DECEMBER 2014

Rhode Island Airport Corporation

QUONSET STATE AIRPORT MASTER PLAN UPDATE

THE Louis Berger Group, INC.

Study Introduction

Updating an Airport Master Plan (AMP) is a standard industry practice. The need may be developed based on some dramatic change at the Airport, but as a "rule of thumb" updates should be considered approximately every five years to maintain the currency of the data and the airport standards.

The primary product of an airport master plan study is the Airport Layout Plan (ALP), which serves as the framework for planning future development at the Airport. The ALP is approved by the Federal Aviation Administration (FAA) and they require the airport sponsor, the Rhode Island Airport Corporation (RIAC) to keep it current.

The last airport master plan study for Quonset (OQU) was conducted in 2006 and since then the Airport has under gone a number of changes in the form of facilities, operations, and other issues that need to be formally documented. Doing so allows for the planning necessary to preserve the Airport's role in the state, region, and national transportation system. Therefore, the development of this AMP Update and ALP is essential to reaffirm and preserve the future role of the Airport.

The 2006 AMP and the 2011 RI Airport System Plan contain a considerable amount of information that has not changed. The recommendations in this update considered recent airport improvements, issues, and overall national downturn in general aviation activity. Using both traditional and non-traditional methods, this document reevaluates the 2006 AMP. It makes effective use of project resources to recognize the changes at the Airport since 2006 to develop a list of recommended capital improvement projects for the period 2015 – 2025. Additionally, the AMP determines OQU's ability to meet FAA design standards and how to best address those facilities that do not meet standards or requirements.

The planning activity that was involved with this project was defined by a scope of work, included in Appendix D of this document, which followed the guidelines provided by the FAA Advisory Circular 150-5070-6 "Preparing Airport Master Plan". The objectives of the study were to:

- Utilize as much existing information and plans as possible to reduce the costs associated with a comprehensive inventory typical with a full master plan
- Evaluate and update the 2006 forecasts to assess the airport role
- Conduct an assessment of the Airport's ability to meet current FAA design standards
- Combine Facility requirements and Alternatives analysis into one task titled "Development Issues and Options"
- Prepare and approve a new Airport Layout Plan; and
- Assess the physical condition of the seawall and develop options to correct the problem potential

Additionally, it was the goal of the study to accomplish these objectives in accordance with a public coordination and communication process. This goal was achieved through the creation of an Airport Advisory Committee (AAC) that was established to discuss and provide comments on technical reports and recommendations developed during the planning process. Membership of the AAC represented a broad range of stakeholders, including airport users, local business, the community, and planning agencies. A copy of the AAC membership is also included in Appendix D of this document.

A Public information meeting was held on July 1, 2014 to provide the general public with the opportunity to learn about the study and provide input into the process. Notification of these meetings was provided by publishing notices in local newspapers. Finally, project information including the draft chapter, public notices, and the scope of work were provided on the airport's website.

This Airport Master Plan was prepared and is presented in the following Chapters:

Chapter 1 – Existing Conditions

Chapter 2 – Environmental Inventory

Chapter 3 – Aviation Forecasts

Chapter 4 – Development Issues and Options

Chapter 5 – Implementation Plan

Chapter 6 – Airport Layout Plan

Appendices

Appendix A: Quonset State Airport Seawall Analysis
Appendix B: Flood Insurance Rate (FIRM) Map Review Technical Memorandum
Appendix C: FAA Modification to Standards Requests/Determinations
Appendix D: Project Work Scope, AAC Meeting Presentations, Notes, and Sign-in Sheets
Appendix E: Public Information Meeting Presentation, Advertisements, and Comments

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TABLE OF CONTENTS

Chapter 1- Existing Conditions 1.1
Chapter 2- Environmental Inventory 2.1
Chapter 3- Aviation Forecasts 3.1
Chapter 4- Development Issues & Options 4.1
Chapter 5- Implementation Plan 5.1
Chapter 6- Airport Layout Plan 6.1

TABLE OF FIGURES

Figure 1-0: Airport Diagram 1.3
Figure 1-1: Airport Runway Information 1.4
Figure 1-2: Airport Taxiway Information 1.5
Figure 1-3: Airfield Apron Information 1.6
Figure 1-4: Airspace Classifications Diagram 1.7
Figure 1-5: Boston Terminal Area Chart 1.8
Figure 1-6: Typical FAA Part 77 Imaginary Surfaces 1.9
Figure 1-7: Instrument Approaches 1.10
Figure 1-8: Navigational Aids 1.10
Figure 1-9: Airfield Pavement Markings 1.13
Figure 1-10: Airport Vehicles and Equipment 1.19
Figure 1-11: Historical Airport Operations 1.22
Figure 1-12: Airport Operations Breakdown 1.23
Figure 1-13: GA Local and GA Itinerant Airport Operations Breakdown 1.23
Figure 1-14: Ten Year Percentage of Historical Operations 1.24
Figure 1-15: Historical Based Aircraft 1.25
Figure 1-16: Historical Airport Fuel Volume 1.25
Figure 2-1: Airport Location Map 2.4
Figure 2-2: Land Use Map 2.5
Figure 2-3: Stormwater Drainage Map 2.11
Figure 2-4: Wetland Location Map 2.13
Figure 2-5: Flood Zone Location Map 2.15
Figure 2-6: Areas of Environmental Concern 2.22

Figure 2-7: Soil Types....2.26
Figure 3-1: 2006 Top Down Forecast (Operations)....3.3
Figure 3-2: 2006 Quonset Airport Market Area....3.4
Figure 3-3: 2006 Bottom Up Forecast (Operations)....3.6
Figure 3-4: 2006 Bottom Up Operations Forecast Scenarios....3.6
Figure 3-5: 2006 Bottom Up Forecast (Based Aircraft)....3.7
Figure 3-6: 2006 Bottom Up Operations Forecast Scenarios (Based Aircraft)....3.7
Figure 3-7: 2011 RI State System Plan Forecasts....3.8
Figure 3-8: 2004-2012 Actual Airport Activity with Average Growth Rates....3.9
Figure 3-9: 2012 Low Activity Forecast....3.11
Figure 3-10: 2012 Medium Activity Forecast....3.12
Figure 3-11: 2012 High Activity Forecast....3.12
Figure 3-12: 2012 Proposed Forecast Scenarios (Operations)....3.13
Figure 3-13: 2012 Proposed Forecast Scenarios (Based Aircraft)....3.13
Figure 4-1: 2006 & 2006 Development Summary....4.2
Figure 4-2: 2014 Development Plan....4.4
Figure 4-3: Airport Reference Code Approach Category....4.5
Figure 4-4: Airport Reference Code Wingspan Category....4.6
Figure 4-5: Taxiway W Extension....4.9
Figure 4-6: Taxiway A Relocation....4.11
Figure 4-7: Non-Essential Airfield Pavement....4.11
Figure 4-8: Based Aircraft Storage Requirements....4.14
Figure 4-9: Based Aircraft Storage Requirements Summary....4.14
Figure 4-10: Average Day Peak Month Transient Operations....4.16
Figure 4-11: Average Day Peak Month Transient Aircraft Requirements....4.16
Figure 4-12: Average Day Peak Month Transient Aircraft Requirements Summary....4.17
Figure 4-13: Development Areas A, B, and F Capacity Estimates....4.18
Figure 4-14: Areas A, B and F Development Scenario....4.19
Figure 4-15: Existing Fuel Farm Location Inside the RVZ....4.20
Figure 4-16: Proposed SRE Development Area....4.21
Figure 4-17: Quonset Air Museum and Adjacent Area....4.22

Figure 4-18: 2011 RI System Plan Performance Summary 4.24

Figure 4-19: 2011 RI System Plan User Survey Results 4.25

Figure 4-20: Wetland Location Map 4.33

Figure 4-21: Soil Type Location Map 4.35

Figure 5-1: Summary of Airport Development and Estimated Costs 5.3

APPENDICES

Appendix A: Quonset State Airport Seawall Analysis

Appendix B: Flood Insurance Rate (FIRM) Map Review Technical Memorandum

Appendix C: FAA Modification to Standards Requests/Determinations

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CHAPTER 1

QUONSET STATE AIRPORT MASTER PLAN UPDATE

EXISTING CONDITIONS

THE Louis Berger Group, INC.

1.0 EXISTING CONDITIONS

INTRODUCTION

This chapter is an overview of conditions at Quonset State Airport (OQU). It is a compilation of all pertinent data relative to the Airport including airfield conditions, existing facilities, and operational activity.

For this Master Plan Update, data was collected from various sources. These include:

- Airport site visits;
- Airport administration records;
- FAA 5010 forms;
- 2006 Airport Master Plan;
- 2011 Rhode Island Airport System Plan
- 2008 Quonset Airport Strategic Plan; and
- Other pertinent data and studies from the Federal Aviation Administration (FAA), Rhode Island Airport Corporation (RIAC), Quonset Development Corporation (QDC) and surrounding towns.

This Chapter is categorized into the following sections:

- Section 1.1 – Airport Overview;
- Section 1.2 – Airfield Conditions;
- Section 1.3 – Airspace, Approaches and Navigational Aids (NAVAIDS);
- Section 1.4 – Airport Buildings;
- Section 1.5 – Airport Tenants;
- Section 1.6 – Fleet mix, historical operations, based aircraft, and fuel volume;
- Section 1.7 – Airport Utilities

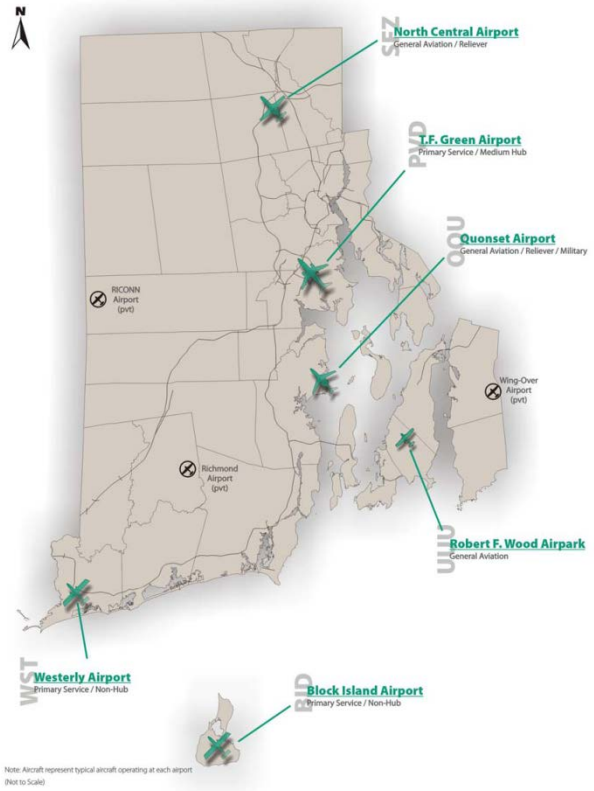
The data collected will be utilized throughout the master planning process to assess the current growth, re-evaluate previous aviation forecasts, provide recommendations to stimulate new air traffic and economic growth, and present an updated Master Plan and Airport Layout Plan (ALP). Both the Airport and the Quonset Business Park have been the subject of numerous planning efforts. As such, there is a great deal of data available about the Airport and the surrounding area. To avoid a duplication of effort, the Airport Master Plan Update will utilize the existing data sources to their maximum potential to prepare this Inventory Chapter. A primary source of this information is the previous 2006 OQU Master Plan and the 2011 Statewide Airport System Plan.

1.1 AIRPORT OVERVIEW

Quonset State Airport is a joint-use civil-military facility covering 754 acres located on a peninsula three miles northeast of North Kingstown Rhode Island adjacent to Narragansett Bay, approximately 16 miles south of downtown Providence, and less than nine miles south of T.F. Green Airport (PVD). It is also approximately 7 nautical miles northwest of Newport State Airport. The Airport serves general aviation civilian users and also serves as a base of operations for the Rhode Island Air National Guard's 143rd Airlift Wing and the Rhode Island Army National Guard's 1st Battalion, 126th Aviation Regiment. The Airport service area includes eastern Washington County, eastern Kent County, Jamestown and the industrial park at Quonset. The Airport's location relative to other RI Airports is illustrated on the following page. A through narrative on the history of Quonset State Airport can be found in the 2006 Master Plan Inventory.

FAA's National Plan of Integrated Airport System (NPIAS) defines Quonset as a General Aviation/Reliever Airport. Basically that means, OQU serves as an alternative for the general aviation user that would otherwise use T.F. Green Airport (PVD). In their 2011, General Aviation Airports, A National Asset report, the FAA classified OQU as a "Local Airport". The FAA ASSET study defines a Local Airport as an Airport that serves local to regional markets with moderate levels of activity, with some multi-engine propeller aircraft averaging about 33 based propeller-driven aircraft and no jets.

By way of information; the FAA ASSET study is a recent FAA effort to develop a new classification system of airports in the National Airport System. The changes are intended to better represent the role of airports. It is still in its initial phases of development. It is not expected to change the funding received from FAA.



OQU is unique among Rhode Island's airports in that it is a public use facility that is an integral element of an industrial/transportation complex that combines port, rail, road and air transportation facilities. Included in that complex are areas (Quonset Business Park) developed for industrial use, by the Quonset Development Corp. (QDC). Electric Boat, a subsidiary of General Dynamics, operates a large submarine manufacturing facility and also has a large sub-component manufacturing plant. Although there are large manufacturing facilities in close proximity to the Airport, there is relatively little air cargo activities. Most of the cargo (both raw materials and manufactured goods) is trucked, and shipped by rail and barge.

The Airport is located in Washington County in the town of North Kingstown. A community comprehensive plan has been adopted and zoning ordinances are in place to help regulate and guide the town's future growth and development. The February 1992 North Kingstown Comprehensive Plan delineates a Quonset Point/Davisville Planning District as the land situated east of Post Road, north of Roger Williams Way and south of Newcomb Road, corresponding generally to the former Naval Air Station boundaries. The Planning district is further divided into sub-areas, with the Airport included in the Central Quonset sub-area. Proposed uses for Central Quonset are heavy industrial to light manufacturing, transitioning from south to north. The airfield portion of the sub-area is proposed for public/institutional land use, retaining the airport's existing land use classification. This Comprehensive Plan is currently being updated in accordance with State Guide Plan requirements.

