinerant parking requirements can be determined from knowledge of busy day operations. Future demand for itinerant parking spaces was estimated based on 40 percent of design day itinerant operations (40% of daily itinerant operations divided by two, to identify peak parking demand). The FAA planning criterion of 360 square yards per itinerant aircraft was applied to the number itinerant spaces to determine future itinerant ramp requirements. **By 2032, itinerant aircraft parking requirements are estimated to be 25 aircraft positions**. It is anticipated that the parking requirements would include space for small airplanes,

business aircraft and helicopters (see below). Projected aircraft parking requirements are summarized in **Table 4-8**.

Corporate Aircraft Parking

The Airport accommodates regular itinerant business aircraft activity including turboprops and business jets in the apron area adjacent to the Avian Flight Center. As noted earlier, this section of apron is not marked with specific aircraft parking positions, but the apron appears to be large enough to accommodate projected demand for business aircraft parking. The alternatives analysis will evaluate aircraft parking configuration options for this section of apron that meet FAA design standards for taxilane clearance and provide efficient movement of aircraft.

Initially, it appears that four parking positions (drive-through) for transient corporate aircraft are adequate to accommodate current typical peak demand adjacent to the general aviation terminal/FBO. It is estimated that six business aircraft parking positions will be needed by 2032. In the event that additional FBO facilities are developed on the east side of the airport, a portion of the projected demand may need to be accommodated in different areas.

Air Cargo Aircraft

Bremerton National Airport accommodates daily small package express flights with Cessna Caravan single-engine turbine aircraft or a variety of multi-engine turboprops. 1 or 2 designated parking spaces with adequate space for aircraft loading/unloading and support vehicle access appears to be adequate for current and projected needs.

Helicopter Parking

Bremerton National Airport accommodates locally based and transient helicopters, including aircraft used in flight training. It appears that providing parking for 1 or 2 transient helicopters will be adequate for the foreseeable future. Longer term demand may require additional helicopter parking. Peninsula Helicopters also uses a portion of the main apron for aircraft parking during normal business hours.

Aircraft Fueling Apron

The existing aircraft fueling area can accommodate two small aircraft simultaneously at the fuel island. The covered fueling area appears to be adequate for current and projected use, although as noted earlier, the need to develop new hangars and related facilities on the east side of the runway may require a second fixed-point fueling area to serve the east flight line.

AIRCRAFT HANGARS

Bremerton National Airport accommodates a wide variety of hangars including commercial hangars and hangars used primarily for aircraft storage. It is estimated that 85 percent of the airport's 192 based aircraft are stored in hangars, with the remaining aircraft parked on aircraft apron. For planning purposes, it is assumed that existing hangar space is committed and all additional (forecast) demand would need to be met through new construction.

As indicated in the aviation activity forecasts, the number of based aircraft at Bremerton National Airport is projected to increase by 84 aircraft during the twenty year planning period. Based on a projected 85 percent hangar utilization level, additional long term demand for new hangar space is estimated to be 71 spaces (approximately 106,500 square feet). A planning standard of 1,500 square feet per based aircraft stored in hangars is used to project gross space requirements. The projected hangar requirements for aircraft storage at Bremerton National Airport are presented in **Table 4-8.**

In addition to aircraft storage, additional demand for business related and commercial hangar needs is anticipated. Specialized aviation service businesses such as engine & airframe repair, avionics, interior and paint shops generally prefer locations that provide convenient aircraft access. Highly successful aviation service businesses generally rely on both locally based aircraft and their ability to attract customers from outside the local area. While there is no specific formula to predict demand for general aviation service businesses at a particular airport, reserving several spaces for larger commercial hangars is recommended.

Individual aircraft owners needs vary and demand can be influenced by a wide range of factors beyond the control of an airport. In addition, the moderate forecast growth in based aircraft may be exceeded if conditions are favorable. For this reason, it is recommended that hangar development reserves be identified to address the uncertainty of hangar market conditions and demand factors. Conservative development reserves should be established to accommodate a combination of conventional hangars and T-hangars, roughly equal to 50 to 100 percent of the twenty year forecast (net) demand. The location and configuration of the development reserves will be addressed in the alternatives analysis.

TABLE 4-8: APRON AND HANGAR FACILITY REQUIREMENTS SUMMARY

ITEM	BASE YEAR (2012)	2017	2022	2027	2032
Based Aircraft Forecast	**192**	**209**	**230**	**252**	**276**
Aircraft Parking Apron ***(Note: capacities reflect current configuration of existing public use apron areas, actual capacity when reconfigured may be different.)***					
Small Aircraft Tiedowns (SE/ME)	71				
Large Aircraft Parking Positions	5-10				
Small Helicopter Parking Spaces	0*				
Air Cargo Aircraft Parking Spaces	0*				
Total Designated Parking Spaces Available	76-81*				
Total Apron Area *(includes taxilanes and unusable space required for hangars access)*	45,000 sy (estimated)				
Projected Needs (*Gross Demand)* [1]					
Small Airplane Itinerant Tiedowns (@ 360 SY each)		11 spaces / 3,960 sy	11 spaces / 3,960 sy	12 spaces / 4,320 sy	13 spaces / 4,680 sy
Locally Based Tiedowns (@ 300 SY each)		31 spaces / 9,300 sy	35 spaces / 10,200 sy	38 spaces / 11,400 sy	41 spaces / 12,300 sy
Business Aircraft Parking Positions (@ 625 SY each)		4 spaces / 2,500 sy	5 spaces / 3,125 sy	5 spaces / 3,125 sy	6 spaces / 3,750 sy
Small Helicopter Parking Positions (@ 380 SY each)		2 spaces / 760 sy	2 spaces / 760 sy	3 spaces / 1,140 sy	4 spaces / 1,520 sy
Air Cargo Parking Demand (@ 625 SY each)		1 space / 625 sy	1 space / 625 sy	2 spaces / 1,250 sy	2 spaces / 1,250 sy
Total Apron Needs		**49 spaces 17,145 SY**	**54 spaces 18,670 SY**	**60 spaces 21,235 SY**	**66 spaces 23,500 SY**
Aircraft Hangars ***(Existing Facilities)***					
Existing Hangar Spaces	Approx. 151 spaces (AC storage)				
Projected Needs ***(Net Increase in Demand)*** [2]					
(New) Hangar Space Demand (@ 1,500 SF per space) *(Cumulative twenty year projected demand: 71 spaces / 106,500 SF)*		**+14 spaces / 21,000 sf**	**+18 spaces / 27,000 sf**	**+19 spaces / 28,500 sf**	**+20 spaces / 30,000 sf**

* These aircraft are accommodated on the main apron (open areas)

1. Aircraft parking demand levels identified for each forecast year represent forecast gross demand.
2. Hangar demand levels identified for each forecast year represent the net increase above current hangar capacity.

AIRCRAFT WASH DOWN FACILITIES

Wash down facilities are recommended to accommodate general aviation aircraft with a catch basin and hard piping to divert wash residue into a sewer or stormwater treatment system. Wash facilities are typically sized to accommodate one aircraft on a pad approximately 50 feet by 50 feet. The wash pad may be located adjacent to existing parking apron or hangars; close access to utility systems is a key siting factor.

SURFACE ACCESS AND VEHICLE PARKING

The primary surface access to the Airport is provided by State Highway 3. The Airport's west landside area is accessed by one direct connection to the highway and a frontage road that extends the entire length of the area.

Vehicle access to the east landside area is provided Airport Way, which connects to Highway 3 on the north end of the Airport. All existing developed landside areas on the Airport are served by internal access roads.

The future development of landside facilities on the east side of Runway 02/20 is expected to contribute to an increase in airport ground vehicle activity, including airport fuel trucks. To maintain a safe operating environment, only airport maintenance, emergency and snow removal vehicles should be permitted on the runway taxiway system. The recommended alignment for an airport service road depicted on the 2006 Airport Layout Plan will be reevaluated based on current FAA standards.

Vehicle Parking

The west landside area has several areas used for vehicle parking in the terminal area, adjacent to the road system and within individual lease areas. Some of the vehicle parking is paved, other areas are gravel surfaced. Expansion of dedicated vehicle parking areas adjacent to existing and future hangar developments should be considered to address vehicle parking on taxilanes.

AGRICULTURAL AIRCRAFT FACILITIES

There are currently no designated agricultural aircraft facilities at the Airport. There is no indication of current need to accommodate this type of use at the Airport.

AIR TRAFFIC CONTROL TOWER

Based on current and forecast air traffic levels, it does not appear that the Airport will reach activity levels needed to justify an Air Traffic Control Tower (ATCT). The FAA is currently evaluating options for closing several control towers at lower activity commercial service and general aviation airports. Historically, airports accommodating 75,000 to 100,000 annual operations were considered viable

candidates for siting a control tower. However, recent cost-cutting efforts have focused on closing towers at airports with annual operations in this range, or higher.

Support Facilities

AVIATION FUEL STORAGE

The Port-owned aviation fuel storage and dispensing facilities appear to be adequate to accommodate current demand. However, as noted earlier, future landside development on the east side of the airport may drive the need to provide additional fueling facilities. For planning purposes, a development area capable of accommodating two 12,000-gallon aboveground fuel storage tanks and multiple aircraft fueling positions should be incorporated into all east landside development options.

The development of secondary containment areas for mobile fuel truck parking should also be considered. Most mobile fuel trucks in use today have single wall tank construction and do not provide the secondary containment of double wall aboveground bulk storage tanks. It is anticipated that federal or state regulations will eventually require secondary containment for single wall tank mobile fuel trucks when unattended, such as for overnight parking when the trucks are not in service or otherwise monitored. Locating secondary containment areas for airport fuel trucks in close proximity to the bulk fuel storage areas may be the most efficient use of land in the terminal area.

AIRPORT UTILITIES

The existing utilities on the airport appear to be adequate both in capacity and service within the developed areas of the airport. However, extensions of water, sanitary sewer, electrical, fiber optics and telephone service to serve future east landside developments will be required to support future expansion. All electrical power service in the vicinity of the airfield is required to be buried.

Another significant element in future master planning will be storm water detention and management. As noted earlier, the stormwater basins serving the west landside area are at or near capacity. In addition, airport management anticipates a potential requirement in the future to modify the existing stormwater detention pond and dam located near the south end of the runway to comply with fish passage requirements. The addition of large areas of impervious surfaces on the east side of the runway will also require upgrades in stormwater conveyance and storage. Stormwater system requirements will be evaluated as part of the alternatives analysis based on projected runoff levels for existing and future impervious surfaces.

Security

The Airport's existing perimeter fencing and controlled access gates appear to provide adequate security for current development. Expansion of landside facilities on the east side of the airfield will require modifications in fencing and gate access to accommodate future development.

Flood lighting should be provided in expanded aircraft parking and hangar areas and any other new development areas on the airport to maintain adequate security. The use of full or partial cutoff light fixtures is recommended for all exterior lighting on the airport to limit upward glare.

Facility Requirements Summary

The projected twenty year facility needs for Bremerton National Airport are summarized in **Table 4-9**. As noted in the table, maintaining existing pavements represents a significant, ongoing facility need. The updated forecasts of aviation activity anticipate moderate growth in activity that will result in similarly moderate airside and landside facility demands beyond existing capabilities. The existing airfield facilities have the ability to accommodate a significant increase in activity, with targeted facility improvements. For the most part, the need for new or expanded facilities, such as aircraft hangars, will be market driven, although there will be significant front end investments required in preparation, utility extensions, road extensions, and taxiway construction for new development on the east side of the airfield. The nonconforming items noted at the beginning of this chapter are relatively minor and can be addressed systematically during the current planning period to improve overall safety for all users.

TABLE 4-9: FACILITY REQUIREMENTS SUMMARY

ITEM	SHORT TERM	LONG TERM
Runway 02/20	Pavement Maintenance[1] Replace Runway Designation Numbers to "2" and "20"	Pavement Maintenance[1] Pavement Rehabilitation
Taxiways	Rehabilitate Taxiway A and Exit Taxiways Reconfigure Taxiway F to 90-degree Exit Potential Reconfiguration of Taxiways D and E to address FAA "hot spot" design considerations Access Taxiways to East Landside Area Taxilanes in New Hangar Areas Pavement Maintenance[1]	Pavement Maintenance[1] Taxiways/Taxilanes to New Hangar Areas Rehabilitate West Hangar Taxilanes Additional Taxilane Connection on Main Apron to Taxiway A (optional) East Parallel Taxiway (Reserve)
Aircraft Aprons	Reconfigure Main Apron and South Tiedown Apron (rehabilitate/reconstruct older sections) to meet FAA Design Standards Pavement Maintenance[1]	Pavement Maintenance[1] Apron Development Reserves (East Landside Area)

Hangars	West Landside Area: Infill Development East Landside Area: Define development Areas for T-hangars, Conventional Hangars, and Commercial Hangars	Hangar development reserves
Navigational Aids and Lighting	Evaluate Replacement/Upgrade of AWOS-3	Evaluate NDB Removal Runway Visual Range (RVR) (optional) Runway 02 Approach Lighting (optional) Replace Runway 20 MALS-R Replace HIRL and MITL(at end of useful life) Next Generation Precision Instrument Approach System
Fuel Storage	Establish East Landside Aviation Fuel Storage Reserve Identify Secondary Containment Area(s) for Fuel Truck Parking	Same
FBO	Identify East Landside FBO reserve(s)	Same
Utilities	Extend Service to New Development Areas Update Stormwater Management Plan Upgrade/Expand Stormwater Conveyance and Storage System Capacity	Same
Roadways & Vehicle Parking	Extend/Improve Roads to New Development Areas Add Vehicle Parking in Existing/Future Hangar Areas Construct New Internal Airport Service Road to Connect West and East Flightlines	Same
Security	Modify Perimeter Fencing and Automated Gates for new landside areas Flood Lighting	Same

Vegetation control, crackfill, sealcoat, slurry seal, localized patching, joint rehabilitation, etc., as required.

Airfield Capacity

Annual service volume (ASV) is a measure of estimated airport capacity and delay used for long-term planning. ASV, as defined in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay, provides a reasonable estimate of an airport's operational capacity. The ratio between demand and capacity helps to define a timeline to address potential runway capacity constraints before they reach a critical point. If average delay becomes excessive (greater than 3 minutes per aircraft), significant congestion can occur on a regular basis, which significantly reduces the efficient movement of air traffic. ASV is calculated based on the runway and taxiway configuration, percent of VFR/IFR traffic, aircraft mix, lighting, instrumentation, the availability of terminal radar coverage and the level of air traffic control at an airport.

The 2004 Airport Master Plan did not analyze annual airfield capacity. However, for long-term planning purposes, the FAA estimates annual capacity (ASV) for a single runway with no air carrier traffic is approximately 230,000 operations; hourly capacity is estimated to be 98 operations during visual flight rules (VFR) conditions and 59 operations during instrument flight rules (IFR) conditions. Although these estimates assume optimal conditions (air traffic control, etc.), they provide a reasonable basis for approximating existing and future capacity:

Existing Capacity: 55,558 Annual Operations / 230,000 ASV = 24.2% (demand/capacity ratio)

Future Capacity: 90,503 Annual Operations/ 230,000 ASV = 39.4% (demand/capacity ratio)

Based on these ratios, the average delay per aircraft would be expected to remain below one minute through the planning period. The FAA recommends that airports proceed with planning to provide additional capacity when 60 percent of ASV is reached. As indicated in the updated aviation activity forecasts, peak hour activity is projected to remain well below the 60 percent threshold during the planning period.

In the event that the runway-taxiway system begins to experience periodic periods of congestion leading to increase delay, one or more existing 90-degree exit taxiways could be modified to provide high speed exit capabilities for aircraft to reduce runway occupancy time for landing aircraft. In addition, the location and configuration of aircraft holding areas can be examined to enhance aircraft ground movement.

Chapter 5 – Airport Development Alternatives

Chapter 5 – Airport Development Alternatives

The evaluation of future development options represents a critical step in the airport master planning process. The primary goal is to define a path for future development that provides an efficient use of resources and is capable of accommodating the forecast demand and facility needs defined in the master plan.

Introduction

As noted in the facility requirements evaluation, current and long term planning for Bremerton National Airport is based on maintaining and improving the airport's ability to serve a wide range of general aviation and business aviation aircraft.

All proposed facility improvements are consistent with applicable FAA airport design standards and FAR Part 77 airspace planning standards. Airplane Design Group II (ADG II) standards are recommended for all facilities including the runway, major taxiways, aircraft parking apron and access taxiways used by business aircraft. Aircraft tiedown aprons and hangar taxilanes used exclusively by smaller aircraft are typically designed based on Airplane Design Group I standards. For hangar areas with a variety of hangar sizes, the largest hangar door width determines the maximum size of aircraft to be accommodated. All proposed improvements are compatible with protecting and enhancing the Airport's existing precision instrument approach capabilities.

Evaluation Process

Creating preliminary alternatives represents the first step in a multi-step process that leads to the selection of a preferred alternative. It is important to note that the current FAA-approved airport layout plan (ALP) identifies future improvements that were the product of the last master planning process. The master plan update provides a fresh look at addressing facility needs, but also allows the components of the previous preferred alternative to be retained if they meet current needs.

The preliminary alternatives are evaluated to identify general preferences for both individual items and the overall concepts being presented. The process will allow the widest range of ideas to be considered and the most effective facility development concept to be defined. From this evaluation process, elements of a preferred alternative will emerge that can best accommodate all required facility improvements. The Consultant will integrate these items into a draft preferred alternative that will be reviewed and refined as the Port proceeds through the process of selecting a final preferred development alternative for Bremerton National Airport. Throughout this process, public input and coordination with the FAA will also help to shape the preferred alternative.

Once the preferred alternative is selected by the Port, a detailed capital improvement program is created that identifies and prioritizes specific projects that can be implemented. The elements of the preferred alternative are integrated into the updated airport layout plan (ALP) drawings that will be used to guide future improvements at the airport.

Executive Summary

A preferred alternative was developed through the evaluation process described above. For the convenience of the reader, an executive summary of the preferred alternative is presented on the following page. The original sequence and process of evaluation that was reflected in draft working papers is maintained in the sections that follow the executive summary.

The Bremerton National Airport Master Plan Update has defined current and future airport facility needs for the next twenty years. A primary goal of the airport master plan is to provide the Port of Bremerton with a realistic and economical path for facility development that meets their operational and financial requirements, while meeting all Federal Aviation Administration (FAA) standards.

The preferred development alternative for Bremerton National Airport has three primary components or areas of emphasis: the runway-taxiway system (airside), the existing west development area (west landside), and the new east development area (east landside).

The existing airfield facilities at Bremerton National Airport have been designed, constructed and maintained to a very high standard. By starting with excellent facilities, only minor improvements or changes in configuration are recommended to improve operational safety, efficiency and these projects will be interspersed with new development through the planning period.

RUNWAY-TAXIWAY

There are no changes to Runway 2/20 recommended in the current twenty year planning period. Runway extension reserves are identified at both ends as place holders that may be triggered by future events that cannot currently be quantified.

Minor improvements are recommended for the west parallel taxiway and South aircraft hold area. A new aircraft hold area is planned for the north end of the west parallel taxiway.

A parallel taxiway will be constructed on the east side of Runway 2/20 to serve future aviation related development as needed. A new access taxiway will added from the north end of the runway to serve new landside facilities in the east landside area.

WEST LANDSIDE AREA

Improvements in the west landside area include reconfiguration of the existing north and south aircraft tiedown aprons to meet FAA design standards and targeted areas of infill development for new hangars and a new aviation fuel storage area.

A new hangar area will be developed at the south end of the west landside area. The south hangar area development will accommodate approximately 48 small aircraft, which is about half the of airport's forecast growth in based aircraft over the next 20 years. The south hangar area will require taxiway, vehicle access, and vehicle parking improvements.

EAST LANDSIDE AREA

The east landside area is a new aviation use development located along the airport's former second runway, which has been closed for 20+ years. The existing raceway drag strip facilities located on the closed runway are planned for relocation which will allow redevelopment for aviation use. The area is largely undeveloped and will require access, utility and stormwater improvements. The planned development provides a compact site that minimizes potential impacts on environmentally sensitive areas.

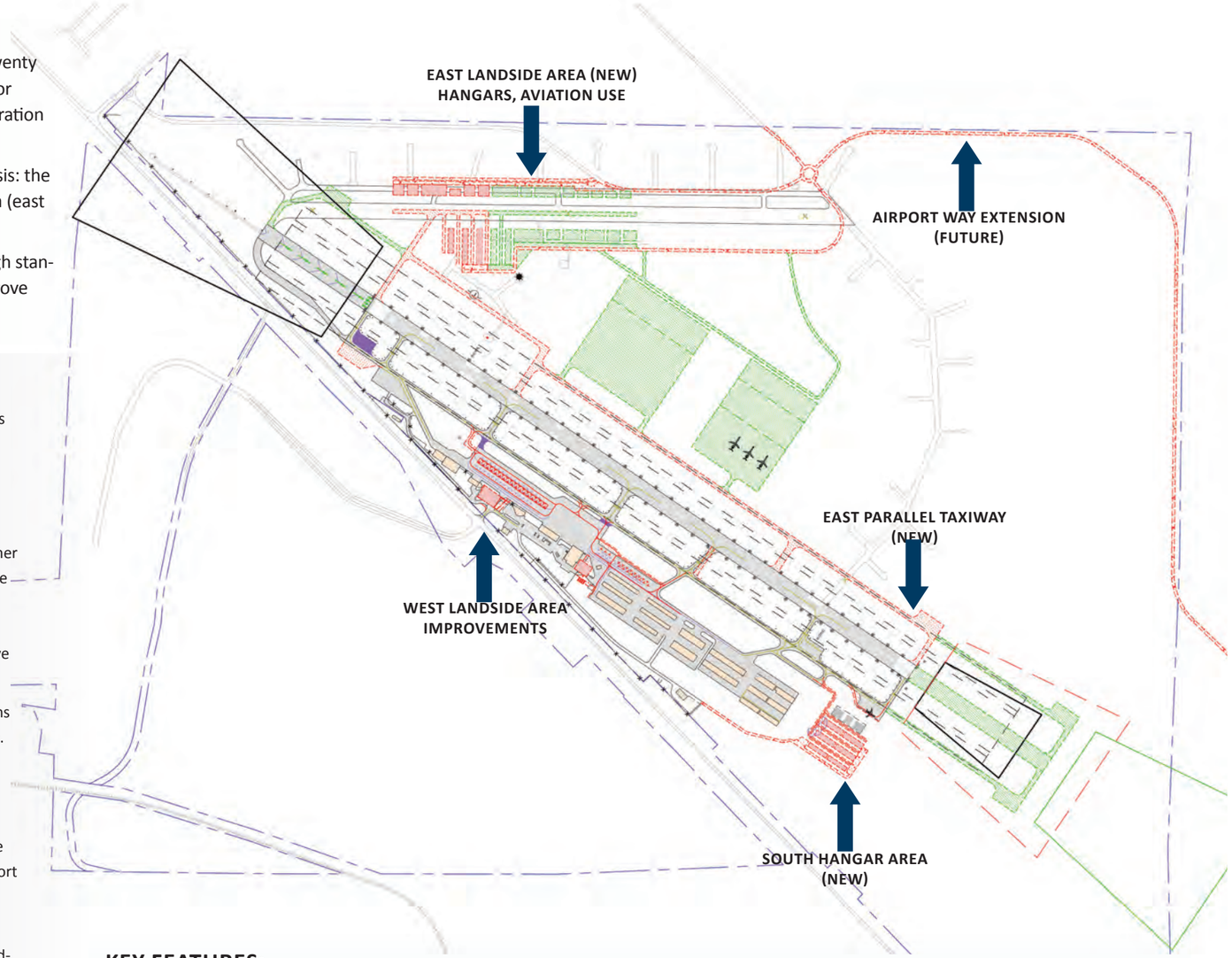
The additional hangar capacity provided in the east landside area will be developed based on demand, particularly for new business aviation tenants requiring larger hangars. The area will accommodate a variety of hangars for large and small aircraft, including mixed use facilities capable of accommodating aircraft storage other functions for both individual and commercial tenants.

Hangar sites are located along the east and west sides of the former runway. When combined with planned hangar development in the west landside area, the northern section of the east hangar area provides enough capacity to meet the airport's 20-year forecast demand. Additional capacity is provided by a development reserve in the southern section of the hangar area.

Vehicle access to the area will be provided through new connections to the Airport Way, which travels along the eastern side of the area.

Two aviation development reserves are identified south of the hangar development area. One reserve is for an aircraft parking apron and fixed base operation (FBO) area that could accommodate hangars, buildings and aircraft fueling. The demand for these facilities could occur as the east landside area develops and support services are needed.

The second development reserve is a commercial airline terminal area that includes space for aircraft parking, a small terminal building complex and vehicle parking. This reserve is designed to create a placeholder (land area) capable of accommodating the facility development that would be needed in the event that commercial air service for Bremerton was established. There is no timeframe associated with this potential need and the development reserve is recommended to preserve the option for the future.



KEY FEATURES:

RUNWAY/TAXIWAY SYSTEM

- Maintain current capabilities (length, width, instrumentation, lighting)
- Runway extension reserves
- Limited reconfiguration of exit and connecting taxiways on west parallel taxiway
- Future east parallel taxiway

WEST LANDSIDE AREA

- Infill development/redevelopment
- Transient aircraft storage hangar
- Above ground fuel storage tanks and containment/ parking area for fuel trucks
- New south hangar area (will accommodate approximately 48 small aircraft)
- Aircraft parking apron reconfiguration to meet FAA standards

EAST LANDSIDE AREA (NEW)

- Aircraft hangars (conventional and multi-unit storage)
- Mixed-use hangar sites intended to accommodate business and commercial tenants
- New access taxiway from north end of the runway
- New surface access to connect to existing/ future sections of Airport Way
- Long term development reserves identified for general aviation and commercial air terminal areas

No-Action Alternative

In addition to proactive options that are designed to respond to future facility needs, a "no-action" option also exists, in which the Port may choose to maintain existing facilities and capabilities without investing in facility upgrades or expansion to address future demand. The existing airfield configuration would remain unchanged from its present configuration and the airport would essentially be operated in a "maintenance-only" mode.

The primary result of this alternative would be the inability of the airport to accommodate forecast aviation demand beyond current facility capabilities. Future aviation activity would eventually be constrained by the capacity, safety and operational limits of the existing airport facilities.

The no-action alternative concept establishes a baseline from which the action alternatives can be developed and compared. The purpose and need for the action alternatives is defined by the findings of the forecasts and facilities requirements analyses. Forecast aviation activity and the factors associated with increased activity (potential for congestion, safety, etc.) are the underlying rationale for making facility improvements. Market factors (demand) effectively determine the level and pace of private investment (hangar construction, business relocation to the airport, etc.) at an airport. Public investment in facilities is driven by safety, capacity and the need to operate an airport on a financially sustainable basis.

Based on the factors noted above, the no-action alternative is inconsistent with the management and development policies of the Port of Bremerton and its long-established commitment to provide a safe and efficient public air transportation facility that is socially, environmentally, and economically sustainable.

Preliminary Development Alternatives

The facility needs identified in the previous chapter include a variety of airside (runway-taxiway) and landside needs (aircraft parking, hangars, fueling, support facilities, etc.). Items such as fencing, lighting improvements, minor roadway extensions and pavement maintenance do not typically require an alternatives analysis and will be incorporated into the preferred development alternative. The preliminary alternatives have been organized into three groups to address these broad needs and other related needs:

- **Airside Development Options (Runway/Taxiway)**
- **West Landside Improvement Options**
- **East Landside Improvement Options**

The preliminary development alternatives are described below with graphic depictions (**Figures 5-1 through 5-8**) provided to illustrate the key elements of each alternative. The preliminary alternatives are

intended to facilitate a discussion and evaluation about the best path to meet the facility needs of the airport.

It is important to note that the eventual preferred alternative selected by the Port may come from one of the preliminary alternatives, a combination or hybrid of the preliminary alternatives, or a new concept that evolves through the evaluation and discussion of the preliminary alternatives. Once the elements of the preferred alternative are defined, they will be integrated into the updated Airport Layout Plan (ALP) as "future" development and the individual projects will be included in the updated capital improvement program.

AIRSIDE DEVELOPMENT OPTIONS (RUNWAY – TAXIWAY IMPROVEMENTS)

As noted in the Facility Requirements chapter, Runway 02/20 is capable of accommodating the current and future design aircraft (medium business jets) under most weather conditions. The runway is also capable of accommodating larger business jets, transport, and military aircraft with varying operational limits. Long term development reserves for runway improvements are proposed. An east side parallel taxiway is proposed to provide access to future aviation development areas on the east side of the runway. Minor improvements to the aircraft hold areas on the west parallel taxiway (Taxiway A) are proposed. Taxiway F is reconfigured to provide a 90-degree exit connection to the runway. The proposed runway-taxiway improvements and development reserves are depicted in **Figure 5-1** and summarized below.

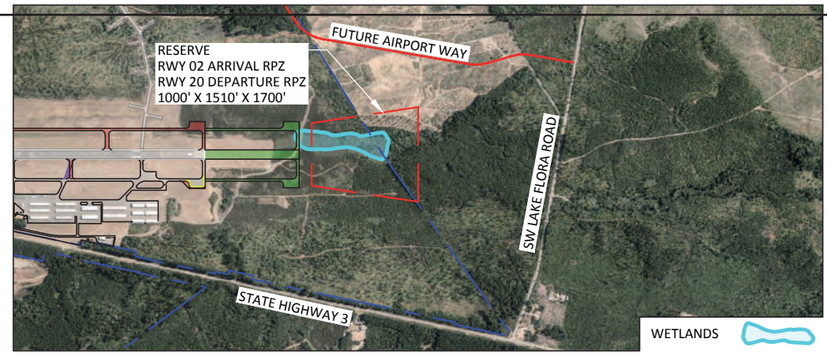
Development Reserves

With current and projected needs addressed for the current twenty year planning period, the Port has also expressed an interest in preserving operational capabilities that may occur either beyond the current planning period, or through a significant, unanticipated change in market demand.

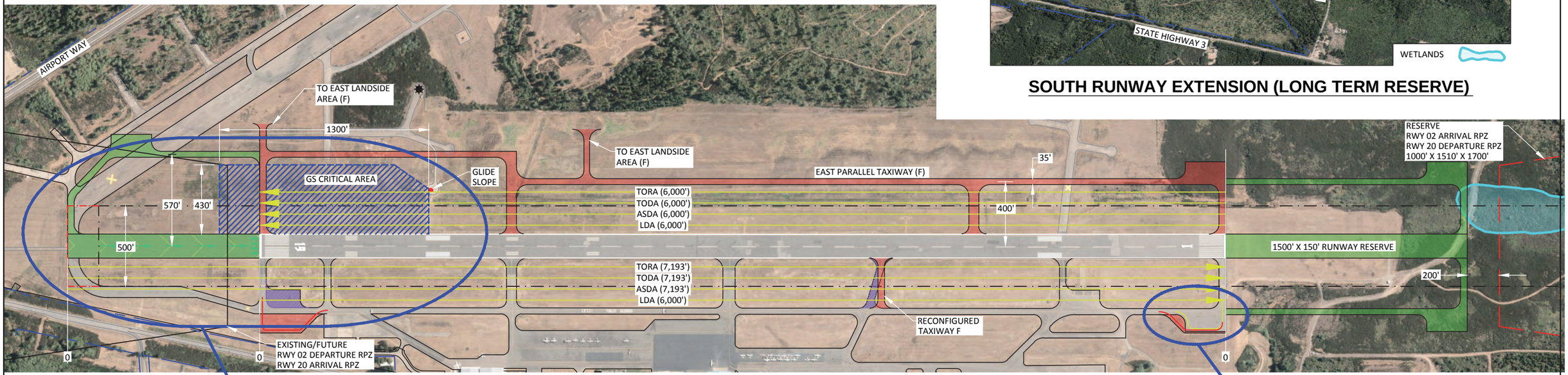
The potential for Bremerton National Airport to accommodate commercial air service has been a of topic of discussion for decades and continues to be acknowledged in the current Washington Long Term Air Transportation Study (LATS). The presence of a large military population and employment base could also create a unique market niche that could support specialized air service. Airport management reports that airlines periodically expressing interest in Bremerton have indicated that a runway length of 7,000 feet would be ideal for their aircraft fleets. Another activity that could produce demand for increased runway length at the Airport is the effort spearheaded by the Kitsap Aerospace and Defense Alliance (KADA), a public-private partnership, to attract and expand the commercial and defense aerospace industry to the local area. The ability to accommodate a wide range of military and transport aircraft similar to other Puget Sound airports with existing aircraft manufacturing capabilities is considered to be a critical element in attracting prospective activity. A runway length of 7,500 to 8,000 feet is believed to be capable of serving this segment of activity at Bremerton National Airport.

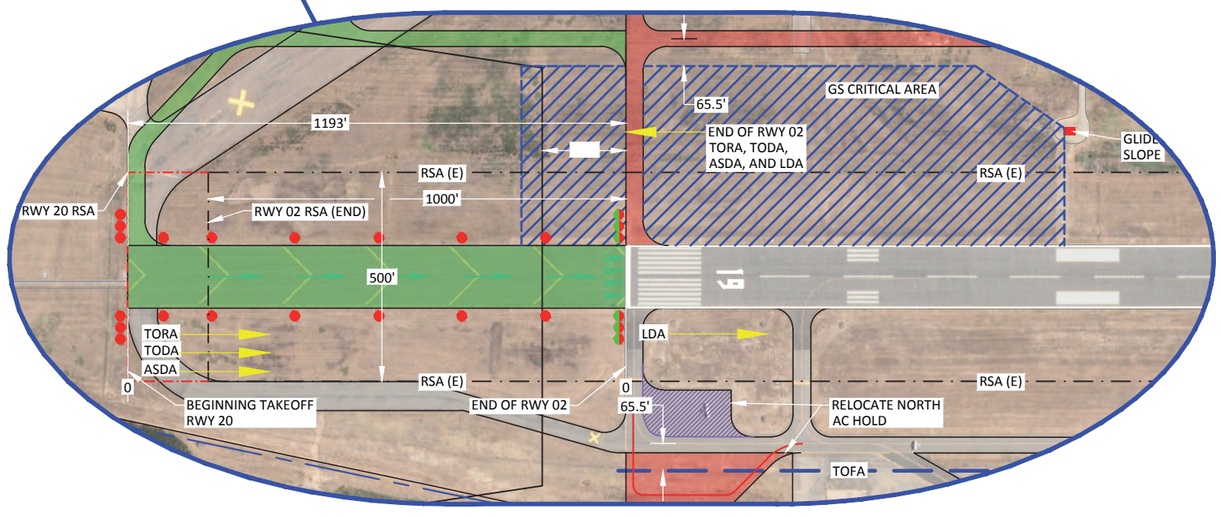
Two runway improvement reserves are proposed to address the potential development opportunities noted above. The runway improvement reserves are intended to protect long-term development options and to identify potential land use and surface transportation needs. It is recognized that sufficient justification for the runway improvements will be required by FAA in order for the projects to be eligible for FAA funding. As development reserves, these improvements would be depicted on the updated airport layout plan (ALP), but projects would not be included in the airport's FAA-approved 20-year capital improvement program (CIP) at this time.

Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.

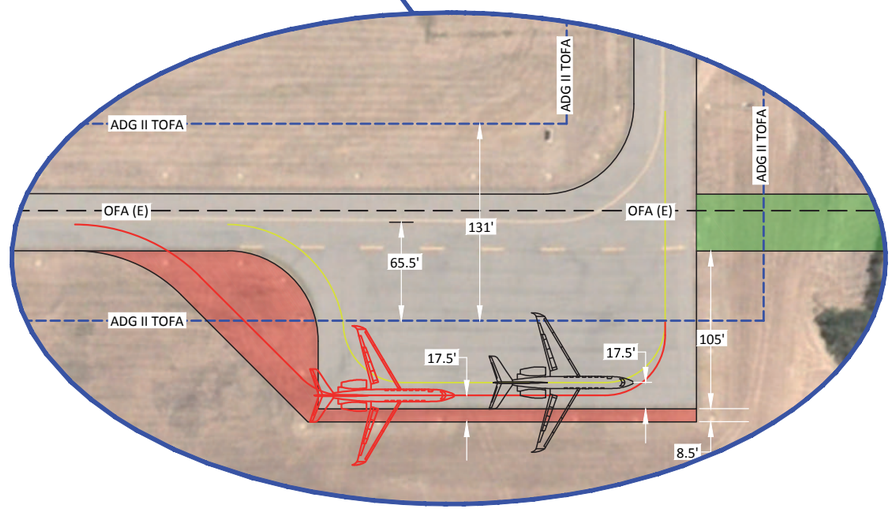


SOUTH RUNWAY EXTENSION (LONG TERM RESERVE)





DISPLACED THRESHOLD (RESERVE)



SOUTH AC HOLD AREA

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

RUNWAY/TAXIWAY IMPROVEMENTS | **FIG. 5-1**

CENTURY WEST ENGINEERING CORPORATION

Runway 20 End

The proposed improvement would convert the existing 1,193-foot paved overrun at the north end of Runway 02/20 to displaced threshold. The former displaced threshold for Runway 20 was converted to an overrun as part of a south runway extension project several years ago. The proposed improvement would convert the overrun back to the original displaced threshold configuration. The reconfiguration would not affect the glide slope for the instrument landing system (ILS) approach or require any changes to the approach lights or visual guidance indicators for Runway 20.

The displaced threshold combined with the existing 6,000-foot runway increases the length available for takeoff to 7,193 feet on Runway 20. This length is generally sufficient for narrow body transport aircraft such as the McDonnell Douglas/Boeing MD80 series or various Boeing 737 models to operate in Bremerton. Due to other design standards requirements, all other aircraft runway operations (landing on Runway 20, takeoff and landing on Runway 02) are limited to the current 6,000-foot runway length.

By maintaining the existing Runway 20 threshold location for landing, this option provides a full 1,000 feet of RSA in front of the landing threshold. The portion of RSA located north of the threshold would also be used for Runway 20 takeoffs. Full-width RSA (500 feet wide) is required from the beginning of takeoff in the event of an aircraft leaving the sides of the runway on its takeoff roll.

The proximity of the north end of the runway to Highway 3 eliminates the ability for the displaced threshold portion of the runway to be used for takeoff or landing on Runway 02. For transport aircraft such as MD80s and 737s, FAA design standards require 1,000 feet of runway safety area (RSA) beyond the useable end of runway (for takeoff or landing roll out) and leading up to the landing point. Based on this requirement, the usable length of Runway 02 for takeoff and landing operations is 6,000 feet based on the ability to provide 1,000 feet of RSA beyond the Runway 20 threshold. This configuration also keeps the departure runway protection zone (RPZ) for Runway 02 in its current location, 200 feet beyond the Runway 20 threshold. As a result, no changes occur to roads within the RPZ.

Published declared distances (specific runway lengths available for various operations) and appropriate runway lighting and signage will be required to clearly indicate the limits of usable runway for operations in both directions on the runway.

Runway 02 End

A 1,500-foot south runway extension reserve is identified to address potential development related to the region's ongoing efforts to develop an aerospace manufacturing base on the Kitsap Peninsula. The extension would provide 7,500 feet of usable runway in both directions; the runway available for takeoff on Runway 20 would be 8,693 feet if the north displaced threshold reserve is included. The future runway protection zone (RPZ) for the runway extension reserve extends beyond airport property. The future RPZ

is clear of any existing or proposed roads, including the planned extension of Airport Way to Lake Flora Road, near Highway 3. The reserve includes dual parallel taxiways and would require 1,000 x 500 feet of prepared safety area extending beyond the runway end (500 feet wide) and relocation of the existing ILS localizer. The runway safety area for the south extension reserve is in the vicinity of an existing wetland, which would require mitigation.