In December 1992, the Rhode Island Airport Corporation (RIAC) was formed as a quasi-public state agency that would lease and operate Rhode Island's six state airports (including the Quonset State Airport). While RIAC is responsible for the operation and maintenance of OQU, as well as the planning, design, and construction of airport improvements, AvPorts manages the day-to-day operations at OQU as well as the other state's airports (Westerly, North Central, Block Island, and Newport). AvPorts is in the business of owning, leasing and managing airports and related airport infrastructure. AvPorts began in 1927 as the Airport Division of Pan Am World Services, Inc., (a wholly-owned subsidiary of Pan American World Airways, the original airline pioneer). Later, AvPORTS became owned by other world-class companies like Johnson Controls World Services, Inc. and Associate British Ports PLC, before becoming an AFCO Company in 2009.

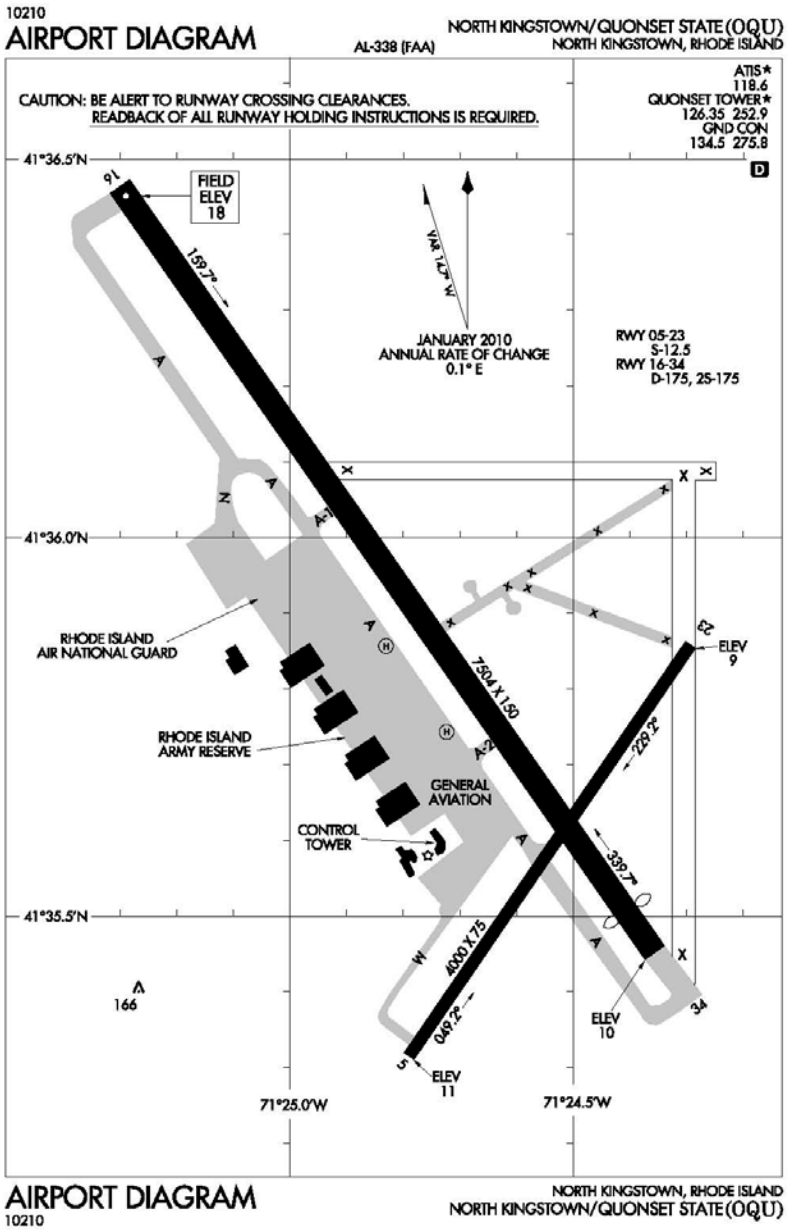
1.2 AIRFIELD CONDITIONS

A complete inventory of the airfield conditions at OQU was collected. The inventory includes airfield pavements, lighting and NAVAIDS, airport terminal and other airport structures, airport access and parking, airport equipment, airspace and runway approaches.

Data presented was obtained and referenced from existing documents, plans, and electronic files provided by RIAC and AvPorts, and supplemented with FAA data. The information was verified and updated as necessary with data collected during two airport site visits conducted in July and August 2012.

The general configuration of the airfield at Quonset is shown on Figure 1-0. The existing conditions of the facility are described on the following pages.

FIGURE 1-0 / AIRPORT DIAGRAM. *Airport Layout.*



1.2.1 Runways

FIGURE 1-1 / RUNWAYS. *Airport Runway information.*

	AIRFIELD RUNWAYS	
Runway Orientation	16-34	5-23
Airport Reference Code (ARC)	D-IV	B-II
Wind Coverage	VFR/94.4% - IFR/89.1%	VFR/95% - IFR N/A
Runway Dimensions (feet)	7,504' L x 150' W	4,003' L x 75' W
Surface Type/Pavement Condition	Asphalt/Good	Asphalt/Fair
Effective Gradient	0.1	0.0
Runway Pavement Strength	175,000 lbs Dual Wheel Aircraft	12,500 lbs Single Wheel Aircraft
Runway Markings	Precision - Non-Precision	Basic
Visual Aids	4 light PAPI – RWY 16 & 34	None
Navigational Aids	Category I ILS – RWY 16	None
Approach Visibility Minimums	½ Statute Mile	Visual and not lower than 1 mile
Runway Edge Lighting Intensity	High (HIRL)	Medium (MIRL)
Runway End Identifier Lights (REILS)	Yes	No
Approach Lighting	MALSR – RWY 16	None
Runway Safety Area (L x W)	1,000' x 500'	300' x 150'
Runway Protection Zone (Length x Inner Width x Outer Width)	2,500' x 1,000' x 1,750' (RWY 16) 1,700' x 500' x 1,010' (RWY 34)	1,000' x 500' x 700'
Parallel Taxiway	Full (Taxiway A)	Partial (Taxiway W)
Stub Taxiway	A – Runway to Air Guard Apron A2 – Runway to GA Apron N – Taxiway A to Air Guard Apron	None

Source: FAA 5010 Master Record – AFD Effective Date 9/20/2012 and 2006 AMP

1.2.2 Taxiways

FIGURE 1-2 / TAXIWAYS. *Airport Taxiway information.*

AIRFIELD TAXIWAYS	
	Taxiway A
Type	Full Length Parallel (RWY 16-34)
Width	75'
ARC	D-IV
RWY/TWY Centerline Separation	375' from RWY 34 to TWY N 538' from TWY N to RWY 16
Pavement Age	1993 (TWY N to RWY 34) 1983 (TWY N to RWY 16)
Pavement Condition	Fair to Excellent
Pavement Strength	N/A
Lighting	Medium Intensity Taxiway Lights (MITL)
	Taxiway A1
Type	Stub (RWY 16-34 to Air Guard Apron)
Width	75'
ARC	D-IV
RWY/TWY Centerline Separation	N/A
Pavement Age	1999
Pavement Condition	Fair
Pavement Strength	N/A
Lighting	Medium Intensity Taxiway Lights (MITL)
	Taxiway A2
Type	Stub (RWY 16-34 to GA Apron)
Width	75'
ARC	D-IV
RWY/TWY Centerline Separation	N/A
Pavement Age	1993
Pavement Condition	Fair/Good
Pavement Strength	N/A
Lighting	Medium Intensity Taxiway Lights (MITL)
	Taxiway N
Type	Stub (TWY A to Air Guard Apron)
Width	75'
ARC	D-IV
RWY/TWY Centerline Separation	N/A
Pavement Age	1993
Pavement Condition	Excellent
Pavement Strength	N/A
Lighting	Medium Intensity Taxiway Lights (MITL)

AIRFIELD TAXIWAYS CONT'D	
	Taxiway W
Type	Partial Parallel (TWY A to RWY 5)
Width	50'
ARC	B-I
RWY/TWY Centerline Separation	240'
Pavement Age	2005
Pavement Condition	Excellent
Pavement Strength	12,500
Lighting	Medium Intensity Taxiway Lights (MITL)

Source: 2006 AMP

1.2.3 Aircraft Aprons

The aircraft aprons at OQU consist of aircraft parking and movement areas specifically designated for military and civilian aircraft. A total of four (4) aircraft aprons support the airfield. These aprons also include aircraft movement areas, such as taxilanes. Information pertaining to the existing aircraft aprons is summarized in Figure 1-3.

FIGURE 1-3 / AIRFIELD APRONS. *Airfield Apron information.*

AIRFIELD APRONS	
	Civilian Apron - North
Approximate Size	168,000 SF
Associated Facilities	Existing Terminal and Hangar
Transient Parking	136,000 SF
Pavement Type	Portland Cement Concrete
Pavement Age	Varies
Pavement Condition	Excellent to Good
	Civilian Apron - South
Approximate Size	124,000 SF
Associated Facilities	Old Terminal Building
Transient Parking	D-IV
Pavement Type	Portland Cement Concrete
Pavement Age	Not Available
Pavement Condition	Good
	Military Apron- Army Nat'l Guard
Approximate Size	390,000 SF
Associated Facilities	Army National Guard Facilities
Transient Parking	None
Pavement Type	Portland Cement Concrete
Pavement Age	Varies
Pavement Condition	Excellent to Good

AIRFIELD AIRCRAFT APRONS CONT'D	
	Military Apron- Air Nat'l Guard
Approximate Size	800,000 SF
Associated Facilities	Air National Guard Facilities
Transient Parking	None
Pavement Type	Portland Cement Concrete
Pavement Age	Varies
Pavement Condition	Excellent to Good

Airfield Perimeter Road

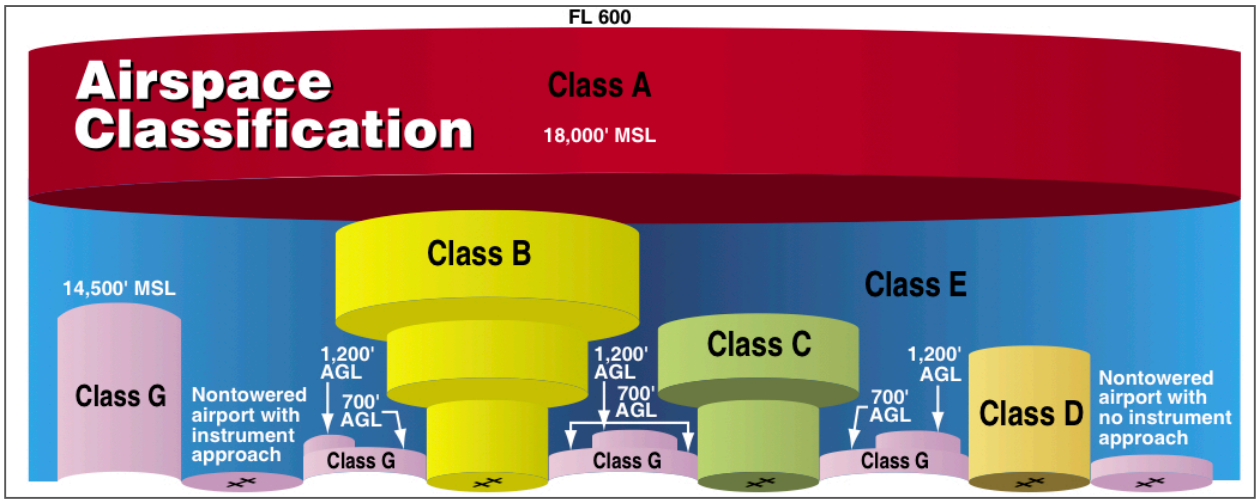
Quonset Airport has no paved airfield perimeter road. It does have some unpaved access drives, mainly leftover from military operations, or for accessing NAVAIDS. The desirable standard is for an airport to have a paved road located on the Airport Operations Area (AOA). It should provide continuous, unimpeded access around the airfield. The perimeter road must also remain clear of all active runways, taxiways and critical areas in accordance with FAA setback requirements.

1.3 AIRSPACE, APPROACHES, AND NAVIGATIONAL AIDS (NAVAIDS)

Airspace Control

Our National Airspace System was developed to provide a safe and efficient operating environment under visual flight rules (VFR) and instrument flight rules (IFR). With good visibility, pilots fly under VFR to determine altitude by utilizing visual cues, and without such cues, pilots fly under IFR and use aircraft instrumentation to determine their altitude. Typically, sport and recreational private pilots fly under VFR, while more complex aircraft and commercial flight activities fly under IFR. Figure 1-4 shows the various classes of airspace as defined by FAA. Classes B, C, and D represent airspace with air traffic control towers whereby Class B surrounds the busiest major airports, Class C surrounds moderately busy airports, and Class D typically surrounds smaller, less busy airports.

FIGURE 1-4 / AIRSPACE. *Airspace Classifications Diagram.*



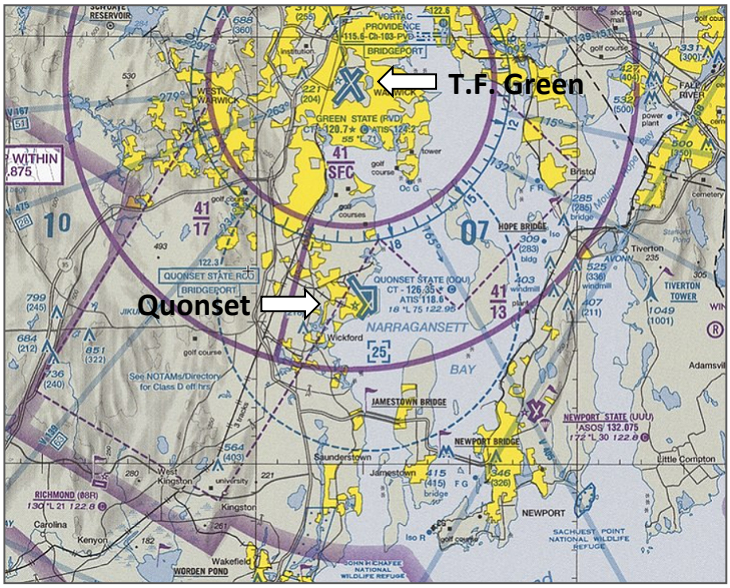
Source: Expertaviator.com

Quonset Airport has an Air Traffic Control Tower (ATCT) managed by the National Guard's 143rd Airlift Wing, and during tower operations is located in Class D airspace. The designated Common Traffic Advisory Frequency (CTAF) for the OQU ATCT is 126.35 MHz. During the hours that the tower is closed, OQU is in Class G airspace up to 1,300 feet above the Airport.

The OQU ATCT manages all instrument arrivals to and departures from the Airport, except during non-tower hours. During those hours, Providence Approach Control (135.4 MHz) manages the instrument operations for OQU. Providence Approach controls air traffic to both PVD and OQU, ensuring adequate separation and safe routings for arrivals and departures. When Providence Approach is not operating, Boston Center (124.85 MHz) assumes control.

During non-tower operating hours, pilots operating at OQU can still utilize the CTAF frequency for voluntary position reporting. This standard procedure is used by pilots to acknowledge their presence to other aircraft and to request specific aircraft services. The cross-section of the navigational chart shown in Figure 1-4 depicts Quonsets proximity to T.F. Green Airport. The dashed blue circle encompasses Quonset's Class D airspace. The magenta circles surrounding T.F. Green depict the limits of T.F. Green's class C airspace.

FIGURE 1-5/NAVIGATIONAL CHART. *Boston Terminal Area Chart*



Source: www.skyvector.com

Standard Flight Procedures

Quonset Airport has standard left-hand traffic patterns for operations on all runways. Traffic pattern altitude is the standard 1,000 feet above the indicated airport elevation, which is 19 feet above Mean Sea Level (MSL). Therefore OQU's traffic pattern altitude is 1,019 feet MSL.

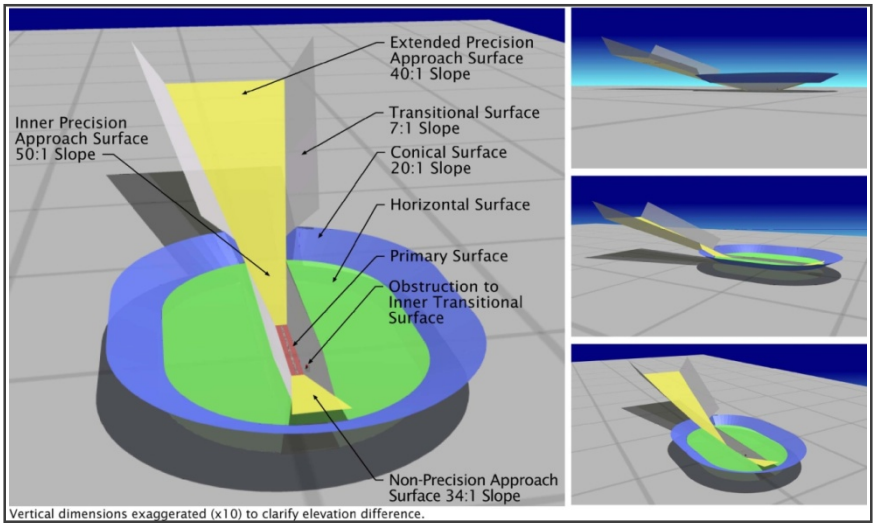
Standard flight procedures are limited to those given by the tower to the operating pilot. Since T.F. Green's Class C airspace (from surface to 4,100' MSL) lies within two nautical miles to the north of OQU, while the OQU tower is closed, smaller general aviation aircraft often modify their standard procedures slightly to avoid penetrating T.F. Green's airspace which requires contacting the T.F. Green tower. T.F. Green's Class C airspace (from surface to 4,100' MSL) lies within two nautical miles to the north of OQU. When the OQU tower is closed, smaller general aviation aircraft can modify their standard procedures slightly to avoid penetrating T.F. Green's airspace. It requires contacting the T.F. Green tower.

In an effort to be "good neighbors", both National Guard units have instituted a policy to adhere to over-water routes for incoming and outgoing traffic, and cessation of flights after 10:00 PM.

FAA Part 77 Airport Imaginary Surfaces

Federal Aviation Regulation (FAR) Part 77, Objects Affecting Navigable Airways is the regulation that protects the airport's airspace. The regulation establishes a requirement for anyone proposing to build a structure near an airport to report their intentions to the FAA. In addition it defines a series of standards used for determining obstructions to an airport's navigable airspace. This is accomplished through the establishment of a set of airport imaginary surfaces, that if penetrated represent an obstruction to air navigation. In some cases they may be classified by the FAA as a "hazard". Airport imaginary surfaces are established with relation to the airport and to each runway. The size of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are also determined by the most precise approach procedure existing or planned for that runway end. A general diagram depicting FAR Part 77 surfaces is shown below in Figure 1-6. Brief descriptions follow.

FIGURE 1-6 / TYPICAL FAA PART 77 IMAGINARY SURFACES.



Source: http://www.san.org

- **Primary Surface.** This surface is longitudinally centered on each runway and extends 200 feet beyond each runway end (if the runway is paved). The elevation of the primary surface of a given runway is the same as that of the nearest point on the runway centerline.

- **Approach Surface.** The approach surface is a trapezoidal-shaped surface that begins at the primary surface of each runway end, upwards and outwards for a prescribed slope and distance based on the type of approach (visual, non-precision, or precision).

- **Transitional Surface.** This surface is a plane with a 7:1 slope (horizontal to vertical) that extends upwards, outwards, and at right angles from the primary and approach surfaces, terminating at the airport horizontal surface.

- **Horizontal Surface.** This is a horizontal plane 150 feet above the established airport elevation. This surface is defined by drawing semi-circles of a given radius from the ends of the primary surfaces. The radius of the circle is determined by the type of approach serving each runway end.

- **Conical Surface.** The conical surface is an enclosed plane that extends upward and outward from the horizontal surface at a 20:1 slope.

Instrument Approach Procedures (IAP's)

There are five instrument approach procedures available at Quonset. Figure 1-7 summarizes these approaches and provides the visibility minimums associated with each approach as well as the slope requirements as determined by FAR Part 77.

FIGURE 1-7 / INSTRUMENT APPROACHES. *NAVAIDS.*

Instrument Approach Procedures					
Runway	Approach	Approach Type	Ceiling Minimums	Visibility Minimums	Approach Slope
16	ILS/Localizer	Precision	268 feet	¾ mile	50:1
16	RNAV (GPS)	Non Precision	320 feet	¾ mile	34:1
34	RNAV (GPS)	Non Precision	520 feet	1 mile	34:1
34	VOR	Non Precision	720 feet	1 mile	34:1
34	VOR-A	Non Precision	600 feet	1 mile	34:1
5	Visual	N/A	N/A	N/A	20:1
23	Visual	N/A	N/A	N/A	20:1

Source: FAA 5010 Data and Existing Published Instrument Approach Plates

Navigational Aids

Airport navigational aids come in many forms, from simple inexpensive windsocks indicating wind direction, to sophisticated ground-based systems that use radio signals that provide precision guidance to an aircraft approaching and landing on a runway. While only the simplest airfields are designed for operations under visual meteorological conditions (VMC) during daylight hours, other more complex airports are equipped for operations in darkness and instrument meteorological conditions (IMC) during reduced visibility and cloud cover. Pilots flying under VMC to the most basic airports use visual cues and reference appropriate maps while more complex airports are fitted with a variety of navigational aids that require routine maintenance and when used in conjunction with aircraft instrumentation, assist pilots in establishing the correct position while approaching an airport. Figure 1-8 identifies the more complex navigational aids at the Airport.

FIGURE 1-8 / NAVIGATIONAL AIDS. *NAVAIDS.*

Airport Navigational Aids			
Runway	Equipment	Owner	Maintenance
16	ILS (Glideslope/Localizer)	Air National Guard	FAA
16	Middle Marker	Air National Guard	FAA
16	MALSR	Air National Guard	FAA
16	PAPI	RIAC	AvPorts
34	PAPI	RIAC	AvPorts
5	REILS	FAA	FAA
5	PAPI	FAA	FAA
23	REILS	FAA	FAA
23	PAPI	FAA	FAA

Source: Airport Records

Instrument Landing System (ILS)

The ILS serving Runway 16 at OQU is comprised of a glideslope antenna, a localizer antenna, a middle marker beacon, and a medium intensity approach lighting system (MALSR). The ILS broadcasts on 109.5 MHz and identifies "IOQU".

GLIDESLOPE ANTENNA. *RUNWAY 16*

LOCALIZER. *RUNWAY 16*

Based on electronic components emitting signals by reference to airborne instruments during instrument approaches, a glideslope antenna provides vertical guidance for aircraft during approach and landing. The antenna is located to the left of Runway 16, approximately 1,100' from its threshold and is owned by the Air National Guard and maintained by the FAA.

A Localizer antenna provides horizontal course guidance to a given runway. Quonset Airport's localizer is located on centerline and 600' before the departure point of Runway 34, and 1,000' before its displaced threshold. It is owned and maintained by the Air National Guard.

A Middle Marker is a marker beacon that defines a point along the glideslope of an ILS, by indicating to the pilot aurally and visually, when the aircraft is passing over the facility. The middle marker for Quonset is owned by the Air National Guard and maintained by the FAA. It is typically located at or near the point of decision height.

Runway 16 is also equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) shown below. It is owned and maintained by the FAA. The associated MALSR equipment building is located northeast of the Runway 16 end, and adjacent to a service road.

RUNWAY 16 - MALSR. *RUNWAY 16*

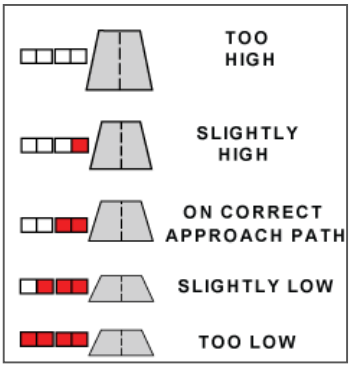
MALSR EQUIPMENT BUILDING.

A MALSR is an Approach Lighting System (ALS) that provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on the approach for landing.

Specifically, a MALSR is a 2,400-foot medium intensity ALS with runway alignment indicator lights (RAIL) and is a system approved for CAT I precision approaches. The MALS (steady burning lamp) portion of the system is 1,400 feet in length. The RAIL (strobe lighting) portion extends outward an additional 1,000 feet. Spacing between light structures is typically 200 feet.

Precision Approach Path Indicator (PAPI)

PAPI is a visual aid that assists pilots landing aircraft. PAPI enables a pilot making an approach to a runway to acquire and maintain the correct glide path from the time that the PAPI system becomes visible until the aircraft has crossed the runway threshold. PAPI systems utilize a set of two color high intensity light projectors. The upper half of the light beam from each projector is white and the lower half red. The transition between the two colors occurs over a small angle. Each runway at Quonset is serviced by a Precision Approach Path Indicator (PAPI). The PAPIs on Runway 16-34 were installed in 1999 during runway reconstruction and are owned by RIAC and maintained by AvPorts. The PAPIs on Runway 5-23 are owned and maintained by the FAA.



FOUR UNIT PAPI SYSTEM

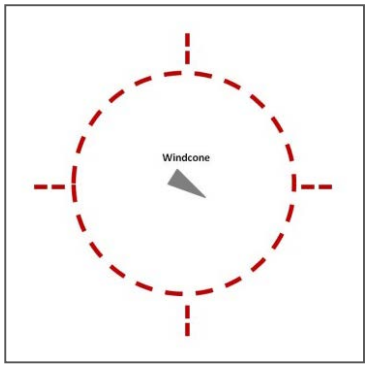
PAPI. *RUNWAY 16*

Rotating Beacon

The Airport has a rotating beacon on the tower roof. The beacon displays, from dusk to dawn, alternate white and green flashes, indicating a lighted civilian airport.

Segmented Circle

The Airport has a segmented circle and a lighted wind cone, located east of Runway 16-34, near the intersection with Runway 5-23. The segmented circle is a basic visual indicator system designed to show the direction of the runways and is equipped with a windcone designed to indicate wind direction and relative wind speed to assist pilots in determining the most appropriate direction for landing.



SEGMENTED CIRCLE.

SEGMENTED CIRCLE. *EAST OF RWY 16 AT OQU*

Runway and Taxiway Lighting

Airports use standardized lighting to provide identification to air and ground crews to assist in differentiating airport runways and taxiways at night. Blue lights run alongside taxiways while runways have white lights marking their edges.

As mentioned, Runway 16-34 has High Intensity Runway Lights (HIRLs), Runway 5-23 has Medium Intensity Runway Lights (MIRLs), and the taxiway system has Medium Intensity Taxiway Lights (MITLs).

Pavement Markings

Accurate and visible airport pavement markings improve airport safety by providing situational awareness and are used on runways, taxiways, aprons, and service roads to define operational areas and their functions. The FAA has established various standards and schemes for surface markings used on airfield pavements according to the type of runway and taxiway design. Runway markings are in white, while taxiway markings are in yellow. A complete discussion of pavement markings is provided in FAA AC 150/53401K, Standards for Airport Markings.

FIGURE 1-9 / AIRFIELD MARKINGS. *Airfield Pavement Markings.*

Airfield Pavement Markings	
Runway	Marking Type
16	Precision Instrument
34	Non-Precision Instrument
5/23	Basic

1.4 AIRPORT BUILDINGS

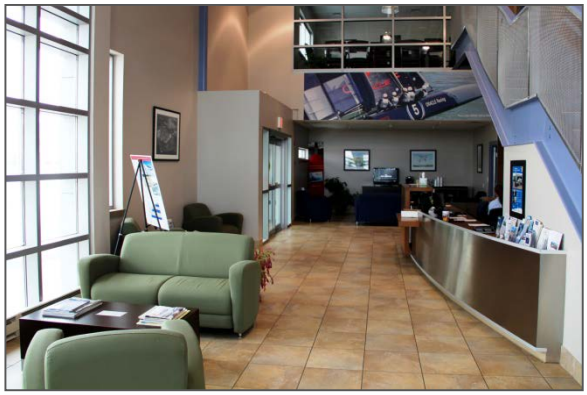
Facilities at an airport typically include the following:

- Terminal Building
- Various Hangars
- Fuel Storage Facilities
- Snow Removal Equipment (SRE) Facilities
- Ground Support Equipment (GSE) Facilities
- Airfield Maintenance Facilities
- Aircraft Rescue and Fire Fighting Facilities (ARFF)
- Tenant Facilities
- Air Traffic Control Tower
- Miscellaneous Buildings
- Automobile Parking

Terminal Building

A 6,000 square-foot terminal building was constructed in 2009. The new terminal consists of a passenger lobby, service counter, pilot lounge, flight kitchen, and office space. Attached to the terminal is a 20,000 square-foot hangar capable of accommodating large corporate jets.