East Parallel Taxiway

A full length parallel taxiway (35 feet wide) is proposed on the east side of Runway 02/20. The taxiway would provide efficient movement of air traffic to/from the runway and provide access to future landside development on the east side of the runway. A runway-parallel taxiway separation of 400 feet is depicted for most of the taxiway, which mirrors the separation for the west parallel taxiway. The northern section of the parallel taxiway has an increased runway separation (570 feet) to avoid the ILS glide slope transmitter and to reduce aircraft taxiing through the glide slope critical area. Aircraft hold areas are located at both ends of the runway. Four 90-degree exit taxiways are depicted on the existing runway; additional exit taxiway connections are included in the north and south runway reserves. The taxiway could be widened to 50 feet in the future if transport category aircraft use was anticipated without requiring relocation.

Aircraft Hold Areas

Improvements to the existing aircraft hold area located on Taxiway A at the south end of the runway are proposed to address taxiway object free area (TOFA) clearance requirements. In its current configuration, portions of larger aircraft may extend into the TOFA creating a potential hazard (wing tip clearance) for aircraft traveling on the taxiway. The hold area would be expanded to provide additional clearance and a fillet is added to improve taxiing geometry for aircraft entering and exiting the hold area.

The existing north aircraft hold area located on Taxiway A (runway side) would be replaced with a hold area on the outside of the taxiway. A similar improvement is depicted on the current airport layout plan drawing, although this location is compatible with the diagonal taxiway that extends from the north hangar area to Taxiway A. The reconfigured holding area provides increased runway separation for holding aircraft and reduces contact between the flows of arriving and departing aircraft.

WEST LANDSIDE AREA

As indicated earlier in the master plan, the Airport's west landside area is approaching full build out. Based on land availability and suitability for development, the majority of future landside facility demand (hangars, aircraft parking, etc.) will be accommodated on the east side of the runway. However, in an effort to maximize the efficiency of existing facilities and infrastructure, several targeted improvements have been identified in the west landside area (see **Figure 5-2** and **Figure 5-3**).

South Hangar Development

The land area located at the south end of the west landside area has been previously cleared and graded to accommodate future aviation development. As depicted, the site would accommodate two 4-unit executive hangars and several (four depicted) conventional hangars. Taxiway access to the hangar area would be provided from the taxiway that extends south of Taxiway G. An existing unpaved airport access road would be upgraded and paved and vehicle parking would be added. The proposed taxiways and hangar sites are designed to avoid the subsurface stormwater detention pipes that are installed adjacent to the aircraft hold area.

FBO Facility Reconfiguration (Hangar and Fuel)

The airport business plan, currently being developed, has identified several improvements or actions that the Port may consider to attract and serve a wide range of general aviation users. One specific need identified is hangar space for transient aircraft, particularly business jets and turboprops. The ability to provide enclosed storage for overnight or extended stays is a valued service among business users, particularly for operators of multi-million dollar aircraft. The availability of transient hangar space is among the many factors that distinguish individual airports competing for business aviation market share.

A large transient aircraft hangar is located immediately south of the existing Avian building. The proposed location provides centralized FBO facilities for customers at the south end of the main apron. The hangar development will require relocation of the existing aircraft fueling island. The Port has previously identified a need to replace several underground fuel storage tanks with new above ground tanks. The relocation of the fueling island would coincide with tank replacement. A new aircraft fueling island is proposed immediately south of Taxiway F, opposite the hangar area. The fueling area would be capable of accommodating four 12,000 gallon fuel tanks, with multiple fueling locations. The new fuel storage tanks would be double-wall construction and the fueling area would be designed with secondary containment for inadvertent fuel spills.

South Aircraft Tiedown Apron

Expansion and reconfiguration of the south aircraft tiedown apron is proposed to meet FAA design standards for separation from the adjacent taxilane. The double tiedown row would be shifted to the east to provide the standard 79 feet of taxilane object free area clearance between the adjacent T-hangars and parked aircraft (tiedowns). The apron would be expanded along its east edge to accommodate a taxilane to access the east-facing tiedowns. The outer taxilane would connect to Taxiway F at the south end and the apron near the transient hangar. The north section of the tiedown row would be configured with a single row of west-facing tiedowns in order to accommodate an ADG II taxilane for the proposed

transient aircraft hangar. As depicted, the reconfigured south tiedown apron would have 19 small airplane tiedowns.

Large and Corporate Aircraft Parking Apron

The section of the main apron that accommodates transient business and military aircraft is unchanged, although ADG II taxilanes around the outer edges of the apron define useable parking area. The taxilanes require a clear 115-foot path (no parked aircraft or other objects) to meet ADG II object free area dimensional standards. FBO ground crews direct aircraft parking within the area.

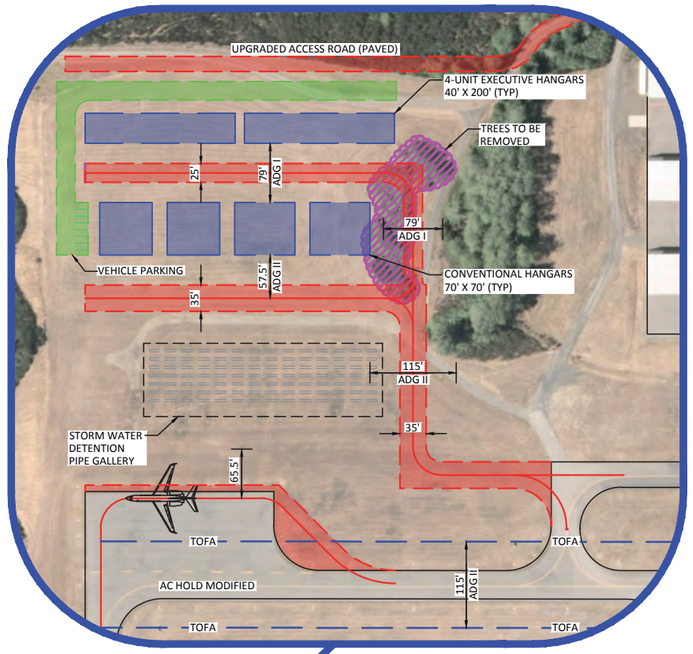
North Apron Reconfiguration

Two options are presented for reconfiguring the north tiedown apron to meet FAA taxilane design standards. As noted in the facility requirements analysis, the clearance provided for the existing apron taxilanes does not meet FAA standards for small aircraft (ADG I).

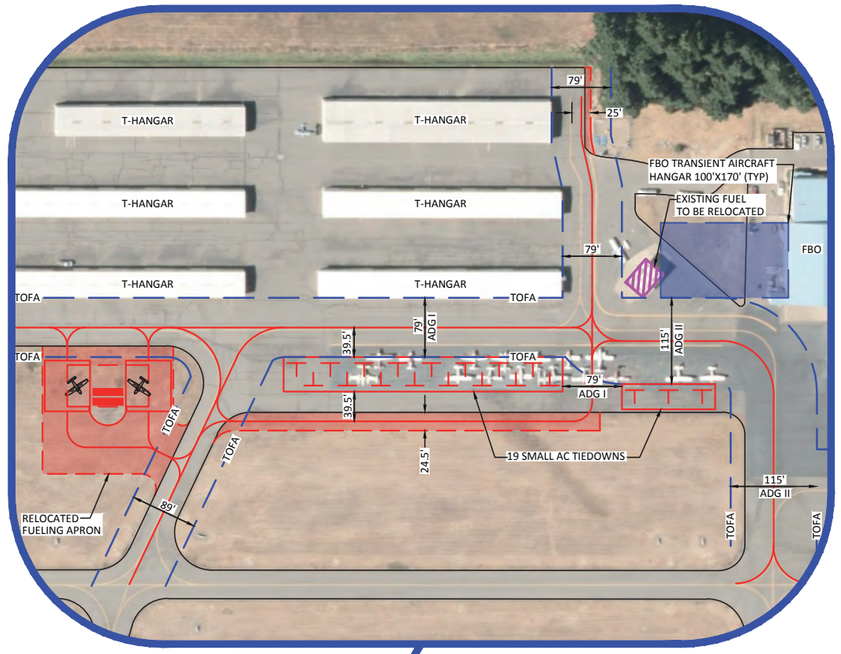
Option A uses an ADG I taxilane object free area (TOFA) dimension of 79 feet between tiedown rows. The tiedown rows are shifted east to provide standard taxilane clearance between the west row and adjacent buildings (airport restaurant, etc.) and between the west and east tiedown rows. The eastern row of tiedowns is shifted to align with the existing outer edge of the apron. The apron reconfiguration is compatible with development of additional hangars (for ADG I aircraft) between the airport restaurant and the Lent hangar. The existing access road/gate entering the apron would be reconfigured to accommodate hangars and vehicle parking. ADG II taxilane clearances are maintained at the north and south ends of the tiedown apron to provide access to adjacent facilities. Option A provides 60 small airplane tiedowns.

Option B uses an ADG II taxilane object free area (TOFA) dimension of 115 feet between the west tiedown row and the back edge of the apron. The apron reconfiguration is compatible with development of large hangars for ADG II aircraft between the airport restaurant and the Lent hangar. The existing access road/gate entering the apron would be reconfigured to accommodate hangars and vehicle parking. In this configuration, one double sided tiedown row is provided (33 tiedowns). An ADG I taxilane is located on the east side to the tiedown row. ADG II taxilanes at the north and south ends of the tiedown apron connect to the western taxilane to provide access to adjacent facilities.

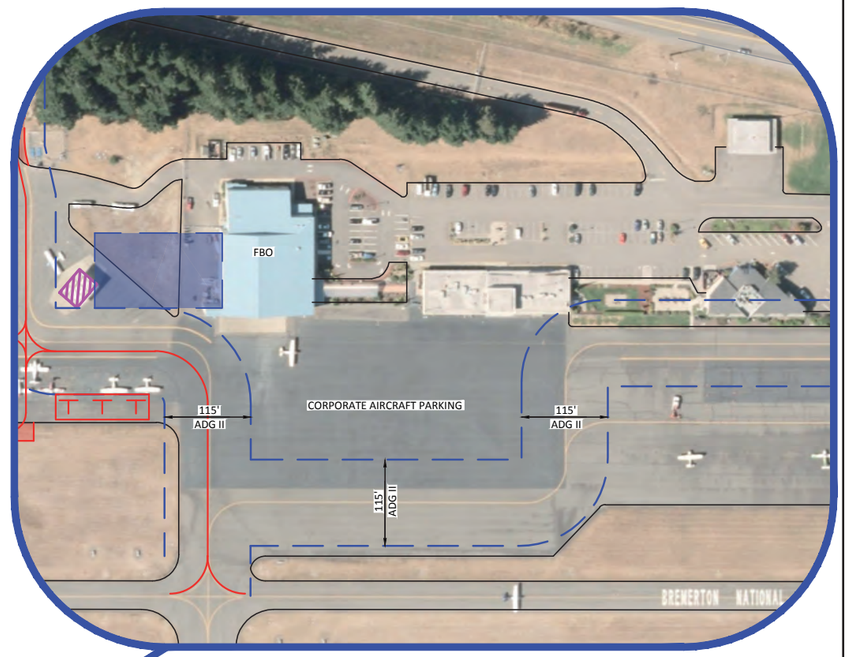
SOUTH DEVELOPMENT OPTION

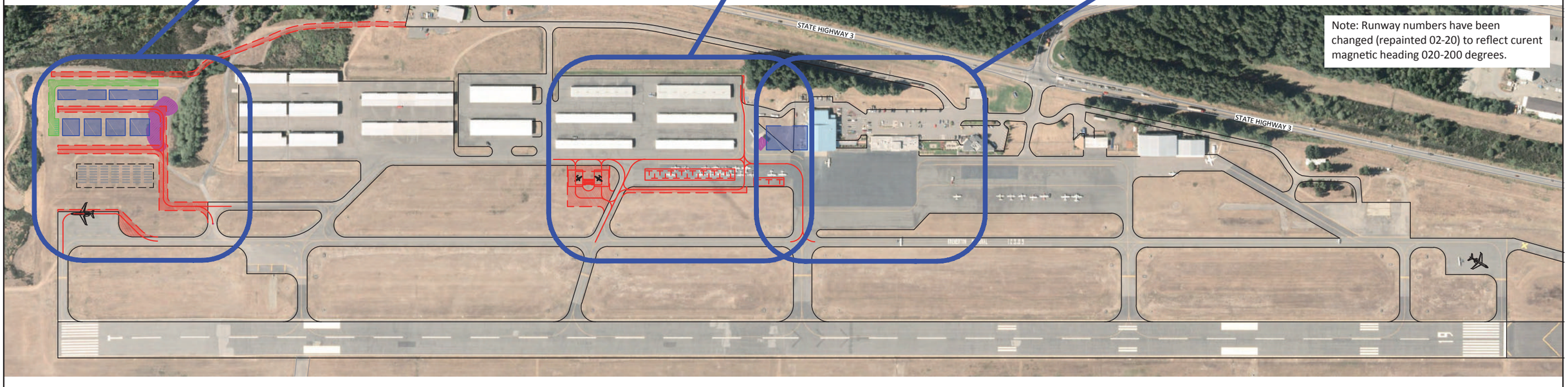


FBO AREA OPTION



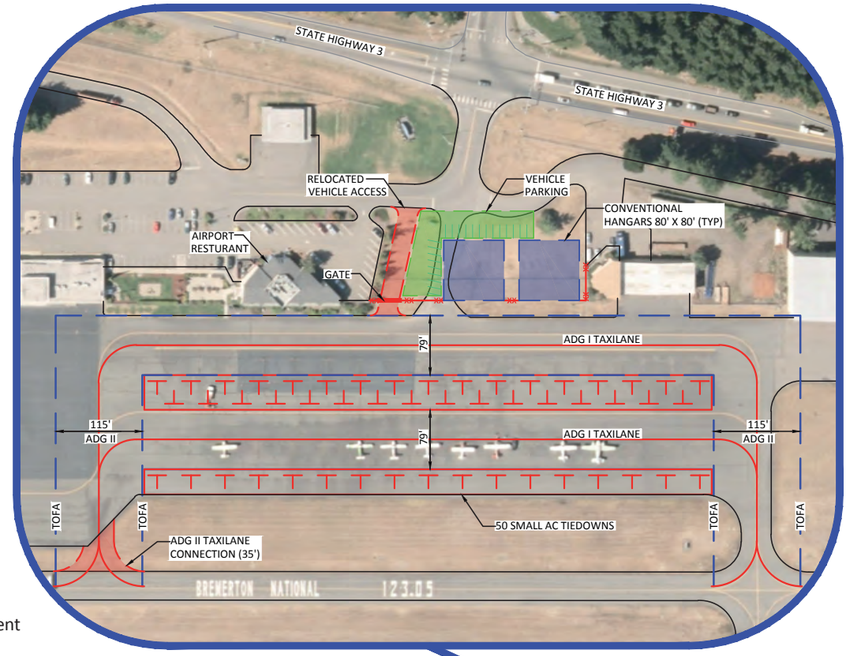
CORPORATE AIRCRAFT PARKING OPTION



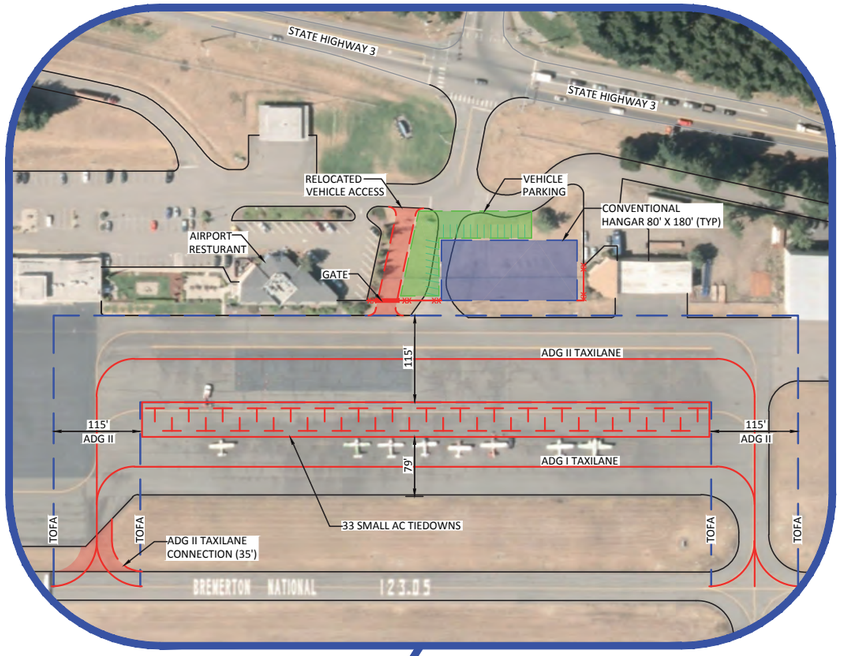


Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.

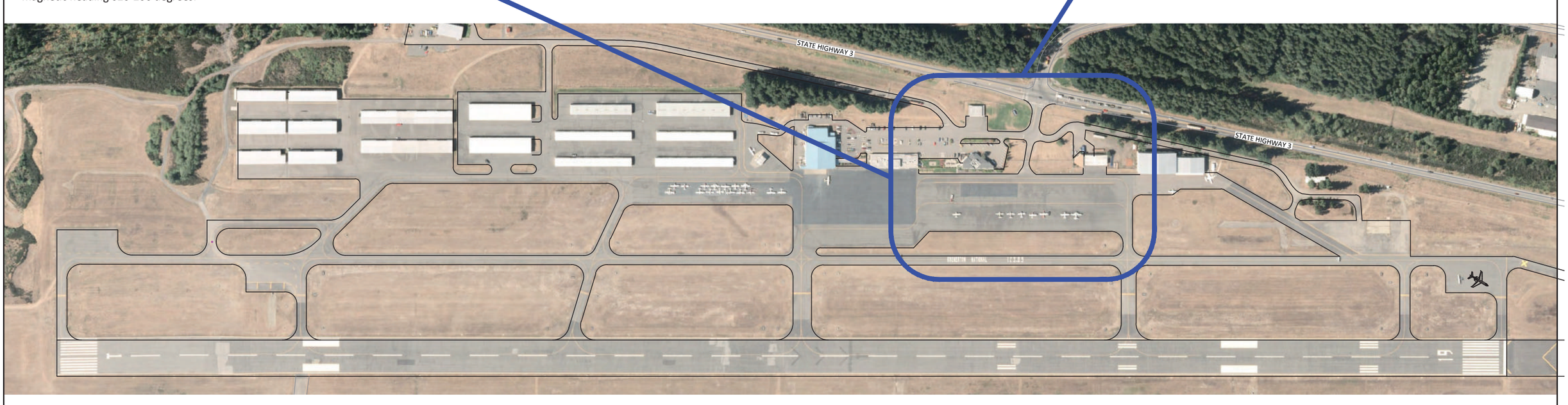
NORTH APRON RECONFIGURATION OPTION A



NORTH APRON RECONFIGURATION OPTION B



Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.



EAST LANDSIDE AREA

The primary focus for the east landside area is to develop facilities for general aviation that can be incrementally developed as demand warrants and funding is available. Demand for hangar space and hangar sites for a variety of types (corporate, executive, commercial hangars, T-hangars, etc.) is expected to drive development needs in this area.

Aircraft parking capacity, support facilities and services in the west landside area are expected to satisfy demand well into the current twenty year planning period. However, as noted in earlier, development options for new hangar construction in the west landside area is limited. Potential longer term demand for fixed base operator (FBO) facilities including aircraft parking, fuel and commercial hangar space is accommodated through development reserves.

A terminal area reserve (approximately 16 acres) is also accommodated in the east landside area as a placeholder in the event that commercial air service was established. The terminal reserve provides sufficient space to accommodate a typical non-hub terminal building (20,000-30,000 sf), curbside area and roadways, vehicle parking, aircraft apron, and airport rescue and firefighting (ARFF) facilities. A terminal area reserve has been included in each of the three east landside options.

Options B and C include a long term development reserve for fixed base operator (FBO) facilities, such as aircraft parking apron, fuel storage, aircraft parking, commercial hangars, vehicle access and parking, and other related facilities. The expectation is that over time, the development of facilities on the east side of the runway will drive demand for services. The FBO reserve is intended to protect the ability to develop facilities that may be needed to serve tenants in the east landside area.

East Landside Option A

Option A (see **Figure 5-4**) reflects the landside configuration of the 2004 Airport Master Plan that consisted of two separate hangar areas. The primary hangar area is located along the east side of the former runway, with seven rows of T-hangars (14 units each, 98 spaces total). The hangars are perpendicular to the former runway, which is converted/reconfigured into a series of access taxiways. The hangar development area has a single taxiway connection to the runway (at the Runway 20 threshold). Vehicle access to the hangar area is provided from Airport Way, although a significant change in elevation exists between the road and the hangar area.

A second hangar development is located along the east side of Runway 02/20 and the future east parallel taxiway. The hangar configuration is unchanged from the previous master plan preferred alternative. However, the hangar development is shifted west, toward the runway, with the elimination of the previously-recommended short parallel runway. The hangar area has four T-hangars (16 units each, 64 spaces total) and three rows of conventional hangars (12 buildings depicted). The overall T-hangar

capacity is 162 aircraft. The conventional hangars would typically accommodate 1 to 3 aircraft per building (12 to 36 aircraft). The proposed landside development is fully compatible with the future east parallel taxiway depicted in **Figure 5-1**.

As noted in the facility requirements analysis, the capacity provided by the existing runway-taxiway system is adequate to accommodate forecast demand and considerable volume beyond. The functionality of the 2,400-foot runway would be very limited, while consuming a large amount of prime developable land. The FAA also indicated a low probability for funding a second runway.

GENERAL AVIATION HANGAR AREA

GLIDE SLOPE CLEAR AREA

GLIDE SLOPE

BEACON

AIRPORT WAY (EXISTING)

TO SW LAKE FLORA ROAD

TERMINAL AREA RESERVE (16 ACRES)

GENERAL AVIATION HANGAR AREA (T-HANGARS/ EXECUTIVE HANGARS)

AIRPORT WAY (FUTURE)

FUTURE AIRPORT WAY

400'

LEGEND

- PROPOSED BUILDINGS
- PROPOSED AIRFIELD IMPROVEMENTS
- PROPOSED VEHICLE ACCESS/PARKING
- PROPOSED DEVELOPMENT RESERVE
- PROPOSED ACCESS ROAD
- EXISTING AIRPORT WAY
- FUTURE AIRPORT WAY
- PROPERTY LINE
- WETLANDS
- CONTOUR LABELS (460')
- DETENTION PONDS
- AREAS OF CONCERN (ENVIRONMENTALLY SENSITIVE)

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

EAST LANDSIDE OPTION A | **FIG. 5-4**

CENTURY WEST ENGINEERING CORPORATION

East Landside Option B

Option B (see **Figure 5-5 and Figure 5-6**) also utilizes the former runway to provide primary taxiway access within the development area and to the runway-taxiway system. The hangar development configuration is designed to make use of the relatively level area along both sides of the former runway. A variety of conventional hangar sites (20 individual buildings depicted) are located on both sides of the main taxiway. The hangar sites would accommodate a full range of hangar types and sizes. Four T-hangars (approximately 44 units) are located on the west side of the main access taxiway served by individual stub taxilanes. Vehicle access and parking areas are identified for each hangar area. The proposed landside development is fully compatible with the future east parallel taxiway depicted in **Figure 5-1**.

East Landside Option C

Option C (see **Figure 5-7** and **Figure 5-8**) also utilizes the former runway to provide primary taxiway access within the development area and to the runway-taxiway system. The hangar development configuration is designed to maintain the east-west orientation of hangar doors that is used exclusively on the airport today.

A series of stub taxilanes (parallel to Runway 02/20) extend from the main access taxiway to serve conventional hangar sites. Hangar sites are also located on the east side of the main access taxiway; buildings can be constructed parallel to the adjacent taxiway or turned to face west. As with Option B, this option makes use of the relatively level area along both sides of the former runway for conventional hangars, access roads and vehicle parking. A variety of conventional hangar sites (26 individual buildings depicted) are located on both sides of the main taxiway. The hangar sites would accommodate a full range of hangar types and sizes. A separate hangar development is located further south to avoid a deep east-west drainage located between the original "Open-V" runway configuration. The overall area depicted includes T-hangars, executive hangars, and conventional hangars. Not including the large conventional hangars, which could accommodate a variety of commercial and mixed use activities, the storage hangar capacity depicted is approximately 90 to 100 aircraft. Vehicle access and parking areas are identified for each hangar area. The proposed landside development is fully compatible with the future east parallel taxiway depicted in **Figure 5-1**.

STATE HIGHWAY 3

EXISTING RPZ

RESERVE RPZ

TO SW LAKE FLORA ROAD

BRL (35')

APL

400'

715'

745'

570'

GLIDE SLOPE CLEAR AREA

GLIDE SLOPE

BEACON

APRON AREA RESERVE

BUILDING AREA RESERVE

VEHICLE PARKING & CIRCULATION RESERVE

APRON

BUILDING AREA

TERMINAL AREA RESERVE (16 ACRES)

FBO/APRON RESERVES

GENERAL AVIATION HANGAR AREA

AIRPORT WAY (EXISTING)

EXISTING/FUTURE RPZ

AIRPORT WAY (FUTURE)

AIRPORT WAY

LEGEND

- PROPOSED BUILDINGS
- PROPOSED GA APRON/FBO RESERVE
- PROPOSED AIRFIELD IMPROVEMENTS
- PROPOSED VEHICLE ACCESS/PARKING
- PROPOSED DEVELOPMENT RESERVE
- PROPOSED ACCESS ROAD
- EXISTING AIRPORT WAY
- FUTURE AIRPORT WAY
- PROPERTY LINE
- WETLANDS
- CONTOUR LABELS (460')
- DETENTION PONDS
- AREAS OF CONCERN (ENVIRONMENTALLY SENSITIVE)

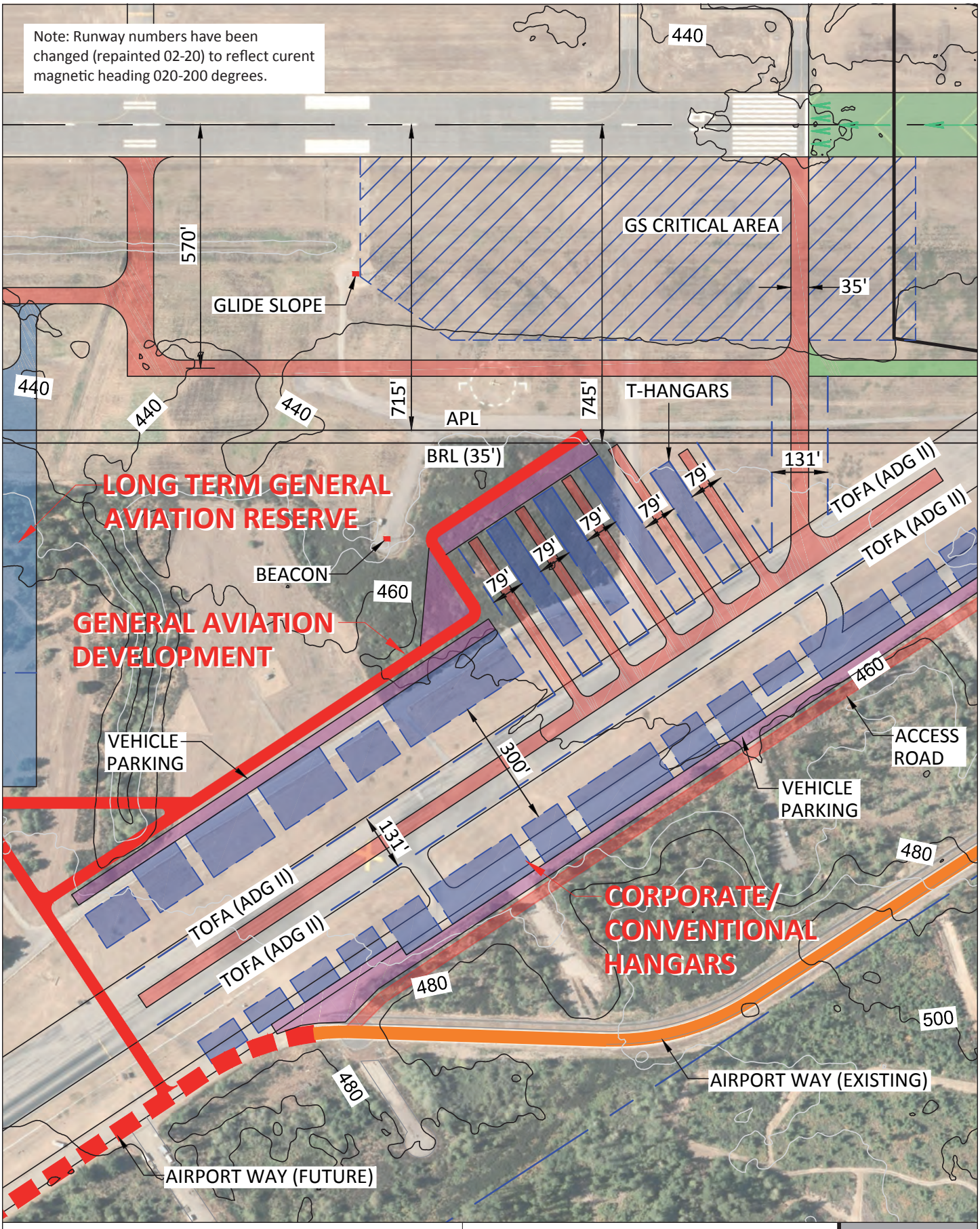
BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

EAST LANDSIDE OPTION B | **FIG. 5-5**

CENTURY WEST ENGINEERING CORPORATION

Insert Figures 5-6


Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.
440
570'
GS CRITICAL AREA
35'
GLIDE SLOPE
440
440
440
715'
APL
745'
T-HANGARS
BRL (35')
131'
LONG TERM GENERAL AVIATION RESERVE
79'
79'
79'
79'
79'
TOFA (ADG II)
TOFA (ADG II)
BEACON
460
GENERAL AVIATION DEVELOPMENT
460
VEHICLE PARKING
300'
ACCESS ROAD
VEHICLE PARKING
131'
480
TOFA (ADG II)
TOFA (ADG II)
CORPORATE/ CONVENTIONAL HANGARS
480
500
480
AIRPORT WAY (EXISTING)
AIRPORT WAY (FUTURE)

STATE HIGHWAY 3

EXISTING RPZ

RESERVE RPZ

715'

400'

745'

570'

BRL (35')

APL

GLIDE SLOPE CLEAR AREA

GLIDE SLOPE

APRON AREA RESERVE

BUILDING AREA RESERVE

VEHICLE PARKING & CIRCULATION RESERVE

APRON

BUILDING AREA

BEACON

EXISTING/FUTURE RPZ

AIRPORT WAY (EXISTING)

TO SW LAKE FLORA ROAD

FBO/APRON RESERVES

TERMINAL AREA RESERVE (16 ACRES)

GENERAL AVIATION HANGAR AREA

AIRPORT WAY (FUTURE)

AIRPORT WAY

LEGEND

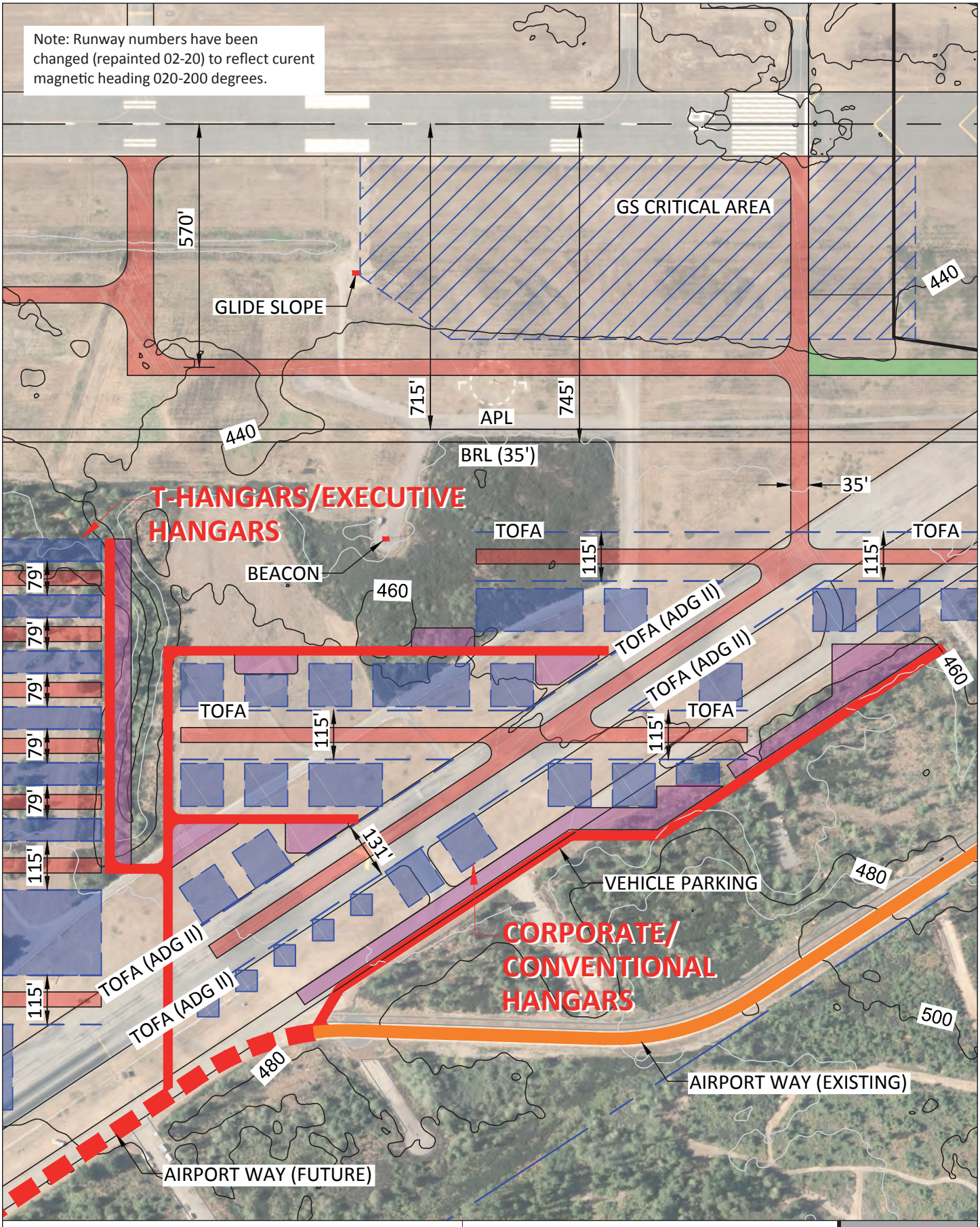
- PROPOSED BUILDINGS
- PROPOSED GA APRON/FBO RESERVE
- PROPOSED AIRFIELD IMPROVEMENTS
- PROPOSED VEHICLE ACCESS/PARKING
- PROPOSED DEVELOPMENT RESERVE
- PROPOSED ACCESS ROAD
- EXISTING AIRPORT WAY
- FUTURE AIRPORT WAY
- PROPERTY LINE
- WETLANDS
- CONTOUR LABELS (460')
- DETENTION PONDS
- AREAS OF CONCERN (ENVIRONMENTALLY SENSITIVE)

BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

EAST LANDSIDE OPTION C | **FIG. 5-7**

CENTURY WEST ENGINEERING CORPORATION


Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.
570'
GS CRITICAL AREA
GLIDE SLOPE
440
715'
APL
745'
440
BRL (35')
35'
T-HANGARS/EXECUTIVE HANGARS
TOFA
115'
TOFA
BEACON
460
79'
79'
79'
79'
79'
115'
TOFA (ADG II)
TOFA (ADG II)
460
TOFA
115'
TOFA
115'
131'
VEHICLE PARKING
480
CORPORATE/ CONVENTIONAL HANGARS
TOFA (ADG II)
TOFA (ADG II)
115'
500
480
AIRPORT WAY (EXISTING)
AIRPORT WAY (FUTURE)

Preferred Development Alternative

The preliminary development alternatives, presented earlier in the chapter, were designed to accommodate the forecast aviation demand and the corresponding facility requirements for Bremerton National Airport described in Chapter 4 for the twenty year planning period (2012-2032).

The preliminary development alternatives were presented to the Master Plan Advisory Committee, the Port Commission, and to the general public at meetings held in August, 2013. The draft documents were also submitted to FAA and WSDOT Aviation for review and comment.

Based on the wide range of input provided during these meetings and through subsequent discussions, the elements of the preferred alternative were formed. Additional coordination with Port staff led to further refinement and the concepts were prepared for presentation to the Port Commission. The preferred alternative presented in this section has been reviewed and approved by the Port Commission.

The components of the preferred development alternative are presented in **Figures 5-9 through 5-12**, located at the end of the chapter. These will be incorporated into the draft Airport Layout Plan (ALP) and a draft Capital Improvement Program when approved by the Port Commission, and presented for public and agency review in the Draft Final Airport Master Plan.

Below is a short summary of key items:

RUNWAY-TAXIWAY (AS DEPICTED IN FIGURE 5-1)

There are no changes proposed for the preliminary runway-taxiway improvements previously presented (see **Figure 5-1**). Runway extension and associated taxiway reserves are identified at both ends of Runway 2/20 (the runway numbers were recently changed due to magnetic declination). The reserves depict the footprint of potential development that may occur beyond the airport master plan's 20-year planning period. It is also conceivable that demand justifying one or both of the runway reserves could occur within the current planning period, although this is not reflected in the recently approved aviation forecasts. A change of activity of this magnitude would require updated activity forecasts and an assessment of specific project needs. No projects related to the runway reserves will be included in the updated 20-year capital improvement program.

One of the recommended improvements on the west parallel taxiway (Alpha) is currently being designed for 2014 construction (reconfiguration of Taxiway Foxtrot near mid runway). Other future improvements include expansion of the south aircraft hold area and replacement of the north aircraft hold area.

A future east parallel taxiway is recommended to provide safe and efficient aircraft access to the runway from the future east landside area. The taxiway may be constructed in phases based on activity levels (i.e., the pace of construction in the east landside area) and funding availability. The northern section of the east parallel taxiway will have increased runway separation to avoid conflicts with the instrument landing system electronic glide slope. The open ditch that runs along the east side of the runway will be affected by the new east parallel taxiway. At a minimum, several of the connecting taxiways would require culverts to cross the ditch. Converting the open ditch to a closed ditch may be recommended to reduce wildlife attraction potential and as part of the overall stormwater design (to be determined).

The main access taxiway entering the new east landside area will extend from the north end of the runway at the runway threshold. The east parallel taxiway and the east access taxiway will be designed to meet airplane design group II (ADG II) standards.

SOUTH HANGAR AREA (AREA DEPICTED IN FIGURE 5-9)

The previously proposed mixed of corporate aircraft and small aircraft hangar development (ADG II/I) in the south hangar area has been modified to focus exclusively on ADG I aircraft. This area will provide readily accessible hangar development on the west side of the airfield, allowing implementation of the new east landside development area to be phased in more gradually.

The hangar development will include an access taxiway extending from the parallel taxiway system near the south end (west side) of the runway. Three stub taxilanes will extend from the access taxiway to serve three rows of small aircraft hangars. The majority of the site was cleared and graded as part of a previous project. The development avoids the underground pipe gallery for the stormwater detention system. Modification of the existing stormwater collection/detention system may be required to accommodate an increase in impervious surface (taxiways and hangar roofs).