AIRPORT TERMINAL BUILDING. *EXTERIOR.*



AIRPORT TERMINAL BUILDING. *INTERIOR.*

Old Terminal Building

The old terminal building is four-story concrete structure built as part of the original Naval Air Station. The upper two floors are a tower extending above the main building. This tower also contains the old Air Traffic Control Tower (ATCT) cab. The tower is integrated into the structural frame of the building and cannot be separated. In addition to the ATCT, the terminal used to house the airfield electrical vault that has recently been relocated.

The location of the old terminal is ideal for aeronautical use and is well suited for corporate aviation development. It is anticipated that once RIAC receives interest for private development on this site, the old terminal building will be removed for new development.

OLD TERMINAL BUILDING. *LANDSIDE EXTERIOR.*

T Hangars

T-Hangars are located on the aircraft ramp south of the terminal. There are ten units of varying type and design providing a total of approximately 16,000 square feet of coverage. All structures are privately owned with an associated ground lease to RIAC on a short-term basis.

GA TIE DOWNS AND TEMPORARY T HANGAR AREA

TEMPORARY T HANGAR AREA

Quonset Air Museum

The Quonset Air Museum is a non-profit organization that operates out of a hangar located on the southwest portion of the airfield along Eccleston Avenue west of the Runway 5 end. The Quonset Air Museum Hangar is a one-story, steel-framed, curtain-wall, 45,000 square foot structure with a large central bay. A 30-year lease was signed with the State of Rhode Island and RIAC on September 10, 1992.

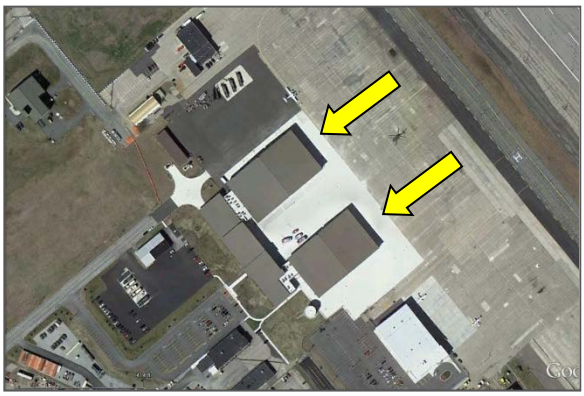
QUONSET AIR MUSEUM. *AIRSIDE*

QUONSET AIR MUSEUM. *LANDSIDE*

Army National Guard

The Army National Guard operates out of two 40,000 square foot hangars adjacent to the midfield of Runway 16/34 on the eastern portion of the airfield, next to the new terminal building.

RHODE ISLAND ARMY NATIONAL GUARD. *AIRSIDE*



RHODE ISLAND ARMY NATIONAL GUARD. *AERIAL VIEW*

Air National Guard

The Air National Guard (ANG) facilities make up a large portion of the northeast area of the airfield. The ANG operates out of a 16,500 and 55,000 square foot and hangar facility on the eastern portion of the airfield, located next to the Aircraft Rescue and Fire Fighting facility. These hangars are supported by a building with airside access that consists of approximately 20,000 square feet of office space.

RHODE ISLAND AIR NATIONAL GUARD. *AIRSIDE*

RHODE ISLAND AIR NATIONAL GUARD. *AIRSIDE*

RHODE ISLAND AIR NATIONAL GUARD. *LAND/AIRSIDE*

Fuel Farm

The Civil Aviation Fuel Farm is operated by AvPorts and is located east of the old terminal building on the apron. It is comprised of one aboveground 12,000-gallon Avgas tank, and one 12,000-gallon Jet-A tank. AvPorts utilizes one fuel truck for delivery of each fuel type.

CIVILIAN FUEL FARM. *AIRSIDE*

CIVILIAN FUEL FARM. *AERIAL VIEW*

Snow Removal Equipment (SRE), Ground Support Equipment (GSE), Airfield Maintenance

The only facility for SRE, GSE and Airfield Maintenance use are the two maintenance bays located on the north end of the old terminal building. (These were originally designed for use by ARFF equipment for the NAS.) There are no storage facilities for any of this equipment, which is now typically parked outside and airside southwest of the new Air Traffic Control Tower.

EXISTING MAINTENANCE/SRE BUILDING. *AIRSIDE*

OUTDOOR SRE STORAGE. *AIRSIDE*

The following page includes a listing of the SRE and GSE equipment inventory at the Airport:

FIGURE 1-10 / AIRPORT VEHICLES AND EQUIPMENT. *SRE and GSE.*

AIRPORT VEHICLES/SRE EQUIPMENT		
Year	Make	Type
2000	Ford	4x4 SUV
2001	Chevrolet	4x4 Pick-Up W/Plow
2003	EZ-Dump	Trailer
2001	Ford	4x4 Pick-Up 6x Plow
1996	Ford	4x4 Sander
1986	Oshkosh	Blower
1985	International	16' Broom
1986	Mack	Dump Truck
2000	Ster/Elgin	Sweeper
1979	Mack	Dump Truck
1999	Ford	4x4 Pick-Up W/Plow
1989	Sicard	Blower
2007	Ford	4x4 Service Truck
1985	Mack	Dump Truck
2005	Challenger	Tractor
1999	Batts	De-Ice Trailer
2005	Holder	Tractor
1999	Ford	Crew Cab
2005	Crafco	Tar Kettle
2007	Bri-mar	Utility trailer
2006	Towmaster	Trailer
2006	Hot shot	Deicer
AIRPORT GSE EQUIPMENT		
2008	TB125	Tow Bar(Multi head)
2009	34R UNIVER	Tow Bar(Scissor)
2008	BEC2	King Air
2008	CL1R	Challenger 600
2008	CL3R	Challenger 300
2008	CNA3	Cit I-III / Lear
2008	CNA4	Cit V / Sovereign
2008	FAL2	Falcon 50/900/2000
2008	CGE	Global X
2008	G100	Gulfstream G100/150
2008	G200	Gulfstream G200
2008	G5	Gulfstream G2-5
2008	BEC5	BeechJet/Premier
2008	HS1	Hawker
2008	P180	Piaggio 180
2008	Reducer	Reducer/adapter
2009	TWA-10	Tail Wheel Adapter
2009	T-N 182	Cessna wheel pant
2009	T-349A	Cirrus

Source: Airport Records

Aircraft Rescue & Fire Fighting (ARFF)

ARFF services for Quonset Airport are provided by the Rhode Island Air National Guard. The ARFF facility is centrally located on the western side of the airfield, between the Army National Guard and the Air National Guard.

AIRCRAFT RESCUE AND FIREFIGHTING BUILDING. *AIRSIDE*

ARFF LOCATION. *AERIAL VIEW*

Air Traffic Control Tower (ATCT)

Air Traffic Control (ATC) services are provided at Quonset in a new control tower that was constructed in 2012. Located west of the southernmost General Aviation apron, the tower operates Tuesday-Friday, 0800-2300; Saturday 0900-1700; Sunday 1000-1800, and is closed on Mondays & Holidays.

The Rhode Island Air National Guard currently leases the tower location from RIAC and funds the ATC services on a contract basis in order to support their specific mission requirements.

AIR TRAFFIC CONTROL TOWER

AIR TRAFFIC CONTROL TOWER. *AERIAL VIEW.*

Miscellaneous Buildings

The Quonset Development Corporation (QDC) Wastewater Treatment Facility is located on Zarbo Avenue and provides sanitary services for the entire Quonset Davisville development area. The facility is located on Airport property and is operated by QDC.

Automobile Parking

Automobile parking for General Aviation demands is accommodated by a 65,000 square foot parking lot (approximate) adjacent to the Terminal Building. This parking lot can accommodate approximately 150 vehicles. Access is gained to the lot from Airport Street.

General Aviation Terminal Area Access

The Quonset Airport General Aviation terminal area is accessed through a driveway from Airport Street, which connects to Eccleston Avenue and then to Roger Williams Way. This is a four-lane roadway that connects to Route 403 (a limited access four land highway) and Route 1 (Post Road).

Airport Security

Quonset Airport currently has a security fence that encompasses the entire airfield up to the seawall overlooking Narragansett Bay. The General Aviation terminal area has a keyed power gate for vehicular access to the GA apron.

In support of their mission requirements, manned security services for the entire airport are provided by the Rhode Island Air National Guard.

Air National Guard and Army National Guard

The landside facilities for the Rhode Island Air National Guard are generally similar to those of the civilian landside facilities. Both National Guard units located on Quonset Airport are active segments of their respective branches of the United States military and as such, descriptions beyond a general overview cannot be provided.

The Rhode Island ANG unit leases approximately 76 acres from RIAC on Quonset Airport. The Air Guard sub-lets approximately 17 acres of that total to the Rhode Island Army National Guard for its facilities. The Air Guard has also leased an additional 24 acres from the Rhode Island Economic Development Corporation. This area abuts the Air Guards existing facility and encompasses the open area bounded by Conway Avenue, Airport Street, Belver Avenue and Cripe Street.

1.5 AIRPORT TENANTS

A complete listing of the current tenants (on airport owned land) at Quonset Airport include:

- **Advanced Driving & Security, Inc. (ADSI).** ADSI is an internationally recognized advanced driving school, specialized in training Security Drivers, Executive Protection Teams and hosting many Corporate Fleet Safety programs. They currently utilize the unused pavement on the east side of the airfield, along Narragansett Bay.

- **Applied Radar, Inc.** Applied Radar, Inc is a high-tech research and development company of microwave and RF sensing, communicating and navigating systems for various commercial applications and military customers. They currently occupy offices on the second story of the general aviation terminal building.

- **Air Traffic Control Tower.** The ATCT is a contract tower financed by the Rhode Island Air National Guard.

- **Quonset Air Museum.** The Museum is operated by the Rhode Island Aviation Heritage Association, a sub-committee of the Rhode Island Heritage Commission. RIAHA operates the Quonset Air Museum which is non-profit, Tax-exempt Corporation dedicated to the restoration and preservation of vintage, classic, and special interest aircraft and aviation history. It leases the museum hangar structure for a nominal annual fee.

- **Rhode Island Air National Guard.** As detailed previously, the Air Guard leases approximately 76 acres of the airport, of which approximately 17 is sub-let to the Rhode Island Army National Guard.

1.6 FLEET MIX, HISTORICAL OPERATIONS, BASED AIRCRAFT, AND FUEL VOLUME

This section provides an overview of historical operational data. In the forecast effort for this master plan, the information will be used to re-evaluate the forecast effort completed in the 2006 airport master plan. The 2006 forecasting effort utilized aviation activity and trends which were occurring prior to 2005 and given the economic climate in those prior years it is anticipated this current forecasting process will change the aviation projections.

1.6.1 Airport Operations

The FAA distinguishes airport operations between local operations and itinerant operations.

Local Operations are generally operations occurring within sight of the airport or 20 nautical miles; these are typically training operations and are subdivided into two classes:

- Civil: All operations other than military operations.
- Military: All operations performed by the military.

Itinerant Operations are all aircraft operations other than local operations and are subdivided into three classes:

- Air Taxi: Scheduled and non-scheduled passenger service.
- General Aviation: Includes aircraft used for personal, recreational, or business use.
- Military: All operations performed by the military.

AvPorts has provided the historical operational data shown in Figure 1-9.

FIGURE 1-11 / HISTORICAL AIRPORT OPERATIONS.

Historical Airport Operations					
Year	Air Taxi	GA Local	GA Itinerant	Military	Total
2001	n/a	7,927	n/a	6,992	14,919
2002	378	6,769	4,046	7,048	18,241
2003	497	1,227	11,240	8,364	21,328
2004	521	6,387	8,874	4,846	20,628
2005	726	12,222	2,399	3,687	19,034
2006	818	11,387	3,792	6,727	22,724
2007	694	14,836	4,449	9,208	29,187
2008	529	14,694	4,640	7,358	27,221
2009	470	18,074	4,053	8,586	31,183
2010	572	18,909	4,453	8,738	32,672
2011	665	12,464	3,993	6,587	23,709

Source: Airport Records

FIGURE 1-12 / AIRPORT OPERATIONS BREAKDOWN.

Historical Airport Operations Breakdown (including Air Taxi & Military Ops)									
Year	Air Taxi	% of Total	GA Local	% of Total	GA Itinerant	% of Total	Military	% of Total	Total
2001	n/a	0%	7,927	53%	n/a	0%	6,992	47%	14,919
2002	378	2%	6,769	37%	4,046	22%	7,048	39%	18,241
2003	497	2%	1,227	6%	11,240	53%	8,364	39%	21,328
2004	521	3%	6,387	31%	8,874	43%	4,846	23%	20,628
2005	726	4%	12,222	64%	2,399	13%	3,687	19%	19,034
2006	818	4%	11,387	50%	3,792	17%	6,727	30%	22,724
2007	694	2%	14,836	51%	4,449	15%	9,208	32%	29,187
2008	529	2%	14,694	54%	4,640	17%	7,358	27%	27,221
2009	470	2%	18,074	58%	4,053	13%	8,586	27%	31,183
2010	572	2%	18,909	58%	4,453	14%	8,738	26%	32,672
2011	665	3%	12,464	53%	3,993	17%	6,587	27%	23,709

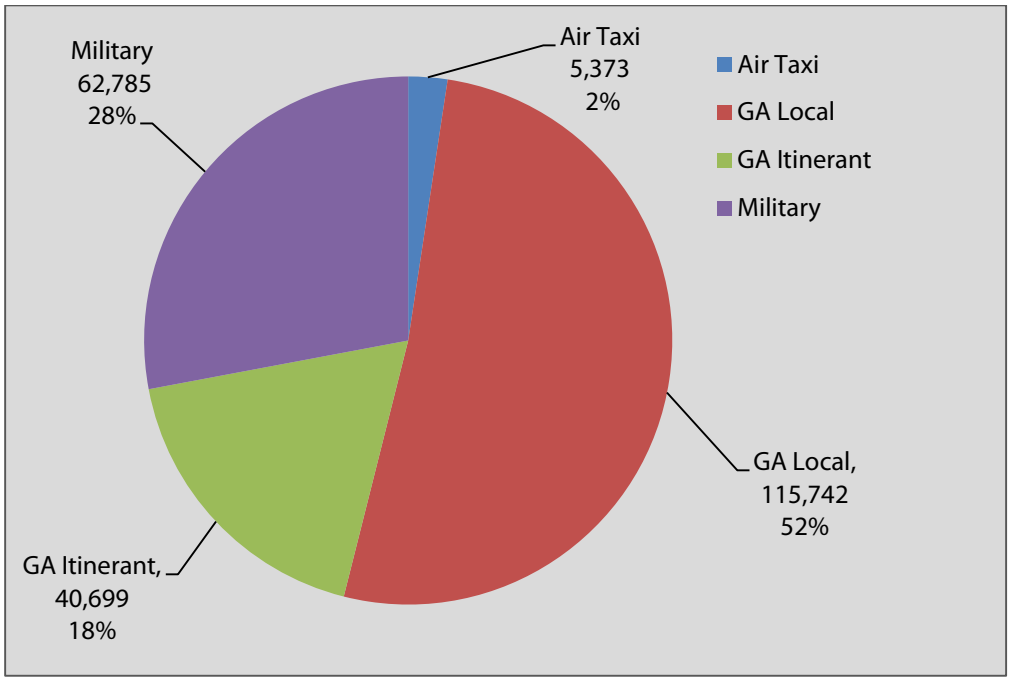
Source: Consultant Calculations

FIGURE 1-13 / GA LOCAL AND GA ITINERANT AIRPORT OPERATIONS BREAKDOWN.