Improved vehicle access (realigned and paved) will be extended from the existing road near the airport maintenance shop. Two areas of vehicle parking are identified for the hangar area. The access road and vehicle parking areas may incorporate a variety of stormwater design elements (vegetated swales, gravel, porous pavement, etc.) to complement conventional asphalt.

FBO AREA (AREA DEPICTED IN FIGURE 5-9)

Improvements to the FBO area include reconfiguration/expansion of the existing aircraft tiedown area, minor expansion/reconfiguration of aircraft taxilanes, future construction of a second large FBO hangar, a small increase in apron pavement directly in front of the new hangar, and development of bulk fuel storage area near the west end of the hangar area (adjacent to existing paved access road). The new FBO hangar will be sited to avoid the existing aircraft fuel island.

The new fuel storage facility will replace several existing underground single-wall fuel tanks with aboveground double wall tanks. The number of new tanks will depend on market, but the area would be able to accommodate up to four 12,000-gallon tanks and provide parking (with secondary containment) for several mobile fuel vehicles. The existing underground tanks will be removed. The need for site remediation is unknown, although the existing tanks are lined and monitored and there is no history of leakage.

NORTH APRON (AREA DEPICTED IN FIGURE 5-10)

The primary changes to the north apron involve reconfiguration of aircraft tiedowns to meet FAA taxilane clearance standards. The preferred option upgrades the rear (western) apron taxilane to Airplane Design Group II (ADG II) standards to accommodate larger business aircraft in new hangars to be located along the back of the apron. The change in taxilane configuration will reduce the number of available small airplane tiedowns, although capacity is expected to be adequate well into the planning period. As long-term apron reserve is located along the front (east edge) of the apron to provide additional tiedown capacity if needed.

The alternative ADG I apron configuration is also depicted for reference. This configuration more closely resembles the existing parking configuration, adjusted to meet FAA taxilane clearing standards. The final decision on apron reconfiguration will be made at design and will be driven by the type of aircraft hangars or other facilities developed along the rear of the apron that would require either ADG I or ADG II aircraft access.

The apron reconfiguration also includes changes to existing taxiway connections to the west parallel taxiway (Alpha) to conform to current FAA guidance on runway-taxiway safety. Two existing taxiway connections at the north and south ends of the apron, in line with Taxiways Delta and Echo, will be removed and replaced with new connectors.

The future development of one or two large hangars at the rear of the apron will require relocation of an existing access road and automated gate that is near the airport entrance to Highway 3. Additional vehicle parking will be required.

A Portland Cement Concrete (PCC) aircraft hard stand is depicted (with MD81) in the same location as the proposed large hangars at the back of the apron. Airport management is currently in discussions with a prospective tenant that retrofits older generation airliners and this site may be leased for that use. If this occurs, the activity would be restricted (tow only on the ramp) so no changes in apron configuration or taxilane clearances would be required.

EAST LANDSIDE DEVELOPMENT (DEPICTED IN FIGURES 5-11 AND 5-12)

The preferred east landside development is a refined version of **East Landside Option B** (**Figures 5-5 and 5-6**) which consolidates new development of aircraft hangars along the old runway with vehicle access provided via Aviation Way. The east land side area will be capable of accommodating a variety of private and commercial hangars ranging from T-hangars and multi-unit conventional hangars to medium and large conventional or mixed use hangars.

A large long term development reserve is identified adjacent to the future east parallel taxiway to accommodate future apron and fixed base operator (FBO) facilities including aircraft parking and fueling. A second development reserve is identified for commercial air service terminal needs including a terminal building, aircraft ramp space, an aircraft rescue and firefighting (ARFF) building, and vehicle parking and roadway circulation. The area is a potential site for locating a new air traffic control tower, should airfield activity levels ever reach the threshold used by FAA at the time.

The preferred east landside development area is also compatible with concepts being developed and marketed through the Kitsap Aerospace Defense Alliance (KADA), which will become more refined as market opportunities are pursued.

The primary development items in the East Landside Area include:

- The main access taxiway will extend from the north end of the runway directly into the east landside area and continue along the old runway.
- Stub taxilanes on the west side of the access taxiway to serve T-hangars and smaller multi-unit conventional hangars.
- An access road to serve conventional hangar sites on the east side of the main access taxiway.
- Hangar sites and vehicle parking on the east side of the main access taxiway; full service utilities (water, sewer, electric) will be extended from existing lines.
- Phase II of Airport Way required to access second roundabout. The single point of access to the majority of the east landside area will extend from the new roundabout.
- Additional surface access and vehicle parking required for planned hangar development on the west side of the main access taxiway and future development areas (depicted as long-term development reserves).
- Hangar sites and vehicle parking on the west side of the main access taxiway; full service utilities (water, sewer, electric) will be extended from existing lines.

- Stormwater systems required for new development. No existing systems currently in place.

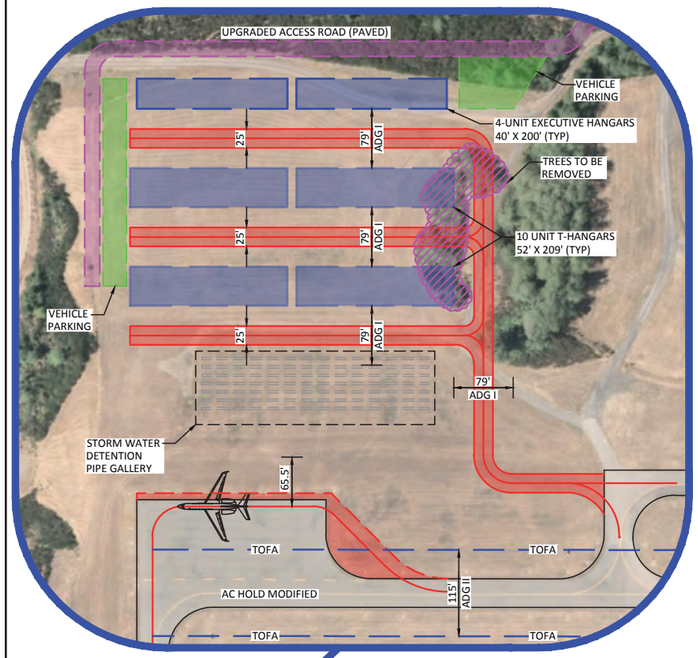
Previously mapped wetlands have been avoided by proposed development (not including the south runway/parallel taxiway extension), although the potential buffer requirements (worst case) will be reviewed to determine if any changes will be recommended on facility configurations.

PROPERTY ACQUISITION

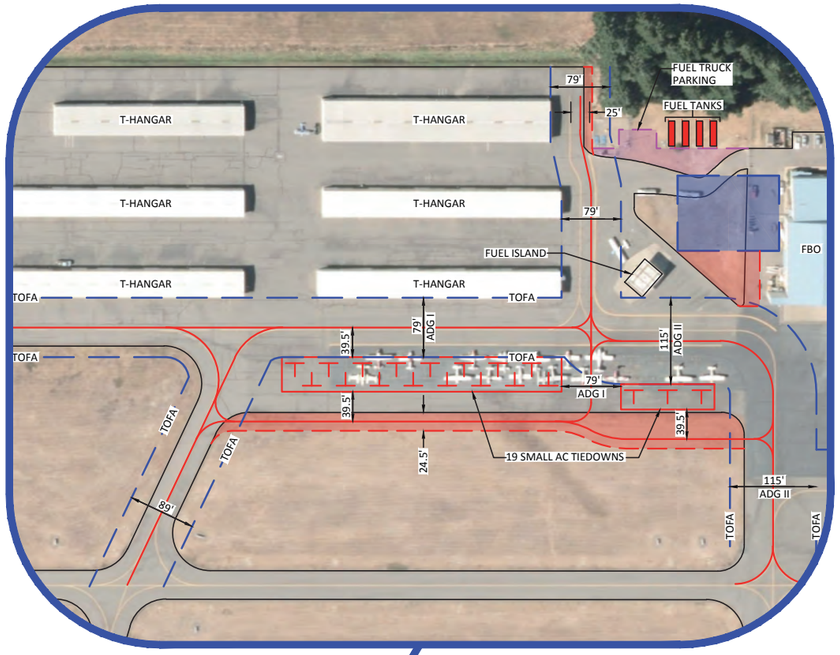
During the evaluation of airport development needs, no areas of property acquisition were identified.

DRAFT

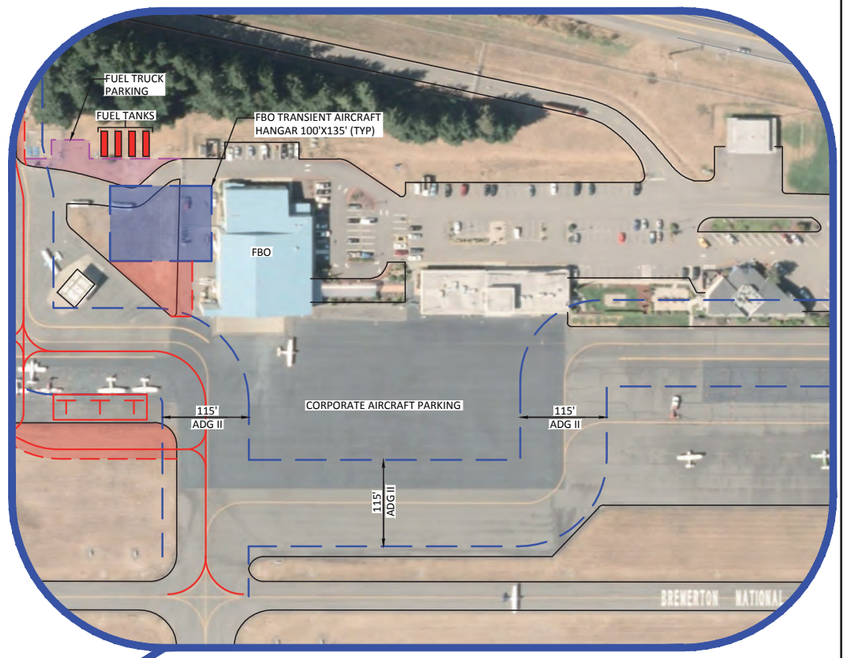
SOUTH HANGAR AREA

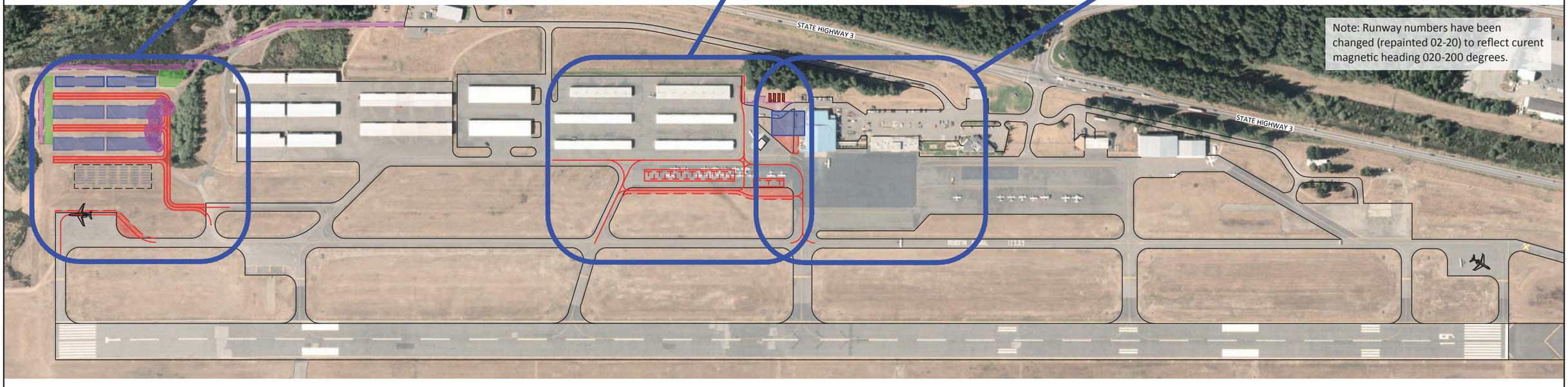


FBO AREA IMPROVEMENTS



FBO AREA/CORPORATE AIRCRAFT PARKING





Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.

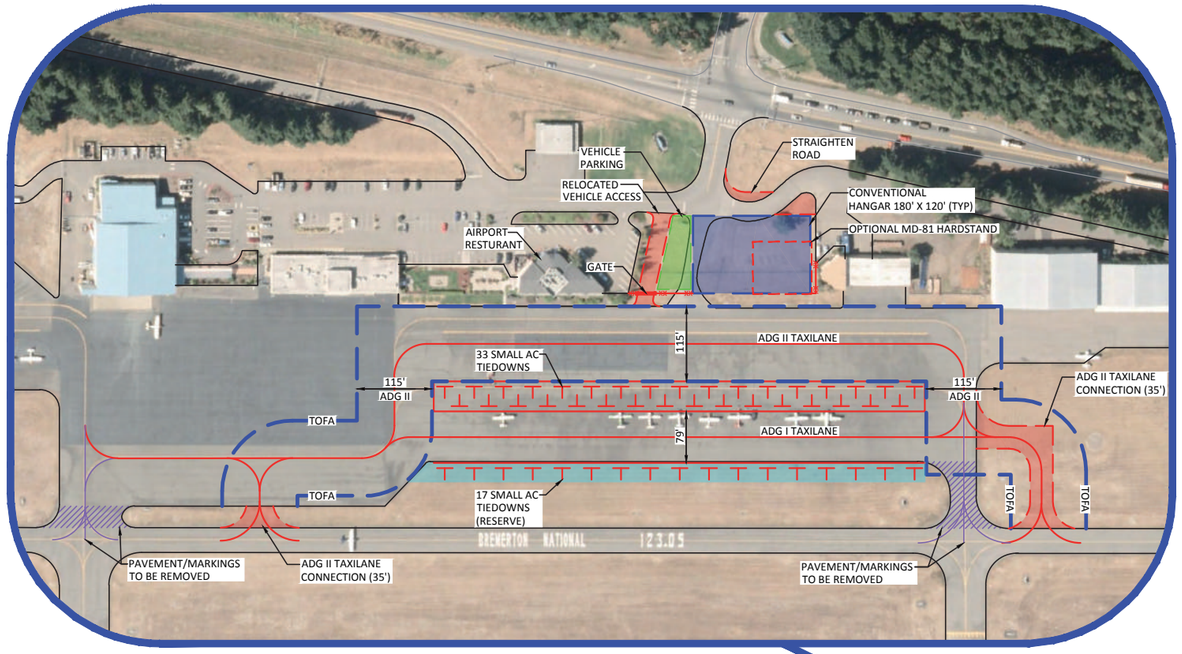
BREMERTON NATIONAL AIRPORT | AIRPORT MASTER PLAN

PORT OF Bremerton Washington

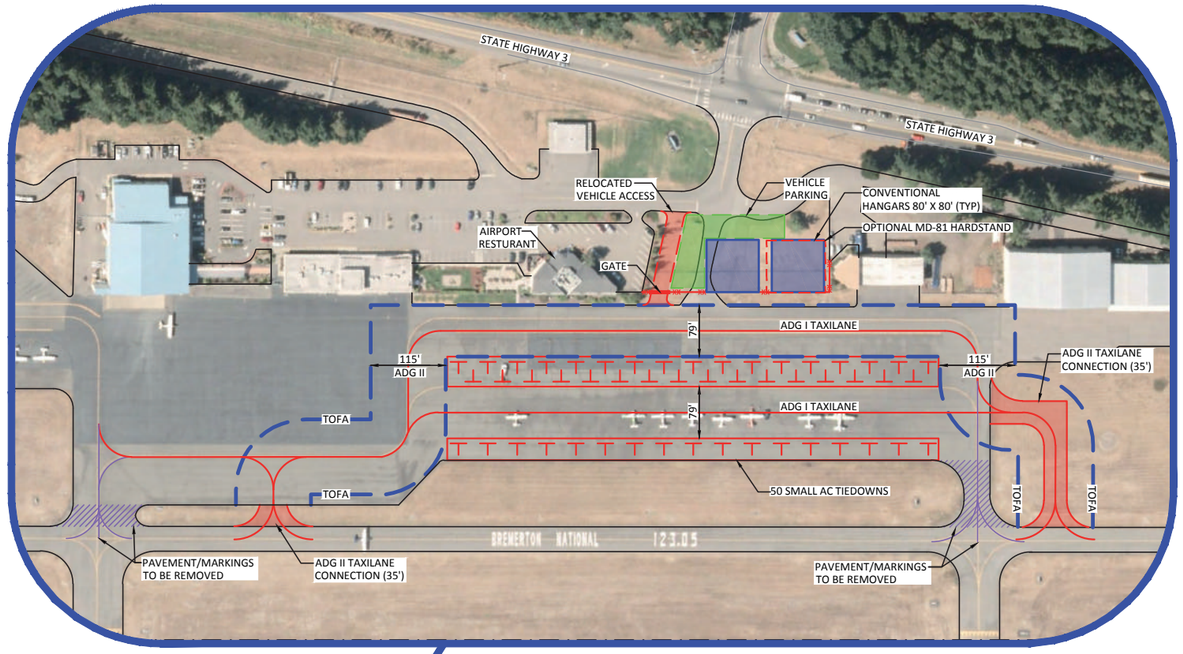
WEST LANDSIDE PRELIMINARY PREFERRED ALTERNATIVE | **FIG. 5-9**

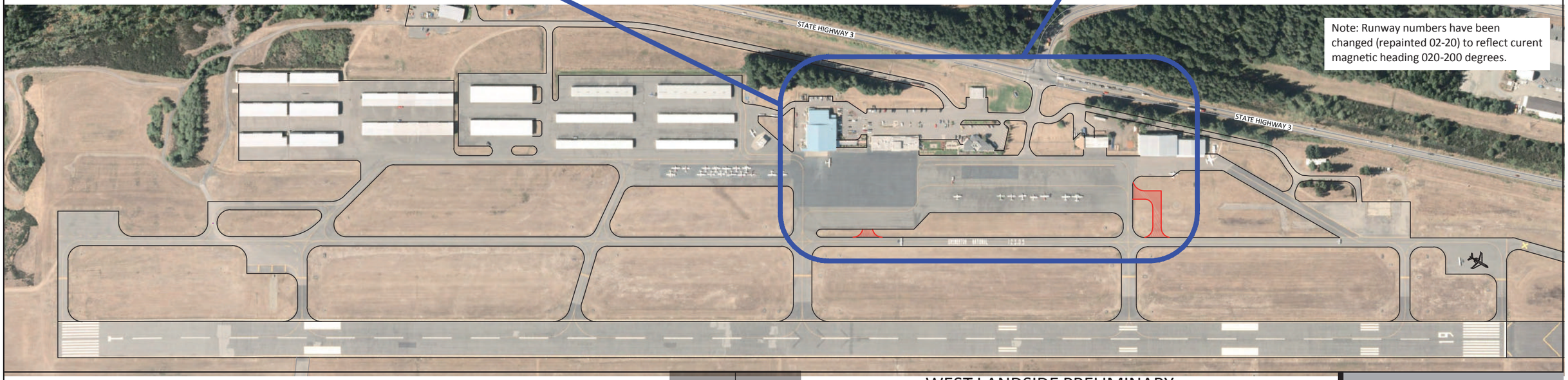
CENTURY WEST ENGINEERING CORPORATION

NORTH APRON RECONFIGURATION
PREFERRED ALTERNATIVE



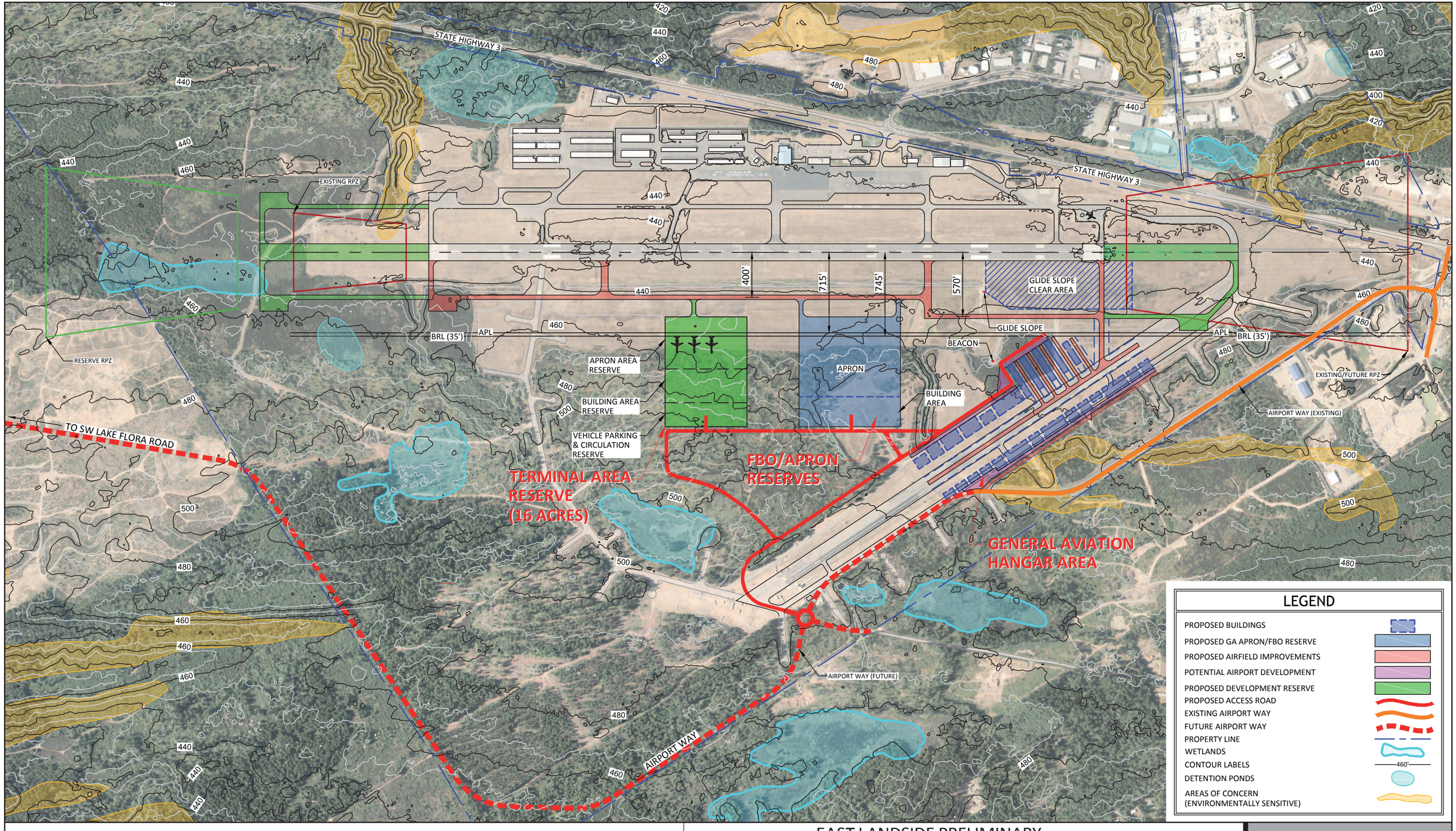
NORTH APRON RECONFIGURATION
SMALL AIRPLANE OPTION (ADG I)
(TO BE DETERMINED AT DESIGN)





Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.

FIGURE 5-10 WEST LANDSIDE PRELIMINARY PREFERRED ALTERNATIVE (NORTH APRON OPTIONS)



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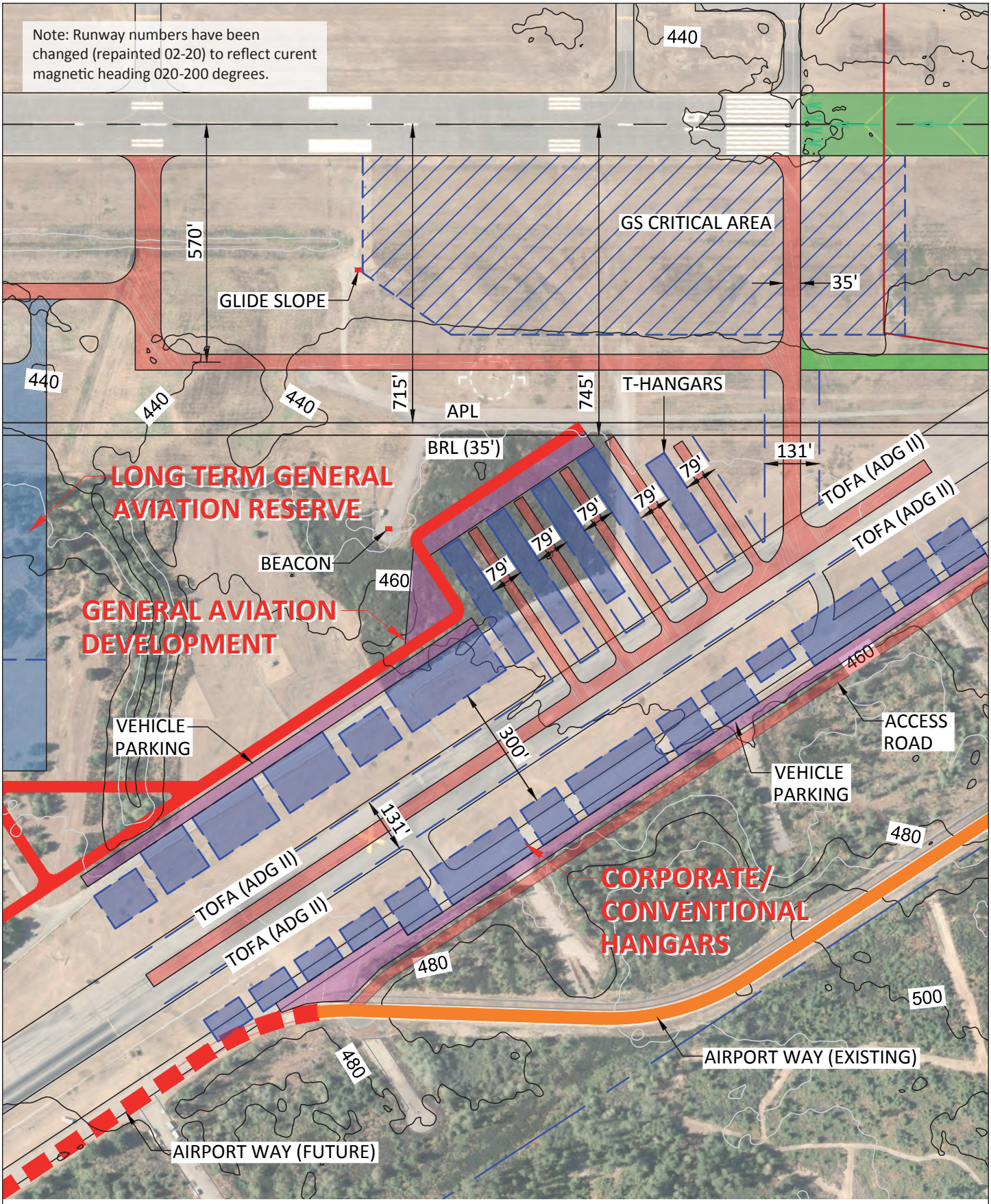
EAST LANDSIDE PRELIMINARY PREFERRED ALTERNATIVE | **FIG. 5-11**

CENTURY WEST ENGINEERING CORPORATION


Note: Runway numbers have been changed (repainted 02-20) to reflect curent magnetic heading 020-200 degrees.
440
570'
GS CRITICAL AREA
35'
GLIDE SLOPE
440
440
440
715'
APL
745'
T-HANGARS
BRL (35')
131'
LONG TERM GENERAL AVIATION RESERVE
79'
79'
79'
79'
79'
TOFA (ADG II)
TOFA (ADG II)
BEACON
460
GENERAL AVIATION DEVELOPMENT
460
VEHICLE PARKING
300'
ACCESS ROAD
VEHICLE PARKING
131'
480
TOFA (ADG II)
TOFA (ADG II)
CORPORATE/ CONVENTIONAL HANGARS
480
500
480
AIRPORT WAY (EXISTING)
AIRPORT WAY (FUTURE)

Chapter 6 – Environmental Review

Chapter 6 – Environmental Review

Introduction

The purpose of this Environmental Review is to identify physical or environmental conditions of record which may affect the recommended improvements at Bremerton National Airport. This environmental review includes the evaluation of airport noise for both existing conditions and future years and an evaluation of other environmental conditions and stormwater management unique to the airport site.

With the exception of the airport noise evaluation, the scope of work for this element is limited to compiling, reviewing and briefly summarizing information of record from applicable local, federal and state source for the airport site and its environs. The airport noise evaluation was conducted based on prescribed Federal Aviation Administration (FAA) guidelines, using the FAA's Integrated Noise Model (INM) computer software with several airport-specific inputs including FAA-approved air traffic forecasts, fleet mix, common aircraft flight tracks, and existing/future runway configurations.

Local Site Conditions

The review of existing airport site conditions and items of interest included water resources (wetlands, streams, stormwater), air quality, species of concern, and wildlife hazards. A planning level analysis of stormwater drainage was conducted to document both existing conditions and potential changes that may be related to future proposed development. The technical memorandums are included in **Appendix E**.

Airport Noise Analysis

AIRPORT NOISE AND NOISE MODELING

It is often noted that noise is the most common negative impact associated with airports. A simple definition of noise is "unwanted sound." However, sound is measurable, whereas noise is subjective. The relationship between measurable sound and human irritation is the key to understanding aircraft noise impact. A rating scale has been devised to relate sound to the sensitivity of the human ear. The A-weighted decibel scale (dBA) is measured on a "log" scale, by which is meant that for each increase in sound energy level by a factor of 10, there is a designated increase of 1 dBA. This system of measurement is used because the human ear functions over such an enormous range of sound energy impacts. At a psychological level, there is a rule of thumb that the human ear often "hears" an increase of 10 decibels as equivalent to a "doubling" of sound.

The challenge to evaluating noise impact lies in determining what amount and what kind of sound constitutes noise. The vast majority of people exposed to aircraft noise are not in danger of direct physical harm. However, much research on the effects of noise has led to several generally accepted conclusions:

- The effects of sound are cumulative; therefore, the duration of exposure must be included in any evaluation of noise.
- Noise can interfere with outdoor activities and other communication.
- Noise can disturb sleep, TV/radio listening, and relaxation.
- When community noise levels have reached sufficient intensity, community wide objection to the noise will likely occur.

Research has also found that individual responses to noise are difficult to predict.[1] Some people are annoyed by perceptible noise events, while others show little concern over the most disruptive events. However, it is possible to predict the responses of large groups of people – i.e. communities. Consequently, community response, not individual response, has emerged as the prime index of aircraft noise measurement.

On the basis of the findings described above, a methodology has been devised to relate measurable sound from a variety of sources to community response. For aviation noise analysis, the FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of yearly day/night average sound level (DNL) as FAA's primary metric. The DNL methodology is used in conjunction with the standard A-weighted decibel scale (dBA) which is measured on a "log" scale, by which is meant that for each increase in sound energy level by a factor of 10, there is a

[1] Beranek, Leo, *Noise and Vibration Control*, McGraw-Hill, 1971, pages ix-x.

designated increase of 1 dBA. DNL has been adopted by the U. S. Environmental Protection Agency (EPA), the Department of Housing and Urban Development (HUD), and the Federal Aviation Administration (FAA) for use in evaluating noise impacts. In a general sense, it is the yearly average of aircraft-created noise for a specific location (i.e., runway), but includes a calculation penalty for each night flight.

The FAA has determined that a significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same time frame. As an example, an increase from 63.5 dB to 65 dB is considered a significant impact. The DNL methodology also includes a significant calculation penalty for each night flight. DNL levels are normally depicted as contours. These contours are generated from noise measurements processed by a FAA-approved computer noise model. They are superimposed on a map of the airport and its surrounding area. This map of noise contour levels is used to predict community response to the noise generated from aircraft using that airport.

The basic unit in the computation of DNL is the sound exposure level (SEL). An SEL is computed by mathematically summing the dBA level for each second during which a noise event occurs. For example, the noise level of an aircraft might be recorded as it approaches, passes overhead, and then departs. The recorded noise level of each second of the noise event is then added logarithmically to compute the SEL. To provide a penalty for nighttime flights (considered to be between 10 PM and 7 AM), 10 dBA is added to each nighttime dBA measurement, second by second. Due to the mathematics of logarithms, this calculation penalty is equivalent to 10-day flights for each night flight.[2]

A DNL level is approximately equal to the average dBA level during a 24-hour period with a weighting for nighttime noise events. The main advantage of DNL is that it provides a common measure for a variety of different noise environments. The same DNL level can describe an area with very few high noise events as well as an area with many low-level events.

NOISE MODELING AND CONTOUR CRITERIA

DNL levels are typically depicted as contours. Contours are an interpolation of noise levels drawn to connect all points of a constant level, which are derived from information processed by the FAA-approved computer noise model. They appear similar to topographical contours and are superimposed on a map of the airport and its surrounding area. It is this map of noise levels drawn about an airport, which

[2] Where Leq ("Equivalent Sound Level") is the same measure as DNL without the night penalty incorporated, this can be shown through the mathematical relationship of:
$Leq_d = 10 \log \left(\frac{N_d \times 10^{(SEL/10)}}{86{,}400} \right)$
If SEL equals the same measured sound exposure level for each computation, and if $N_d = 10$ daytime flights, and $N_n = 1$ night-time flight, then use of a calculator shows that for any SEL value inserted, $Leq_d = Leq_n$.

is used to predict community response to the noise from aircraft using that airport. DNL mapping is best used for comparative purposes, rather than for providing absolute values. That is, valid comparisons can be made between scenarios as long as consistent assumptions and basic data are used for all calculations. It should be noted that a line drawn on a map by a computer does not imply that a particular noise condition exists on one side of the line and not on the other. These calculations can only be used for comparing average noise impacts, not precisely defining them relative to a specific location at a specific time.

NOISE AND LAND-USE COMPATIBILITY CRITERIA

Federal regulatory agencies of government have adopted standards and suggested guidelines relating DNL to compatible land uses. Most of the noise and land-use compatibility guidelines strongly support the concept that significant annoyance from aircraft noise levels does not occur outside a 65 DNL noise contour. Federal agencies supporting this concept include the Environmental Protection Agency, Department of Housing and Urban Development, and the Federal Aviation Administration.

Federal Aviation Regulations (FAR) Part 150, Airport Noise Compatibility Planning provides guidance for land-use compatibility around airports. **Table 6-1** summarizes the federal guidelines for compatibility or non-compatibility of various land uses and noise exposure levels. Under federal guidelines, all land uses, including residential, are considered compatible with noise exposure levels of 65DNL and lower. Generally, residential and some public uses are not compatible within the 65-70 DNL, and above. As noted in this table, some degree of noise level reduction (NLR) from outdoor to indoor environments may be required for specific land uses located within higher-level noise contours. Land uses such as commercial, manufacturing, some recreational uses, and agriculture are compatible within 65-70 DNL contours.

Residential development within the 65 DNL contour and above is not recommended and should be discouraged. Care should be taken by local land use authorities to avoid creating potential long-term land use incompatibilities in the vicinity of the airport by permitting new development of incompatible land uses such as residential subdivisions in areas of moderate or higher noise exposure. Washington's airport noise and land use compatibility guidelines discourage residential development starting at the 55 DNL contour, although it is not prohibited.

Bremerton National Airport is located within the South Kitsap Industrial Area (SKIA), a defined subarea within the City of Bremerton. The Airport and the other land in the SKIA subarea have industrial zoning and comprehensive plan land use designations that provide an effective land use buffer between the runway and areas abutting the subarea.

TABLE 6-1: LAND USE COMPATIBILITY WITH DNL

	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (DNL) IN DECIBELS					
Land Use	<65	65-70	70-75	75-80	80-85	85+
Residential						
Residential, other than mobile homes & transient	Y	N(1)	N(1)	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and Nursing Homes	Y	25	30	N	N	N
Churches, Auditoriums, and Concert Halls	Y	25	30	N	N	N
Government Services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, Business and Professional	Y	Y	25	30	N	N
Wholesale and Retail-Building Materials,						
Retail Trade-General	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing General	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and Optical	Y	Y	25	30	N	N
Agriculture (except livestock) and Forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock Farming and Breeding	Y	Y(6)	Y(7)	N	N	N
Mining and Fishing, Resource Production and						
Recreational						
Outdoor Sports Arenas, Spectator Sports	Y	Y(5)	Y(5)	N	N	N
Outdoor Music Shells, Amphitheaters	Y	N	N	N	N	N
Nature Exhibits and Zoos	Y	Y	N	N	N	N
Amusement Parks, Resorts and Camps	Y	Y	Y	N	N	N
Golf Courses, Riding Stables and Water	Y	Y	25	30	N	N

Y (Yes) Land-use and related structures compatible without restrictions.

N (No) Land-use and related structures are not compatible and should be prohibited.

NLR - Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into design and construction of the structure.

25, 30 or 35 - Land uses and structures generally compatible; measure to achieve NLR or 25, 30 or 35 dB must be incorporated into design and construction of the structure.

Table 6-1 Notes:

1. Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor Noise Levels Reduction (NLR) of at least 25dB and 30dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2. Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
5. Land-use compatible, provided special sound reinforcement systems are installed.
6. Residential buildings require an NLR of 25.
7. Residential buildings require an NLR of 30.
8. Residential buildings not permitted.

SOURCE: Federal Aviation Regulations, Part 150, Airport Noise Compatibility Guidelines

PLANNING PERIOD NOISE CONTOURS

A noise analysis of the effects of existing aircraft operations and proposed projects/activities linked to the updated airport master plan has been performed using the FAA's Integrated Noise Model (INM), version 7.0D. The INM data runs are included in **Appendix D.**

The noise contours and associated information have been developed to assess current and future aircraft noise exposure and support local land use compatibility planning. Data from the updated forecasts of activity levels were assigned to the common arrival, departure and airport traffic pattern flight tracks defined for the runways. The existing and future noise contours were generated based on the FAA-approved master plan aircraft operations forecast for 2012, 2017 and 2032.

No changes to the existing runway configuration are assumed in the twenty year planning period. Runway extensions reserves, depicted on the updated airport layout plan, are not reflected in the future noise contours since the projects are not anticipated to occur in the current twenty year planning period.

The runway use (directional) distributions for the updated noise analysis are consistent with the noise analysis conducted in the previous master plan, with the exception of the previously planned additional of a small parallel runway, which is no longer recommended. The current runway use distribution (60% Runway 20/40% Runway 02) is maintained in the future year noise runs (2017 and 2032).

The airport's existing traffic patterns were maintained for all future years. The fixed wing aircraft traffic patterns for Runway 2/20 are located on the east side of the runway, 1,000 feet above ground level (AGL). A helicopter traffic pattern is located on the west side of the runway, 500 feet AGL.

The current and future noise contours are depicted in **Figure 6-1**. The contours are plotted in 5 DNL increments from 65 DNL to 80 DNL, which is consistent with local noise and land use compatibility planning. As noted earlier in this section, under federal standards, all land uses are considered compatible with noise exposure below 65 DNL and the FAA does not formally recognize noise levels below 65DNL in its land use compatibility planning assessments.

The large land area that comprises Bremerton National Airport creates significant land use compatibility benefits for the surrounding community. Based on the forecast activity levels through 2032, all 65 DNL and higher noise contours (for 2012, 2017 and 2032) are contained entirely within the airport property boundary, or extend only slightly over the Highway 3 right of way.

Table 6-2 summarizes the overall size (measured in square miles) of the 65 to 85 DNL noise contours for the current, 5-year, and 20-year INM runs. The increase in surface area for each noise level is consistent with the forecast increase in air traffic, minor changes in aircraft fleet mix, and no changes to the current runway configuration.

TABLE 6-2: CURRENT AND FUTURE NOISE CONTOUR SIZE

DNL NOISE LEVELS	SIZE OF CONTOURS (IN SQUARE MILES)		
	2012	**2017**	**2032**
65	0.23	0.25	0.31
70	0.08	0.09	0.13
75	0.03	0.03	0.04
80	0.01	0.01	0.01
85	0	0	0

2012 Noise Contours

The 65 DNL noise contour extends along the sides of Runway 2/20 and approximately 100 to 150 feet beyond each end of the runway, largely within the runway's 1000-foot wide primary surface. The 65 DNL contour widens on its west side, near mid-runway due to the flight tracks and west traffic pattern established for helicopter operations. For mapping purposes, a common takeoff and landing point was established adjacent to the parallel taxiway, near mid-runway. This location approximates the common location of operations, hover-taxiing and parking generated by flight training, transient and military helicopters. The helicopter operations create a "bubble" that merges with the noise generated from runway operations to form a continuous area of 65 DNL. The helicopter operations also generate a concentration of noise above 65 DNL (up to 80 DNL), which is contained entirely within the runway-taxiway system.

A characteristic of aircraft noise exposure on a runway is the increase in contour size (width) near the ends of the runway. Like wake turbulence generated from aircraft wings during flight, noise energy is dissipated behind and to the sides of the aircraft. The enlarged contours near the runway ends reflect the increase in noise generated during the initial application of power for takeoff and during the initial slow movement of aircraft at the beginning of the takeoff roll. The low altitude of aircraft during final approach and landing also concentrates noise exposure at the runway ends. Both ends of Runway 2/20 have islands of 70 DNL contours that extend approximately 150 to 200 feet beyond the ends of the runway and 1,400 to 1,600 feet down the runway. Smaller 75 and 80 DNL contours extend approximately 100 feet beyond the runway ends and 800 to 1,000 feet down the runway.

2017 Noise Contours

The 65 DNL noise contour for 2017 has the same overall shape as the 2012 contour, with a slight increase in size. A very small sliver of the 65 DNL contour extends beyond airport property near the north end of the runway, into the Highway 3 right of way. The 70, 75, and 80 DNL contours also increase marginally based on the forecast increase in aircraft operations.

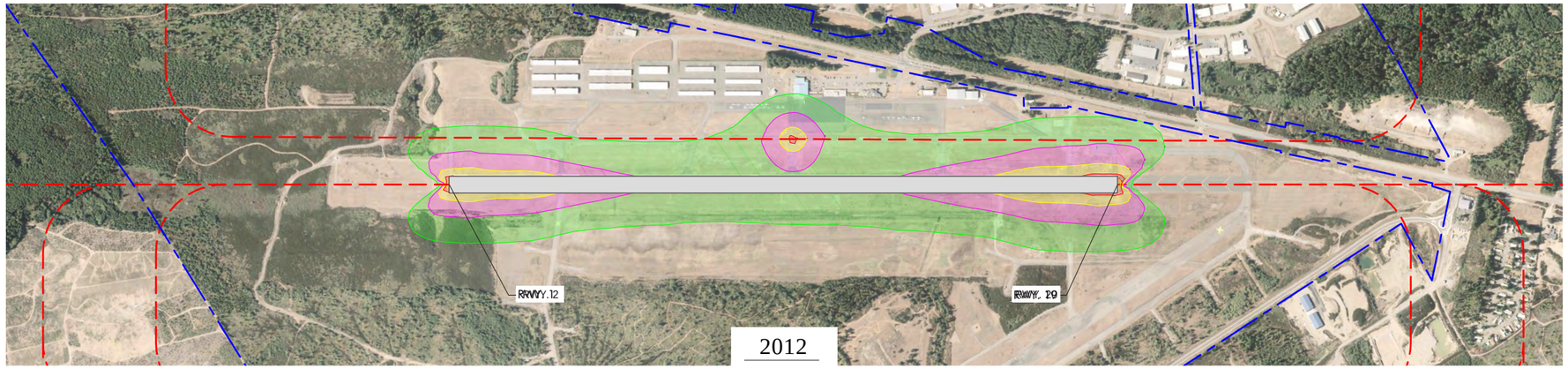
2032 Noise Contours

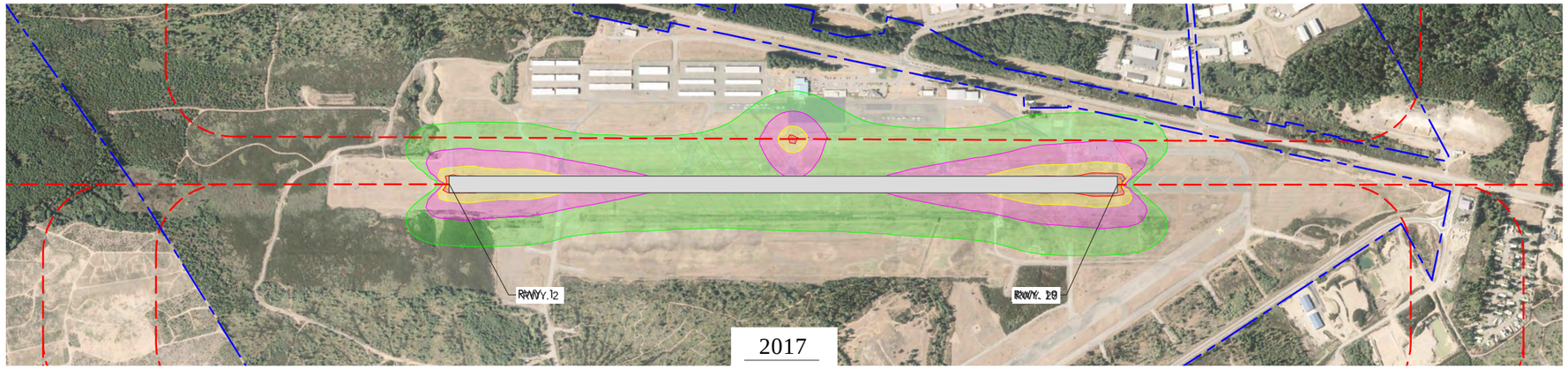
The 65 DNL noise contour for 2032 has the same overall shape as the 2012 and 2017 contours, with continued growth due to the forecast increase in flight activity. A small portion of the 65 DNL contour extends beyond airport property near the north end of the runway, into the Highway 3 right of way. The 70, 75, and 80 DNL contours also increase in size based on the forecast increase in aircraft operations and the islands of 70 DNL noise contours largely concentrated at the ends of the runway in the 2012 and 2017 contours now merge with the helicopter noise bubble and extend along nearly the entire length of the runway.

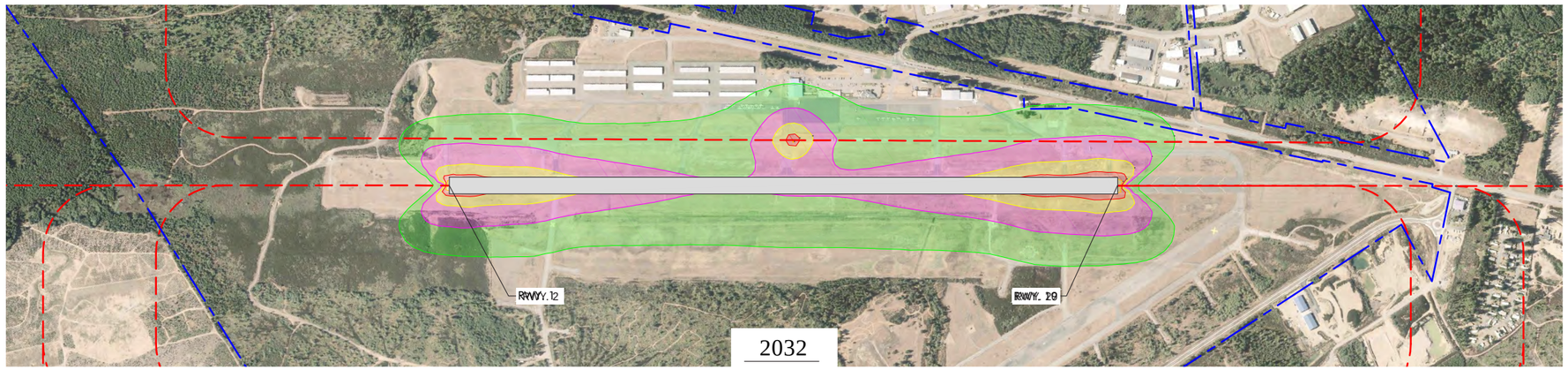
LEGEND

- 65 DNL
- 70 DNL
- 75 DNL
- 80 DNL
- 85 DNL
- FLIGHT TRACKS
- PROPERTY LINE

DAY-NIGHT LEVEL (DNL)







DRAFT

NOTE:
1. FAA INM VERSION 7.0C USED TO DEVELOP NOISE CONTOURS. CONTOURS BASED ON MASTER PLAN FORECAST AIRCRAFT OPERATIONS FOR 2012 AND 2032.

Chapter 7 – Airport Financial Plan/CIP

Chapter 7 – Financial and Development Program

Introduction

The purpose of this chapter is to present the projects identified in the Airport Capital Improvement Program (ACIP) that have been developed and assembled based on the analyses conducted in the Facility Requirements and Development Alternatives chapters (Chapters Four and Five). The ACIP projects are summarized in **Table 7-1** and depicted in **Figure 7-1** later in the chapter. The ACIP is organized in short-, intermediate- and long-term periods that reflect both project prioritization and financial capabilities. Several factors were considered in determining project prioritization, including safety, forecast demand, the need to maintain/replace existing airfield facilities, and financial capabilities of both the Port and FAA to support the development program based on existing funding mechanisms.

The master plan preferred alternative includes airside elements (improvements to west parallel taxiway exit locations and geometry, a new east parallel taxiway, new taxiway access, lighting upgrades, etc.) and landside elements (main apron reconfiguration, helicopter parking, hangars, FBO related facility development areas). Minor pavement maintenance items such as vegetation removal and crack filling are not included in the capital improvement program, but will need to be undertaken by the Port on an annual or semi-annual basis.

In addition to specific construction related activities, some projects will require environmental study. A brief environmental review presented in Chapter 6 and **Appendix E**, provides an overview of areas of potential concern related to the proposed development. As noted in the Inventory chapter, the site for

Bremerton National Airport consists of a complex environmental setting and topography that includes wetlands, stormwater management, water quality and natural habit. These site characteristics affect the design and construction of improvements that often involve a higher level of agency review and permit approval than would be required at a less complex site.

The ACIP lists all major projects included in the twenty year planning period addressed in the Master Plan. Individual projects for the first five years of the planning period are listed in order of priority by year. Projects for the intermediate and long-term phases of the planning period (years 6-20) are listed in order of priority but have not been assigned a year. Each project's eligibility for FAA funding is noted, based on current federal legislation and funding formulas. Specific project details are depicted on the updated airport layout plan and terminal area plan drawings contained in Chapter 8.

A primary source of potential funding identified in this plan is the FAA's Airport Improvement Program (AIP). As proposed, approximately 90 percent of the airport's 20 year ACIP will be eligible for federal funding. Funds from this program are derived from the Aviation Trust Fund, which is the depository for all federal aviation taxes collected on such items as airline tickets, aviation fuel, lubricants, tires, aircraft registrations, and other aviation related fees. These funds are distributed by FAA under appropriations set by Congress to all airports in the United States that are included in the federal airport system (National Plan of Integrated Airport Systems – NPIAS).

However, as noted in **Table 7-1**, the projected twenty year total for FAA eligible projects in the ACIP significantly exceeds current FAA funding levels through the non-primary entitlement program. While other types of FAA funding may be available for some projects, it is reasonable to assume that despite establishing eligibility for FAA funding, not all eligible projects are likely to be funded by FAA. As the Port manages its ACIP, maximizing the use of available FAA and other outside sources of funding is assumed. However, in some cases, the limited availability of outside funds may require projects to be deferred, or funded with increased levels of Port, State or private funding.

Airport Development Schedule and Cost Estimates

Cost estimates for each individual project were developed in 2014 dollars based on typical construction costs associated for the specific type of project. The project costs listed in the ACIP represent order-of-magnitude estimates that approximate design engineering, environmental, other related costs, sales tax, and contingencies. The estimates are intended only for preliminary planning and programming purposes. Specific project analysis and detailed engineering design will be required at the time of project implementation to provide more refined and detailed estimates of the development costs.

In future years, as the plan is carried out, these cost estimates can continue to assist management by adjusting the 2014-based figures for subsequent inflation. This may be accomplished by converting the

interim change in the United States Consumer Price Index (USCPI) into a multiplier ratio through the following formula:

$$\frac{X}{I} = Y$$

Where:
X = USCPI in any given future year
Y = Change Ratio
I = Current Index (USCPI)[1]

USCPI-U
234.781
(1982-1984 = 100)
February 2014

Multiplying the change ratio (Y) times any 2014-based cost figures presented in this study will yield the adjusted dollar amounts appropriate in any future year evaluation. Several different CPI-based indices are available for use and any applicable index may be substituted by the Port in its financial management program.

The following sections outline the recommended development program and funding assumptions. The scheduling has been prepared according to the facility requirements determined through the master plan evaluation. The projected staging of development projects is based upon anticipated needs and investment priorities. Actual activity levels may vary from projected levels; therefore, the staging of development in this section should be viewed as a general guide. When activity does vary from projected levels, implementation of development projects should occur when demand warrants, rather than according to the estimated staging presented in this chapter. In addition to major projects, the airport will continue to require regular facility maintenance such as pavement maintenance, vegetation control, sweeping, lighting repair and fuel system maintenance.

The first phase of the capital improvement program includes the highest priority projects recommended during the first five years of the planning period. Intermediate and long term projects are anticipated to occur in the 6 to 20 year time period, although changes in demand or other conditions could accelerate or slow demand for some improvements.

[1] U.S. Consumer Price Index for All Urban Consumers (USCPI-U)

SHORT TERM PROJECTS

The short term program contains work items of the highest priority. Priority items include improvements related to safety. Because of their priority, these items will need to be incorporated into the State Capital Improvement Program (SCIP) managed by the FAA Seattle Airport District Office and WSDOT Aviation. To assist with this process, the short term projects are scheduled in specific calendar years for the first six years of the planning period (2014-2019).

The main focus in the short term development period is to address major taxiway improvements, preserve (seal coat) runway pavement, and address current needs on the south and north tiedown aprons. A new hangar development area will be located near the south end of the west flight line. The south hangar area will accommodate primarily small aircraft in a variety of hangar types. Additional infill development (hangars, etc.) will be accommodated in select locations in the west terminal area.

Short Term Projects:

- Rehabilitate West Parallel Taxiway A and Reconfigure Taxiways (Taxiway F, Apron Taxilanes);
- Rehabilitate/Reconstruct Sections of Main Apron
- Runway 02/20 - Sealcoat and Repaint Precision & Nonprecision Instrument Markings
- Replace Taxiway Edge Lighting (MITL)
- Replace Runway Edge Lighting (HIRL)
- South Hangar Area Development
    - Site Preparation, Stormwater Development, Utilities
    - Construct Access Taxiway, Hangar Taxilanes
    - Construct Hangar Access Road
    - Construct T-hangar/Executive Hangar (10 units) Port or Private
- Reconstruct/Reconfigure/Expand South Aircraft Tiedown Apron
- Existing West Hangar Area Taxilanes (north section) Overlay
- Aircraft Fueling Apron Overlay (asphalt sections)
- North Apron (tiedowns) rehabilitate/reconfigure tiedowns

INTERMEDIATE & LONG TERM PROJECTS

Several intermediate or long term projects are considered to be current needs. However, based on the limited funding resources available, it was necessary to shift some projects to the longer term timeline. However, projects may be completed sooner in the event that additional funding can be generated.

Intermediate Term Projects (6-10 years)

- Maintenance/upgrade on Port-owned hangars
- T-Hangar construction (market driven)
- West hangar area taxilane sealcoats and rehabilitation (overlay)
- Main apron rehabilitation/reconstruction
- Relocated access road & automated gate on main apron
- New taxilane connectors between the main apron and Taxiway A
- Runway and major taxiways sealcoat, repaint markings
- East Landside Development Area
    - Site Grading
    - Utilities and Stormwater
    - Access Road (connection to Airport Way, east side of development)
    - Access Taxiway (corporate hangars)
    - T-Hangars (market driven)
- Removal of underground aviation fuel storage tanks; replacement above ground fueling system and mobile fuel truck parking/containment
- Aircraft hold area improvements (Taxiway A)
- East Parallel Taxiway (Phase 1 – north section)

Long Term Projects (11-20 years)

- Complete pavement maintenance projects: Regular crack filling, slurry seal all airfield (asphalt) pavements on 6 to 8 year intervals; repaint airfield markings.
- East Parallel Taxiway (Phase 2 – south section)
- East Landside Area Access Road (Phase 2 – T-Hangars, west side of development)
- East Landside Area Stub Taxilanes (3)
- Pavement Maintenance, Rehabilitation, and Reconstruction:
    - Sealcoat runway, major taxiways, repaint markings (6 to 8 year intervals)
    - Overlay pavements with PCI <70
    - Reconstruct pavements with PCI <50
- Replace airport beacon
- Replace Runway 20 Approach Lighting System. (MALSR)
- Replace REIL and PAPI for Runway 02 & 20
- Replace Port-owned T-hangars

Port of Bremerton
Bremerton National Airport
2014-2034

20-YEAR CAPITAL IMPROVEMENT PROGRAM

February 2014

Current NPE $ Accumulation (Balance after FY 2014 Taxiway/Apron Project): $0.00

Annual Non-Primary Entitlement Funding: $150,000

Short Term	Yr	Project	Project Category	Unit	Quantity	Unit Cost	Subtotal Cost	40% Engineering/ Contingency / Environmental / Sales Tax	Total Cost	FAA GA Entitlement	FAA Other Funding **	Port/Local Costs***	
2014	0	Taxiway A, E, F, Main Apron (South Section) Rehabilitation/Reconstruction	Pavement Construction	LS	1	$1,843,000	$1,843,000	$552,900	$2,395,900	$600,000	$1,556,310	$239,590	
		This project cost estimate is based on 30% design and has a 30% contingency											*$0*
													accumlated NPE$
Subtotal - Year 0							$1,843,000	$552,900	$2,395,900	$600,000	$1,556,310	$239,590	
2015	1	No Projects/Carryover NPE$											$150,000
													accumlated NPE$
Subtotal - Year 1							$0	$0	$0	$0	$0	$0	*$150,000*
2016	2	No Projects/Carryover NPE$											$150,000
													accumlated NPE$
Subtotal - Year 2							$0	$0	$0	$0	$0	$0	*$300,000*
2017	3	Runway 02/20 Sealcoat and Restriping, PIR/NPI markings	Pavement Rehabilitation	SY	100,283	$2	$250,566	$100,226	$350,792	$315,713	$0	$35,079	$150,000
													accumlated NPE$
Subtotal - Year 3							$250,566	$100,226	$350,792	$315,713	$0	$35,079	*$450,000*
2018	4	Replacement MITL and Directional Signs Taxiway A & Exits	Lighting	LF	7,800	$60	$508,000	$203,200	$711,200	$284,287	$355,793	$71,120	$150,000
		Replacement HIRL Runway 2/20 (6,000')	Lighting	LF	6,000	$60	$360,000	$144,000	$504,000	$0	$453,600	$50,400	
		South Hangar Area Access Road	Other	LF	1,850	$150	$277,500	$111,000	$388,500	$0	$349,650	$38,850	
		South Hangar Area Access Taxiway	Pavement Construction	SY	1,730	$75	$129,750	$51,900	$181,650	$0	$163,485	$18,165	
		South Hangar Area Stub Taxilanes (2)	Pavement Construction	SY	2,560	$75	$192,000	$76,800	$268,800	$0	$241,920	$26,880	
		South Hangar Area Site Preparation, Stormwater	Construction	LS	1	$100,000	$100,000	$40,000	$140,000	$0	$126,000	$14,000	
		T-Hangar (10-unit)	Building	SF	10,870	$40	$434,800	$173,920	$608,720	$0	$0	$608,720	*accumlated NPE$*
													$284,287
Subtotal - Year 4							$2,002,050	$800,820	$2,802,870	$284,287	$1,690,448	$828,135	
2019	5	South GA Tiedown Apron Expand/Reconstruct/Reconfigure Tiedowns	Pavement Construction	SY	8,481	$65	$606,265	$242,506	$848,771	$150,000	$613,894	$84,877	$150,000
		West T-Hangar Taxilanes Overlay (north section)	Pavement Rehabilitation	SY	13,430	$45	$609,350	$243,740	$853,090	$0	$767,781	$85,309	
		West Aircraft Fuel Apron Overlay (AC Sections)	Pavement Rehabilitation	SY	1,703	$45	$81,635	$32,654	$114,289	$0	$102,860	$11,429	*accumlated NPE$*
		North GA Tiedown Apron Rehab/Reconfigure Tiedowns	Pavement Rehabilitation	SY	1,703	$45	$81,635	$32,654	$114,289	$0	$102,860	$11,429	*$150,000*
Subtotal - Year 5							$1,378,885	$551,554	$1,930,439	$150,000	$1,587,395	$193,044	
						0-6	**$5,474,501**	**$2,005,500**	**$7,480,001**	**$1,350,000**	**$4,834,153**	**$1,295,848**	

** Other FAA Funding Total listed for reference only based on general project eligibility; FAA funding levels are expected to be below projected needs.

*** Local portion of project share may include WSDOT grant funding or other contributions

Intermediate Term (2020-2024)	Yr	Project	Project Category	Unit	Quantity	Unit Cost	Subtotal Cost	40% Engineering/ Contingency/ Environmental / Sales Tax	Total Cost	FAA GA Entitlement *	FAA Other Funding **	Port/Local Costs***
		Port Hangars Maintenance/Upgrade	Other	LS	1	$50,000	$50,000	$20,000	$70,000	$0	$0	$70,000
		T-Hangar (10-unit)	Building	SF	10,870	$40	$434,800	$173,920	$608,720	$0	$0	$608,720
		West T-Hangar Taxilane Sealcoat (middle section)	Pavement Rehabilitation	SY	8,110	$2	$19,220	$7,688	$26,908	$0	$24,217	$2,691
		West T-Hangar Taxilane Sealcoat (south section)	Pavement Rehabilitation	SY	19,748	$2	$43,496	$17,398	$60,894	$0	$54,805	$6,089
		Main Apron - Relocated Access Road and Automated Gate	Other, Security	LS	1	$22,500	$22,500	$9,000	$31,500	$0	$28,350	$3,150
		Main Apron - New Taxilane Connectors (2) to Txy A; Remove 2 Existing Connectors	Pavement Construction	SY	1,320	$75	$119,000	$47,600	$166,600	$0	$149,940	$16,660
		North Tiedown Overlay & Tiedown Reconfiguration	Pavement Rehabilitation	SY	21,635	$45	$1,078,575	$431,430	$1,510,005	$600,000	$759,005	$151,001
		North Hangar Taxilane (west landside) Sealcoat	Pavement Rehabilitation	SY	3,190	$2	$8,380	$3,352	$11,732	$0	$10,559	$1,173
		West Parallel Taxiway (Txy A, Exits B-H) Sealcoat & Restriping	Pavement Rehabilitation	SY	47,621	$2	$110,242	$44,097	$154,339	$0	$138,905	$15,434
		Transient Aircraft Hangar & Apron Paving	Building/Pavement	LS	1	$ 1,515,000	$1,515,000	$606,000	$2,121,000	$0	$212,100	$1,908,900
		East Landside Area Access Road (east row of hangars)	Other	LF	2,300	$250	$575,000	$230,000	$805,000	$0	$724,500	$80,500
		East Landside Area Access Taxiway - Phase 1 (1,650 x 35')	Pavement Construction	SY	6,420	$75	$481,500	$192,600	$674,100	$0	$606,690	$67,410
		East Landside Area - Water Service	Site Development/Utilities	LF	6,100	$25	$152,500	$61,000	$213,500	$0	$192,150	$21,350
		East Landside Area - Sanitary Sewer Service	Site Development/Utilities	LF	6,930	$30	$207,900	$83,160	$291,060	$0	$261,954	$29,106
		East Landside Area - Electrical Service	Site Development/Utilities	LF	5,400	$35	$189,000	$75,600	$264,600	$0	$238,140	$26,460
		East Landside Area - Stormwater System	Site Development/Utilities	CF	235,750	$2	$471,500	$188,600	$660,100	$0	$594,090	$66,010
		East Landside Area Grading/Site Preparation	Site Development/Utilities	CY	35,535	$11	$390,885	$156,354	$547,239	$0	$492,515	$54,724
		South Hangar Area Stub Taxilane (1)	Pavement Construction	SY	1,280	$75	$96,000	$38,400	$134,400	$0	$120,960	$13,440
		South Hangar Area Taxilanes (west landside) Sealcoat	Pavement Rehabilitation	SY	4,290	$2	$10,580	$4,232	$14,812	$0	$13,331	$1,481
		T-Hangar (10-unit)	Building	SF	10,870	$40	$434,800	$173,920	$608,720	$0	$0	$608,720
		Runway 02/20 Sealcoat and Restriping/PIR/NPI Markings	Pavement Rehabilitation	SY	100,283	$2	$250,566	$100,226	$350,792	$0	$315,713	$35,079
		Taxiway A, Exit Taxiways B-H Sealcoat & Restriping	Pavement Rehabilitation	SY	39,138	$2	$93,276	$37,310	$130,586	$0	$117,528	$13,059
		West T-Hangar Taxilane Sealcoat (north section)	Pavement Rehabilitation	SY	20,665	$2	$46,330	$18,532	$64,862	$0	$58,376	$6,486
		REIL Runway 20	Lighting	ea	1	$25,000	$25,000	$10,000	$35,000	$0	$31,500	$3,500
		Above Ground Fuel Tanks (2-12,000 gal.; AVGAS & Jet-A), Pumps	Other	LS	2	$100,000	$200,000	$80,000	$280,000	$0	$252,000	$28,000
		Removal of underground fuel storage tanks (3)	Other	LS	1	$50,000	$50,000	$20,000	$70,000	$0	$63,000	$7,000
		Mobile Fuel Vehicle Parking Pad	Pavement Construction	SY	456	$150	$93,400	$37,360	$130,760	$0	$117,684	$13,076
		T-Hangar (10-unit)	Building	SF	10,870	$40	$434,800	$173,920	$608,720	$0	$0	$608,720
		South Aircraft Hold Area Expansion	Pavement Construction	SY	980	$75	$73,500	$29,400	$102,900	$0	$92,610	$10,290
		North Aircraft Hold Area (new)	Pavement Construction	SY	4,230	$75	$317,250	$126,900	$444,150	$0	$399,735	$44,415
		CatEx/Environmental Assessment - East Parallel Taxiway	Planning	LS	1	$150,000	$150,000	$60,000	$210,000	$0	$189,000	$21,000
		East Parallel Taxiway - Phase 1 (North Section w/ MITL)	Pavement Construction	SY	7,980	$75	$663,500	$265,400	$928,900	$0	$836,010	$92,890
		FBO Apron Sealcoat	Pavement Rehabilitation	SY	17,860	$2	$40,720	$16,288	$57,008	$0	$51,307	$5,701
		Port Hangars Maintenance/Upgrade	Other	LS	1	$50,000	$50,000	$20,000	$70,000	$0	$0	$70,000
		West T-Hangar Taxilane Overlay (northwest section)	Pavement Rehabilitation	SY	7,240	$45	$327,300	$130,920	$458,220	$0	$412,398	$45,822
		Runway 02/20 Sealcoat and Restriping, PIR/NPI markings	Pavement Rehabilitation	SY	100,283	$2	$250,566	$100,226	$350,792	$0	$315,713	$35,079
Subtotal - Year 6-10							**$9,477,086**	**$3,790,834**	**$13,267,920**	**$600,000**	**$7,874,784**	**$4,793,136**

* Non Primary Entitlement Funding For 5-Year Period Currently Projected at $750,000; project funding priorities to be determined

** Other FAA Funding Total listed for reference only based on general project eligibility; FAA funding levels are expected to be below projected needs.

*** Local portion of project share may include WSDOT grant funding or other contributions

5 year NPE $ = $750,000

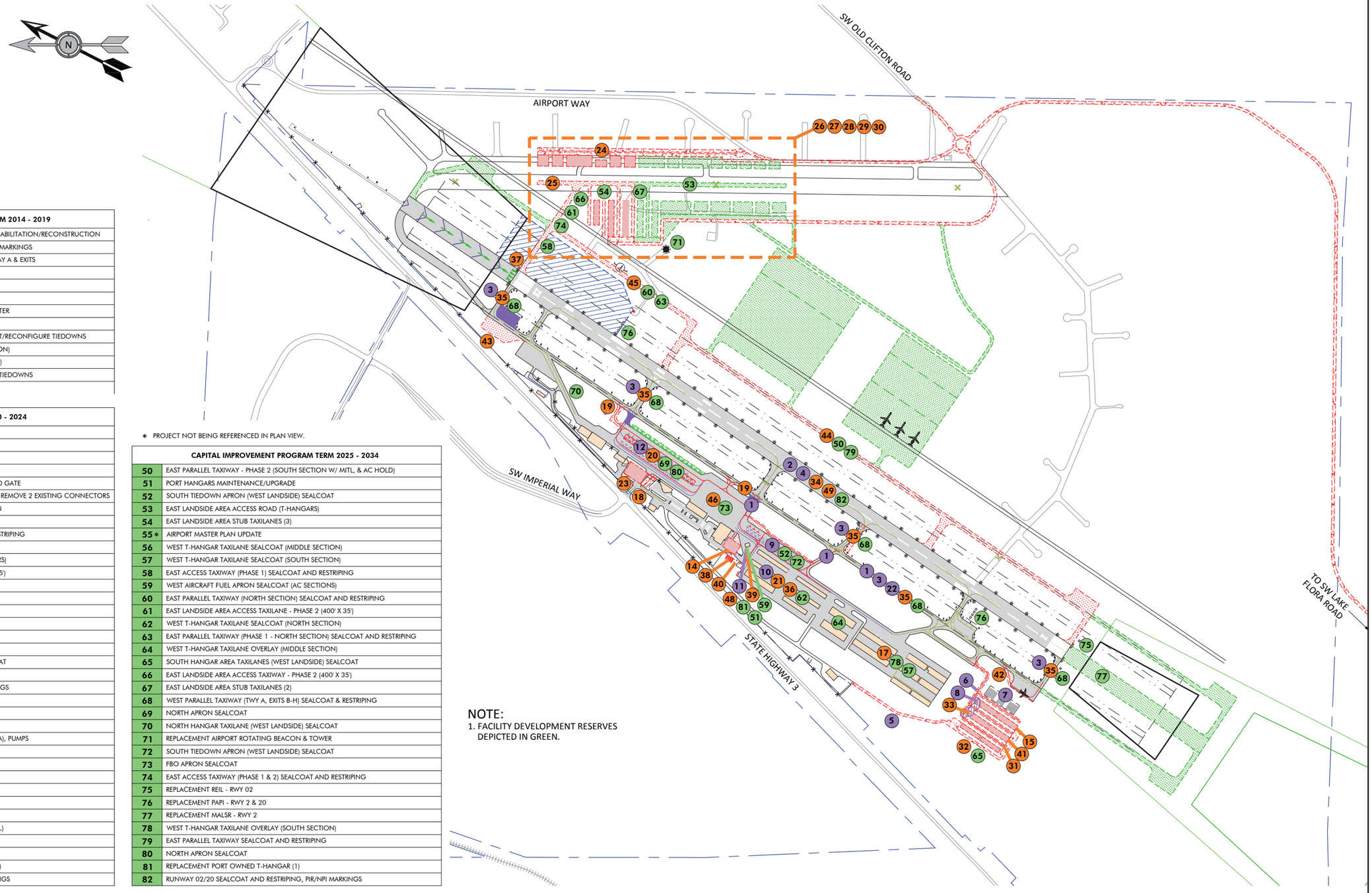
Long Term (2025-2034)	Yr	Project	Project Category	Unit	Quantity	Unit Cost	Subtotal Cost	40% Engineering/ Contingency/ Environmental / Sales Tax	Total Cost	FAA GA Entitlement *	FAA Other Funding **	Port/Local Costs***
		East Parallel Taxiway - Phase 2 (South Section w/ MITL, & AC Hold)	Pavement Construction	SY	23,670	$75	$1,890,250	$756,100	$2,646,350	$600,000	$1,781,715	$264,635
		Port Hangars Maintenance/Upgrade	Other	LS	1	$50,000	$50,000	$20,000	$70,000	$0	$0	$70,000
		South Tiedown Apron (west landside) Sealcoat	Pavement Rehabilitation	SY	8,481	$2	$21,962	$8,785	$30,747	$0	$27,672	$3,075
		East Landside Area Access Road (T-hangars)	Other	LF	4,200	$250	$1,050,000	$420,000	$1,470,000	$0	$1,323,000	$147,000
		East Landside Area Stub Taxilanes (3)	Pavement Construction	SY	3,600	$75	$270,000	$108,000	$378,000	$0	$340,200	$37,800
		Airport Master Plan Update	Planning	LS	1	$ 250,000	$250,000	$100,000	$350,000	$0	$315,000	$35,000
		West T-Hangar Taxilane Sealcoat (middle section)	Pavement Rehabilitation	SY	8,110	$2	$19,220	$7,688	$26,908	$0	$24,217	$2,691
		West T-Hangar Taxilane Sealcoat (south section)	Pavement Rehabilitation	SY	19,748	$2	$43,496	$17,398	$60,894	$0	$54,805	$6,089
		East Access Taxiway (Phase 1) Sealcoat and Restriping	Pavement Rehabilitation	SY	6,420	$2	$17,840	$7,136	$24,976	$0	$22,478	$2,498
		West Aircraft Fuel Apron Sealcoat (AC Sections)	Pavement Rehabilitation	SY	1,703	$2	$8,406	$3,362	$11,768	$0	$10,592	$1,177
		East Parallel Taxiway (North Section) Sealcoat and Restriping	Pavement Rehabilitation	SY	7,980	$2	$20,960	$8,384	$29,344	$0	$26,410	$2,934
		East Landside Area Access Taxilane - Phase 2 (400 x 35')	Pavement Construction	SY	1,560	$75	$119,000	$47,600	$166,600	$0	$149,940	$16,660
		West T-Hangar Taxilane Sealcoat (north section)	Pavement Rehabilitation	SY	20,665	$2	$46,330	$18,532	$64,862	$0	$58,376	$6,486
		East Parallel Taxiway (Phase 1 - North Section) Sealcoat and Restriping	Pavement Rehabilitation	SY	7,980	$2	$30,960	$12,384	$43,344	$0	$39,010	$4,334
		West T-Hangar Taxilane Overlay (middle section)	Pavement Rehabilitation	SY	8,110	$45	$367,950	$147,180	$515,130	$0	$463,617	$51,513
		South Hangar Area Taxilanes (west landside) Sealcoat	Pavement Rehabilitation	SY	5,570	$2	$13,140	$5,256	$18,396	$0	$16,556	$1,840
		East Landside Area Access Taxiway - Phase 2 (400 x 35')	Pavement Construction	SY	1,560	$75	$117,000	$46,800	$163,800	$0	$147,420	$16,380
		East Landside Area Stub Taxilanes (2)	Pavement Construction	SY	2,600	$75	$195,000	$78,000	$273,000	$0	$245,700	$27,300
		West Parallel Taxiway (Txy A, Exits B-H) Sealcoat & Restriping	Pavement Rehabilitation	SY	47,621	$2	$110,242	$44,097	$154,339	$0	$138,905	$15,434
		North Apron Sealcoat	Pavement Rehabilitation	SY	25,635	$2	$56,270	$22,508	$78,778	$0	$70,900	$7,878
		North Hangar Taxilane (west landside) Sealcoat	Pavement Rehabilitation	SY	3,190	$2	$8,380	$3,352	$11,732	$0	$10,559	$1,173
		Replacement Airport Rotating Beacon & Tower	Lighting	ea	1	$125,000	$125,000	$50,000	$175,000	$0	$157,500	$17,500
		South Tiedown Apron (west landside) Sealcoat	Pavement Rehabilitation	SY	8,481	$2	$21,962	$8,785	$30,747	$0	$27,672	$3,075
		FBO Apron Sealcoat	Pavement Rehabilitation	SY	17,860	$2	$40,720	$16,288	$57,008	$0	$51,307	$5,701
		East Access Taxiway (Phase 1 & 2) Sealcoat and Restriping	Pavement Rehabilitation	SY	7,980	$2	$20,960	$8,384	$29,344	$0	$26,410	$2,934
		Replacement REIL - Rwy 02	Lighting	ea	1	$25,000	$25,000	$10,000	$35,000	$0	$31,500	$3,500
		Replacement PAPI - Rwy 2 & 20	Lighting	ea	2	$60,000	$120,000	$48,000	$168,000	$0	$151,200	$16,800
		Replacement MALSR - Rwy 2	Lighting	ea	1	$500,000	$500,000	$200,000	$700,000	$0	$630,000	$70,000
		West T-Hangar Taxilane Overlay (south section)	Pavement Rehabilitation	SY	19,748	$45	$892,660	$357,064	$1,249,724	$0	$1,124,752	$124,972
		East Parallel Taxiway Sealcoat and Restriping	Pavement Rehabilitation	SY	31,654	$2	$78,308	$31,323	$109,631	$0	$98,668	$10,963
		North Apron Sealcoat	Pavement Rehabilitation	SY	25,635	$2	$56,270	$22,508	$78,778	$0	$70,900	$7,878
		Replacement Port Owned T-Hangar (1)	Building	SF	11,375	$40	$455,000	$182,000	$637,000	$0	$0	$637,000
		Replacement Port Owned T-Hangar (1)	Building	SF	11,375	$40	$455,000	$182,000	$637,000	$0	$0	$637,000
		Runway 02/20 Sealcoat and Restriping, PIR/NPI markings	Pavement Rehabilitation	SY	100,283	$2	$250,566	$100,226	$350,792	$0	$315,713	$35,079
Subtotal - Year 11-20							**$4,105,718**	**$1,642,287**	**$5,748,005**	**$0**	**$4,026,605**	**$1,721,401**
						20 Yr Total	**$19,057,305**	**$7,438,622**	**$26,495,927**	**$1,950,000**	**$16,735,542**	**$7,810,385**

* Non Primary Entitlement Funding For 10-Year Period Currently Projected at $1,500,000; project funding priorities to be determined.

** Other FAA Funding Total listed for reference only based on general project eligibility; FAA funding levels are expected to be well below projected needs.