Historical Airport Operations Breakdown (Minus Air Taxi & Military Ops)					
Year	GA Local	% of Total	GA Itinerant	% of Total	Total
2001	7,927	100%	n/a	0%	7,927*
2002	6,769	63%	4,046	37%	10,815
2003	1,227	10%	11,240	90%	12,467
2004	6,387	42%	8,874	58%	15,261
2005	12,222	84%	2,399	16%	14,621
2006	11,387	75%	3,792	25%	15,179
2007	14,836	77%	4,449	23%	19,285
2008	14,694	76%	4,640	24%	19,334
2009	18,074	82%	4,053	18%	22,127
2010	18,909	81%	4,453	19%	23,362
2011	12,464	76%	3,993	24%	16,457

Source: Consultant Calculations

FIGURE 1-14 / TEN YEAR PERCENTAGE OF HISTORICAL OPERATIONS.



Source: Consultant Calculations

1.6.2 Based Aircraft

Based aircraft are defined as non-transient aircraft that either hangar or tie down at the Airport and represent a critical factor in planning for future facility needs. The number of based aircraft correlates to operational demands they place on airport facilities such as runways, taxiways, lighting and navigational/visual aids. The number of based aircraft directly impact adequacy of ground facilities, such as hangar storage, fueling facilities, and aircraft service and repair needs.

Based aircraft data for Quonset was collected from airport records for the years 2001, 2002, 2003 and 2011 and supplemented with FAA Terminal Area Forecast data that does not show a breakdown of aircraft type, or include military aircraft. The Terminal Area Forecast (TAF) system is the official forecast of aviation activity at FAA facilities. These forecasts are prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public. Figure 1-13 identifies the based aircraft for each aircraft category since 2001. The current fleet mix of OQU based aircraft includes: 22 single-engine; 2 multi-engine piston aircraft, one jet and 19 military aircraft.

FIGURE 1-15 / HISTORICAL BASED AIRCRAFT.

Historical Based Aircraft					
Year	Single Engine	Multi-Engine	Jet	Military	Total
2001	17	2	-	20	39
2002	22	2	-	25	49
2003	22	2	2	25	51
2004	N/A	N/A	N/A	N/A	46*
2005	N/A	N/A	N/A	N/A	46*
2006	N/A	N/A	N/A	N/A	44*
2007	N/A	N/A	N/A	N/A	48*
2008	N/A	N/A	N/A	N/A	37*
2009	N/A	N/A	N/A	N/A	37*
2010	N/A	N/A	N/A	N/A	20*
2011	N/A	N/A	N/A	N/A	20*
2012	22	5	1	19	47

*Source: Airport Records, FAA TAF Data**

Fuel Volume

Figure 1-14 shows the historical fuel volume the Airport has sold from 2007-2012.

FIGURE 1-16 / HISTORICAL AIRPORT FUEL VOLUME.

Historical Fuel Volume (Gallons)					
Year	AVGAS	% of Total	Jet A	% of Total	Total
2007	24,498	4.8%%	482,696	95.2%	507,194
2008	30,126	6.5%	483,862	93.5%	513,988
2009	29,280	7.4%	365,612	91.6%	394,892
2010	31,496	6.2%	471,664	93.8%	503,160
2011	32,984	6.5%	478,618	93.5%	511,602
2012	31,496	5.6%	534,675	94.4%	566,171

Source: Airport Records

1.7 AIRPORT UTILITIES

Electric Service

Electricity is provided by National Grid to the Airport from a system of power lines located southwest of the Airport running overhead along Roger Williams Way. The lines branch off at Belver Avenue and continue down Airport Street, providing approximately 12 KV of power. The lines are fed underground to a pad mounted transformer located adjacent to the terminal building parking area.

Water Service

The Quonset Business Park receives its water supply from the Rhode Island Economic Development Corporation through a system of three wells fed by the Hunt River Aquifer in the southern section of Warwick. Quonset Airport connects to the Quonset water system located along Post Road.

Constructed in the 1940's, the Post Road system supplies an existing 20" water main located north of the airport along Newcomb Road. A 16" main branches off of the Newcomb Road main and eventually connects with the National Guard property along Cripe Street. The 16" main runs along the National Guard hangars until it reaches the main terminal building of Quonset Airport. The 16" main loops down Eccleston Avenue and around Roger Williams Way, and Dillabur Avenue. A separate 6" cast iron pipe, branching off the 16" main, crosses T/W "W" and RW 5-23 inside a utility tunnel and continues down Zarbo Avenue until it meets the 16" main. Pressure in the system averages about 65 PSI. The airport's service is provided by a 6" PVC pipe that is located along the northern perimeter of the terminal parking area until it connects directly into the terminal building.

Storm Drainage

The surfaces of the paved parking and apron areas immediately surrounding the terminal building are crowned along an axis dividing the terminal building at the front entrance from front to back. Storm water from the paved terminal parking area on the south side of the terminal enters a closed drainage system located along the access road into the Airport.

The closed drainage system was constructed in the 1940's, and consists of five catch basins connected longitudinally and laterally with 10" and 12" vitrified clay pipes. The storm water flow converges at a catch basin located on the east side of the generator hut and flows within a 12" vitrified clay pipe south to a manhole located adjacent to T/W 'A'. A 12" pipe then crosses TW 'A' and RW 5-23 and connects with a concrete pipe system located between RW 5-23 and TW 'A'. The pipe depths are between 3' and 4' due to the proximity to the bay.

Storm water converges with the runway drainage system and eventually flows west in a 24" concrete pipe. Storm water from the northern portions of the terminal parking area enters a 48"concrete pipe trunk line located along Airport Street west of the terminal. Storm water from Airport Street, TW 'A', and the terminal area combine at a catch basin located adjacent to RW 5-23. The combined flow enters a 54" trunk line that flows into Narragansett Bay opposite the sewerage treatment plant. At its outlet, the 54" trunk line carries approximately 40,000 GPM of storm water at a slope of 0.192%.

Sanitary Service

The airport maintains a direct connection to the municipal sewer system feeding the Rhode Island Economic Development Corporation Wastewater Treatment Facility. The treatment facility is located on Zarbo Avenue, south of the airfield and currently on airport property. The airport's sewerage system was constructed in the 1940's as part of the terminal building construction.

The terminal building connects to the system through 6" vitrified clay pipes exiting the building on the west side. The 6" pipes connect, through a series of manholes, with a 15" vitrified clay main located on Airport Street. The sewerage flows south on Airport Street to a manhole located on the corner of Eccleston Street and Airport Street. It then enters

an 18" vitrified clay pipe that crosses TW 'A' and RW 5-23. The 18" pipe parallels the 54" storm drain located beneath RW 5-23. The sewerage then discharges directly into the sewerage treatment plant.

Telephone Service

Telephone Services are provided by Verizon, Inc. to Quonset Airport through a system of overhead lines located along Airport Street. These cables connect underground into telephone manholes located along the southwestern perimeter of the old terminal building parking lot.

Gas Service

Gas service is provided by National Grid and available in the airport vicinity. Presently, National Grid has installed gas mains along Airport Street from Belver Street to a point approximately 100' from the access road into the terminal parking area. National Grid also services all of the National Guard buildings.

Fire Protection

The Quonset Airport terminal building is connected to an existing 10" transite fire main located along the south side of Airport Street. The terminal connects with a 6" transite service connection to a fire hydrant located adjacent to the terminal parking area. The fire alarm system transmits directly to the North Kingstown Fire Department via overhead pole to pole connections along Airport Street.

Fiber Optic

Cox Communications has installed fiber coaxial cables in Kiefer Park and the majority of the Quonset Business Park. Plans are available at the construction services office of RIEDC. These cables now provide data, digital video, high-speed Internet connections and digital phone to customers within the Business Park.

SUMMARY

This chapter was intended to provide concise factual data and observations of existing airfield and facility conditions. To avoid excessive redundancy, the following chapters contain additional existing conditions data specific to their particular task. For example, land-use, zoning, and climatic data is presented in the Environmental Inventory, while existing airport design characteristics are presented within the Facility Requirements section of the report that discusses the needs of the Airport relative to forecasted demand. A more detailed and comprehensive historical account of the Quonset Airport can be found in the inventory chapter of the 2006 Airport Master Plan prepared by Edwards & Kelcey.

DECEMBER 2014

Rhode Island Airport Corporation

CHAPTER 2

QUONSET STATE AIRPORT MASTER PLAN UPDATE

ENVIRONMENTAL INVENTORY

THE Louis Berger Group, INC.

2.0 ENVIRONMENTAL INVENTORY

INTRODUCTION

This chapter provides an inventory of environmental conditions at Quonset State Airport. It is a compilation of pertinent environmental data relative to the Airport, including physical setting, water resources, ecology, air quality, hazardous materials, and historical and cultural resources.

The environmental inventory is based on a review of available information. This information includes Airport, Federal, State, and municipal records; a review of previous studies such as Master Plan reports and Environmental Assessments; as well as a site inspection and interviews with officials familiar with airport operations. The previous Airport Master Plan (AMP) was prepared in 2006 by Edwards & Kelcey, Inc. Environmental baseline information in that AMP came from various sources including the 1990 Installation Restoration Program Preliminary Assessment for the adjacent Rhode Island Air National Guard (RIANG) facility. Additional recent master planning documents have been prepared for the adjacent Quonset Business Park (QBP) (Maguire Group, 2008) and relevant environmental information from those documents has also been incorporated into this AMP Update.

2.1 GENERAL SETTING AND CLIMATE

Quonset State Airport is located on Quonset Point in the Town of North Kingstown in the south-central portion of the State of Rhode Island, and is surrounded by Narragansett Bay to the south, east and, in part, to the north. The Airport occupies approximately 500 acres on a larger, state-owned 3,000-acre complex. Figure 2.1 identifies the location of Quonset Airport.

The climate within the region is the moist temperate type. Warm ocean currents and accompanying sea winds adjacent to Rhode Island generate a more moderate climate than that of other New England states. There is a complete weather record maintained at T.F. Green Airport in Warwick, Rhode Island. Mean annual temperature in the area can range from 28.7°F in January to 73.3°F in July. The mean annual precipitation in Rhode Island averages 42 to 46 inches. Monthly precipitation levels are typically uniform and range between 2.5 to 4 inches per month. Average annual snowfall along the western shore of Narragansett Bay range from 25 to 30 inches per year (National Climate Data Center, 2012).

Wind direction and speed are represented on a wind rose graphic on the Airport Layout Plan. An analysis of Quonset Airport's all-weather wind rose shows the following information on wind speed:

- less than 10 knots: 67.6 percent of the time
- less than 13 knots: 74.7 percent of the time
- less than 15 knots: 88.0 percent of the time

2.2 ZONING AND LAND USE

The Quonset State Airport was once the site of the Quonset Naval Air Station (NAS), which closed in 1972. Prior to its use as a naval base, the area was utilized as open space, farming, and for residential uses. Quonset State Airport is surrounded by Narragansett Bay and the adjacent QBP. The 2,000-acre QBP was formerly known as the Quonset Davisville Port and Commerce Park and is operated by the Rhode Island Economic Development Corporation (RIEDC). The QBP includes approximately 147 companies with 6,900 employees (Town of North Kingstown, 2008).

Quonset Airport is zoned by the Town of North Kingstown as PL (Public Lands). The airport is located within Plats 187,188, 189, 191, 192 and parts of 183 and 186. Zoning to the west is generally industrial and to the north includes land zoned as Rural Residential, Village Residential, Neighborhood Residential, and Waterfront Industrial. Land use proximate to Quonset Airport is shown on Figure 2.2.

Several references to Quonset Airport are included in the 2008 North Kingstown Comprehensive Plan. The Natural and Cultural Resources Element of that Plan indicates that the Town should maintain a peaceful noise environment by adopting noise ordinances for Quonset Airport. In addition to noise, the North Kingstown Comprehensive Plan is specific regarding development actions related to the Airport. These Comprehensive Plan Actions, Goals and Objectives are summarized as follows:

- Action CS.17.4.6 Coordinate the Town's emergency planning with the Rhode Island Airport Corporation (RIAC) to ensure continued operation and reduce the cost of disaster clean up at Quonset State Airport.

- Goal ED.3 work with the Quonset Davisville Corporation (QDC), RIAC and the Rhode Island Department of Transportation to maximize the benefits to North Kingstown from the redevelopment of the QBP in a manner that is compatible with nearby uses, complies with environmental regulations and enhances quality of life, while meeting the needs and vision of the community for economic development.

- Action LU.1.6.3 Develop an Airport Overlay Zone around the Quonset State Airport consistent with Rhode Island General Laws, Section 1-3:
    - to preserve the airport as a local and regional resource;
    - for the landing and taking off of aircraft;
    - to be utilized in the interest of the public; and
    - to protect against noise and light impacts, as well as land use conflicts with surrounding properties.

- Action LU.1.6.4 Coordinate the development of any multi-family or townhouse units with RIAC for consistency with the Airport Overlay Zoning in the Airport Overlay Zone.

- Goal QBP.12 Protect North Kingstown from the Impacts of the Quonset State Airport.

- Objective QBP.12.1 Work with the RIAC to address common issues.

- Action QBP.12.1.1 Develop a memorandum of understanding between RIAC and the Town that includes the following issues:

    - Appropriate regulations for industrial and airport uses;
    - Assessment of mitigation measures related to the activities at the Airport, including restrictions on nighttime flights to the extent allowable by federal law;
    - Proposals for the expanded use of the Airport for charter flights, aircraft repair and manufacturing, and express delivery services imposing operating restrictions on critical variables such as time of day for flights, number of daily flights and noise impacts;
    - Developing a review process with RIAC for proposals within the flight zone;
    - Maintenance of the seawall to minimize sediment flow to the Bay; and
    - Development of zoning restrictions to regulate structure heights within the approach and departure areas for both runways.

- Objective QBP.12.1 Limit the Quonset Airport to both military and general aviation needs including national defense and disaster relief.

- Goal QBP.12.2 Encourage appropriately scaled enhancements at the Quonset State Airport in order to better serve the businesses at QBP.

- Action QBP.12.2.1 Support redevelopment of landside facilities in accordance with RIAC's Quonset State Airport Master Plan.

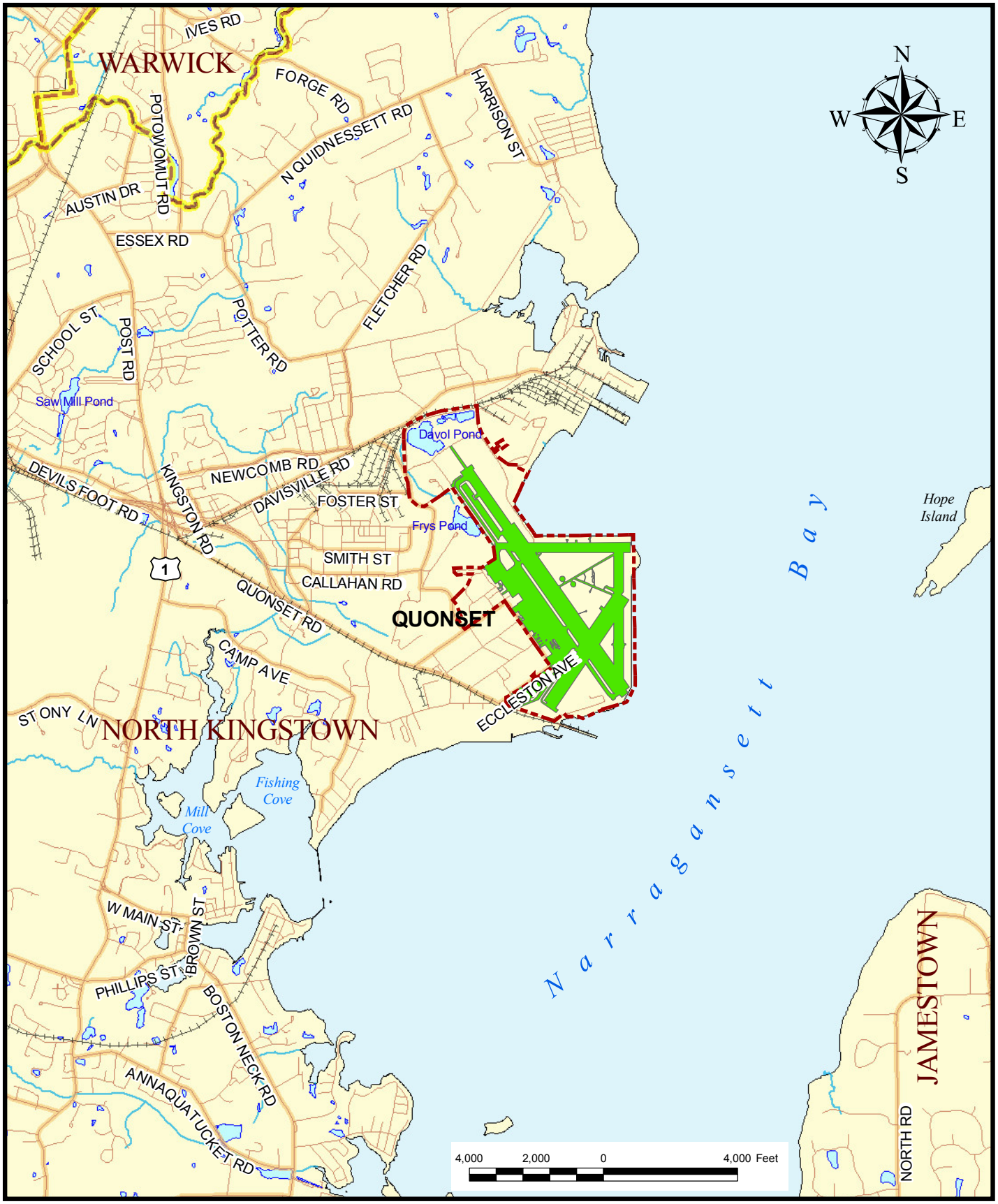
- Action QBP.12.2.2 Participate with RIAC in the review of proposed long term development options of shoreline parcels north and east of the airfield to assure that use is consistent with the Town Comprehensive Plan.

- Action QP.12.2.3 Require mitigation measures related to the activities at Quonset Airport, including restrictions on nighttime flights.

- Action QP.12.2.4 Assess proposals for the expanded use of the Airport for charter flights, aircraft repair and manufacturing, and express delivery services imposing operating restrictions on critical variables such as time of day for flights, number of daily flights, and noise impacts.

- Objective QBP.12.3 Encourage appropriately scaled enhancements at the Quonset Airport in order to better serve the businesses at Quonset Point/Davisville.

The RIEDC has developed a Master Plan for active revitalization of the former military base that includes Quonset Airport within the QBP. Quonset Airport continues to serve some military and general aviation needs and support uses at the park.



QUONSET STATE AIRPORT MASTER PLAN

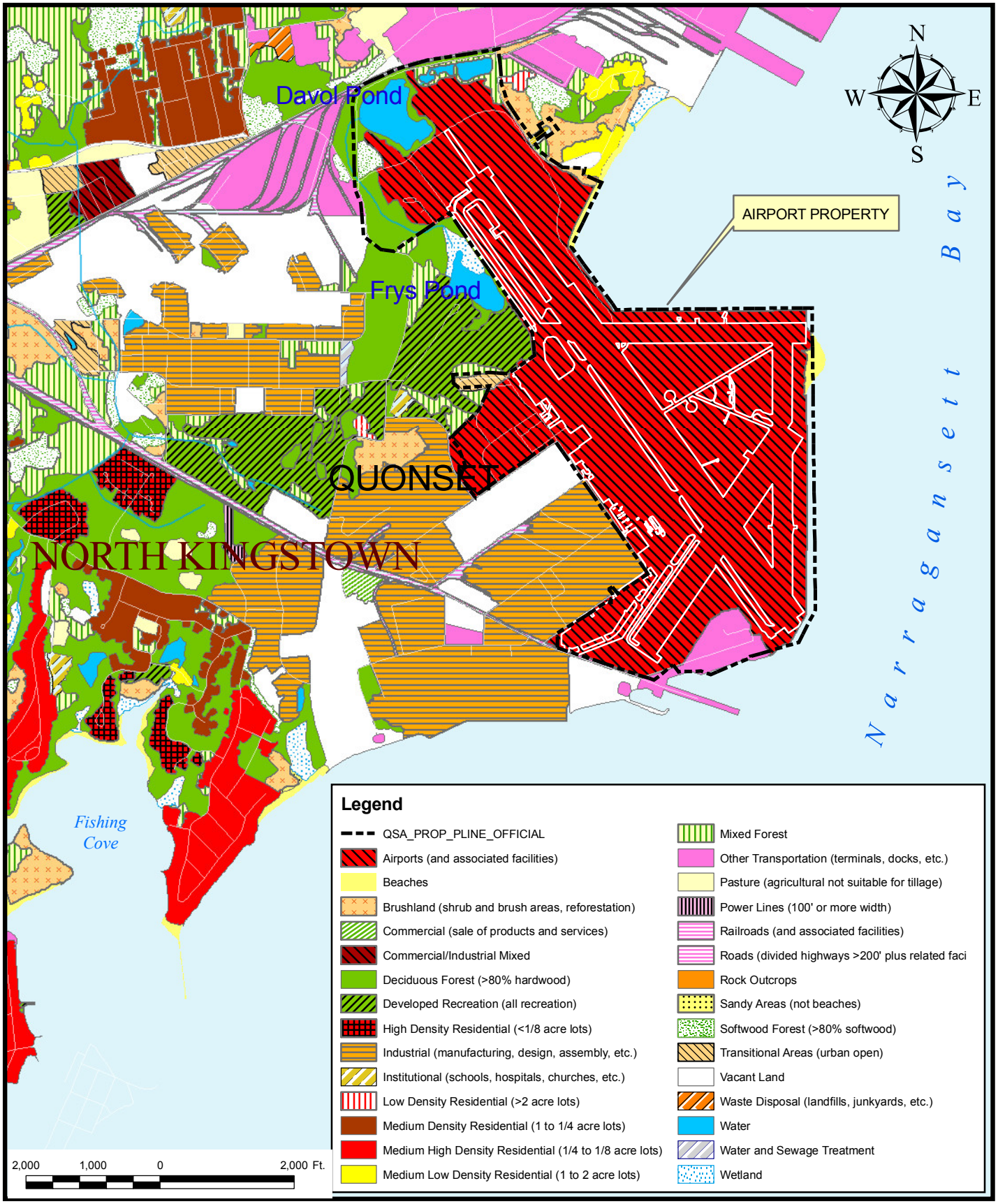
The Louis Berger Group, Inc.

Figure 2.1: AIRPORT LOCATION MAP

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_LOCUS.mxd



QUONSET STATE AIRPORT MASTER PLAN

The Louis Berger Group, Inc.

Figure 2.2: LAND USE MAP

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_LANDUSE.mxd

2.3 TOPOGRAPHY AND GEOLOGY

Quonset Airport is located within the Narragansett Basin of the Seaboard Lowland Physiographic Provence, which is narrow strip of rolling land that borders the coasts of Connecticut, Rhode Island, and Massachusetts. The Seaboard Lowland Provence in Rhode Island extends northeastward along the coast from Narragansett Bay to Massachusetts. This area resulted from the erosion and submergence of the underlying sedimentary rocks and the subsequent formation of Narragansett Bay. On the land west of Narragansett Bay, the Seaboard Lowland Provence consists of a narrow strip, which is bordered on the west by the granitic upland of western Rhode Island (USGS, 1953).

The topography in the area of the Airport is shown on the Wickford Quadrangle (U.S. Geological Survey (USGS), 2012). The elevation of Quonset Airport in the vicinity of the terminal building is about 18 feet above mean sea level. The topography of the Airport is relatively flat, on ground adjacent to Narragansett Bay. The amount of elevation change across the Airport is no more than 30 feet. The topography of this area resulted from the erosion and submergence of the underlying sedimentary rocks and the subsequent formation of Narragansett Bay.

Soils at the Airport are primarily derived from glacial ice sheets that deposited much of the soils across Rhode Island. The glacial deposits in Rhode Island can be divided into four principal types: upland till plains, Narragansett till plains, Charlestown and Block Island moraines, and outwash deposits (U.S. Soil Conservation Service, now known as the Natural Resources Conservation Service (NRCS), 1981). Soils underlying Quonset Airport consist of Udorthends-Urban land complex (UD), Urban Land, Quonset gravelly sandy loam (QoA), Merrimac soils (MmA), and Raypol silt loam (Rc) (NRCS, 1981). Soils data from the Rhode Island Geographic Information System is derived from the NRCS data and confirms that the majority of Airport property contains soils with moderate constraints to development. Scattered areas of hydric soils and bedrock with slopes greater than 15% exist to the southwest of Runway 16.

The Airport is extensively covered with concrete, asphalt and buildings, with very little uncovered soil. Udorthents-Urban land complex soils consist of moderately well drained to excessively drained soils that have been disturbed by cutting or filling, and areas covered by buildings or pavement. Urban land consists of sites for buildings, paved roads, and parking lots. Airport soil is composed of 70% Udorthents, 20% Urban Land, and 10% other soils. Other soil types present at the airport consist of the following:

- Merrimac soils (MmA) are excessively drained soils on undulating terraces and outwash plains. Typically, the surface layer is dark brown sandy loam underlain by yellowish brown and dark yellowish brown sandy loam. Permeability is rapid (6.0 – 20 inches/hour (in/hr)) and soil erosion is slight.

- Quonset gravelly sandy loam (QoA) consists of excessively drained soils derived from glaciofluvial deposits, which were derived mainly from phyllite, shale, schist, and gneiss rocks. Typically the surface layer is a very dark gray gravelly sandy loam about three inches thick. The subsoil is dark yellowish brown and light olive brown gravelly loamy sand about 13 inches thick. The substratum is dark gray very gravelly sand to a depth of 60 inches or more. The permeability is moderately rapid (2.0 to 6.0 in/hr) to rapid (6.0 to 20 in/hr and soil erosion is slight.

- Raypol silt loam (Rc) consists of nearly level, poorly drained soils formed in windblown or water-deposited silts derived mainly from schist, gneiss, and shale rocks. The surface layer is typically very dark grayish brown silt loam about four inches thick. The subsoil is light olive brown, mottled silt loam 18 inches thick. The substratum is grayish brown and yellowish brown, mottled gravelly sand to a depth of 60 inches or more. The permeability rate is moderate (0.6 to 2.0 in/hr) and soil erosion is moderate.

2.3.1 Bedrock Geology

Information on geology was provided by the Office of the Rhode Island State Geologist (1994) and USGS publications. According to the Geologic Map of Rhode Island (1994) and the USGS Geological Survey Bulletin 1158-C (1964), the the area of the Airport is underlain by the Rhode island Formation of Pennsylvanian Age (318 to 299 mya), as well as metasedimentary biotite gneiss of the Blackstone Series of Precambrian age (about 4.5 billion years to 540 million years ago (mya)); the intrusive Hope Valley Alaskite, Ten Rod Granite Gneiss and the Cowesett Granite of early-

Pennsylvanian Age; the Pondville Conglomerate of Pennsylvanian Age; and quartz veins and pegmatities of Late Pennsylvanian or late-Pennsylvanian Age.