*** Local portion of project share may include WSDOT grant funding or other contributions

10 year NPE $ = $1,500,000



CAPITAL IMPROVEMENT PROGRAM TERM 2014 - 2019	
1	2014 - TAXIWAY A, E, F, MAIN APRON (SOUTH SECTION) REHABILITATION/RECONSTRUCTION
2	2017 - RUNWAY 02/20 SEALCOAT AND RESTRIPING, PIR/NPI MARKINGS
3	2018 - REPLACEMENT MITL AND DIRECTIONAL SIGNS TAXIWAY A & EXITS
4	2018 - REPLACEMENT HIRL RUNWAY 2/20 (6,000')
5	2018 - SOUTH HANGAR AREA ACCESS ROAD
6	2018 - SOUTH HANGAR AREA STUB TAXILANES (2)
7	2018 - SOUTH HANGAR AREA SITE PREPARATION, STORMWATER
8	2018 - T-HANGAR (10-UNIT)
9	2019 - SOUTH GA TIEDOWN APRON EXPAND/RECONSTURCT/RECONFIGURE TIEDOWNS
10	2019 - WEST T-HANGAR TAXILANES OVERLAY (NORTH SECTION)
11	2019 - WEST AIRCRAFT FUEL APRON OVERLAY (AC SECTIONS)
12	2019 - NORTH GA TIEDOWN APRON REHAB/RECONFIGURE TIEDOWNS

CAPITAL IMPROVEMENT PROGRAM TERM 2020 - 2024	
14	PORT HANGARS MAINTENANCE/UPGRADE
15	T-HANGAR (10-UNITS)
16	WEST T-HANGAR TAXILANES SEALCOAT (MIDDLE SECTION)
17	WEST T-HANGAR TAXILANE SEALCOAT (SOUTH SECTION)
18	MAIN APRON - RELOCATED ACCESS ROAD AND AUTOMATED GATE
19	MAIN APRON - NEW TAXILANE CONNECTORS (2) TO TWY A; REMOVE 2 EXISTING CONNECTORS
20	NORTH TIEDOWN OVERLAY & TIEDOWN RECONFIGURATION
21	NORTH HANGAR TAXILANE (WEST LANDSIDE) SEALCOAT
22	WEST PARALLEL TAXIWAY (TWY A, EXITS B-H) SEALCOAT & RESTRIPING
23	TRANSIENT AIRCRAFT HANGAR & APRON PAVEING
24	EAST LANDSIDE AREA ACCESS ROAD (EAST ROW OF HANGARS)
25	EAST LANDSIDE AREA ACCESS TAXIWAY - PHASE 1 (1,650' X 35')
26	EAST LANDSIDE AREA - WATER SERVICE
27	EAST LANDSIDE AREA - SANITARY SEWER SERVICE
28	EAST LANDSIDE AREA - ELECTRICAL SERVICE
29	EAST LANDSIDE AREA - STORMWATER SYSTEM
30	EAST LANDSIDE AREA GRADING/SITE PREPERATION
31	SOUTH HANGAR AREA STUB TAXILANE (1)
32	SOUTH HANGAR AREA TAXILANES (WEST LANDSIDE) SEALCOAT
33	T-HANGAR (10-UNIT)
34	RUNWAY 02/20 SEALCOAT AND RESTRIPING/PIR/NPI MARKINGS
35	TAXIWAY A, EXIT TAXIWAYS B-H SEALCOAT & RESTRIPING
36	WEST T-HANGAR TAXILANE SEALCOAT (NORTH SECTION)
37	REIL RUNWAY 20
38	ABOVE GROUND FUEL TANKS (2-12,000 GAL; AVGAS & JET-A), PUMPS
39	REMOVAL OF UNDERGROUND FUEL STORAGE TANKS (3)
40	MOBILE FUEL VEHICLE PARKING PAD
41	T-HANGAR (10-UNIT)
42	SOUTH AIRCRAFT HOLD AREA EXPANSION
43	NORTH AIRCRAFT HOLD AREA (NEW)
44	CATEX/ENVIROMENT ASSESSMENT - EAST PARALLEL TAXIWAY
45	EAST PARALLEL TAXIWAY - PHASE 1 (NORTH SECTION W/ MITL)
46	FBO APRON SEALCOAT
47	PORT HANGARS MAINTENANCE/UPGRADE
48	WEST T-HANGAR TAXILANE OVERLAY (NORTHWEST SECTION)
49	RUNWAY 02/20 SEALCOAT AND RESTRIPING, PIR/NPI MARKINGS

∗ PROJECT NOT BEING REFERENCED IN PLAN VIEW.

CAPITAL IMPROVEMENT PROGRAM TERM 2025 - 2034	
50	EAST PARALLEL TAXIWAY - PHASE 2 (SOUTH SECTION W/ MITL, & AC HOLD)
51	PORT HANGARS MAINTENANCE/UPGRADE
52	SOUTH TIEDOWN APRON (WEST LANDSIDE) SEALCOAT
53	EAST LANDSIDE AREA ACCESS ROAD (T-HANGARS)
54	EAST LANDSIDE AREA STUB TAXILANES (3)
55∗	AIRPORT MASTER PLAN UPDATE
56	WEST T-HANGAR TAXILANE SEALCOAT (MIDDLE SECTION)
57	WEST T-HANGAR TAXILANE SEALCOAT (SOUTH SECTION)
58	EAST ACCESS TAXIWAY (PHASE 1) SEALCOAT AND RESTRIPING
59	WEST AIRCRAFT FUEL APRON SEALCOAT (AC SECTIONS)
60	EAST PARALLEL TAXIWAY (NORTH SECTION) SEALCOAT AND RESTRIPING
61	EAST LANDSIDE AREA ACCESS TAXILANE - PHASE 2 (400' X 35')
62	WEST T-HANGAR TAXILANE SEALCOAT (NORTH SECTION)
63	EAST PARALLEL TAXIWAY (PHASE 1 - NORTH SECTION) SEALCOAT AND RESTRIPING
64	WEST T-HANGAR TAXILANE OVERLAY (MIDDLE SECTION)
65	SOUTH HANGAR AREA TAXILANES (WEST LANDSIDE) SEALCOAT
66	EAST LANDSIDE AREA ACCESS TAXIWAY - PHASE 2 (400' X 35')
67	EAST LANDSIDE AREA STUB TAXILANES (2)
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69	NORTH APRON SEALCOAT
70	NORTH HANGAR TAXILANE (WEST LANDSIDE) SEALCOAT
71	REPLACEMENT AIRPORT ROTATING BEACON & TOWER
72	SOUTH TIEDOWN APRON (WEST LANDSIDE) SEALCOAT
73	FBO APRON SEALCOAT
74	EAST ACCESS TAXIWAY (PHASE 1 & 2) SEALCOAT AND RESTRIPING
75	REPLACEMENT REIL - RWY 02
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78	WEST T-HANGAR TAXILANE OVERLAY (SOUTH SECTION)
79	EAST PARALLEL TAXIWAY SEALCOAT AND RESTRIPING
80	NORTH APRON SEALCOAT
81	REPLACEMENT PORT OWNED T-HANGAR (1)
82	RUNWAY 02/20 SEALCOAT AND RESTRIPING, PIR/NPI MARKINGS

NOTE:
1. FACILITY DEVELOPMENT RESERVES DEPICTED IN GREEN.

Capital Funding Sources

FEDERAL GRANTS

Federal funding is provided through the Federal Airport Improvement Program (AIP). This reauthorization is the latest evolution of a funding program originally authorized by Congress in 1946 as the Federal Aid to Airports Program (FAAP). The program provides grant funding for airports listed in the National Plan of Integrated Airport Systems (NPIAS). Under current legislation, eligible general aviation airports can receive up to $150,000 per year in general aviation "non-primary entitlement" grants. If a project is anticipated to cost in excess of $150,000, the participating airport can roll over the funding allocations for up to four years, at which time the accumulated total of funds can be used for larger projects. Any unused funds that remain beyond the maximum allowable roll over period revert to the FAA for use at other airports. These funds may only be used for eligible capital improvement projects and may not support airport operation and maintenance costs. Current FAA funding levels are 90 percent with a 10 percent local match. WSDOT Aviation Division grants may be available to reduce the local share, depending on the availability of funding.

FAA funding is limited to projects that have clearly defined need that has been identified through preparation of an FAA approved Airport Layout Plan (ALP). Periodic updates of the ALP are required when new or unanticipated project needs or opportunities exist that require use of FAA funds. The FAA will not generally participate in vehicle parking, utilities, building renovations or projects associated with non-aviation developments.

Projects such as hangar construction or fuel systems are eligible for funding, although the FAA indicates that this category of project would be considered to be a much lower priority than other airfield needs.

The FAA also provides discretionary grants to airports. The dollar amounts of individual grants vary and can be significantly larger than the primary entitlements. Discretionary grants are awarded at the FAA's sole discretion. Discretionary funds are distributed after all entitlement funds have been allocated. For larger projects requiring substantially larger amounts of funding, non-primary entitlement, state apportionment, and discretionary grants are often combined. Other types of FAA funding include facilities & equipment (F&E) projects and Congressionally-appropriated dollars for specific projects.

STATE FUNDING

The Washington State Department of Transportation - Aviation Division provides an additional source of funding for airport projects in the form of grants through its Airport Aid Grants program. The Aviation Division has established grant criteria for airport sponsors requesting aid to define projects related to pavement, safety, maintenance, security improvements or planning.

Although Aviation Division funding is distributed widely to general aviation airports throughout the state, predicting any consistent level of funding for purposes of local long term financial planning is not possible. Competition for the limited grant funds is consistently high, with a priority often given to airports with limited resources or to airports that are not eligible to receive FAA grants. Project funding is determined on a case-by-case basis and is affected by overall funding levels and competition among airports during any particular state budget cycle (biennium).

For these reasons, no specific level of Aviation Division funding has been assumed in the CIP presented in **Table 7-1**. It is recommended that the Port regularly apply for WSDOT funding for eligible projects; however, the limitations on funding availability suggest that it would not be prudent to assume that any specific level or formula percentage is available. In the instances when Aviation Division grant requests are successful, the Port's required expenditure in the form of local match for FAA grants or funding non-FAA eligible projects will be reduced.

The current maximum grant award through the Aviation Division is $250,000, although grants of that amount are uncommon due to the large number of applications for funding normally received. When funding levels permit, the Aviation Division attempts to assist NPIAS general aviation airports with funds needed to match FAA grants. Up to half of the 10 percent local match may be funded through Aviation Division grants, although as noted above, the available funding within each biennial funding cycle effectively limits the ability to support large grant awards.

State Capital Improvement Program (SCIP)

The FAA's Seattle Airport District Office (ADO) is working with state aviation agencies in Washington, Oregon and Idaho to develop a coordinated "state" capital improvement program, known as the SCIP. The SCIP is intended to become the primary tool used by FAA, state aviation agencies and local airport sponsors to prioritize funding. The program has reached full implementation with current and near term future funding decisions prioritized through evaluation formulas. Airport sponsors are asked to provide annual updates to the short term project lists annually in order to maintain a current system of defined project needs. The short term priorities identified in the master plan CIP will be imported into the SCIP and will be subject to additional prioritization for funding in competitive statewide evaluations.

LOCAL FUNDING

As currently defined, the locally funded (Port/tenant) portion for twenty year planning period is estimated to be just over $7.8 million (approximately 30 percent of the total project development costs). The relatively high share of local cost is attributed to several projects that are not likely to receive FAA funding. Hangar construction costs, building maintenance and utility extensions have been included in the CIP, but no FAA funding is assumed.

The majority of local matching funds are generated through airport revenues, including fuel flowage fees, land leases and sale proceeds from non-aviation parcels in the airport industrial park. The Port reviews Bremerton National Airport's rates and fees schedule and land lease terms annually to ensure that the airport is generating fair and reasonable revenue for its facilities. Property appraisals are also recommended to periodically gauge local market valuation.

Airport sponsors occasionally fund infrastructure and revenue-generating development such as hangars locally, either through an inter fund loan or the issuance of long term debt (bonds).

Port of Bremerton Operating Revenues, Expenses and Debt Service Projections

The Port of Bremerton had a 2014 budget of $14.51 million, which included $985,012 for Airport Expenditures and $868,278 for Airport - Industrial Development Expenditures, for a total budget of $1,853,290 for the Airport Fund. The 2014 budget projected Airport operating revenues at $472,907; Olympic View Industrial Park and Business Park operating revenues were projected at $1,031,767 in 2014.

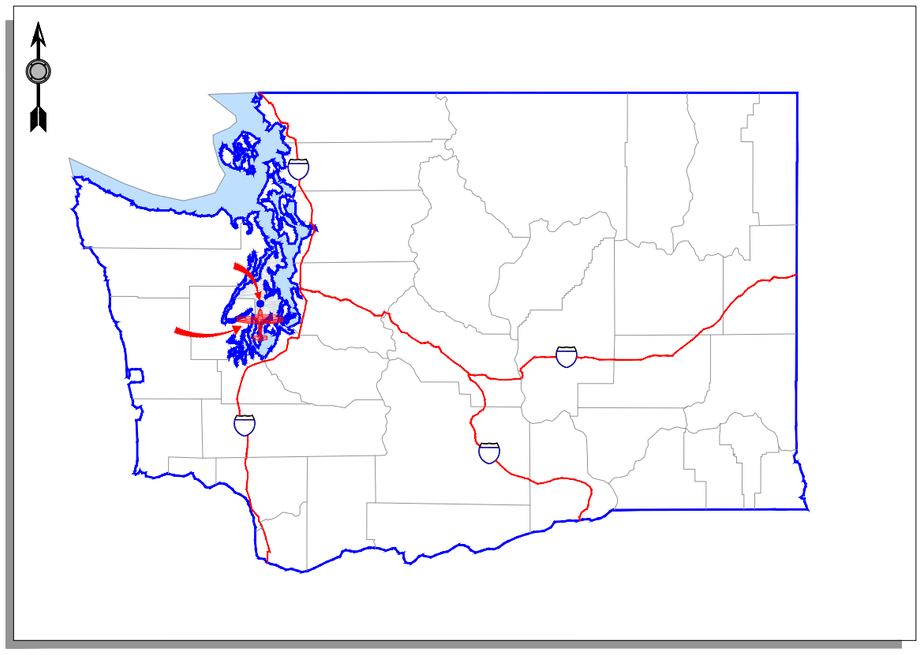
The Port has established separate operating funds and budgets for its individual operating groups (airport, industrial park and marina). Airport revenue sources include ground leases for hangars and other facilities, hangar rentals for Port-owned buildings, other building revenue (airport diner, administration building, etc.), and fuel flowage fees. The cost centers for the Airport include Airport Administration, Administrative Professional Services, and Facility Operation & Maintenance (includes Structures & Grounds Maintenance and Operating System Maintenance).

The Port's tax levy in 2014 provides revenue for general purposes uses and debt service on its General Obligation (GO) bonds. Outstanding debt balances for the airport include $266,673 (balance as of 12/13/13) for a CERB loan used to construct the FBO hangar, which is scheduled to be fully paid by 2024.

Airport Business Plan

The Port of Bremerton commissioned a Comprehensive Airport Business Plan[2] to coincide with the airport master plan. The business plan recommends a variety of operating, investment/development, and marketing strategies designed to increase financial strength for airport operations. The overall conclusion of the business plan is that Bremerton National Airport is well managed with "significant future potential" that will require future investment to realize.

[2] Airport Business Solutions (ABS), January 2014.



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COVER SHEET

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TERMINAL AREA PLAN (WEST)

TERMINAL AREA PLAN (EAST)

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RUNWAY 2 APPROACH SURFACE PLAN AND PROFILE

RUNWAY 20 APPROACH SURFACE PLAN AND PROFILE; THRESHOLD SITING SURFACE

RUNWAY 2 RPZ & INNER APPROACH SURFACE

RUNWAY 20 RPZ & INNER APPROACH SURFACE

ON-AIRPORT LAND USE PLAN

OFF-AIRPORT LAND USE PLAN W/2032 NOISE CONTOURS

EXHIBIT A PROPERTY PLAN

CENTURY WEST

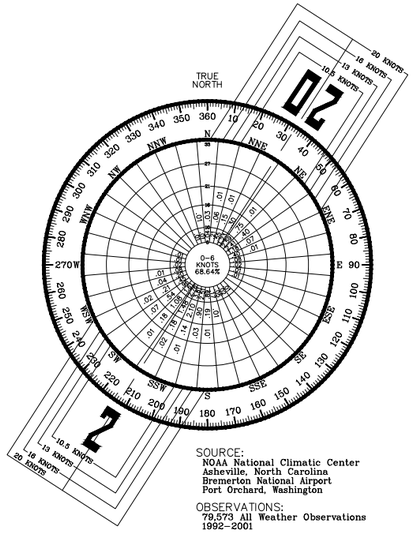
ENGINEERING CORPORATION

1020 S.W. Emkay Drive, Suite 100

Bend, Oregon 97702

541-322-8962 phone ♦ 541-382-2423 fax

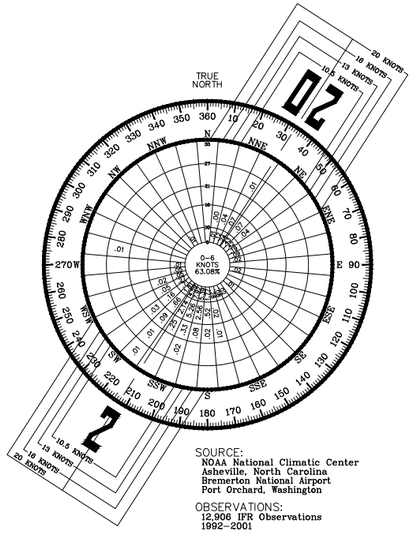
www.centurywest.com



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Bremerton National Airport
Port Orchard, Washington

OBSERVATIONS:
79,573 All Weather Observations
1992-2001

				20 KNOTS
				100.00%

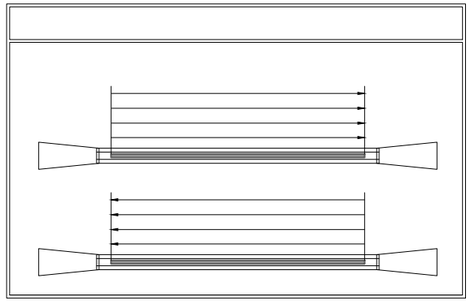


SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Bremerton National Airport
Port Orchard, Washington

OBSERVATIONS:
12,906 IFR Observations
1992-2001

				20 KNOTS
				99.99%

△		
△		



1. RUNWAY 20 HAS A DESIGNATED 34:1 THRESHOLD SITING SURFACE (TSS) BASED ON RUNWAY APPROACH TYPE FOR OBSTRUCTION CLEARANCE.

2. RUNWAY 2/20 WAS REDESIGNATED IN 2013 BASED ON CHANGE IN MAGNETIC DECLINATION; PREVIOUSLY DESIGNATED 1/19.

"THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION (PROJECT NUMBER 3-53-0007-26-2012) AS PROVIDED UNDER TITLE 49, UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS REPORT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

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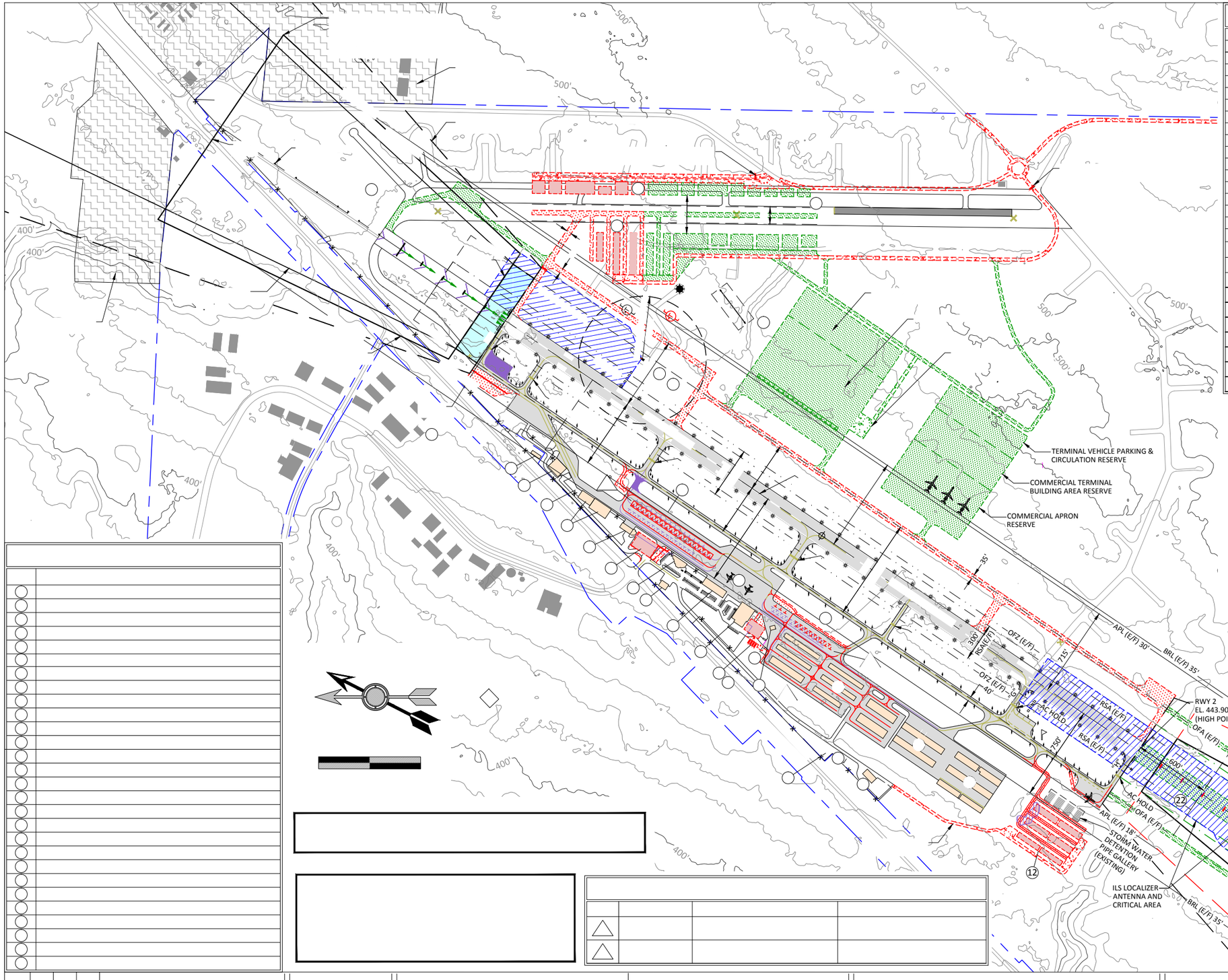
BREMERTON NATIONAL AIRPORT

AIRPORT DATA SHEET



NOTES:

1. ENTIRE AIRPORT PROPERTY LINE NOT DEPICTED ON THIS DRAWING DUE TO SCALE REQUIREMENTS. SEE SHEET 12 OF 14 FOR DEPICTION OF FULL AIRPORT BOUNDARY.

2. RESERVES DEPICTED ON THIS SHEET ARE FOR PLANNING BEYOND CURRENT DEMAND FORECASTS.

3. THERE ARE NO OBSTACLE FREE ZONE (OFZ) PENETRATIONS FOR RUNWAY 2/20.

4. SOURCES FOR EXISTING COORDINATES AND ELEVATIONS: ALASKA FAA SHELL SYSTEM (ADS) BREMERTON NATIONAL AIRPORT DATUM NAD-83, NGVD 88, AND USGS MAPS USING NAD-27.

5. NDB TO BE REMOVED OR RELOCATED.

6. RUNWAY 2 EXTENSION RESERVE BASED ON ARC C/D II STANDARDS.

7. EXISTING RACEWAY FACILITIES TO BE CLOSED/RELOCATED. PAVEMENT TO BE MARKED AS NON-AERONAUTICAL.

8. THE ROADWAY SECTIONS LOCATED INSIDE THE CONTROLLED ACCESS POINTS WILL SERVE ON-AIRPORT AVIATION USE DEVELOPMENT EXCLUSIVELY AND ARE ELIGIBLE FOR FAA FUNDING. THE SECTIONS OF NEW ROADWAY CONSTRUCTED OUTSIDE THE CONTROLLED ACCESS POINTS WILL NOT BE ELIGIBLE FOR FAA FUNDING SINCE THEY WILL PROVIDE ACCESS TO THE AIRPORT AND ADJACENT AREAS OFF AIRPORT PROPERTY.

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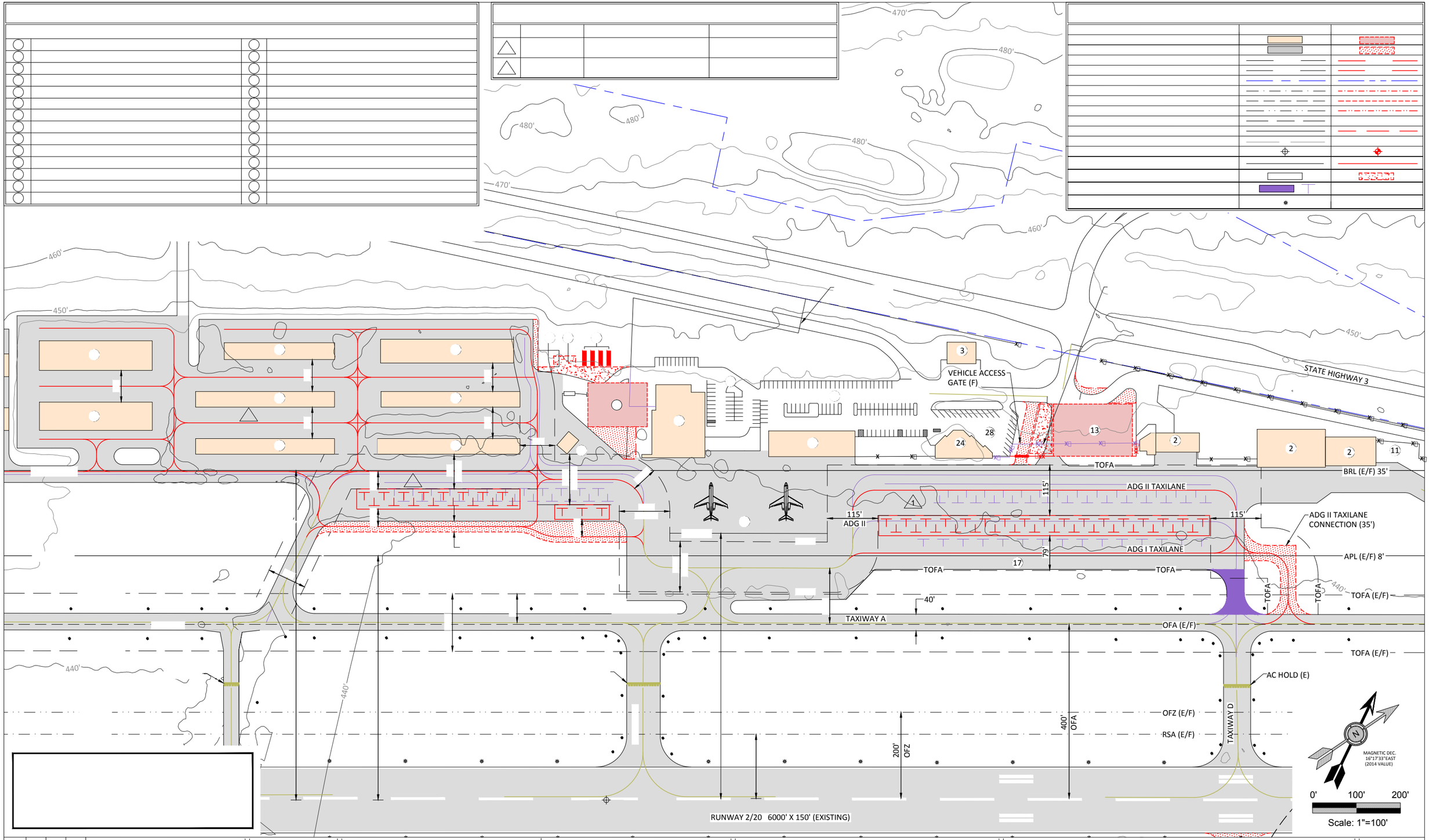
AIRPORT LAYOUT PLAN



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BREMERTON NATIONAL AIRPORT

WEST TERMINAL AREA PLAN

SHEET NO. 4 OF 14

SEE NOTE 2

APL/BRL (SEE NOTE 3)

26

(SEE NOTE 4)

300'

FORMER RUNWAY (CLOSED)

APL/BRL (SEE NOTE 3)

ACCESS ROAD (F)

25'

25'

NDB CRITICAL AREA (TO BE REMOVED)

20

FBO/APRON RESERVE

BRL (E/F) 35'

MAGNETIC DEC. 16°17'33"EAST (2014 VALUE)

0' 100' 200'

Scale: 1"=100'

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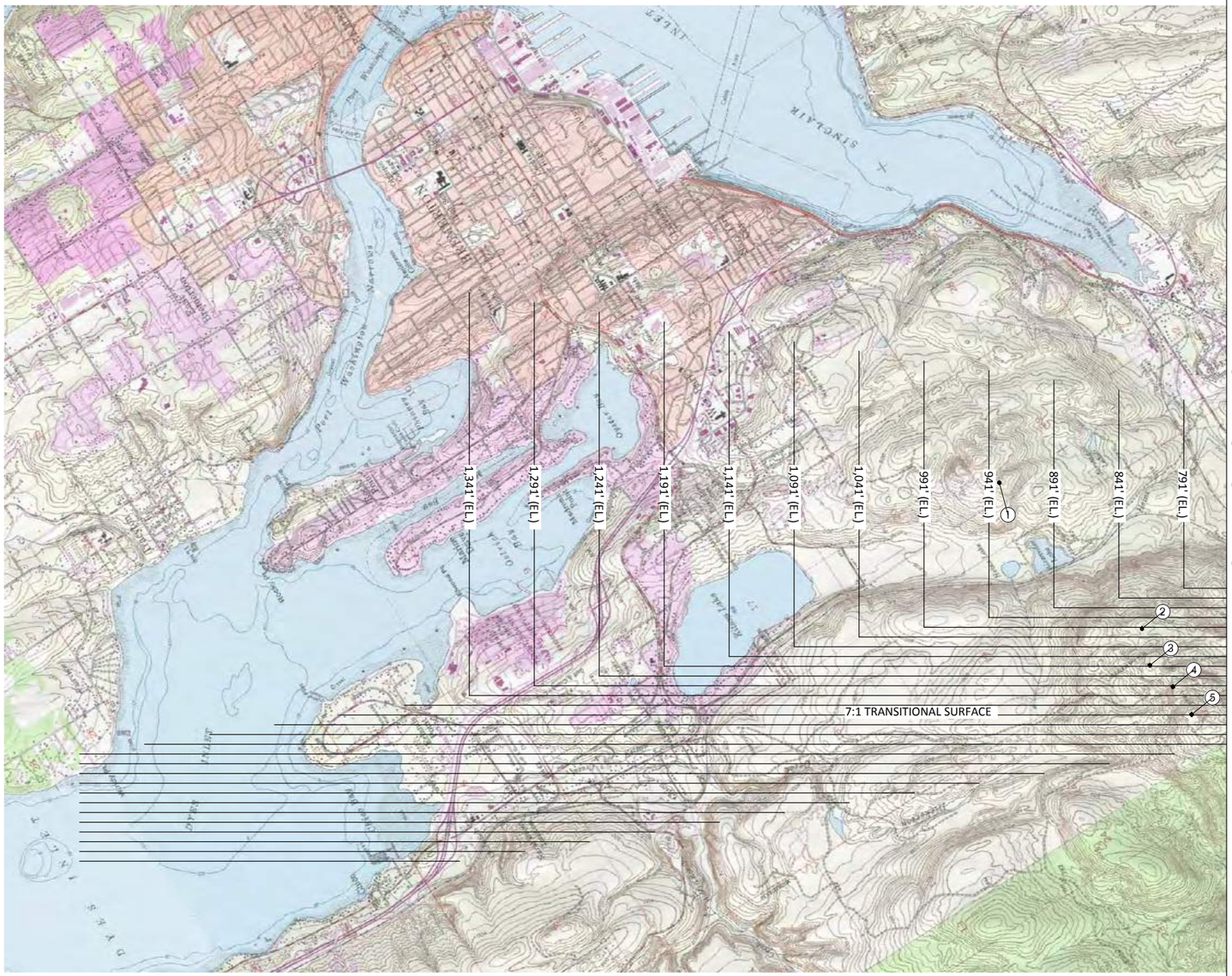
BREMERTON NATIONAL AIRPORT

EAST TERMINAL AREA PLAN

SHEET NO. 5 OF 14



FAR PART 77 PLAN VIEW
RUNWAY 20 PRECISION APPROACH/
TRANSITIONAL SURFACE

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BREMERTON NATIONAL AIRPORT

FAR PART 77 AIRSPACE PLAN 2-2
(RUNWAY 20 PRECISION APPROACH)

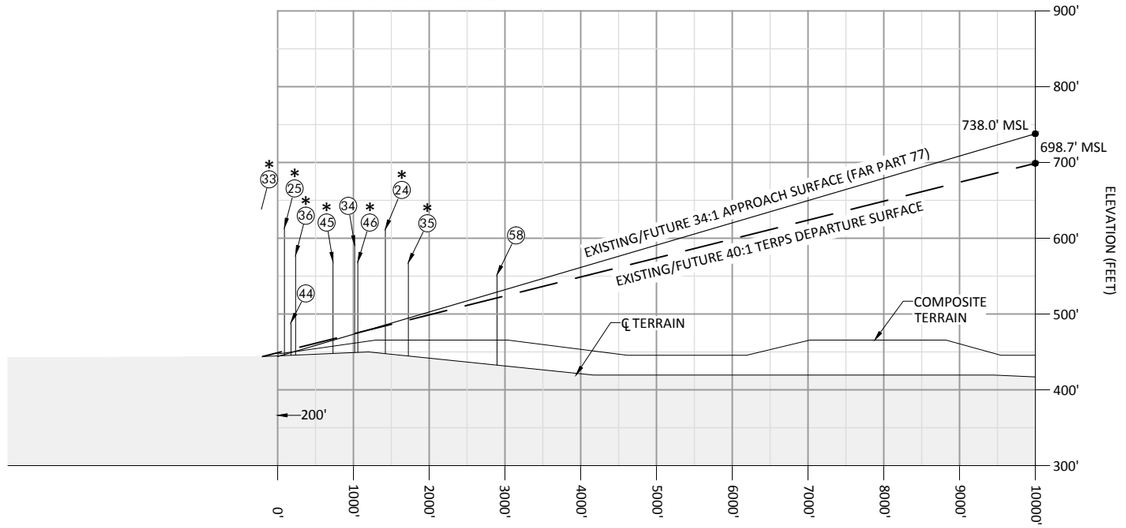
AREAS OF TERRAIN PENETRATION (NONE IDENTIFIED)

PLAN VIEW RUNWAY 2

0' 1000' 2000'

Scale: 1"=1000'

* THESE ITEMS ARE NOT LOCATED WITHIN RUNWAY APPROACH SURFACE



2000'

Horizontal Scale: 1"=1000'

PROFILE VIEW RUNWAY 2

0' 100' 200'

Scale: 1"=100'
Vertical Scale: 1"=100'

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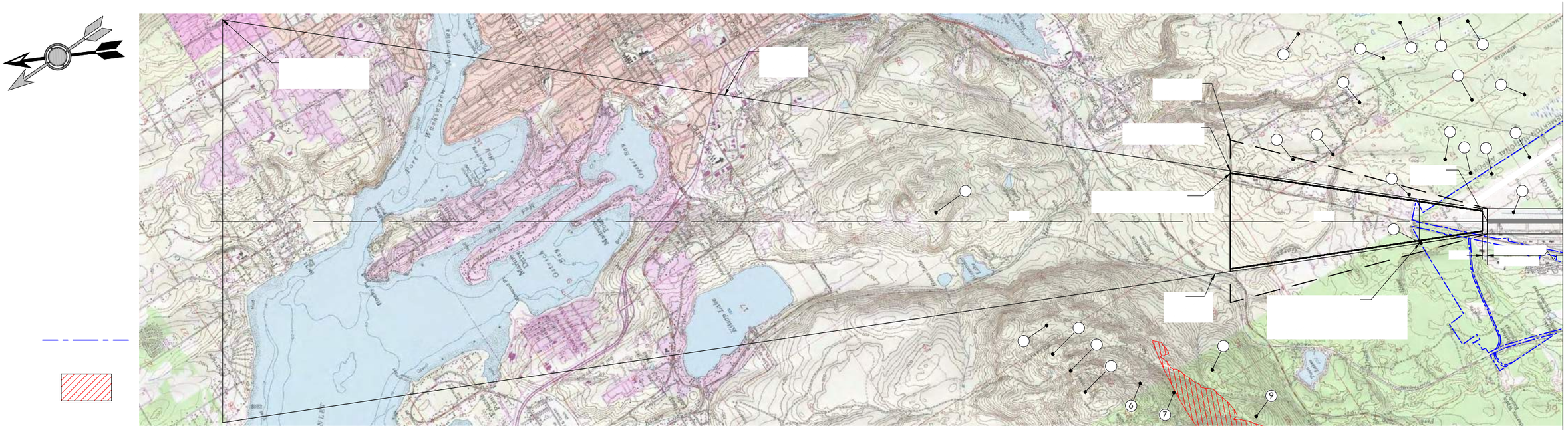
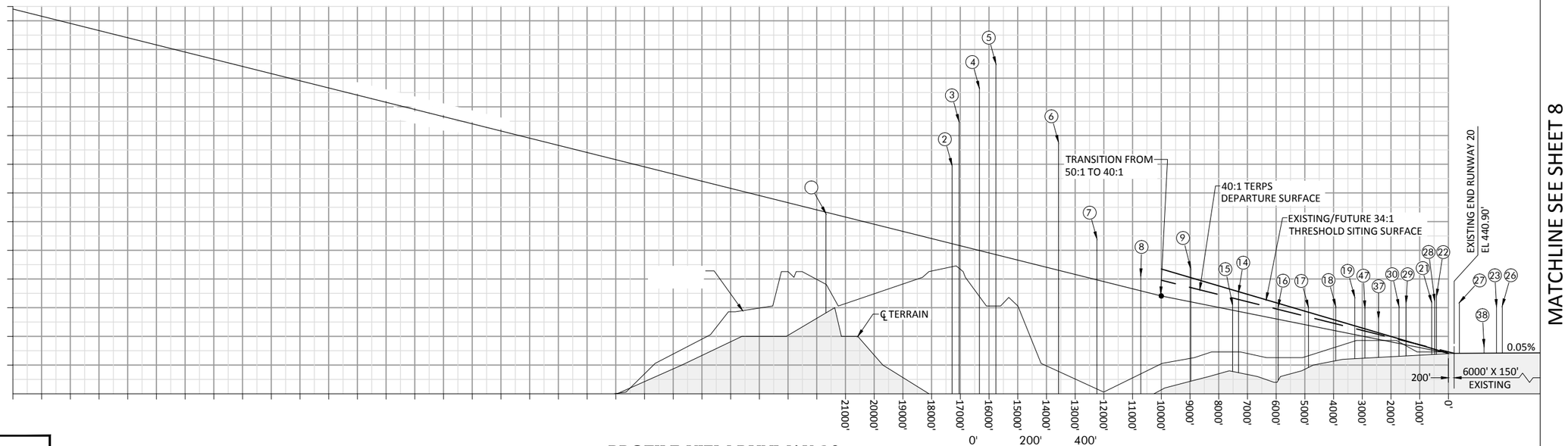
RUNWAY 2 APPROACH
SURFACE PLAN AND PROFILE



PLAN VIEW RUNWAY 20

0' 2000' 4000'

SCALE: 1"=2000'



PROFILE VIEW RUNWAY 20

0' 200' 400'

SCALE OF FEET
VERTICAL SCALE: 1"=200'

MATCHLINE SEE SHEET 8

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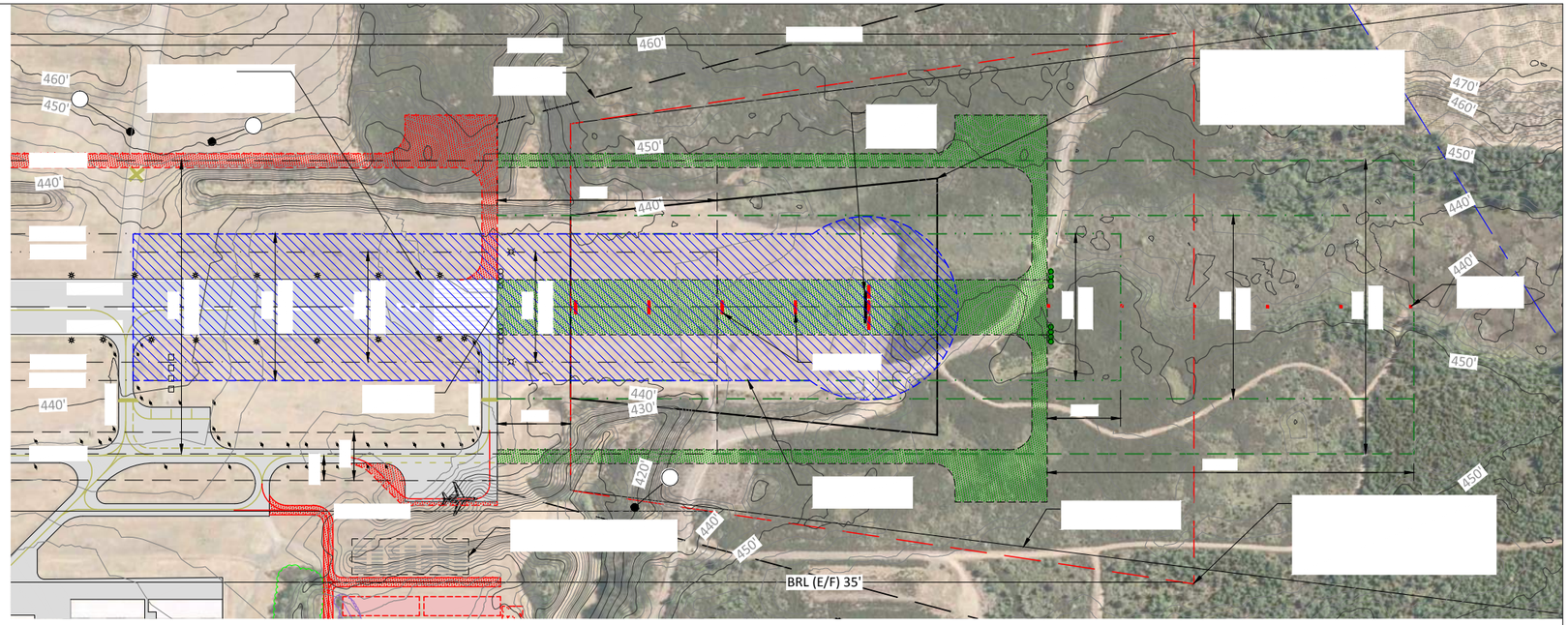
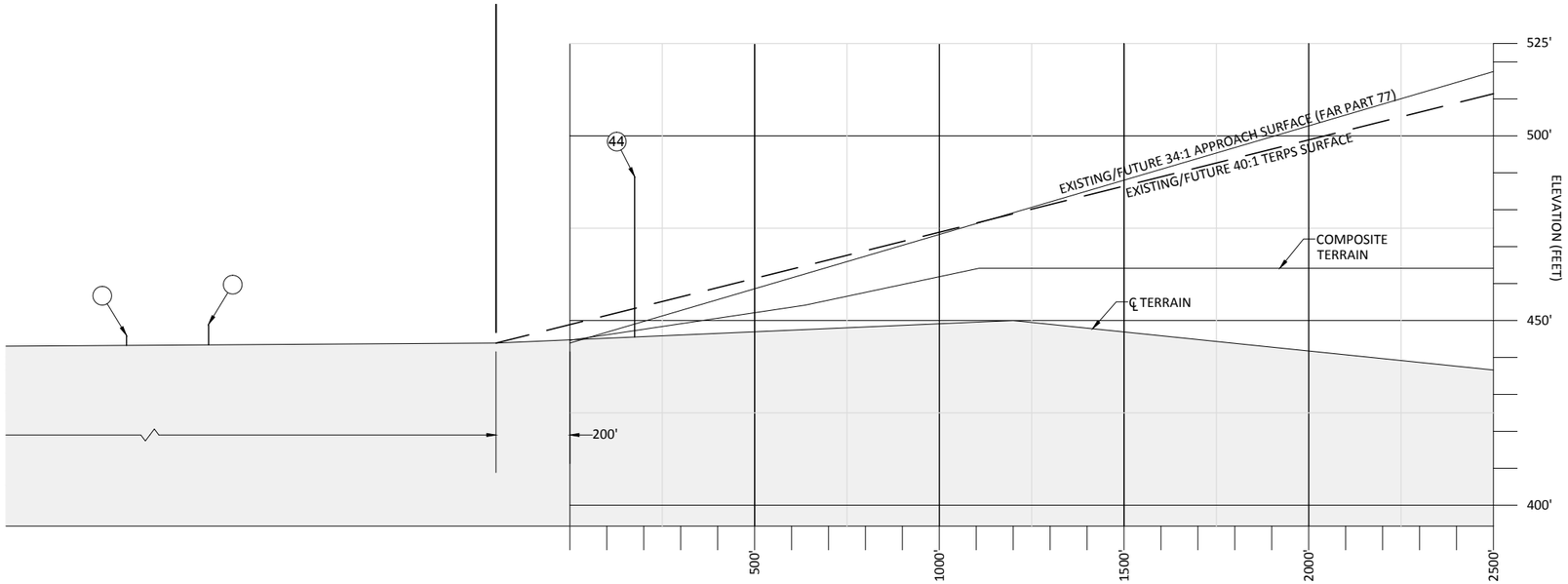
RUNWAY 20 APPROACH SURFACE PLAN AND PROFILE

SHEET NO. 9 OF 14



RUNWAY 2 PLAN VIEW



RUNWAY 2 PROFILE VIEW

0' 200' 400'

Horizontal Scale: 1"=200'

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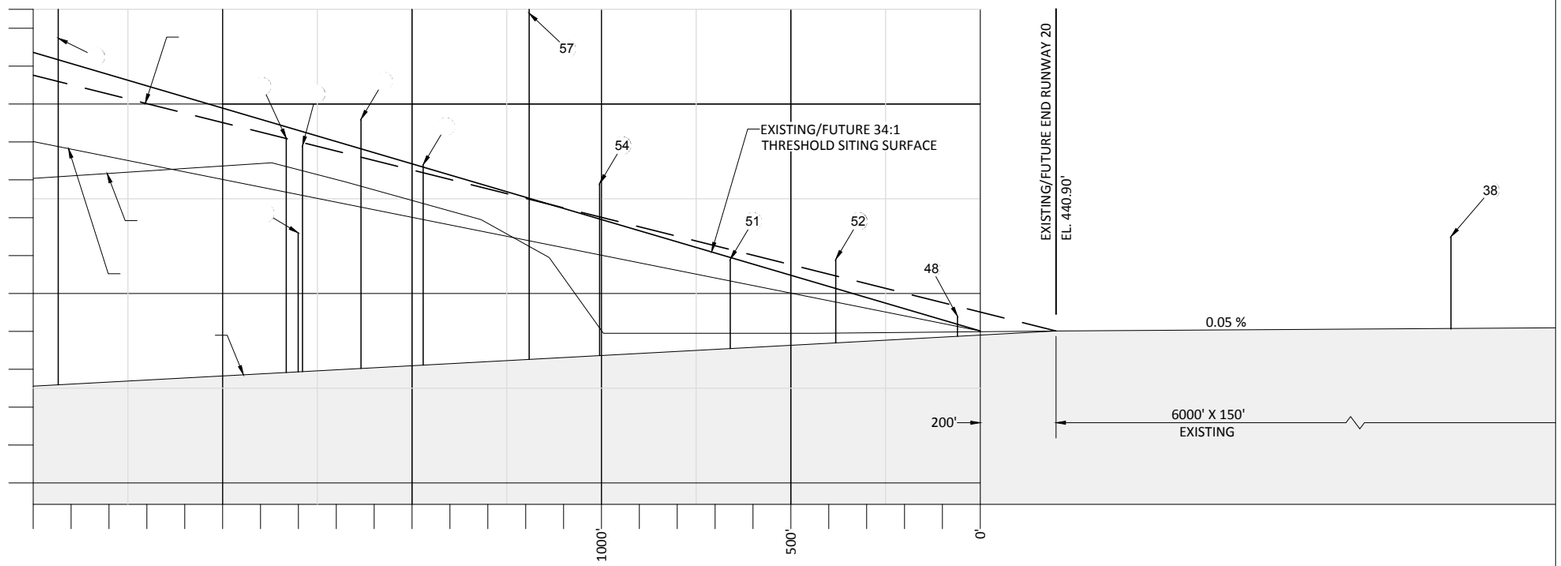
BREMERTON NATIONAL AIRPORT

RUNWAY 2 RPZ AND INNER APPROACH PLAN AND PROFILE

RUNWAY 20 PLAN VIEW



RUNWAY 20 PROFILE VIEW

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BREMERTON NATIONAL AIRPORT

RUNWAY 20 RPZ AND INNER APPROACH PLAN AND PROFILE

SHEET NO. 11 OF 14

RR
RC
MR
GI
AB
PIM
ME
RP
PF

SPECIAL BUSINESS OPPORTUNITY AREA (223.86)

AVIATION RESERVE/ HANGAR STORAGE (97.63 ACRES)

AIRPORT WAY

RWY 20 EL. 440.90'

RWY 2 EL. 443.90'

AIRFIELD OPERATIONS (330.83 ACRES)

65 DNL
70 DNL
75 DNL
80 DNL

34:1 APPROACH SURFACE

SW LAKE FLORA RD.

OPEN SPACE (8.62 ACRES)

STATE HIGHWAY 3

AVIATION USE/ HANGAR STORAGE (53.83 ACRES)

AVIATION RESERVE (14.40 ACRES)

BUSINESS PARK PHASE-III (65.83 ACRES)

BUSINESS PARK PHASE-IV (57.73 ACRES)

CRITICAL AREA (8.36 ACRES)

LIGHT INDUSTRIAL (45.40 ACRES)

LIGHT INDUSTRIAL (40.20 ACRES)

BUSINESS SERVICE (8.07 ACRES)

BUSINESS PARK (174.40 ACRES)

BUSINESS PARK Phase I (102.32)

BUSINESS PARK PHASE II (72.08 ACRES)

CRITICAL AREA (27.85 ACRES)

LIGHT INDUSTRIAL (40.79 ACRES)

INDUSTRIAL (78.07 ACRES)

CRITICAL AREA (26.08 ACRES)

OPEN SPACE (48.72 ACRES)

OPEN SPACE (15.19 ACRES)

INDUSTRIAL RAIL (12.51 ACRES)

INDUSTRIAL RAIL (21.94 ACRES)

RP	
PF	
RR	RURAL RESIDENTIAL
MR	MINERAL RESOURCE
RC	RURAL COMMERCIAL

AB	
PIM	
GI	GENERAL INDUSTRIAL
ME	MIXED EMPLOYMENT

MAGNETIC DEC. 16°17'33"EAST (2014 VALUE)

0' 600' 1200'

Scale: 1"=600'

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BREMERTON NATIONAL AIRPORT

ON-AIRPORT LAND USE PLAN W/ 2032 NOISE CONTOURS

SHEET NO. 12 OF 14

RP
PF
RR RURAL RESIDENTIAL
MR MINERAL RESOURCE
RC RURAL COMMERCIAL

AB
PIM
GI GENERAL INDUSTRIAL
ME MIXED EMPLOYMENT

GI
MR
AB
GI
AIRPORT WAY
BREMERTON NATIONAL AIRPORT
70 DNL
75 DNL
65 DNL
AB
70 DNL
75 DNL
GI
ME
SW LAKE FLORA ROAD
FUTURE RPZ (RESERVE)
I000' X 1510' X I700'
APPROACH VISIBILITY MINIMUMS
NOT LOWER THAN 3/4-MILE
STATE HIGHWAY 3
EXISTING/FUTURE RPZ
I000' X 1750' X 2500'
APPROACH VISIBILITY MINIMUMS
I/2-MILE
EXISTING
RWY 20
EL. 440.90'
EXISTING
RWY 2
EL. 443.90'
FUTURE RPZ
I000' X 1510' X I700'
APPROACH VISIBILITY MINIMUMS
NOT LOWER THAN 3/4-MILE
PIM
RP
RR
PF
MR
RP
MASON COUNTY

MAGNETIC DEC.
16°17'33" EAST
(2014 VALUE)

0' 1000' 2000'
Scale: 1"=1000'

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JLS	WMR	AS SHOWN

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BREMERTON NATIONAL AIRPORT

OFF-AIRPORT LAND USE PLAN

SHEET NO.
13 OF 14

N88°35'13"W
1343.08

TWP. 23N, RG. 1W., W.M.

N88°09'27"W
1337.32

BARNEY WHITE ROAD

N46°00'00"E 4756.54

ACQUIRED UNDER AIP 11

PARCEL B
AF #1016993

PARCEL D
AF #295423

PARCEL C
AF #878659

PARCEL E
AF #878658

U.S. NAVY PROPRTY

NOTE 7

NOTE 6

NOTE 1

ULTIMATE RPZ
500' X 1700' X 1010'
(OWNED FEE SIMPLE)
1 MILE VISIBILITY MINIMUMS

EXISTING/ULTIMATE
RUNWAY 1L
END-EL. 44.0'
(HIGH POINT)

N88°45'23"E
3553.84

50:1
2500'

1000'

1750'

EXISTING RUNWAY 19
END-EL. 441.0'

N1°04'55"E
1994.13

AREA 2

AREA 1

N1°06'47"E
2672.33

N0°58'37"E
2692.81

N0°51'55"E
2735.82

N87°36'16"W
2630.06

N89°20'21"W
2697.38

N86°18'22"W
1228.73

PARCEL NUMBER - (F)

EXISTING / ULTIMATE RPZ
100' X 2500' X 1750'
(PARTIALLY OWNED / EASEMENT)
1/2 MILE VISIBILITY MINIMUMS

EXISTING PAVEMENT

MAGNETIC DEC.
16°17'33"EAST
(2014 VALUE)

0' 600' 1200'

Scale: 1"=600'

DRAWING NOTE:
THIS DRAWING IS BASED ON MARCH 10, 2006 AIRPORT PROPERTY MAP (COFFMAN), AND HISTORIC PROPERTY INFORMATION DEPICTED ON AUGUST 1973 EXHIBIT "A" AIRPORT PROPERTY MAP (REID MIDDLETON).

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BREMERTON NATIONAL AIRPORT

EXHIBIT "A" AIRPORT PROPERTY MAP

SHEET NO.
14 OF 14

Chapter 8 – Airport Layout Plan

Chapter 8 – Airport Layout Plan Drawings

Introduction

The options that were considered for the long-term development of Bremerton National Airport resulted in the selection of a preferred alternative. The preferred alternative has been incorporated into the airport layout plan drawings, which are depicted in this chapter. The set of airport plans, which is referred to in aggregate as the "Airport Layout Plan" (ALP) has been prepared in accordance with FAA guidelines. The drawings illustrate existing conditions, recommended changes in airfield facilities, property ownership, land use, and obstruction removal. The ALP set is presented at the end of this chapter:

- Sheet 1 – Cover Sheet
- Sheet 2 – Airport Data Sheet
- Sheet 3 – Airport Layout Plan
- Sheet 4 –Terminal Area Plan(West)
- Sheet 5 –Terminal Area Plan (East)
- Sheet 6 – FAR Part Airspace Plan (1 of 2)
- Sheet 7 – FAR Part Airspace Plan (2 of 2)
- Sheet 8 – Runway 2 Approach Surface Plan & Profile
- Sheet 9 – Runway 20 Approach Surface Plan & Profile; Threshold Siting Surface
- Sheet 10 – Runway 2 RPZ & Inner Approach Surface
- Sheet 11 – Runway 20 RPZ & Inner Approach Surface
- Sheet 12 – On-Airport Land Use Plan

- Sheet 13 – Off-Airport Land Use Plan w/ 2032 Noise Contours
- Sheet 14 – Airport Property Plan (Exhibit A)

The airport layout plan drawings provide detailed information for existing and future facilities. The future improvements depicted in the drawing set are consistent with the airport master plan's updated 20-year capital improvement program contained in Chapter 7. The ALP drawing set will be submitted along with the draft final airport master plan report to Federal Aviation Administration (FAA) for review and approval. The drawings will be reviewed by the FAA Airports District Office (ADO) with additional review coordinated with other FAA offices (Flight Procedures, Flight Standards, etc.). Once approved, the final ALP drawing set will be signed by the Port of Bremerton and the FAA Seattle Airports District Office (ADO). As individual projects are completed, minor "as-built" updates to the ALP drawing may be completed (with FAA coordination) without updating the airport master plan. A complete update of the full ALP drawing set will be conducted as part of the next master plan update.

The airport layout plan drawings are prepared using AutoCAD® computer-aided drafting software, which allows for easier updating and revision. The drawing files may also be imported into local geographic information systems (GIS) to support land use planning, airport overlay zone mapping, etc.

A brief summary of the individual drawings is provided below:

AIRPORT DATA SHEET DRAWING

The Airport Data Sheet drawing contains detailed runway and airfield dimensions, FAA dimensional standards, wind roses, and other data that is reflected on the sheets in the drawing set.

AIRPORT LAYOUT PLAN DRAWING

The Airport Layout Plan (ALP) drawing graphically depicts existing and future airfield facilities. No changes to Runway 2/20 are recommended in the current 20-year planning period. Minor reconfigurations of existing taxiways and aircraft hold areas on the west parallel taxiway are recommended; an east parallel taxiway is also recommended to accommodate future development of aircraft hangars and related development on the east side of Runway 2/20.

Future facilities are color-coded (red) to distinguish them from existing facilities. Future facilities are represented in the airport master plan's 20-year capital improvement program (CIP) as individual projects or project groupings. Long term development reserves depicted on the ALP are also color coded (green). These items are intended to serve as placeholders or are provided for reference only. Demand for facilities identified as development reserves is not anticipated to occur in the current 20-year planning period and therefore the corresponding projects are not included in the master plan CIP. A change of

events that could move a development reserve into an actual project would require updated planning and coordination with FAA.

TERMINAL AREA PLAN DRAWINGS

Terminal Area Plan drawings for the landside areas located on the west and east side of Runway 2/20 provide additional detail for existing and new facilities. Recommended improvements include reconfigured/expanded aircraft parking apron, new hangar areas, fuel storage facilities, taxiway reconfigurations and access roads.

FAR PART 77 AIRSPACE DRAWINGS

The FAR Part 77 Airspace drawings depict the protected airspace defined for Runway 2/20 in Federal Air Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*. The airspace plan drawings depict the five "imaginary surfaces" defined in FAR Part 77.25 including the primary, transitional, approach, horizontal and conical surfaces, previously described in Chapter 4. Part 77 surfaces should be free of built or terrain obstructions to the great extent possible. Objects that penetrate FAR Part 77 surfaces may require action to mark or remove depending on their severity, location and the feasibility of the action. The drawing includes a table of obstructions with recommended dispositions.

The physical characteristics of the Part 77 surfaces are defined the size of aircraft using the runway and the approach capabilities of the runway. Runway 2/20 accommodates large aircraft (over 12,500 pounds) with precision instrument approach capabilities on Runway 20 and nonprecision instrument approach capabilities on Runway 2.

- **Runway 20 Approach Surface**: Extends 50,000 feet from the end of the runway primary surface. The inner 10,000 feet of the approach surface has a slope of 50:1 and the outer 40,000 feet has a slope of 40:1. The approach surface slope represents the horizontal distance required for each increment of vertical rise.

- **Runway 2 Approach Surface**: Extends 10,000 feet from the end of the runway primary surface with a slope of 34:1.

- **Primary Surface:** Based on the precision instrument approach capabilities, the primary surface is 1,000 feet wide (500 feet on either side of runway centerline), extending 200 feet beyond each end of the runway. The primary surface is a flat plane of airspace centered on the runway with the same elevation as the nearest point on the runway centerline. For Runway 2/20, the primary surface is 6,400 feet long and 1,000 feet wide.

- **Runway Transitional Surface:** The runway transitional surfaces extend outward and upward from the outer edges of the primary surface. The transitional surfaces have a slope of 7:1 and extend to an elevation 150 feet above airfield elevation and connect to the runway horizontal surface. Runway 20 has an approach transitional surface that extends upward at a 7:1 slope, extending 5,000 feet beyond the sides of the runway approach surface. This surface is required for precision instrument approach surfaces.

- **Horizontal Surface:** The horizontal surface is drawn from 10,000-foot radii that extend from both ends of the primary surface to form an oval. The horizontal surface is a flat plane of airspace with an elevation 150 feet above airport elevation. The majority of obstructions identified in the horizontal surface are trees located off airport property.

- **Conical Surface:** The conical surface extends from the outer edge of the horizontal surface at a slope of 20:1 for 4,000 feet. An area of terrain penetration is identified in the northwest section of the conical surface.

RUNWAY APPROACH SURFACE PLAN AND PROFILE DRAWINGS

The Approach Surface drawings depict plan and profile views of the runway approach surfaces depicted in the FAR Part 77 airspace plan. The drawings provide additional detail in identify obstructions, terrain and other physical features within the approach surfaces. The drawings include obstruction data tables for items depicted on the drawing, using the same numbering identifiers from the overall Part 77 Airspace Plan. The drawing for Runway 20 also depicts the threshold siting surface (TSS) that is used to mitigate obstructions to the Part 77 approach surface. The appropriate applications, dimensions and slope for the TSS are defined in FAA Advisory Circular (AC) 150/5300-13A (paragraph 303, section b.).

RUNWAY RPZ & INNER APPROACH SURFACE DRAWINGS

The runway protection zone (RPZ) and inner approach surface drawings depict detailed plan views of these areas and a profile view of the approach surface and threshold siting surface (when used). The drawings include obstruction data tables for items depicted on the drawing, using the same numbering identifiers from the overall Part 77 Airspace Plan and Approach Surface Plan and Profile drawings.

ON-AIRPORT LAND USE PLAN

The On-Airport Land Use Plan drawing depicts existing land uses within airport property in relation to the airfield facilities and surface access to and within the site. The land uses on the airport include a variety of aviation and non-aviation uses. The existing race facility located on the airport's closed runway will be relocated as part of the Port's overall planned development on the east side of the airport. Land uses within the Port-owned industrial park are exclusively non-aviation due to terrain and the inability to

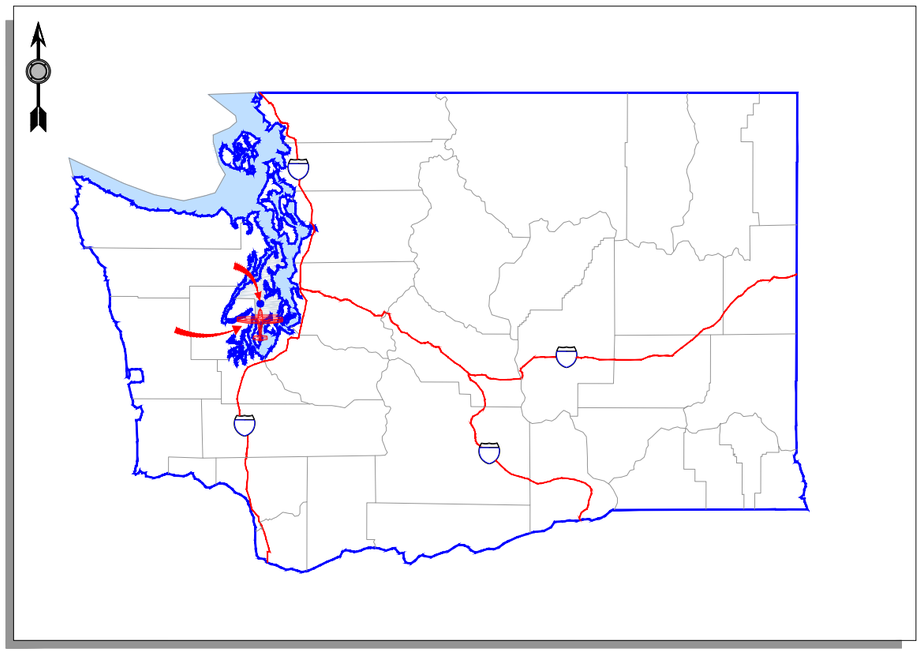
provide aeronautical access to the airfield (over State Highway 3). Updated 20-year noise contours are depicted based on the FAA-approved master plan aviation activity forecasts (2032). All aviation and non-aviation uses (industrial, commercial) at the airport, the adjacent airport industrial park, and the SKIA Subarea are compatible with current and long term (forecast) noise exposure levels.

OFF-AIRPORT LAND USE PLAN

The Off-Airport Land Use Plan drawing depicts existing land uses and zoning for the airport and its immediate vicinity, which encompasses the South Kitsap Industrial Area (SKIA). 20-year noise contours are also depicted on the drawing. The 2032 65 DNL noise contour is contained almost entirely within airport property, with only a small area extending into the adjacent right of way for State Highway 3. The majority of the SKIA subarea is located within the City of Bremerton city limits. Land use and zoning for areas outside to the SKIA subarea are in Kitsap County or Mason County jurisdiction.

EXHIBIT "A" – AIRPORT PROPERTY PLAN

The Airport Property Plan drawing provides depicts all property owned by the Port included in the airport and adjacent industrial park. The drawing notes the form of ownership or control (fee simple, avigation easement, etc.) and the date of acquisition per FAA guidelines.



CONTENTS

COVER SHEET

AIRPORT DATA SHEET

AIRPORT LAYOUT PLAN

TERMINAL AREA PLAN (WEST)

TERMINAL AREA PLAN (EAST)

FAR PART 77 (1 OF 2)

FAR PART 77 (2 OF 2)

RUNWAY 2 APPROACH SURFACE PLAN AND PROFILE

RUNWAY 20 APPROACH SURFACE PLAN AND PROFILE; THRESHOLD SITING SURFACE

RUNWAY 2 RPZ & INNER APPROACH SURFACE

RUNWAY 20 RPZ & INNER APPROACH SURFACE

ON-AIRPORT LAND USE PLAN

OFF-AIRPORT LAND USE PLAN W/2032 NOISE CONTOURS

EXHIBIT A PROPERTY PLAN

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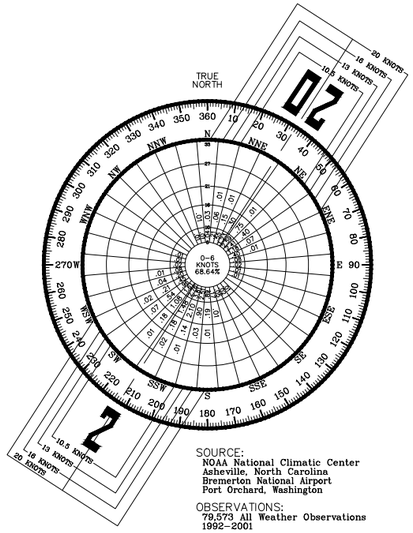
ENGINEERING CORPORATION

1020 S.W. Emkay Drive, Suite 100

Bend, Oregon 97702

541-322-8962 phone ♦ 541-382-2423 fax

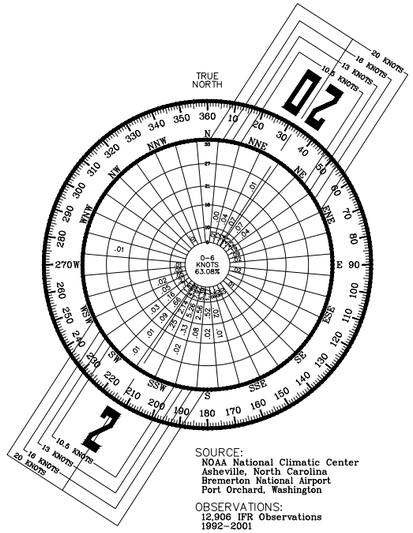
www.centurywest.com



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Bremerton National Airport
Port Orchard, Washington

OBSERVATIONS:
79,573 All Weather Observations
1992-2001

				20 KNOTS
				100.00%

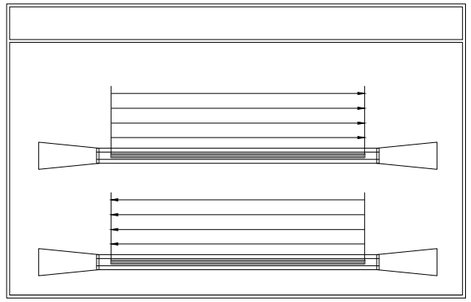


SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Bremerton National Airport
Port Orchard, Washington

OBSERVATIONS:
12,906 IFR Observations
1992-2001

				20 KNOTS
				99.99%

△		
△		



1. RUNWAY 20 HAS A DESIGNATED 34:1 THRESHOLD SITING SURFACE (TSS) BASED ON RUNWAY APPROACH TYPE FOR OBSTRUCTION CLEARANCE.

2. RUNWAY 2/20 WAS REDESIGNATED IN 2013 BASED ON CHANGE IN MAGNETIC DECLINATION; PREVIOUSLY DESIGNATED 1/19.

"THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION (PROJECT NUMBER 3-53-0007-26-2012) AS PROVIDED UNDER TITLE 49, UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS REPORT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

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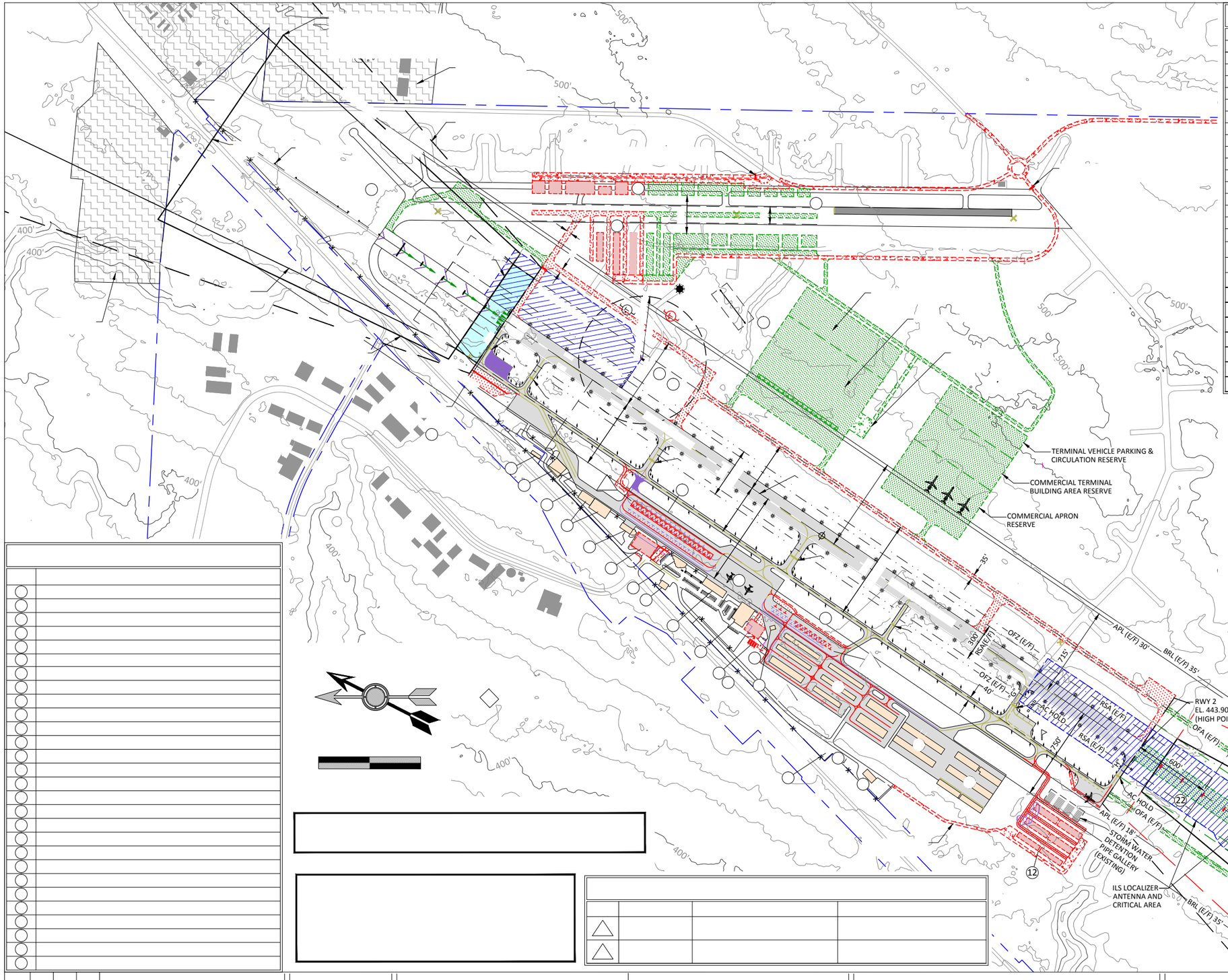
BREMERTON NATIONAL AIRPORT

AIRPORT DATA SHEET



NOTES:

1. ENTIRE AIRPORT PROPERTY LINE NOT DEPICTED ON THIS DRAWING DUE TO SCALE REQUIREMENTS. SEE SHEET 12 OF 14 FOR DEPICTION OF FULL AIRPORT BOUNDARY.

2. RESERVES DEPICTED ON THIS SHEET ARE FOR PLANNING BEYOND CURRENT DEMAND FORECASTS.

3. THERE ARE NO OBSTACLE FREE ZONE (OFZ) PENETRATIONS FOR RUNWAY 2/20.

4. SOURCES FOR EXISTING COORDINATES AND ELEVATIONS: ALASKA FAA SHELL SYSTEM (ADS) BREMERTON NATIONAL AIRPORT DATUM NAD-83, NGVD 88, AND USGS MAPS USING NAD-27.

5. NDB TO BE REMOVED OR RELOCATED.

6. RUNWAY 2 EXTENSION RESERVE BASED ON ARC C/D II STANDARDS.

7. EXISTING RACEWAY FACILITIES TO BE CLOSED/RELOCATED. PAVEMENT TO BE MARKED AS NON-AERONAUTICAL.

8. THE ROADWAY SECTIONS LOCATED INSIDE THE CONTROLLED ACCESS POINTS WILL SERVE ON-AIRPORT AVIATION USE DEVELOPMENT EXCLUSIVELY AND ARE ELIGIBLE FOR FAA FUNDING. THE SECTIONS OF NEW ROADWAY CONSTRUCTED OUTSIDE THE CONTROLLED ACCESS POINTS WILL NOT BE ELIGIBLE FOR FAA FUNDING SINCE THEY WILL PROVIDE ACCESS TO THE AIRPORT AND ADJACENT AREAS OFF AIRPORT PROPERTY.