The Rhode Island Formation that underlies the Airport is the thickest and most extensive of the Pennsylvanian formations in the area. The Formation is divided into the Rhode Island Formation, undifferentiated, and the Rhode Island Formation, argillaceous facies. The Airport is underlain by the undifferentiated portion. The Rhode Island Formation, undifferentiated, consists of a thick sequence of light gray to black rocks—originally a great variety of sedimentary rocks including quartzose, sandstone (carbonaceous, calcareous feldspathic, and arkosic), subgraywacke, conglomerate (coarse to fine), and shale. These rocks are characterized by sharp variations and great irregularity in grain size, mineralogy, and extent. The beds are discontinuous, so the sedimentary sequence in any once place is different from nearby rocks. The thickness of beds range from a few inches to 4 feet.

The topography of the bedrock surface in the area exhibits over 150 feet of relief in north-south trending valleys and ridges. For approximately 300 million years, between the formation of the Pennsylvanian bedrock and the most recent glacial advances (Wisconsin age, ending about 10,000 years before present) the bedrock surface had been exposed to river and stream erosion. In the vicinity of the Airport, just west of Frys Pond the bedrock is greater than 50 feet below the ground surface (bgs).

2.3.2 Surficial Geology

Unconsolidated deposits cover bedrock throughout most of Rhode Island. Their thickness varies from several inches to more than 200 feet (USGS, 1961). Generally, these deposits are thicker in valleys than they are on the highlands. Due to the complex set of natural conditions under which these deposits were laid down, their characteristic properties and compositions change within short distances, both horizontally and vertically. Most of the unconsolidated deposits are generally referred to as glacial drift as they were deposited from pre-existing glacial ice sheets, which eroded the consolidated rocks and redeposited these materials over a wide area. These deposits are classified as till or outwash based on their origin.

Outwash deposits of Pleistocene Age are composed of stratified deposits of gravel, sand, silt, and clay. The thicknesses of beds vary and are usually localized and discontinuous. These deposits occur predominantly in the lowlands bordering Narragansett Bay and in the valleys of most of the larger rivers. These deposits are thickest within these valleys. Data from drilling logs of one test well and two production wells installed at the Airport encountered outwash consisting of beds of sand and gravel, and fine sand (Hazardous Materials Technical Center, 1990). The outwash ranged in thickness from 40 to 80 feet. There are also some shallower, recent-age deposits of gravel, silt, sand, clay and peat found along rivers, and in ponds and marshes in the Airport area. The end of the glacial period was characterized by strong wind movement of silt and sand. This type of deposit is loose and heterogeneous, and not very thick in the area of the Airport. The thickness is often less than ten feet at higher elevations and 150 feet in some portions of the bedrock valleys.

Portions of the Airport were constructed largely on fill material placed into Narragansett Bay in the 1940s, as described in the previous Airport Master Plan (Kelcey & Edwards, 2006) and earlier documents referenced in that AMP. The area of fill includes both of the runways. Information from 11 soil borings from an area north of the Airport hangar under the apron indicated the surface soil to be gravelly sand, sand, or gravelly sandy fill. These soils were found at depths of about 1.5 feet beneath the concrete surface and ranged in thickness from 0.5 to 3.5 feet. The subsoil consists of silty sandy fill, sandy fill, gravelly sandy fill or silty gravelly sand fill. The thickness ranges from 3 to 5.5 feet. The substratum consists of silty fibrous sand, stratified sand, sand or gravelly sand, with thickness generally ranging from 3.5 to 12 feet. Below the 12 to 15 feet depth, soil consists of organic silt and sand with organic silt.

2.3.3 Off-Shore Seabed Characteristics

In 2003, The Louis Berger Group, Inc. (LBG) and the Maguire Group, Inc. analyzed seabed characteristics immediately offshore from the Airport as part of pre-Environmental Impact Statement environmental analysis for a compact container port at Quonset Point that had been considered by the State of Rhode Island. The study included a larger area of shipping channels and turning basins for the proposed container port. The study indicated that because of the

location of the Quonset point area away distant from streams flowing into Narragansett Bay, and because of the tidal currents in the area, sediment accumulation rates have been comparatively low in these areas. As a result, the area has not required maintenance dredging. Based on the existing water depths as compared to the dredging depths in the 1940s, the Quonset/Davisville channels/basins have silted in by approximately 2 to 5 feet over the last 50+ years, or approximately 0.5 to 1 inch per year.

Generally, the sediment in the study area consisted of the following types:

- Black soft organic silt: Upper 0 to 0.80 m (2.6 feet) with high organic carbon content.
- Gray clayey silt: This strata includes some inorganic silt.
- Fine to medium silty sand: In cores where sand was present, the sand was mainly found near the bottom of the cores and consisted of either gray silty sand or brown coarse to medium sand.

Silt covers most of the seabed surface in the study area. Surface sediments consist of sand near the Quonset shore and in most of Frys Cove. The data indicated no consistent layering of silts and sands throughout the study area; rather, there seemed to be "pockets" of sand in specific locations. However, several longer sediment cores reached sand where deeper penetrations were achieved.

Trace metal and organic contaminant data for the sediments in the Quonset Point area indicated that surface sediments were not highly contaminated. However, sediments in the vicinity of the Davisville and Quonset piers contained elevated mercury, polychlorinated biphenyls (PCBs), and dichlorodiphenyltrichloroethane (DDT) concentrations.

The 2003 study provides additional information on sediment characteristics (grain size data, chemical properties, etc.) and should be consulted if shoreward development is ever considered at the Airport.

2.3.4 Surface Water Resources

The Airport is located immediately adjacent to Narragansett Bay, which surrounds Quonset Point to the east, north, and south. Narragansett Bay flows into Rhode Island Sound and the Atlantic Ocean about 15 miles south of the Airport. Due to the close proximity to the ocean, the Bay is salt-water body and tidal. The portion of Narragansett Bay immediately north of Quonset Airport is known as Frys Cove.

Waters of Narragansett Bay are classified differently by two State agencies. According to the Rhode Island Department of Environmental Management (DEM), Bay waters in the Airport area are classified as SA "suitable for shellfishing and suitable water contact recreation." The Rhode Island Coastal Resources Management Council (CRMC) has designated the waters Type 6 for industrial development. CRMC designated water type according to the land use at the time of designation. There is no correlation between CRMC Water Type designation and the water quality, habitat or living marine resources adjacent to the shore.

Frys Pond and Davol Pond are located immediately adjacent to the Airport, near its north end. These ponds are connected by Hall Creek, which flows along the northwest boundary of the Airport. Frys Pond is connected to Narragansett Bay by underground piping approximately one-quarter mile long that extends beneath the Airport runway. These ponds are not known to be used for recreation, fish propagation, or potable water supplies.

Facilities on Quonset Point including the Airport receive their water supply from a system of three wells fed by the Hunt River Aquifer in the southern section of Warwick. Quonset Airport connects to the municipal water system located along Post Road.

2.3.5 Stormwater Drainage

The Airport and surrounding areas are largely covered by concrete and asphalt, and surface drainage of stormwater is channeled via constructed drainage ways, which flow into Frys Pond immediately northwest of the Airport. The surfaces of the paved parking and apron areas immediately surrounding the old terminal building are crowned along an axis dividing the old terminal building at the front entrance from front to back. Stormwater from the paved terminal parking area on the south side of the terminal enters a closed drainage system located along the access road into the Airport. The closed drainage system was constructed in the 1940's, and consists of five catch basins connected longitudinally and laterally with 10" and 12" vitrified clay pipes. The stormwater flow converges at a catch basin located on the east side of the generator hut and flows within a 12" vitrified clay pipe south to a manhole located adjacent to Taxiway 'A'. A 12" pipe then crosses Taxiway 'A' and Runway 5-23 and connects with a concrete pipe system located between Runway 5-23 and Taxiway 'A'. The pipe depths are between 3 and 4 feet bgs due to the proximity to the Bay (Kelcey & Edwards, 2006).

Stormwater converges with the runway drainage system and eventually flows west in a 24" concrete pipe. Stormwater from the northern portions of the terminal parking area enters a 48" concrete pipe trunk line located along Airport Street west of the terminal. Stormwater from Airport Street, Taxiway 'A', and the terminal area combine at a catch basin located adjacent to Runway 5-23. The combined flow enters a 54" trunk line that outlet into Narragansett Bay opposite the airfield sewage treatment plant. At its outlet, the 54" trunk line carries approximately 40,000 gallons per minute of stormwater at a slope of 0.192%.

The stormwater drainage system at the Airport is served by a stormwater drainage system consisting of storm drains, catch basins, underground piping, and structural controls (e.g. oil/water separators). The drainage system discharges to Narragansett Bay via a series of outfalls located along the Bay. According to LBG's Stormwater Pollution Prevention Plan (2008) for Quonset Airport, the Airport is subdivided into 13 drainage areas (Figure 2.3). Materials with the potential for stormwater exposure are located in the following drainage areas:

- Drainage Area 1 includes the new and old Airport terminal building and maintenance garage, a fuel farm, the airport generator, the RIANG maintenance hangar, portable hangars occupied by individual aircraft, and the Quonset Air Museum hangar. Drainage area 1 also encompasses the southwest portion of the airfield, as well as other facilities within the QBP Stormwater in this drainage area is collected by a stormwater drainage system (i.e., storm drains, catch basins, and underground piping) which discharges to Narragansett Bay via outfall DSN-001.

- Drainage Area 2 includes the RIANG aircraft storage hangar, the main RIANG Base, and a portion of the airfield ramp and primary runway. Stormwater in this drainage area is collected by a stormwater drainage system which discharges to Frys Pond via outfall DSN-010 and ultimately to Narragansett Bay via outfall DSN-009. Materials and activities associated with the RIANG facilities are the primary potential sources of stormwater pollution in this drainage area. These materials are described in detail in the RIANG Stormwater Pollution Prevention Plan.

- Drainage Areas 5 and 6 comprise a large portion of the center of the airfield between Runway 16-34 and the outer runways along Narragansett Bay. This area includes an engine test stand operated by RIANG and a series of earthen storage bunkers used by military personnel. Stormwater in these drainage areas discharges to Narragansett Bay via outfalls DSN-004 and 005. Materials with potential stormwater exposure in this drainage area are described below. These materials are described in detail in the RIANG Stormwater Pollution Prevention Plan.

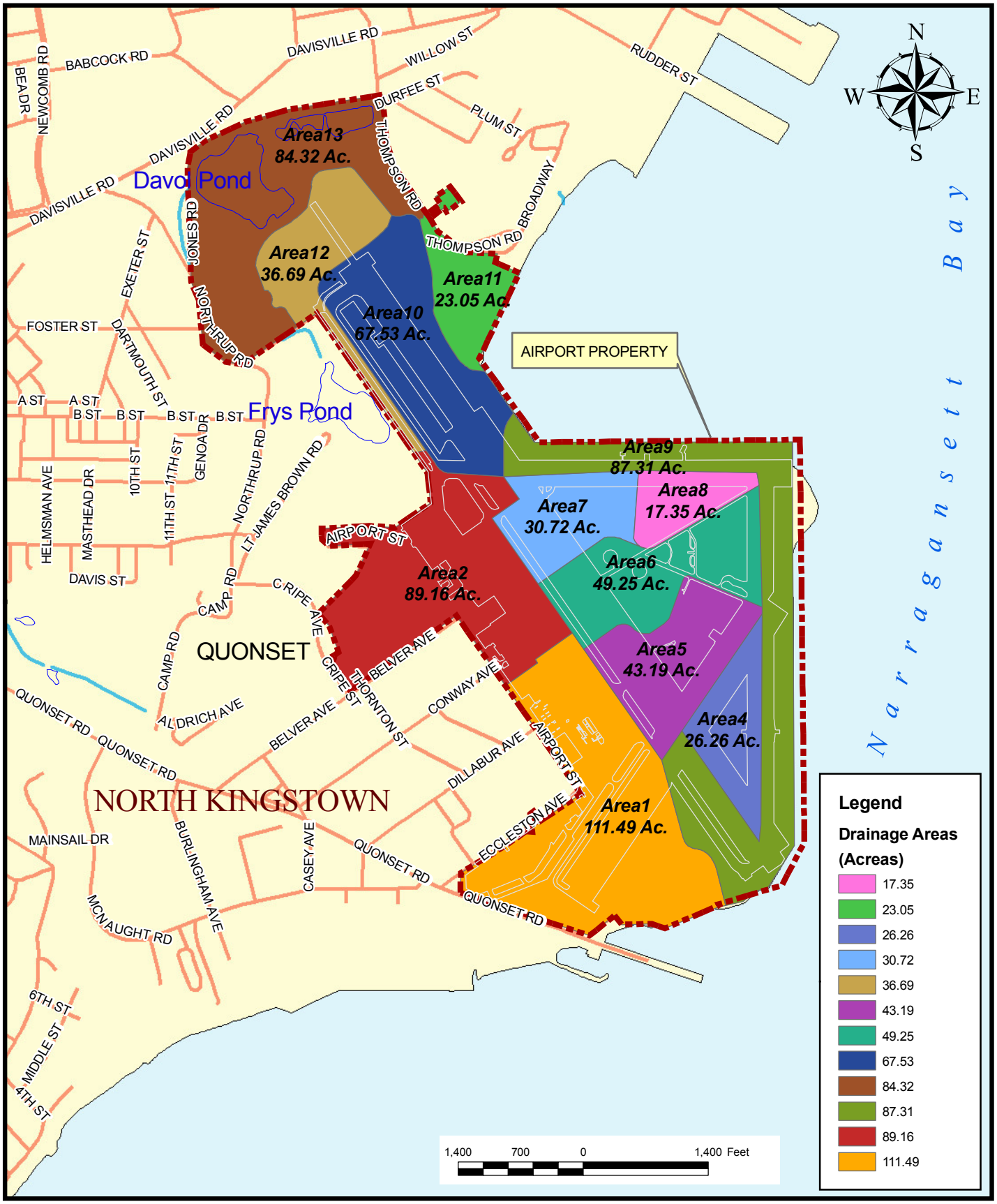
- Drainage Area 11 includes a sand berm used by the state fire marshal and an abandoned Federal Aviation Administration (FAA) communications complex. Stormwater in this area discharges to Narragansett Bay as surface runoff and infiltration. The crescent-shaped berm is approximately 40 feet long and 10 feet high along its centerline. Open burning typically occurs twice per year, while munitions are typically detonated five or six times per year. Remnants from burning and detonating activities are scattered across the face and

at the base of the sand berm. These materials are exposed to precipitation and are a potential source of stormwater pollutants. The state fire marshal is responsible for activities conducted in this area.