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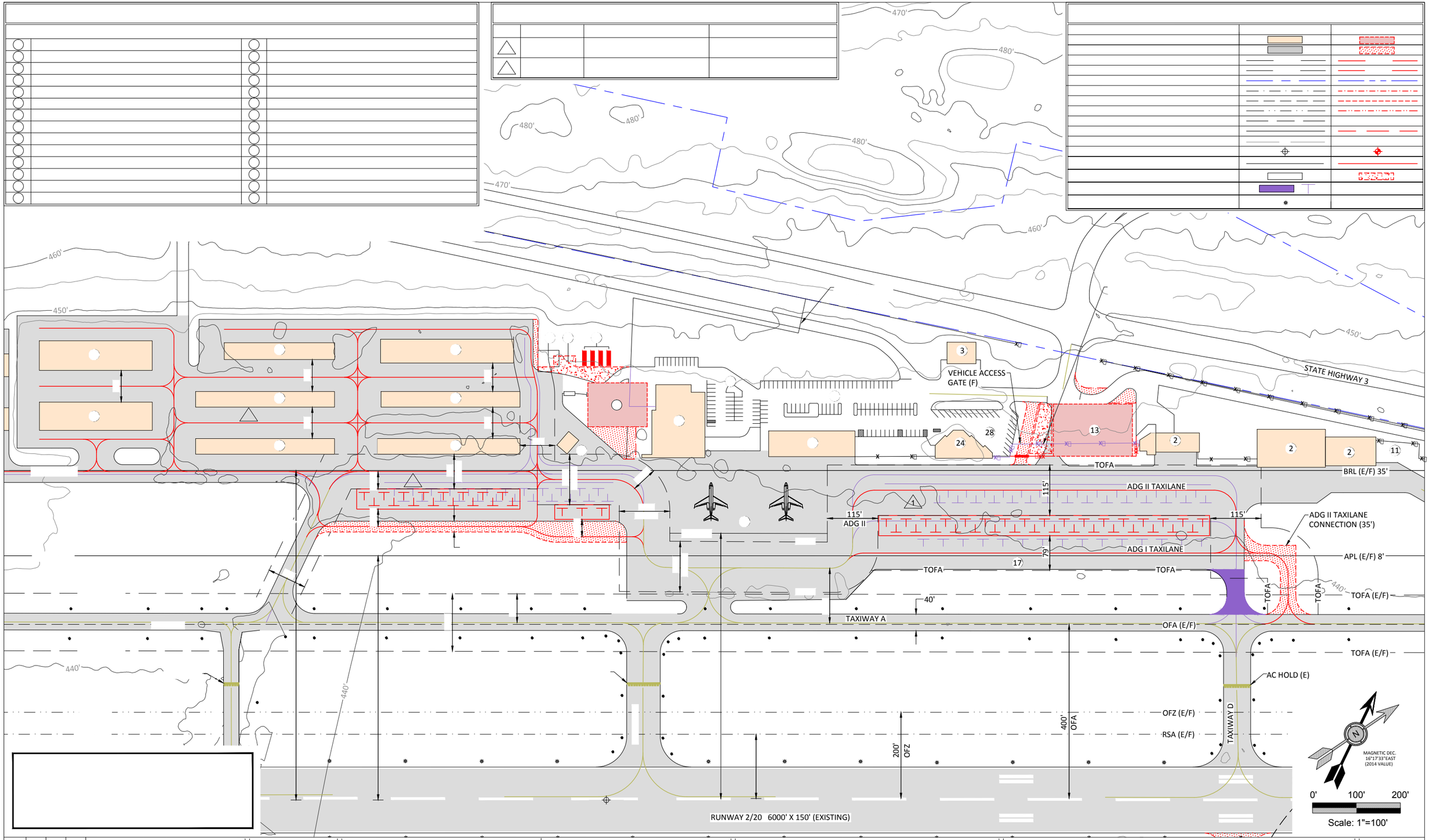
BREMERTON NATIONAL AIRPORT

AIRPORT LAYOUT PLAN



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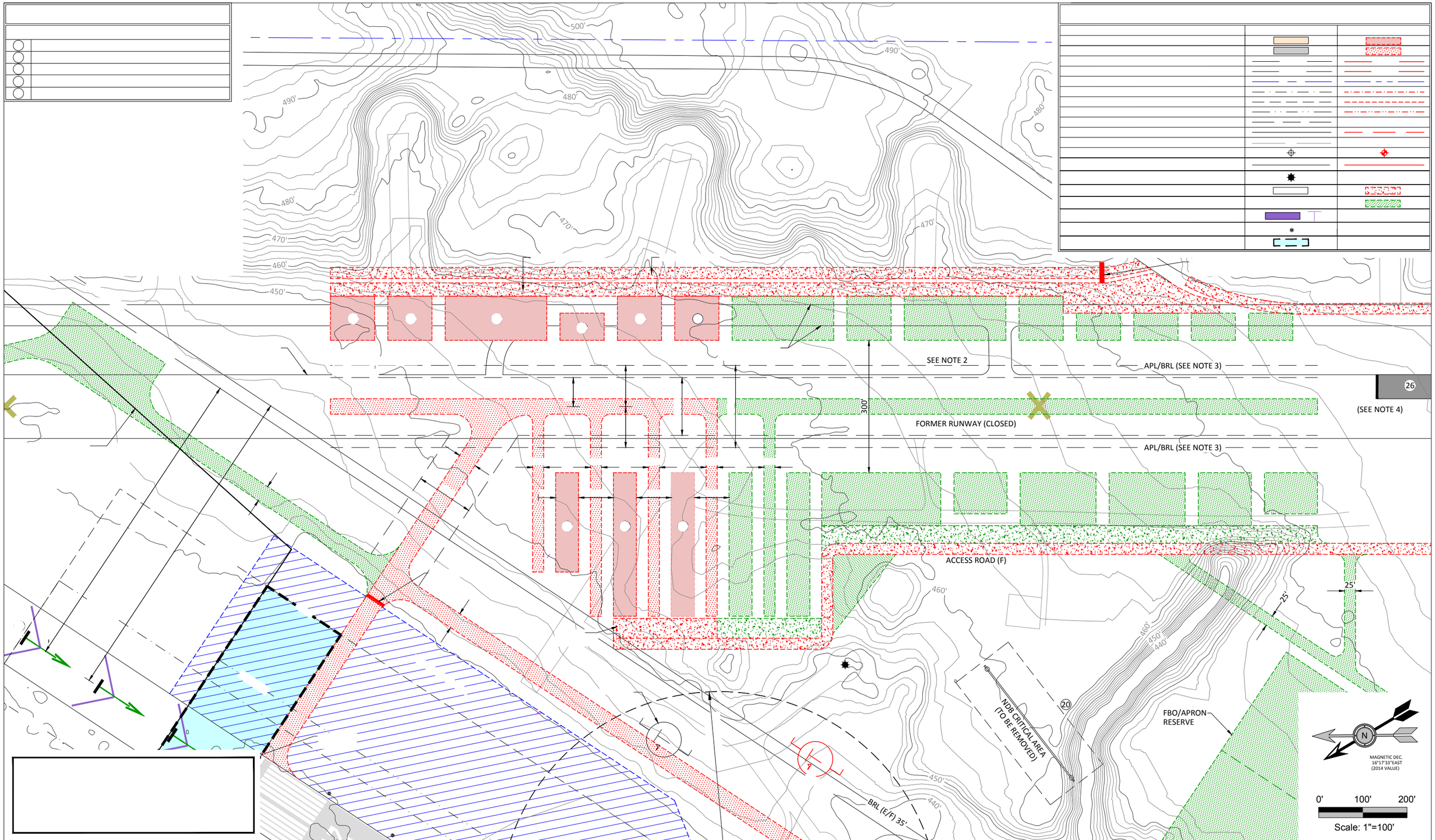
BREMERTON NATIONAL AIRPORT

WEST TERMINAL AREA PLAN

SHEET NO. 4 OF 14



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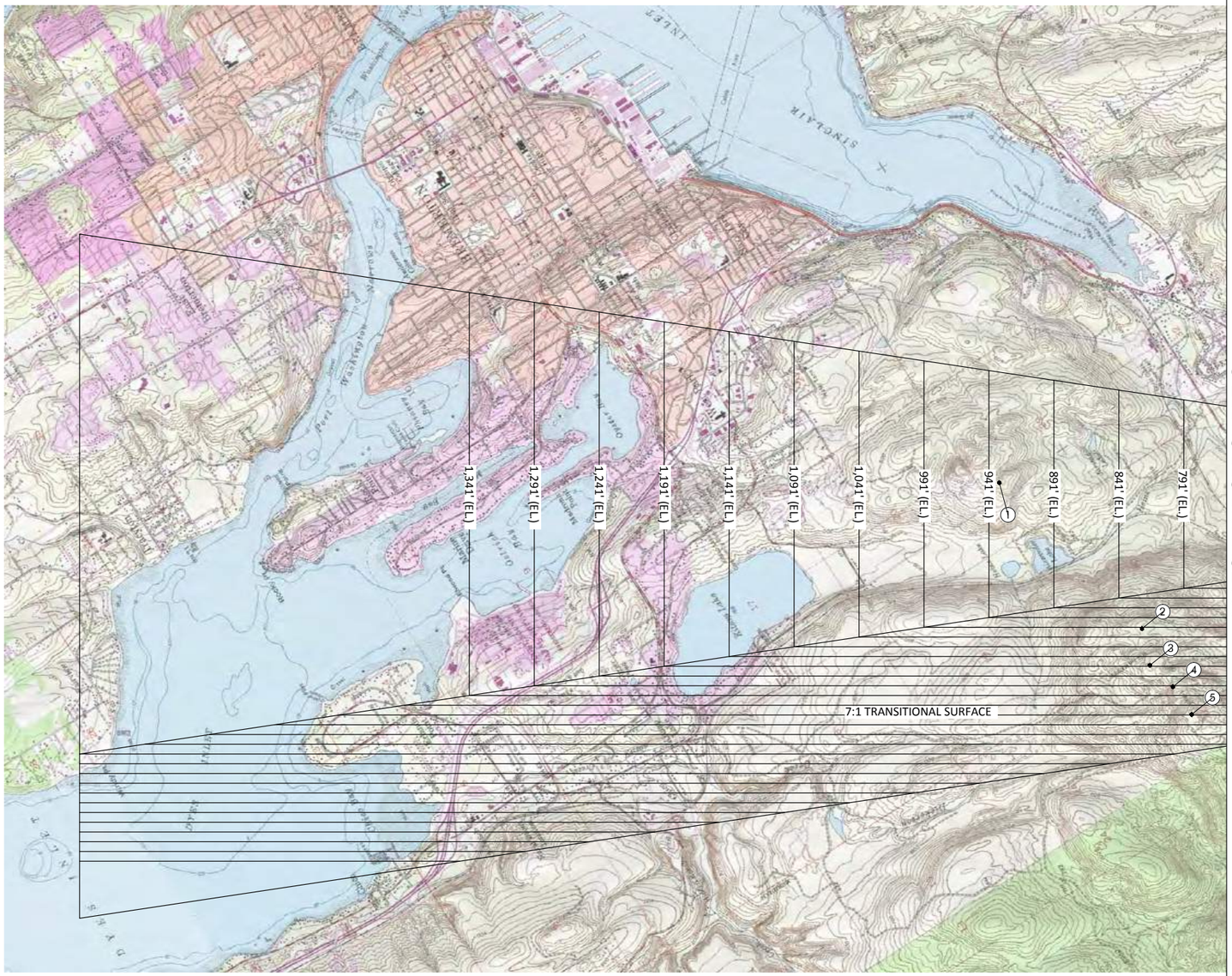
BREMERTON NATIONAL AIRPORT

EAST TERMINAL AREA PLAN

SHEET NO. 5 OF 14



FAR PART 77 PLAN VIEW
RUNWAY 20 PRECISION APPROACH/
TRANSITIONAL SURFACE

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BREMERTON NATIONAL AIRPORT

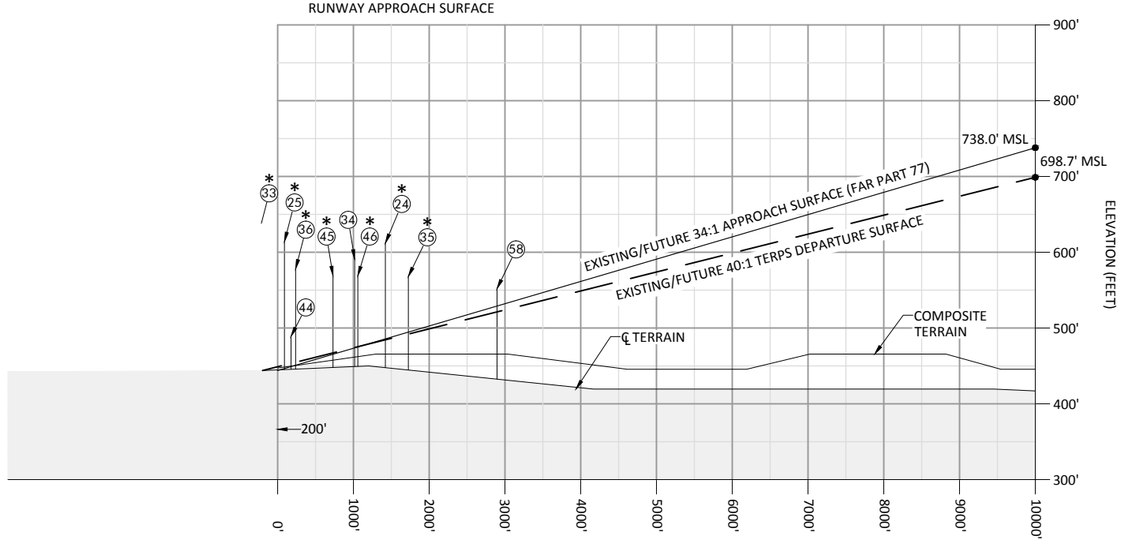
FAR PART 77 AIRSPACE PLAN 2-2
(RUNWAY 20 PRECISION APPROACH)

PLAN VIEW RUNWAY 2

0' 1000' 2000'

Scale: 1"=1000'

* THESE ITEMS ARE NOT LOCATED WITHIN RUNWAY APPROACH SURFACE



2000'

Horizontal Scale: 1"=1000'

PROFILE VIEW RUNWAY 2

0' 100' 200'

Scale: 1"=100'
Vertical Scale: 1"=100'

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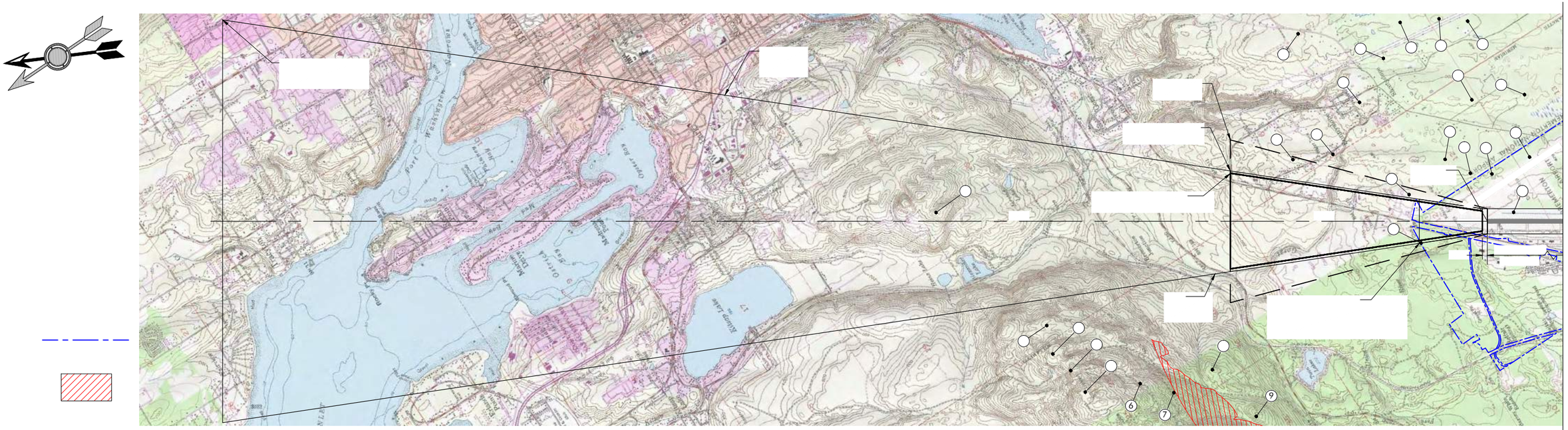
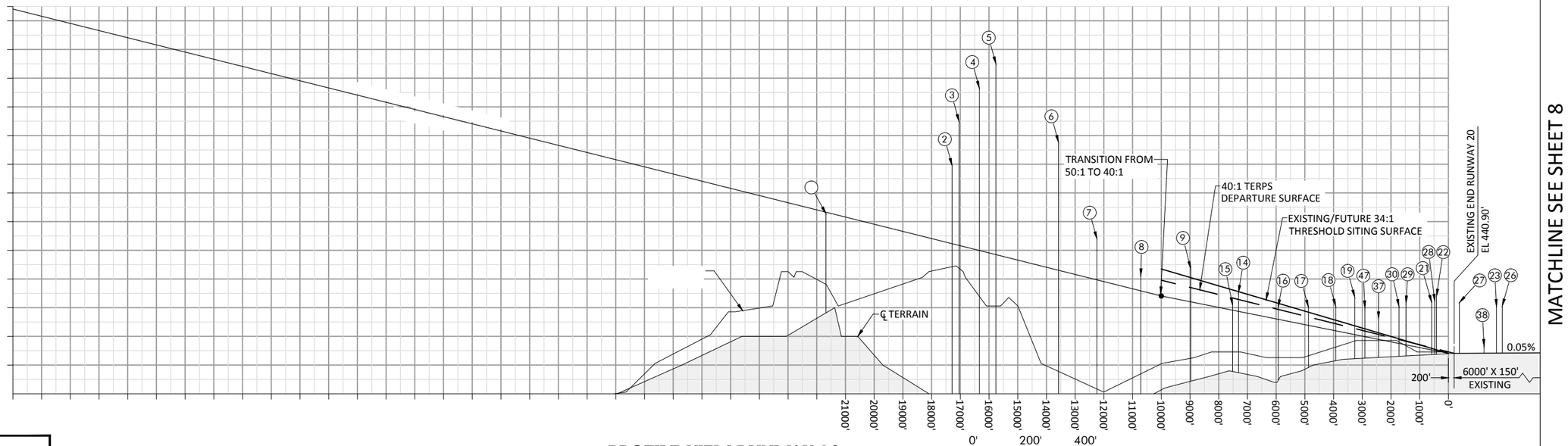
RUNWAY 2 APPROACH SURFACE PLAN AND PROFILE



PLAN VIEW RUNWAY 20

0' 2000' 4000'

SCALE: 1"=2000'



PROFILE VIEW RUNWAY 20

0' 200' 400'

SCALE OF FEET
VERTICAL SCALE: 1"=200'

MATCHLINE SEE SHEET 8

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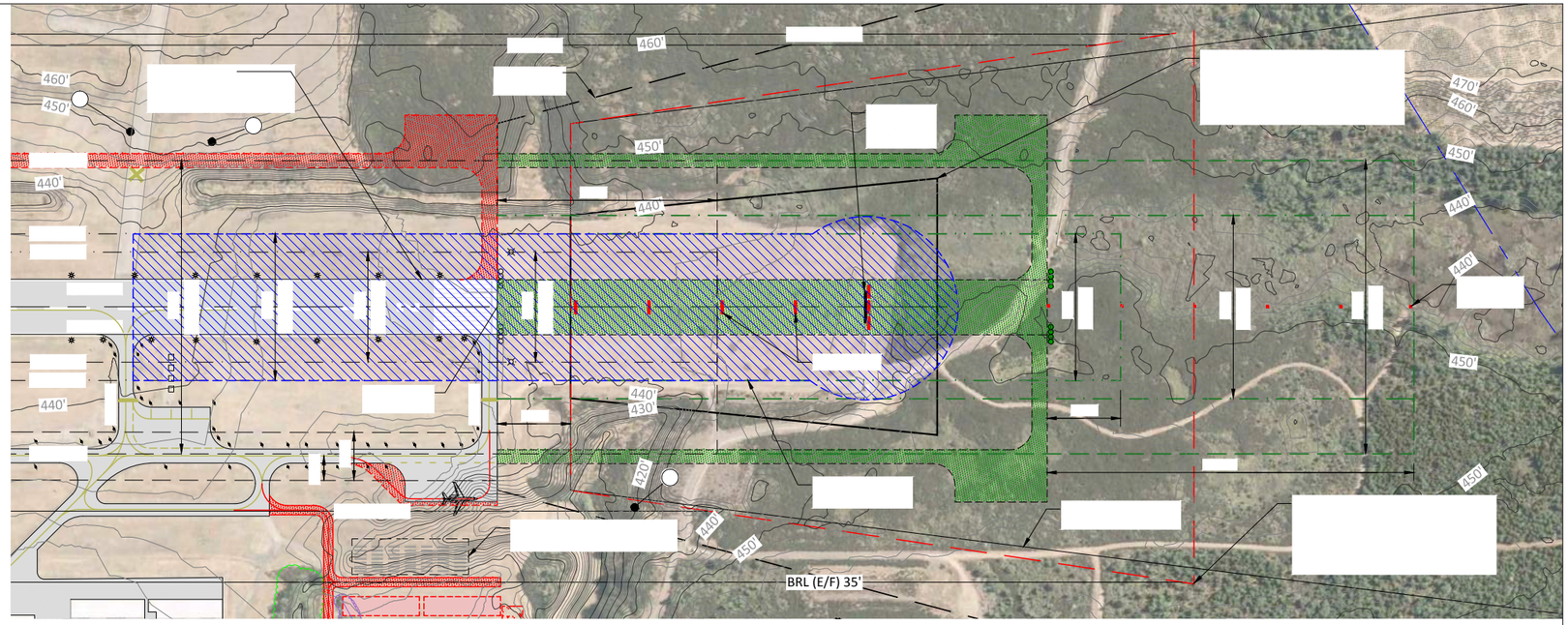
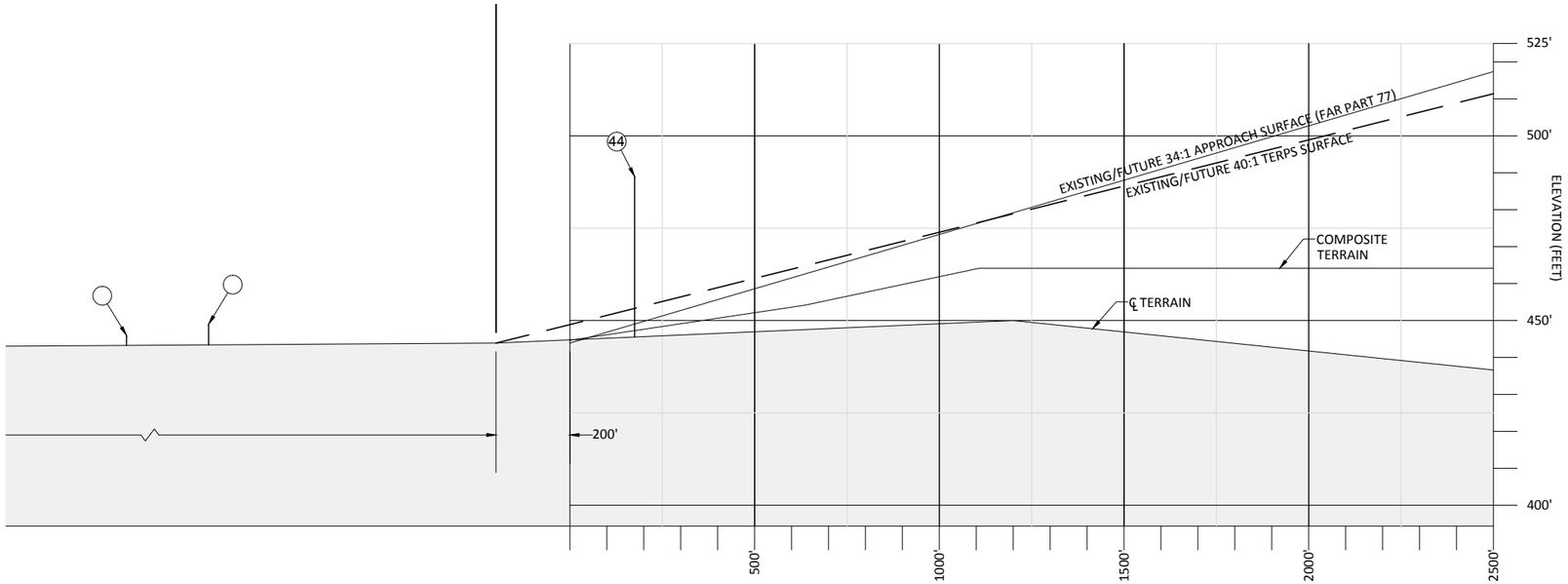
RUNWAY 20 APPROACH SURFACE PLAN AND PROFILE

SHEET NO. 9 OF 14



RUNWAY 2 PLAN VIEW



RUNWAY 2 PROFILE VIEW

0' 200' 400'

Horizontal Scale: 1"=200'

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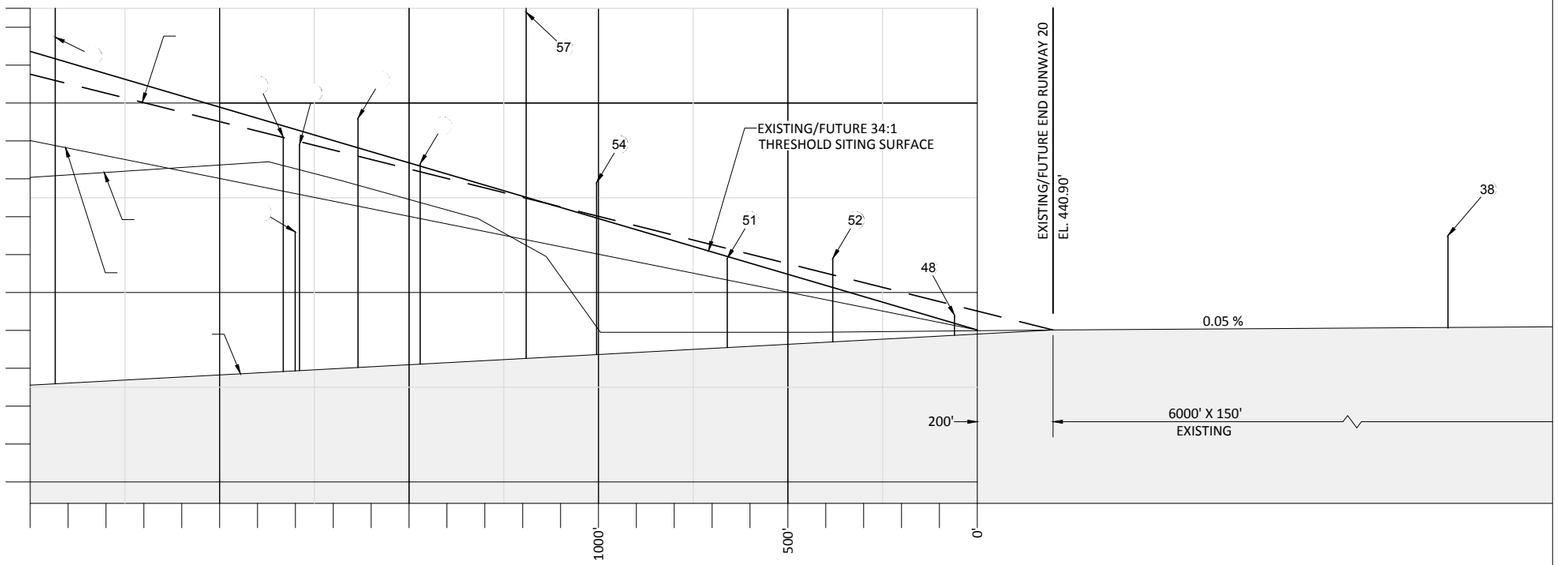
RUNWAY 2 RPZ AND INNER APPROACH PLAN AND PROFILE

0' 200' 400'

Scale: 1"=200'

RUNWAY 20 PLAN VIEW



RUNWAY 20 PROFILE VIEW

0' 200' 400'

Horizontal Scale: 1"=200'

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BREMERTON NATIONAL AIRPORT

RUNWAY 20 RPZ AND INNER APPROACH
PLAN AND PROFILE

SHEET NO.
11 OF 14

RR
RC
MR
GI
AB
PIM
ME
RP
PF

RURAL RESIDENTIAL
MINERAL RESOURCE
RURAL COMMERCIAL
GENERAL INDUSTRIAL
MIXED EMPLOYMENT

SPECIAL BUSINESS OPPORTUNITY AREA (223.86)

AVIATION RESERVE/ HANGAR STORAGE (97.63 ACRES)

AIRPORT WAY

RWY 20 EL. 440.90'

RWY 2 EL. 443.90'

AIRFIELD OPERATIONS (330.83 ACRES)

65 DNL
70 DNL
75 DNL
80 DNL

34:1 APPROACH SURFACE

SW LAKE FLORA RD.

OPEN SPACE (8.62 ACRES)

STATE HIGHWAY 3

AVIATION USE/ HANGAR STORAGE (53.83 ACRES)

AVIATION RESERVE (14.40 ACRES)

BUSINESS PARK PHASE-III (65.83 ACRES)

BUSINESS PARK PHASE-IV (57.73 ACRES)

CRITICAL AREA (8.36 ACRES)

LIGHT INDUSTRIAL (45.40 ACRES)

LIGHT INDUSTRIAL (40.20 ACRES)

BUSINESS SERVICE (8.07 ACRES)

BUSINESS PARK (174.40 ACRES)

BUSINESS PARK Phase I (102.32)

BUSINESS PARK PHASE II (72.08 ACRES)

CRITICAL AREA (27.85 ACRES)

LIGHT INDUSTRIAL (40.79 ACRES)

INDUSTRIAL (78.07 ACRES)

CRITICAL AREA (26.08 ACRES)

OPEN SPACE (48.72 ACRES)

OPEN SPACE (15.19 ACRES)

INDUSTRIAL RAIL (12.51 ACRES)

INDUSTRIAL RAIL (21.94 ACRES)

MAGNETIC DEC. 16°17'33"EAST (2014 VALUE)

0' 600' 1200'

Scale: 1"=600'

CENTURY WEST ENGINEERING CORPORATION
BEND OFFICE
1020 SW EMKAY DRIVE #100
BEND, OR 97702
541.322.8962
541.382.2423 (FAX)
WWW.CENTURYWEST.COM

DRAWN BY: JLS
CHECKED BY: MWR
SCALE: AS SHOWN
PROJECT NO: 1244500101

BREMERTON NATIONAL AIRPORT

ON-AIRPORT LAND USE PLAN W/ 2032 NOISE CONTOURS

RP
PF
RR RURAL RESIDENTIAL
MR MINERAL RESOURCE
RC RURAL COMMERCIAL

AB
PIM
GI GENERAL INDUSTRIAL
ME MIXED EMPLOYMENT

GI
MR
AB
GI
GI
ME
PIM
RP
RR
PF
MR
RP

AIRPORT WAY
BREMERTON NATIONAL AIRPORT
SW LAKE FLORA ROAD
STATE HIGHWAY 3
MASON COUNTY

65 DNL
70 DNL
75 DNL
70 DNL
75 DNL

FUTURE RPZ (RESERVE)
I000' X 1510' X I700'
APPROACH VISIBILITY MINIMUMS
NOT LOWER THAN 3/4-MILE

EXISTING/FUTURE RPZ
I000' X 1750' X 2500'
APPROACH VISIBILITY MINIMUMS
I/2-MILE

EXISTING
RWY 20
EL. 440.90'

EXISTING
RWY 2
EL. 443.90'

FUTURE RPZ
I000' X 1510' X I700'
APPROACH VISIBILITY MINIMUMS
NOT LOWER THAN 3/4-MILE

MAGNETIC DEC.
16°17'33" EAST
(2014 VALUE)

0' 1000' 2000'
Scale: 1"=1000'

CENTURY WEST
ENGINEERING CORPORATION
BEND OFFICE
1020 SW EMKAY DRIVE #100
BEND, OR 97702
541.322.8962
541.382.2423 (FAX)
WWW.CENTURYWEST.COM

DRAWN BY: JLS
CHECKED BY: WMR
SCALE: AS SHOWN
PROJECT NO: 1244500101

BREMERTON NATIONAL AIRPORT

OFF-AIRPORT LAND USE PLAN

SHEET NO.
13 OF 14

N88°35'13"W
1343.08

TWP. 23N, RG. 1W., W.M.

N88°09'27"W
1337.32

BARNEY WHITE ROAD

N46°00'00"E 4756.54

ACQUIRED UNDER AIP 11

PARCEL B
AF #1016993

PARCEL D
AF #295423

PARCEL C
AF #878659

PARCEL E
AF #878658

NOTE 7

NOTE 6

NOTE 1

U.S. NAVY PROPRTY

ULTIMATE RPZ
500' X 1700' X 1010'
(OWNED FEE SIMPLE)
1 MILE VISIBILITY MINIMUMS

N88°45'23"E
3553.84

EXISTING/ULTIMATE
RUNWAY 1L
END-EL. 44.0'
(HIGH POINT)

50:1
2500'

1000'

1750'

EXISTING RUNWAY 19
END-EL. 441.0'

N1°04'55"E
1994.13

AREA 1

AREA 2

PARCEL NUMBER - (F)

EXISTING / ULTIMATE RPZ
100' X 2500' X 1750'
(PARTIALLY OWNED / EASEMENT)
1/2 MILE VISIBILITY MINIMUMS

N87°36'16"W
2630.06

N89°20'21"W
2697.38

N86°38'22"W
1228.73

N0°51'55"E
2735.82

N0°58'37"E
2692.81

N1°06'47"E
2672.33

EXISTING PAVEMENT

DRAWING NOTE:
THIS DRAWING IS BASED ON MARCH 10, 2006
AIRPORT PROPERTY MAP (COFFMAN), AND HISTORIC
PROPERTY INFORMATION DEPICTED ON AUGUST 1973
EXHIBIT "A" AIRPORT PROPERTY MAP (REID MIDDLETON).

MAGNETIC DEC.
16°17'33"EAST
(2014 VALUE)

0' 600' 1200'
Scale: 1"=600'

CENTURY WEST
ENGINEERING CORPORATION

BEND OFFICE
1020 SW EMKAY DRIVE #100
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541.322.8962
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DRAWN BY: JLS
CHECKED BY: WMR
SCALE: AS SHOWN
PROJECT NO: 1244500101

BREMERTON NATIONAL AIRPORT

EXHIBIT "A" AIRPORT PROPERTY MAP

SHEET NO.
14 OF 14

Chapter 9 – Land Use Planning

Chapter 9 – Airport Land Use Compatibility

Introduction

This chapter describes land use associated with Bremerton National Airport and its surroundings, land use controls and other issues related to airport compatibility and jurisdictional responsibilities. A summary of environmental conditions associated with the airport, including updated noise exposure is provided in Chapter Six and in **Appendices D and E**.

Government Roles in Airport Land Use

FEDERAL

The Federal Aviation Administration (FAA) does not have authority to regulate off airport land use, including the construction of built items. Land use regulation is a local responsibility and FAA has a technical advisory role based on its interest in protecting the airspace associated with an airport as part of the national airspace system. The FAA has a role in regulating on-airport land use through approval of the Airport Layout Plan (ALP) and airport sponsor compliance with FAA Airport Improvement Program (AIP) grant assurances, which include measures to maintain airport land use compatibility and to protect the aeronautical function of an airport by restricting the location of non-aviation land uses.

Under 14 Code of Federal Regulations (CFR), Part 77, the FAA has the authority to review proposed construction through its 7460-1 (Notice of Construction or Alteration) process. The FAA review addresses compatibility both on- and off-airport based on the potential for creating a "hazard to air

navigation" that is associated with obstructions/penetrations in defined airspace. FAA airspace reviews include FAR Part 77 surfaces, Terminal Instrument Procedures (TERPS) surfaces, visual runway traffic patterns, and visual navigation aid (e.g., VASI, PAPI, etc.) protected airspace. When a proposed structure penetrates navigable airspace, the FAA will issue a letter objecting to the proposed action (determination of presumed hazard to air navigation) for the consideration of local authorities. When proposed actions do not present a hazard to air navigation, a "no objection" finding is issued. It is important to note that this analysis is based on an obstruction evaluation and is not intended to address land use compatibility in terms of noise exposure or proximity to an airport or runway.

In cases where the airport sponsor is also the local land use authority, local land use actions are reviewed for compliance with the FAA grant assurances intended to protect airports from incompatible land uses. However, in the case of Bremerton National Airport, which is owned and operated by the Port of Bremerton, the City of Bremerton is the primary responsible land use authority, with Kitsap and Mason Counties having secondary responsibility (areas located outside the city limits). City code requires consultation with the Port for all proposed development in the vicinity of the airport, although the City has final approval authority.

The FAA recommends that local jurisdictions include the following language in their development codes: "Nothing in this chapter shall diminish the responsibility of project proponents to submit a Notice of Construction or Alteration to the Federal Aviation Administration if required in accordance with Federal Aviation Regulations Part 77, "Objects Affecting Navigable Airspace."

FAR Part 150 (Airport Noise Compatibility Planning) provides guidance for land use compatibility around airports. The 1990 Airport Noise and Capacity Act (ANCA) defines federal policy on the regulation of airport noise (operating curfews, aircraft restrictions, etc.), with the intent of standardizing noise controls throughout the national system.

STATE

Washington State's goals for land use planning are defined by the Growth Management Act (GMA), adopted by the Washington State Legislature in 1990. In 1996, the GMA was amended to assist in preserving the social and economic benefits of aviation. The GMA requires towns, cities and counties to address airport land use compatibility, and identifies airports as "essential public facilities."

The following summary developed by the WSDOT Aviation Division explains the intent of the Act:

"RCW 36.70.547 and RCW 36.70A.510 require all cities and counties to adopt comprehensive plan goals, policies and regulations to discourage development of incompatible land uses adjacent to public use airports. Local jurisdictions must consult with aviation interests, including WSDOT Aviation, when

adopting comprehensive plan amendments to address airport land use compatibility during GMA updates, subject to the schedule designated by state law."

WSDOT Aviation Division reviews comprehensive plans and regulations; provides technical assistance on aviation issues; and provides land use compatibility guidelines to help local jurisdictions protect airports from incompatible uses. The Aviation Division recommends that local jurisdictions consider three primary areas in determining potential land use compatibility: height hazards, noise, and safety. The specific measures used by each jurisdiction are locally determined based on the guidelines provided by the Aviation Division. Although local compliance with RCW 36.70 is required, the means and degree to which local jurisdictions (cities and counties) achieve compliance are not mandated.

It is recognized that an airport's surrounding land use may extend beyond the immediate jurisdiction to include unincorporated county land areas, or nearby municipalities. Since the responsibility for land use controls may involve more than one jurisdiction, it is critical that effective communication and coordination occur between the airport and all local jurisdictions.

LOCAL

The role of Local government is to ensure that their comprehensive plans, goals, policies and regulations discourage development of incompatible land uses near airports. As noted earlier, these rules are codified in the Revised Code of Washington (RCW) 36.70.547 and 36.70A.510 for all local jurisdictions.

Land Use Jurisdiction

The City of Bremerton has land use authority for Bremerton National Airport and its immediate surroundings. In conjunction with the 2009 annexation of the Airport and the surrounding industrial land base, known as the South Kitsap Industrial Area (SKIA), the City of Bremerton formally created the SKIA Subarea to enable focused land use planning and development, consistent with the City code.

Beyond the SKIA Subarea and the Bremerton city limits, unincorporated areas of Kitsap and Mason County are located in the vicinity of Bremerton National Airport. Portions of the airport's FAR Part 77 Airspace extend into these adjacent jurisdictions, which also extends land use responsibilities.

CITY OF BREMERTON – SKIA SUBAREA

The City of Bremerton adopted the SKIA Subarea Plan on August 1, 2012 as Ordinance 5188. The Subarea Plan provides comprehensive land use controls that integrate wide ranging policies and strategies intended to promote sustainable industrial employment while preserving the area's natural environmental setting. Bremerton National Airport features prominently in the SKIA Subarea and a variety of measures have been created that directly and indirectly protect the airport from incompatible land uses.

Comprehensive Plan Land Use

Section A of the SKIA Subarea Plan defines the goals and strategies for SKIA that are consistent with the intended goal to "support a vibrant industrial center that is a model of environmental stewardship and sustainability." A core element in SKIA planning is the Manufacturing/Industrial Centers (MIC) designation, one of eight in the region recognized by the Puget Sound Regional Council (PSRC). A 2008 amendment to the City of Bremerton Comprehensive Plan states that the SKIA MIC is "expected to retain a different form of urban development than Bremerton's current regional or district centers. The physical size and location of the center allow strategic focused economic growth and it is expected to receive a significant proportion of Kitsap County's employment growth in the manufacturing and industrial sectors."

Although all of the SKIA Subarea goals are compatible with airport operations, several of the goals directly highlight the value of the ongoing planning, development and operation of Bremerton National Airport:

Land Use:

Goal LU2. Restrict uses that are incompatible with intense industrial development, encourage compatibility with airport operations, and ensure consistency with regional planning policies and criteria for Manufacturing/Industrial Centers.

An associated strategy (LU2.3) is "Consistent with FAA and WSDOT guidance, promote controls on land uses and development that are incompatible with Bremerton National Airport."

Transportation:

Goal T1. Develop a complete transportation system that supports all modes of travel and all potential users of the site.

Goal T2: Develop a transportation system that is financially feasible.

Capital Facilities:

Goal CF1. Use capital improvements as an economic development measure to encourage private business investment in SKIA.

Goal CF2. Seek funding for public facilities that are needed to support development in SKIA.

The 2009 City of Bremerton Official Land Use Map has "**Manufacturing/Industrial Center**" land use designation assigned to the Airport. An earlier City of Bremerton land use map identified Bremerton

National Airport as "Urban Industrial" within the SKIA UGA. These designations appear to reflect consistent planning and intended use within the City's urban growth area (UGA) prior to annexation and now through the SKIA Subarea, that are highly compatible with airport operations.

Zoning

The zoning within the SKIA Subarea is industrial and commercial, which provides a high degree of land use compatibility with airport operations. SKIA Subarea Plan, Section 3.010 Zone Establishment and Purpose, states "These goals include promoting the economic viability of manufacturing and industrial uses, encouraging employment growth, protecting Bremerton National Airport from incompatible land uses and preventing the encroachment of unplanned residential and other large non-industrial development within industrial zones." **Figure 9-1** depicts the surface zoning and airport overlay zoning associated with the SKIA Subarea.

The airfield portion of Bremerton National Airport is zoned **Aviation Business (AB)**. The AB zone is defined as "The purpose of this zone is the provide areas for aviation related business, manufacturing and service-related uses, while ensuring compatibility with aircraft operations. A broad range of non-aviation industrial uses that do not include significant outdoor operations are also allowed in this zone, provided measures are taken to reduce the potential negative impacts of these uses on adjacent property through site design, screening, buffers, and landscaping."

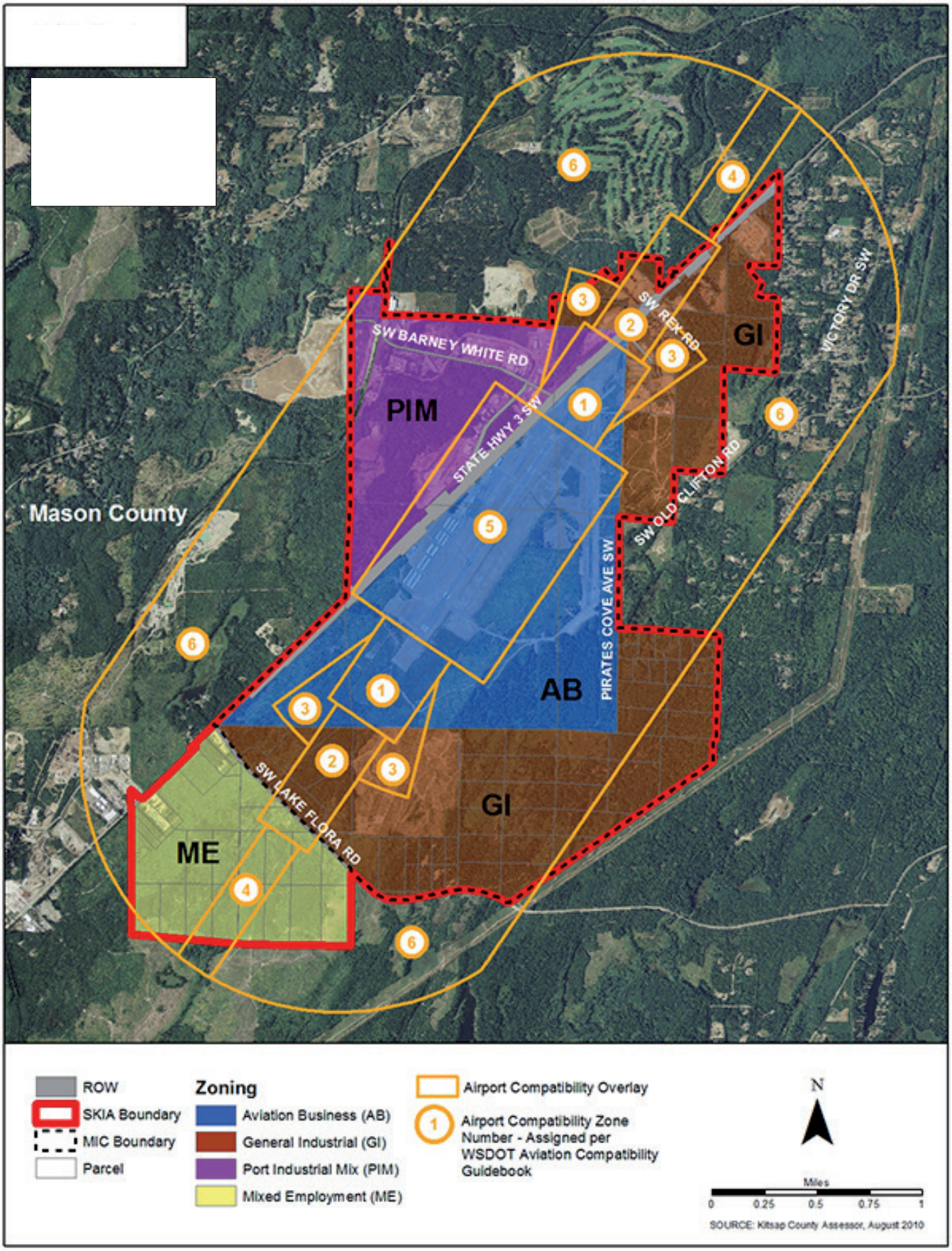
The Port's Olympic View Business and Industrial Park are recognized by the Federal Aviation Administration (FAA) as part of Bremerton National Airport. The business and industrial park area accommodates exclusively non-aeronautical (no direct aircraft access to the adjacent airfield) land uses and is zoned **Port Industrial Mix (PIM)**. The PIM zone is defined as "The purpose of this zone is to promote a wide range of light industrial, support retail and service uses, government uses and compatible service uses within a business park built form, as well as recreational facilities that are designed and operated in a manner that is compatible with industrial uses. Heavy industrial uses are also allowed in this zone, provided that additional measures are taken to reduce the potential negative impacts of these uses on adjacent property through site design, screening, buffers, and landscaping."

Large areas of property north and east of the airport is zoned **General Industrial (GI)**. The GI zone is defined as "The purpose of this zone is to promote a wide range of light and heavy industrial uses and compatible support retail and service uses."

A large area of property located southwest of the Airport and southwest of SW Lake Flora Road is zoned **Mixed Employment (ME)**. The ME zone is defined as "The purpose of this zone is to promote a range of commercial, office and light industrial uses outside the MIC boundaries that are compatible with land

uses in the MIC, with improved non-motorized connections and amenities. Light industrial activities in this zone should occur within enclosed buildings and heavy industrial uses are discouraged."

These zones provide a mix of land uses and activities that are highly compatible with airport operations. As noted in the Environmental Review Chapter, the airport noise analysis indicates that current and future noise levels of 65DNL and above are contained within airport property, except for a small area that extends over Highway 3. Areas of lower noise intensity (55, 60 DNL) are largely contained within the SKIA subarea.


Mason County
SW BARNEY WHITE RD
SW REX RD
VICTORY DR SW
STATE HWY 3 SW
SW OLD CLIFTON RD
PIRATES COVE AVE SW
SW LAKE FLORA RD
PIM
GI
AB
GI
ME
ROW
SKIA Boundary
MIC Boundary
Parcel
Zoning
Aviation Business (AB)
General Industrial (GI)
Port Industrial Mix (PIM)
Mixed Employment (ME)
Airport Compatibility Overlay
Airport Compatibility Zone Number - Assigned per WSDOT Aviation Compatibility Guidebook
N
Miles
0
0.25
0.5
0.75
1
SOURCE: Kitsap County Assessor, August 2010

SKIA Subarea Development Restrictions

The development standards established within the SKIA Subarea are complimentary to airport operations and are designed to avoid or mitigate any potential negative impacts. Several examples are noted below:

Section 3.050 Prohibited Uses addresses outright prohibited uses (junk yard, residential as primary use) and also identifies items that could have a potentially adverse impact on airport operations (light/glare encroachment, odor, dust or smoke encroachment) that are prohibited.

Section 3.060 Site Development Standards provides a high degree of design flexibility that is intended to maintain compatibility with neighboring uses while accommodating a wide range of development needs. The maximum height of structures for all zones within the SKIA Subarea is identified as "market driven." The standards also include a note related to maximum height and protecting the airport: (Table C-1, Note 1) "Where building heights might affect airport operations at Bremerton National Airport applicants must demonstrate compliance with the criteria specified in Federal Aviation Regulations Part 77 and other applicable requirements."

Section 4.070 Exterior Lighting addresses light pollution by requiring that development "does not result in the trespass of excess light onto adjacent parcels or public rights-of-way." Section 4.070 b.3. requires all exterior building and site lighting to use full cut-off fixtures, except when waived by the Director (City of Bremerton) due to specific lighting requirements. The use of full cut-off fixtures in the vicinity of an airport significantly reduces upward projection of glare. Section 3.140 b.4. states "Building-mounted accent lighting should be directed downward onto the illuminated object or area, and not upward into the sky."

Section 4.080 Noise and Emissions is primarily intended to control noise generated by industrial users within the SKIA Subarea. However, the code notes the following regarding airport-generated noise (4.080 b.1.): "All zones within SKIA are herby (sic) established as Noise Control District III, as defined in BMC Chapter 6.32. All requirements of BMC Chapter 6.32 shall apply to development within SKIA, provided that FAA shall be the sole regulator of noise levels associated with Bremerton National Airport."

Airport Overlay Zoning

In addition to primary zoning assigned to individual land parcels within the SKIA Subarea, airport overlay zoning has been adopted, consistent with the Airports and Compatible Land Use Guidelines, published by the WSDOT Aviation Division. Airport Compatibility Overlay (ACO) zoning is established as an element of the SKIA Subarea Plan (Section 3.010 Zone Establishment and Purpose).

The SKIA Subarea zoning includes Airport Compatibility Overlay (ACO) zoning based on WSDOT Aviation Airport Safety Zones 1-6.[1] The SKIA Subarea Plan states "ACO zones are defined based on guidance in the WSDOT Airports and Compatible Land Use Guidebook, available online at http://www.wsdot.wa.gov/aviation/Planning/ ACLUguide.htm." The descriptions of the zones are direct from the WSDOT publication, including sensitive land uses that should not be allowed within certain compatibility zones. However, density restriction guidelines provided by WSDOT Aviation for each of the ACO zones are not referenced in the code.

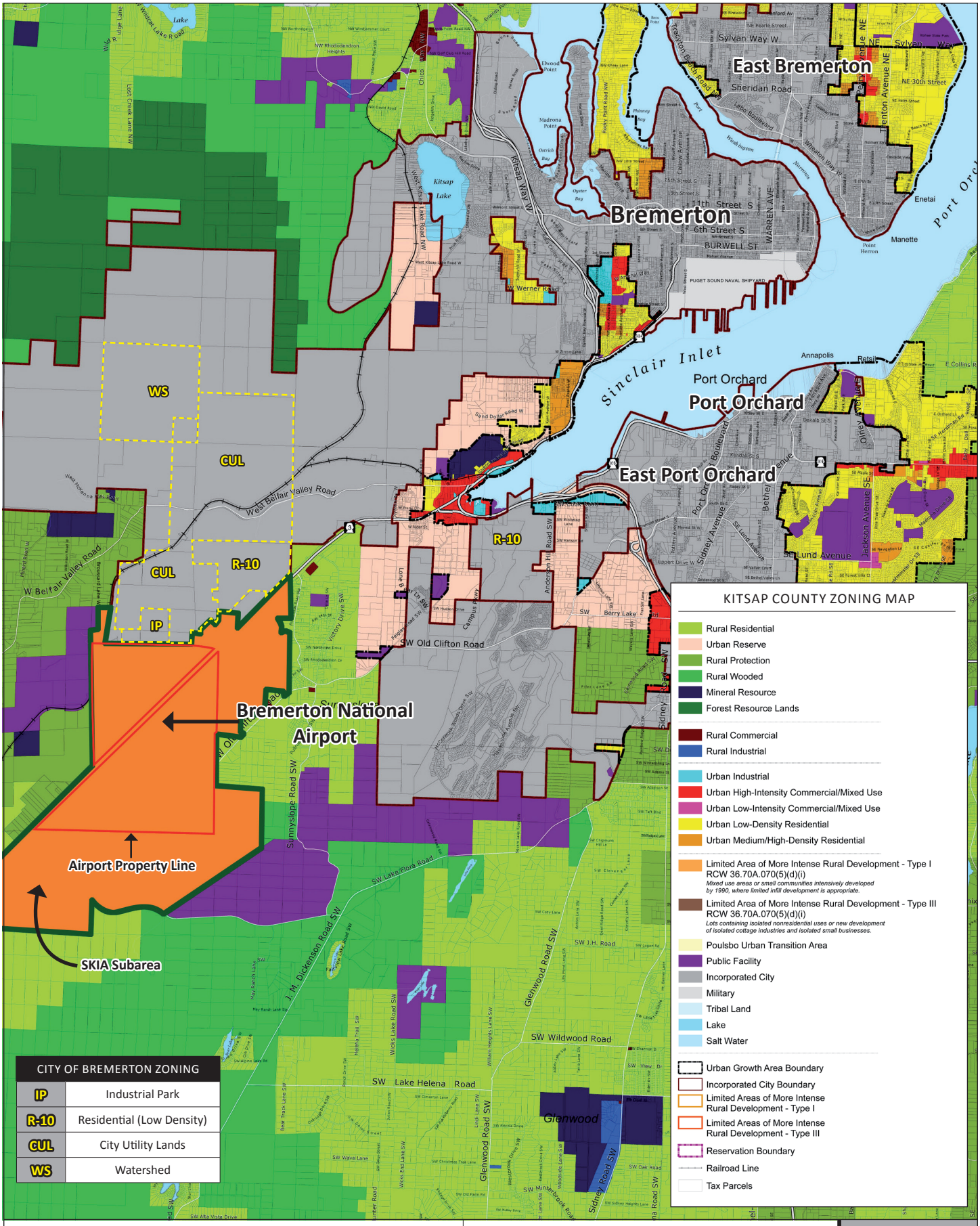
Per the requirements of the SKIA Subarea Plan, defined in City of Bremerton Ordinance 5188 (August 1, 2012), "All applicants proposing work in ACO zones 1 through 6 shall consult the Port of Bremerton after submitting a land use, site development, or building permit application."

Adjacent County Zoning and Land Use

Beyond the SKIA subarea are lands located in unincorporated Kitsap County and Mason County. The land use designations and zoning in these areas is predominantly rural, forest resource zones with limited areas of low density residential. **Figure 9-2** depicts current Kitsap County zoning in the vicinity of the SKIA Subarea. **Figure 9-3** depicts current land use designations from the Kitsap County Comprehensive Plan.

The airport overlay zoning adopted by the City of Bremerton in 2012 as part of the SKIA Subarea does not appear to have been jointly adopted by either Kitsap or Mason County. The Kitsap County Code (Title 17 – Zoning) does not contain airport overlay zone language. The Mason County Code (Chapter 17 – Zoning) does contain an airport overlay zone (Chapter 17.60), however, the ordinance is written specifically for Sanderson Field and it does not recognize any other airports or the airspace associated with any other airports that is located within Mason County. As depicted in **Figure 9-1**, portions of Airport Compatibility Zone #6 and #4 for Bremerton National Airport extend over the adjacent unincorporated counties. Local land use officials should consider jointly adopting the currently defined overlay zoning for Bremerton National Airport across all jurisdictions for consistency.

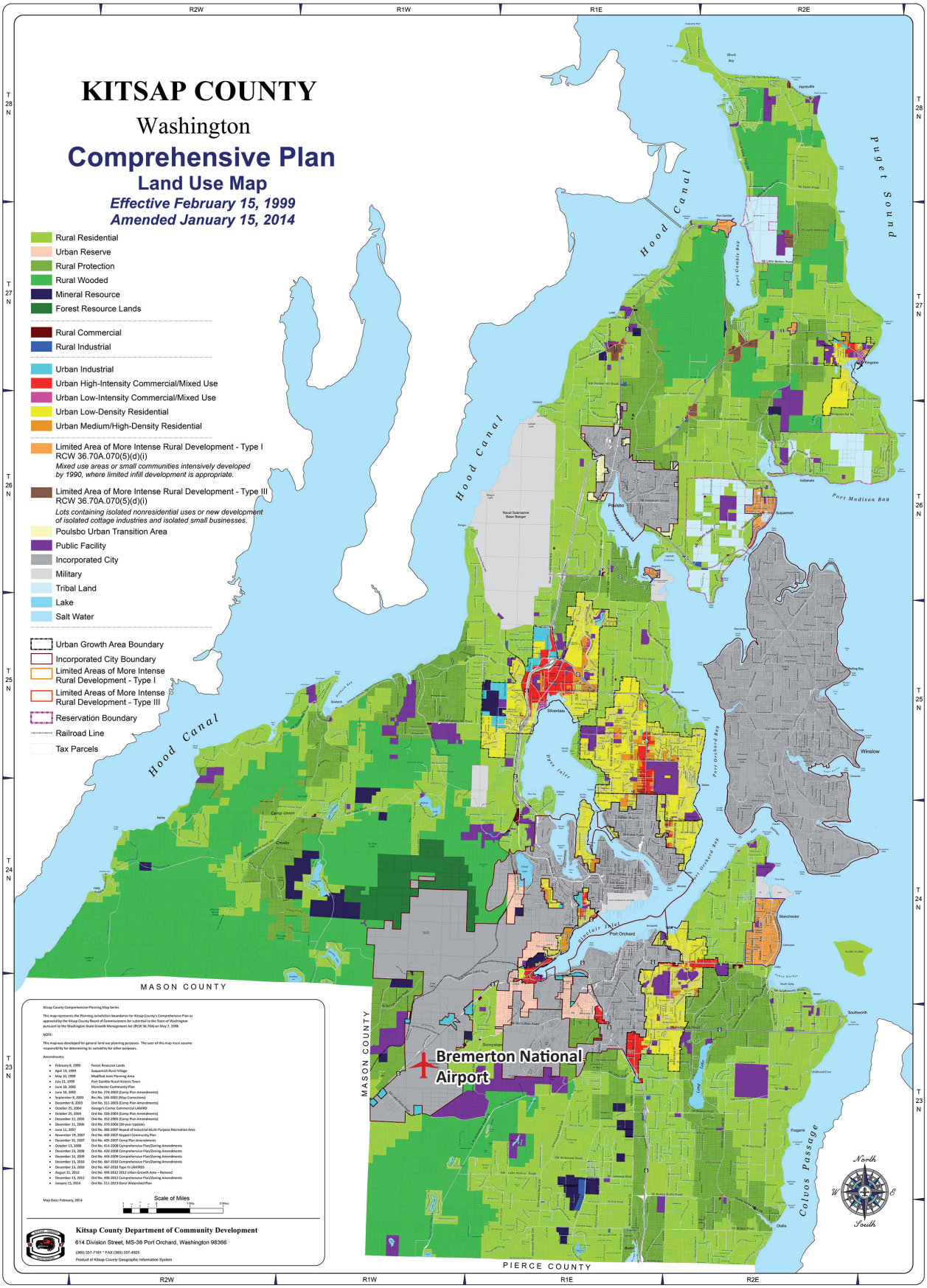
[1] WSDOT Aviation Division Airports and Compatible Land Use Guide



CITY OF BREMERTON ZONING	
IP	Industrial Park
R-10	Residential (Low Density)
CUL	City Utility Lands
WS	Watershed

KITSAP COUNTY ZONING MAP

- Rural Residential
- Urban Reserve
- Rural Protection
- Rural Wooded
- Mineral Resource
- Forest Resource Lands
- Rural Commercial
- Rural Industrial
- Urban Industrial
- Urban High-Intensity Commercial/Mixed Use
- Urban Low-Intensity Commercial/Mixed Use
- Urban Low-Density Residential
- Urban Medium/High-Density Residential
- Limited Area of More Intense Rural Development - Type I RCW 36.70A.070(5)(d)(i)
  Mixed use areas or small communities intensively developed by 1990, where limited infill development is appropriate.
- Limited Area of More Intense Rural Development - Type III RCW 36.70A.070(5)(d)(i)
  Lots containing isolated nonresidential uses or new development of isolated cottage industries and isolated small businesses.
- Poulsbo Urban Transition Area
- Public Facility
- Incorporated City
- Military
- Tribal Land
- Lake
- Salt Water
- Urban Growth Area Boundary
- Incorporated City Boundary
- Limited Areas of More Intense Rural Development - Type I
- Limited Areas of More Intense Rural Development - Type III
- Reservation Boundary
- Railroad Line
- Tax Parcels


KITSAP COUNTY
Washington
Comprehensive Plan
Land Use Map
Effective February 15, 1999
Amended January 15, 2014
Rural Residential
Urban Reserve
Rural Protection
Rural Wooded
Mineral Resource
Forest Resource Lands
Rural Commercial
Rural Industrial
Urban Industrial
Urban High-Intensity Commercial/Mixed Use
Urban Low-Intensity Commercial/Mixed Use
Urban Low-Density Residential
Urban Medium/High-Density Residential
Limited Area of More Intense Rural Development - Type I RCW 36.70A.070(5)(d)(i)
Mixed use areas or small communities intensively developed by 1990, where limited infill development is appropriate.
Limited Area of More Intense Rural Development - Type III RCW 36.70A.070(5)(d)(i)
Lots containing isolated nonresidential uses or new development of isolated cottage industries and isolated small businesses.
Poulsbo Urban Transition Area
Public Facility
Incorporated City
Military
Tribal Land
Lake
Salt Water
Urban Growth Area Boundary
Incorporated City Boundary
Limited Areas of More Intense Rural Development - Type I
Limited Areas of More Intense Rural Development - Type III
Reservation Boundary
Railroad Line
Tax Parcels
R2W
R1W
R1E
R2E
T 28 N
T 27 N
T 26 N
T 25 N
T 24 N
T 23 N
Hood Canal
Puget Sound
Port Madison Bay
Port Orchard Bay
Dyes Inlet
Sinclair Inlet
Colvos Passage
Bremerton National Airport
MASON COUNTY
PIERCE COUNTY
Poulsbo
Silverdale
Bremerton
Port Orchard
Winslow
Manchester
Southworth
Kingston
Indianola
Suquamish
Hansville
Camp Union
Crosby
Olalla
Fragaria
North
South
Kitsap County Comprehensive Planning Map Series
Scale of Miles
Kitsap County Department of Community Development
614 Division Street, MS-36 Port Orchard, Washington 98366
(360) 337-7181 * FAX (360) 337-4925
Product of Kitsap County Geographic Information System

Chapter 10 – FAA Compliance Review

Chapter 10 – FAA Compliance Review

Introduction

This chapter discusses the elements associated with the operation and management of Bremerton National Airport, as a federally-obligated airport. The Federal Aviation Administration (FAA) encourages airport sponsors to establish and implement programs that promote sound operating practices and ongoing compliance with regulatory requirements. The FAA currently recommends that compliance be addressed during the airport planning process through the review of airport documents, plans, and other records, such as an approved ALP, Exhibit" A" Property Map, Airport Ordinance, Zoning Ordinance, Rules and Regulations Minimum Standards, airport budgets, leases, easements, permits, and other documents.

Port of Bremerton Compliance

The Port of Bremerton maintains a high degree of control over the operation of Bremerton National Airport. The Port meets all applicable financial reporting and record keeping requirements and employs a variety of "best practices" including periodic review of market rates and fees, land appraisals, formal procurement and contracting practices, and coordination with adjacent land owners (avigation easements), local government (land use planning, zoning), state government (airport overlay zoning, environmental agencies, etc.), and tribal government. There are no known compliance issues associated with airport development, tenant leases, airport land uses or other items.

FAA Compliance Overview

A management program based on the FAA's "Planning for Compliance" guidance and the adoption of airport management "Best Practices" is recommended to address FAA compliance requirements and avoid noncompliance, which could have significant consequences.

Airport management “Best Practices" are developed to provide timely information and guidance related to good management practices and safe airport operations for airport managers and sponsors. The practices outlined herein are designed for use by the Port of Bremerton for evaluating and improving their current and future operation and management program.

Airport sponsors must comply with various federal obligations through agreements and/or property conveyances. These are outlined in FAA Order 5190.6B, Airport Compliance Manual. The contractual federal obligations that a sponsor accepts when receiving federal grant funds or transfer of federal property can be found in a variety of documents including:

- Grant agreements issued under the Federal Airport Act of 1946, the Airport and Airway Development Act of 1970, and the Airport and Airport lmprovement Act of 1982. Included in these agreement are the requirement for airport sponsors to comply with:
    - Grant Assurances
    - Advisory Circulars
    - Application commitments
    - FAR procedures and submittals
    - Special conditions
- Surplus airport property instruments of transfer
- Deeds of conveyance
- Commitments in environmental documents prepared in accordance with FAA requirements.
- Separate written requirements between a sponsor and the FAA.

Land use compliance and compatible land use planning is often a significant compliance issue for airports. Compliance and suggested best practices are discussed under the following subheadings in this chapter:

- Airport Compliance with Federal and State Grant Assurances
- Environmental Compliance
- Airport User Compliance
- Other Airport Operational Policies and Procedures

Airport Compliance with Grant Assurances

As a recipient of both federal and state airport improvement grant funds, the Port of Bremerton is contractually bound to various sponsor obligations referred to as "Grant Assurances" that have been put together by the FAA and the Washington Department of Transportation – Aviation Division. These obligations, presented in detail in federal and state grants and state statute and administrative code, document the commitments made by the airport sponsor to fulfill the intent of the grantor (FAA and State of Washington) required in association with acceptance necessary of federal and/or state funding for airport improvements. Failure to comply with the grant assurances may result in a finding of noncompliance and/or forfeiture of future funding. Grant assurances and their associated requirements are to protect the significant investment made by the FAA, state and the Port, to preserve and maintain the nation's airports as a valuable national transportation asset, as mandated by Congress.

FAA GRANT ASSURANCES

The FAA's Airport Compliance Program defines the interpretation, administration, and oversight of federal sponsor obligations contained in grant assurances. Currently, **FAA Order 5190.6B,** Airport Compliance Manual, defines policies and procedures for the Airport Compliance Program. Although it is not regulatory or controlling with regard to airport sponsor conduct, it establishes the policies and procedures for FAA personnel to follow in carrying out the FAA's responsibilities for ensuring compliance by the sponsor.

Order 5190.6B states: the FAA Airport Compliance Program is, "…designed to monitor and enforce obligations agreed to by airport sponsors in exchange for valuable benefits and rights granted by the United States in return for substantial direct grants of funds and for conveyances of federal property for airport purposes. The Airport Compliance Program is designed to protect the public interest in civil aviation. Grants and property conveyances are made in exchange for binding commitments (federal obligations) designed to ensure that the public interest in civil aviation will be served. The FAA bears the important responsibility of seeing that these commitments are met. This Order addresses the types of these commitments, how they apply to airports and what FAA personnel are required to do to enforce them."

To better understand the intent of the FAA Compliance Program, it is important to understand the FAA's goals for a national airport system. The national airport system is currently known as the National Plan of Integrated Airport Systems (NPIAS), which has historic origins dating back to the 1946 Federal Airports Act. The airport system has evolved through several legislative updates in concert with changes in the organization and scope of the Federal Aviation Administration (FAA). The NPIAS was adopted as part of the Airport and Airway Development Act of 1982, replacing the National Airspace System Plan (NASP),

created by earlier legislation. There are approximately 2,500 general aviation airports and 800 commercial service airports in the NPIAS.

According to the FAA, cooperation between the FAA, state and local agencies should result in an airport system with the following attributes:

- Airports should be safe and efficient, located at optimum sites, and be developed and maintained to appropriate standards.
- Airports should be operated efficiently both for aeronautical users and the government, relying primarily on user fees and placing minimal burden on the general revenues of the local, state, and federal governments.
- Airports should be flexible and expandable, able to meet increased demand and accommodate new aircraft types.
- Airports should be permanent, with assurance that they will remain open for aeronautical use over the long term
- Airports should be compatible with surrounding communities, maintaining a balance between the needs of aviation and the requirements of residents in neighboring areas.
- Airports should be developed in concert with improvements to the air traffic control system
- The airport system should support national objectives for defense, emergency readiness, and postal delivery
- The airport system should be extensive, providing as many people as possible with convenient access to air transportation, typically not more than 20 miles of travel to the nearest NPIAS airport
- The airport system should help air transportation contribute to a productive national economy and international competitiveness.

FAA AIP grant assurances are summarized and categorized in **Table 10-1**. While Sponsors should understand and comply with all grant assurances, there are several assurances that are common and recurring issues for airport sponsors throughout the country. These are summarized in more detail below. A complete description of current AIP grant assurances is provided in Appendix F. It is important to note that the assurances (and corresponding numbers) are applied to Non-Airport Sponsors Undertaking Noise Compatibility Program Projects and Planning Agency Sponsors. These can also be found in the Airport Improvement Program under Grant Assurances.

TABLE 10-1: SUMMARY OF FAA AIP GRANT ASSURANCES (AIRPORT SPONSOR ASSURANCES 3/2014)

GRANT ASSURANCE NO.	GENERAL AIRPORT	PROJECT PLANNING / DESIGN & CONTRACTING	AIRPORT OPERATIONS AND LAND USE	DAY TO DAY AIRPORT MANAGEMENT	PROJECT CONSTRUCTION	LEASES & FINANCIAL	OTHER
1. General Federal Requirements							
2. Responsibility and Authority of the Sponsor							
3. Sponsor Fund Availability							
4. Good Title							
5. Preserving Rights and Powers							
6. Consistency with Local Plans							
7. Consideration of Local Interest							
8. Consultation with Users							
9. Public Hearings							
10. Metropolitan Planning Organization							
11. Pavement Preventative Maintenance							
12. Terminal Development Prerequisites							
13. Accounting System, Audit, and Record Keeping Requirements							
14. Minimum Wage Rates							
15. Veteran's Preference							

GRANT ASSURANCE NO.	GENERAL AIRPORT	PROJECT PLANNING / DESIGN & CONTRACTING	AIRPORT OPERATIONS AND LAND USE	DAY TO DAY AIRPORT MANAGEMENT	PROJECT CONSTRUCTION	LEASES & FINANCIAL	OTHER
16. Conformity to Plans and Specifications		■					
17. Construction Inspection and Approval					■		
18. Planning Projects		■					
19. Operations and Maintenance			■				
20. Hazard Removal and Mitigation			■				
21. Compatible Land Use			■				
22. Economic Nondiscrimination				■			
23. Exclusive Rights				■			
24. Fee and Rental Structure						■	
25. Airport Revenues						■	
26. Reports and Inspections				■			
27. Use by Government Aircraft							■
28. Land for Federal Facilities							■
29. Airport Layout Plans	■						
30. Civil Rights		■					
31. Disposal of Land	■						

GRANT ASSURANCE NO.	GENERAL AIRPORT	PROJECT PLANNING / DESIGN & CONTRACTING	AIRPORT OPERATIONS AND LAND USE	DAY TO DAY AIRPORT MANAGEMENT	PROJECT CONSTRUCTION	LEASES & FINANCIAL	OTHER
32. Engineering and Design Services							
33. Foreign Market Restrictions							
34. Policies, Standards and Specifications							
35. Relocation and Real Property Acquisition							
36. Access by Intercity Bus							
37. Disadvantaged Business Enterprises							
38. Hangar Construction							
39. Competitive Access							

As the airport sponsor, the Port of Bremerton is responsible for the direct control and operation of Bremerton National Airport. Familiarity with, proper monitoring and implementation of sponsor obligations and FAA grant assurances in particular, is the key to maintaining compliance. FAA Order 5190.6B and ongoing communication with the FAA Northwest Mountain Region Compliance Office are both excellent resources for the Port when addressing policy and compliance.

DURATION

The terms, conditions and assurance of a grant agreement with the FAA remain in effect for the useful life of a development project, which is typically 20 years from the receipt of the last grant. However, terms, conditions and assurances associated with land purchased with federal funds do not expire.

The airport sponsor should have a clear understanding of and comply with all assurances. The following sections describe the selected assurances in more detail.

Project Planning/Design and Contracting

Sponsor Fund Availability (Assurance # 3)

Once a grant is given to an airport sponsor, the receiving sponsor commits to providing the funding to cover their portion of the total project cost. Currently this amount is ten percent of the total eligible project cost, although it may be higher depending on the particular project components or makeup. Once the project has been completed, the receiving airport also commits to having adequate funds to maintain and operate the airport in the appropriate manner to protect the investment in accordance with the terms of the assurances attached to and made a part of the grant agreement.

Consistency with Local Plans (Assurance #6)

All projects must be consistent with city and county comprehensive plans, transportation plans, zoning ordinances development code, and hazard mitigation plans. The airport sponsor and planners should all familiarize themselves with local planning documents before a project is considered and ensure that all projects follow local plans and ordinances.

In addition to understanding local plans, airport sponsors should be proactive in order to prevent noncompliance with this assurance. The airport sponsor should assist in the development of local plans that incorporate the airport and consider its unique aviation related needs. Sponsor efforts should include the development of goals, policies and implementation strategies to protect the airport as part of local plans and ordinances.

Accounting System Audit and Record Keeping (Assurance# 13)

All project accounts and records must be made available at any time. Records should include documentation of cost, how monies were actually spent, funds paid by other sources and any other financial record associated with the project at hand. Any books, records, documents or papers that pertain to the project should be available at all times for an audit or examination.

General Airport

Good Title (Assurance #4)

The airport owner must have a Good Title to affected property when considering projects associated with land, building or equipment. Good Title means the sponsor can show complete ownership of the property without any legal questions, or show it will soon be acquired.

Preserving Rights and Powers (Assurance #5)

No actions are allowed which might take away any rights or powers from the sponsor which are necessary for the sponsor to perform or fulfill any condition set forth by the assurance included as part of the grant agreement. If there is an action taken or activity permitted that might hinder any of those rights or powers it should be discontinued. An example of an action which can adversely affect the rights and powers of the airport is a Through-the-Fence (TTF) activity. TTF activities allow access to airport facilities from off-airport users. In many instances, the airport sponsor cannot control the activities of those operating off the airport resulting in less sponsor control. This loss of control can potentially have an adverse impact to airport users. For example, TTF activities many times do not pay the same rates and charges as on-airport users, resulting in an unfair competitive advantage for business/users located off-airport versus those on-airport.

Airport Layout Plan (ALP) (Assurance #29)

The airport should at all times keep an up-to-date ALP which should include on it both current and future boundaries, facilities/structures, and the location of any non-aviation areas and existing improvements. No changes should be made at the airport to hinder the safety of operations; also no changes should be made to the airport that is not in conformity with the ALP. Any changes of this nature could adversely affect the safety, utility or efficiency of the airport. If any changes are made to the airport without authorization the alteration must be changed back to their original condition or the airport will have to bear all cost associated with moving or changing the alteration to an acceptable design or location. Additionally no federal participation will occur for improvement projects not shown on an approved ALP.

Disposal of Land (Assurance #31)

Land purchased with the financial participation of an FAA Grant cannot be sold or disposed of by the airport sponsor at their sole discretion. Disposal of such lands are subject to FAA approval and a definitive process established by the FAA. lf airport land is no longer considered necessary for airport purposes, and the sale is authorized by the FAA, the land must be sold at fair market value. Proceeds from the sale of the land must either be repaid to the FAA or reinvested in to another eligible airport improvement or noise compatibility project. Land disposal requirements typically arise when a community is building a new airport and the land on which the airport was located is sold with the proceeds used to offset costs of the new airport. In general, land purchased with FAA funds is rarely sold by a sponsor.

Airport Operations and Land Use

Pavement Preventative Maintenance (Assurance #11)

Since January 1995, the FAA has mandated that it will only give a grant for airport pavement replacement or reconstruction projects if an effective airport pavement maintenance-management program is in place. The program should identify the maintenance of all pavements funded with federal financial assistance. The report provides a pavement condition index (PCl) rating (0 to 100) for various section of aprons, runways, taxiways, and a score for overall airport pavements.

Operations and Maintenance (Assurance #19)

All federally funded airport facilities must operate at all times in a safe and serviceable manner. The airport sponsor should not allow for any activities which inhibit or prevent this. The airport sponsor must always promptly mark and light any hazards on the airport, and promptly issue Notices to Airmen (NOTAMs) to advise of any conditions which could affect safe aeronautical use. Exceptions to this assurance include when temporary weather conditions make it unreasonable to maintain the airport. Further, this assurance does not require the airport sponsor to repair conditions which have happened because of a situation beyond the control of the sponsor.

Compatible Land Use (Assurance #21)

Land uses around an airport should be planned and implemented in a manner which ensures surrounding development and activities are compatible with the airport. To ensure compatibility, the sponsor is expected to take appropriate action, to the extent reasonable, including the adoption of zoning laws to guide land use in the vicinity of airports under their jurisdiction. Incompatible land use around airports represents one of the greatest threats to the future viability of airports.

Day to Day Airport Management

Economic Non-Discrimination (Assurance #22)

Any reasonable aeronautical activity offering service to the public should be permitted to operate at the airport as long as the activity complies with airport established standards for that activity. Any contractor agreement made with the airport will have provisions making certain the person, firm or corporation will not be discriminatory when it comes to services rendered as well as rates or prices charged to customers. Provisions include:

- All FBOs on the airport should be subject to the same rate fees, rentals and other charges.

- All persons, firms or corporations operating aircraft can work on their own aircraft with their own employees.
- If the airport sponsor at any time exercises the rights and privileges of this assurance they will be under all of the same conditions as any other airport user would be.
- The sponsor can establish fair conditions which need to be met by all airport users to make the airport safer and more efficient.

The sponsor can prohibit any type, kind or class of aeronautical activity if it is for the safety of the airport. An example of an activity which may be considered for prohibition is sky diving. It is important to point out that the FAA will review such prohibitions and will make the final determination as to whether or not a particular activity type is deemed unsafe at the airport based on current operational dynamics.

Exclusive Rights (Assurance #23)

Exclusive Rights at an airport is often a complicated subject usually specific to individual airport situations. The assurance states the sponsor "will permit no exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public..." There are exceptions to this rule. If the airport sponsor can prove that permitting a similar business would be unreasonably costly, impractical or result in a safety concern, the sponsor may consider granting an exclusive right. To deny a business opportunity because of safety, the sponsor must demonstrate how that particular business will compromise safety at the airport. Exclusive rights are very often found in airport relationships with fixed base operations (FBO) but exclusive rights can also be established with any other business at the airport which could assist in the operation of an aircraft at the airport. If an unapproved exclusive rights agreement exists it must be dissolved before a future federal grant is awarded to the airport.

If a sponsor is contemplating denial of a business use at the airport, it is strongly encouraged that they contact their FAA ADO in order to ensure that they have all necessary information and that denial of access is not going to be seen as unjust discrimination. For more in depth information on exclusive rights reference Advisory Circular 150/5190-6, "Exclusive Rights at Federally Obligated Airports."

Leases and Financial

Fee and Rental Structure (Assurance #24)

Simply put, the fee and rental structure at the airport must be implemented with the goal of generating enough revenue from airport related fees and rents to become self-sufficient in funding day to day operational needs. The airport sponsor should routinely monitor its fee and rental structure to ensure reasonable fees are being charged to meet this goal. Common fees charged by airports include fuel flowage, tie-down, and landing fees and hangar rent.

Airport Revenue (Assurance #25)

All airport revenue and local taxes on aviation fuel should be used toward the operating costs of the airport, the local airport system, or other local facilities which are owned by the same owner of the airport which will directly impact air transportation passengers or property or for noise mitigation on or off airport property. In other words, revenue generated by airport activities must be used to support the continued operation and maintenance of the airport. Use of airport revenue to support or subsidize other non-aviation activities or functions of the sponsor is not allowed and is considered revenue diversion. Revenue diversion is a significant compliance issue subject to cause scrutiny by the FAA.

Other FAA Compliance Requirements

OTHER FEDERAL CONTRACTING AND PROCUREMENT DOCUMENTS

When an airport sponsor accepts an FAA Airport Improvement Program (AIP) grant, they agree to adhere to all applicable federal contracting and procurement requirements. Advisory circulars are required for use in AIP funded projects. Included in each grant request is a federal funding checklist that identifies the requirements an airport should consider before accepting the grant. The following items are noted in the checklist:

- ALPs should be up to date
- Exhibit A Property Map may need to be updated if acquiring additional property
- Land Inventory may need to be updated if you have recently acquired land with federal assistance
- Airports must hold good title to the airport landing area
- Appropriate signage and markings must be in place
- RPZ and approach surface deficiencies must be identified and steps to address deficiencies must be noted
- RSAs must meet FAA standards if planning a runway project
- DBE program goals must be met on projects more than $250,000
- Procedures should be in place to handle bid protests
- Open AIP grant projects need to be identified
- Project closeout form must be submitted within 90 days of work completion
- A “Certification of Economic Justification” must be included for routine pavement maintenance projects
- A “Revenue Generating Facility Eligibility Evaluation” must be completed for hangar constructing or fueling facilities
- A “Reimbursable Agreement” and “Non-Fed Coordination” must be completed for navigational aid projects
- A “Relocation Plan” must be completed if a project requires residences or businesses to be relocated

SPECIAL CONDITIONS

In addition to the standard grant assurances discussed above, the state or the FAA may require "Special Conditions" to individual grants which supplement or expand the standard grant assurances. Special Conditions are unique to an individual airport and can be project or administrative in nature. Airport sponsors need to be aware of such conditions that may be applied to their airport.

MULTIJURISDICTIONAL CHALLENGES

In some instances, airports are jointly owned and operated by more than one airport sponsor. In other instances, airports may be located within multiple jurisdictions. While the official airport sponsor is ultimately responsible for adherence with the grant assurance, the actions, or inactions, of surrounding jurisdictions can and do impact the airport sponsor's ability in meeting its sponsor obligations. This is particularly true with land use compatibility issues around airports. As a result, it is important in either circumstance that all jurisdictions affected by the airport understand the operational needs and complexities of having an airport within its jurisdiction. Mutual agreements addressing airport operational or land use protection needs, or other cooperative measures, are recommended by all jurisdictions to both protect the functionality of the airport as well as the safety and well-being of airport user and neighbors.

WSDOT Aviation Division Grant Assurances

In 2013, WSDOT Aviation adopted new grant assurances (WAC Chapter 468-260) for airport sponsors that are intended to protect the public's investment in the Washington aviation system. The WSDOT grant assurances apply to both NPIAS and non-NPIAS airports that receive funding through the WSDOT Airport Aid Grant Program. The WSDOT grant assurances are consistent and complimentary to FAA grant assurances with a significant emphasis placed on land use planning, public process, and environmental stewardship. A summary of the WSDOT grant assurances are included in **Appendix G.**