- Drainage Area 13 includes an abandoned water pumping station formerly associated with the Airport's drinking water system southwest of Davol Pond.

- Airfield Drainage Areas 3, 4, 7, 8, 9, 10, and 12 contain paved portions of the airfield (taxiways and runways) and vegetated turf or wooded areas. Aircraft traffic is the primary source of potential stormwater pollutants in these areas. Incidental leakage of aircraft engine fluids, normal wear of aircraft mechanical parts (i.e., brake pads), and aircraft engine exhausts contribute small quantities of pollutants to the stormwater discharges from these areas. The vegetated turf areas surrounding the paved portions of the airfield provide filtration of stormwater pollutants and allow stormwater to infiltrate into the ground before discharging off-site.

According to the Quonset Airport Stormwater Pollution Prevention Plan (LBG, 2008), historical leaks or spills of toxic or hazardous pollutants have occurred at the Airport. The majority of the airport's storm water drainage system consists of storm drains, catch basins, underground piping and structural controls (oil/water separators). Drainage from the south and east portions of the airfield drain to Narragansett Bay via stormwater outfalls. Coastal areas drain to the Bay via surface runoff and infiltration while the northern portion of the airfield drains to Davol Pond via surface runoff and infiltration. Stormwater from the adjacent RIANG property discharges to Frys Pond, which is connected to the Bay by two 54-inch underground equalization pipes.



QUONSET STATE AIRPORT MASTER PLAN

The Louis Berger Group, Inc.

Figure 2.3: STORMWATER DRAINAGE MAP

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_FLOOD ZONE.mxd

2.3.6 Ground Water Resources

The Airport is located within an area with groundwater classification GB, meaning water that is unsuitable for drinking water purposes without treatment. The area surrounding the airport includes GA classification, groundwater resources known or presumed to be of drinking water quality. GA-NA classified groundwater (non-attainment areas where the current condition does not meet standards established for the respective class due to contamination associated with specific sources) is located in small areas just outside Airport property, but within the Quonset Point area.

The Airport is located above the Potowomut-Wickford Aquifer System, which extends beneath a large area of central Rhode Island (USGS, 1968). The aquifer ranges from 10 to 80 feet thick and can be found at a depth of 10 feet bgs at the Airport. The aquifer system consists of the Potowomut River basin, the Annaquatucket River basin, the Pettaquamscutt River basin, and the Narragansett Bay basin. The Airport lies within the Narragansett Bay basin. The Narragansett Bay basin is recharged by precipitation infiltration, stream run-off, and the Bay during the winter months. Discharge is from evapotranspiration and underflow into the Narragansett Bay during the summer. Groundwater flow changes direction generally with the seasons. In the summer, groundwater flow tends to be in an east direction and in the summer, groundwater flow will tend to be in a west direction. The aquifer consists chiefly of four geologic materials: (1) stratified sand or gravel interbedded with fine sand and silt, (2) till, (3) stratified sand or gravel interbedded with till, and (4) bedrock. Of these materials, only the stratified sand or gravel is sufficiently permeable to yield appreciable quantities of water (USGS, 1968).

There are no in-use water supply wells on Airport property; however, there were several wells located on property on and adjacent to the Airport (Hazardous Materials Technical Center, 1990). These wells are no longer in use but at one time yielded up to one million gallons per day. They were constructed to a depth of approximately 40 feet, located in the sand and gravel aquifer. One well was drilled to the bedrock at 98 feet, however, water yields were inadequate. The water quality of these wells was mostly saline due to the close proximity of Narragansett Bay, which caused salt-water intrusion. During the time of operation, the saline content rose to 730 parts per million, and the wells were abandoned. The water from these wells was used for construction purposes only.

Based on DEM Underground Injection Control (UIC) regulations the following recommendations were made for Quonset Airport in the 2006 Master Plan:

- Conduct a subsurface investigation of the drywells to delineate the extent of contaminant migration resulting from discharge to the drywells.
- Sample the groundwater monitoring well in the vicinity of two drywells at the International Depository Inc. as part of the subsurface investigation.
- Monitor the progress of investigation and remediation at the Quonset Air Museum for potential environmental impact.

Management of UIC systems at Quonset is ongoing by RIAC environmental management staff.

2.3.7 Wetlands

The majority of land around the Airport is upland. Wetland systems are sparse in the area of the Airport due to the expanse of existing paved and developed areas. A wetland system exists to the west of the threshold end of Runway 16 at the north side of the Airport, including Emergent Wetland, Palustrine Open Water and Scrub-Shrub Swamp. Narragansett Bay, considered Estuarine Open Water, bounds the eastern and southern edge of the airport. Wetlands in the area of the Airport are shown on Figure 2.4.

QUONSET STATE AIRPORT MASTER PLAN

The Louis Berger Group, Inc.

Figure 2.4: WETLAND LOCATION MAP

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_WETLANDS.mxd

2.3.8 Floodplains

Because of its location on Narragansett Bay, Quonset Airport is vulnerable to flooding. Much of the Airport lies within the 1% annual-chance flood event (also known as 100-year flood) of Narragansett Bay and a coastal high hazard area. The 1% annual-chance flood is the area where the chance of a flood is approximately 1% each year. Some of the Airport lies within the 0.2% annual chance flood event (also known as 500-year flood). The areas of 1% annual-chance flood are identified as "AE" and "VE" on Figure 2.5 and include much of the airport. The areas of 0.2% annual-chance flood are away from the shore on the northern and western portions of the Airport, identified as "0.2%" on Figure 2.5. The only portion of the Airport that lies outside of these flood zones is the northern end, off of Runway 16.

The most recent Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Washington County, Rhode Island, is dated October 19, 2010. This map indicates flood potential for nearly all airport property and additional risk of wave damage ("VE" areas) to the eastern portion of the Airport. The locations of floodplains on and near the Airport are shown on Figure 2.5. Development in these zones is not prohibited by FEMA, but must meet floodplain management requirements. Structures are also subject to the Rhode Island State Building Code.

FEMA has updated the portion of this map that covers Quonset Airport in a Letter of Map Revision (LOMR) dated July 26, 2011 from FEMA to the Town Manager for the Town of North Kingstown. The floodplain revision was conducted following submittal of a request for a LOMR by RIAC with accompanying updated site-specific, elevation survey data. An explanation of the FIRM update was provided in the LOMR. Using the information submitted by RIAC, FEMA determined that a revision to the flood hazards depicted in the 2010 FIRM was warranted. The new survey data were collected by RIAC and demonstrated that a portion of the Airport previously identified as VE areas at additional risk of wave damage actually lie at higher elevations that would be within the "AE" flood zone. Therefore the area of total AE There was no associated revision to the Flood Insurance Study Report for Washington County.

Revised Area

The "gutter line" (also known as the zone break line) consists of thin white lines that separate different flood insurance rate zones (e.g. Zone AE and Zone VE as defined below) within the 100-year floodplain on FIRMs. According to the LOMR the gutter line has changed at two different locations:

1. Near the shoreline the gutter line has changed from 2,600 feet northeast of the intersection of Roger Williams Way and Zarbo Avenue (south of OQU Runway 5) to 2,900 feet northeast of the intersection of Conway Avenue and Airport Street.

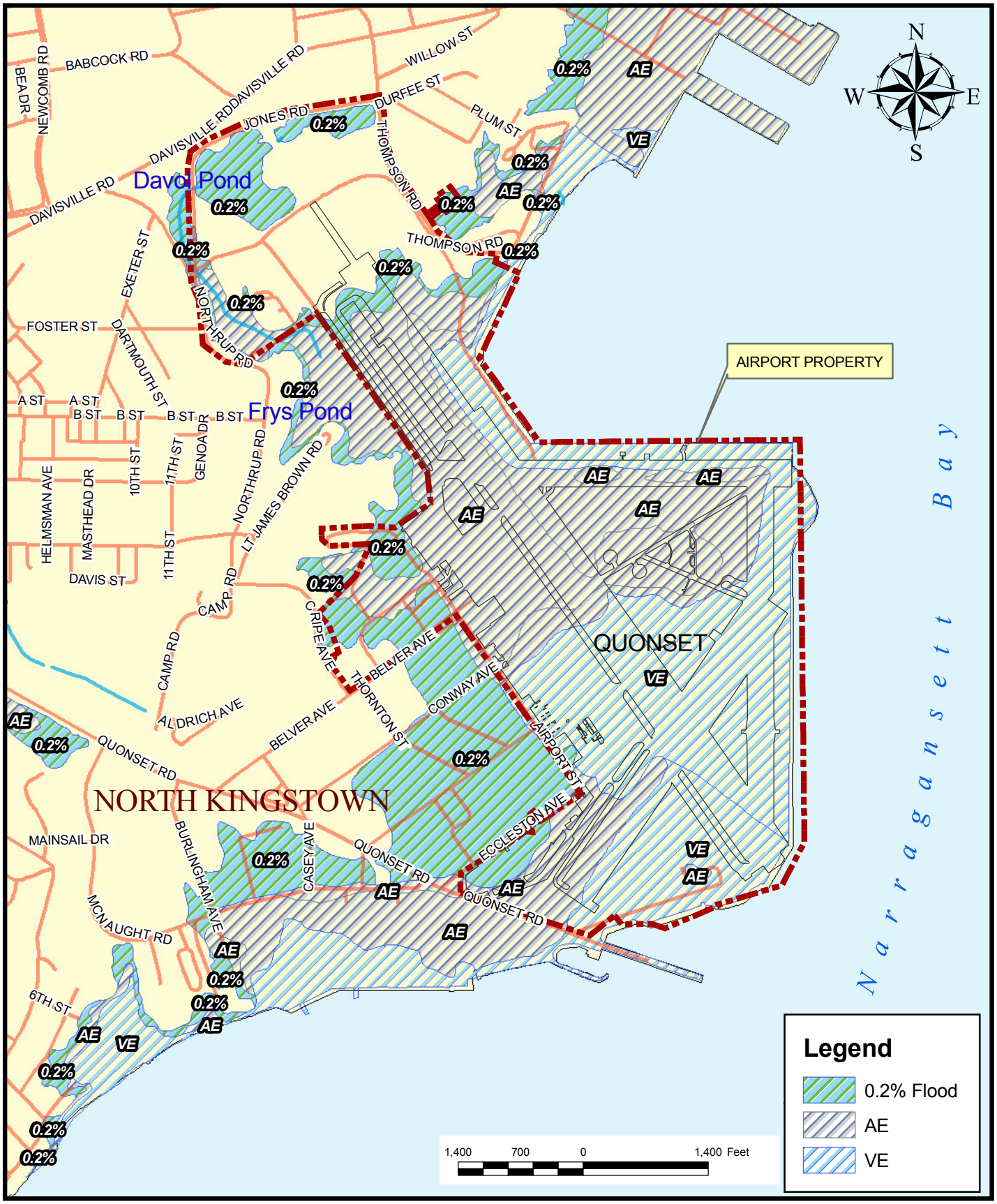
2. Approximately, 1,500 feet inwards from the shoreline the gutter line has changed from approximately 800 feet east of the intersection of Airport Street and Eccleston Avenue (northwest of OQU Runway 5) to approximately 1,500 feet northeast of the intersection of Conway Avenue and Airport Street.

Figure 2.5 shows the area where these revisions occurred and identifies how these lines have changed.

The Base Flood Elevation (BFE) for Narragansett Bay was revised at the following two locations:

1. The BFE was revised from 13 feet to 16 feet in elevation (North American Vertical Datum (NAVD) 1988) approximately 2,000 feet east of the intersection of Conway Avenue and Airport Street.

2. The BFE was revised from 12 feet to 16 feet in elevation (NAVD 1988) approximately 1,300 feet east of the intersection of Conway Avenue and Airport Street.



QUONSET STATE AIRPORT MASTER PLAN

The Louis Berger Group, Inc.

Figure 2.5: FLOOD ZONE LOCATION MAP

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_FLOOD ZONE.mxd

Flood Zones AE and VE are present at the Airport. Flood Zone VE consists of areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Zones marked AE are simply areas subject to inundation by the 1-percent-annual-chance flood. As described in the LOMR, the area of Flood Zone AE has increased and the area of Flood Zone VE has decreased. The Base Flood Elevations have also decreased in the revised area.

2.3.9 Biotic Communities

Quonset Airport is located on the shoreline in the middle of an industrial complex and has the highest number of wildlife species and attractants of all the Rhode Island airports as described in the Wildlife Control Policies, Procedures, and Training Manual for Hawthorne Aviation Rhode Island Airports (Piedmont Hawthorne 2007). Due to this fact, Quonset Airport also has the highest number of bird strikes and wildlife incursions.

An island located in the Bay adjacent to the airport serves as a designated bird sanctuary. Thousands of seagulls have made their home on this island. Additionally, buildings along the western side of the airfield provide flat rooftops for flocking gulls to nest on. Seagulls eat clams and small crabs that are left on the beaches that are very close to the runways when the tide goes out. The runways located on the beachfront provide an excellent surface on which the gulls drop the clams to crack them open and eat them. This scenario provides two problems. First and most importantly, there are often large flocks of gulls sitting on the runway. Secondly, after the birds have finished cleaning out the broken shells, they leave the pieces sitting on the runway.

The golf course at the northwest end of the airfield attracts a number of species, most notably Canada Geese (Branta Canadensis). Canada Geese are a high threat to aircraft at Quonset Airport because of their large size, heavy numbers, and slow flying speed. Canada Geese, swans, and ducks often occupy the two freshwater ponds adjacent to the Airport, Davol Pond and Frys Pond.

The southwestern end of the airfield contains a sewage treatment plant which attracts mice, skunks, rabbits, rats, and other small scavengers. Although these species do not usually pose a problem directly to aircraft, they attract large flying predators such as hawks, turkey vultures, owls, and various other carnivorous animals. The wooded area along the northeastern boundary of the Airport provides an attractive environment for deer, coyote, fox, and turkey. The beaches on the east end of the Airport attract many kinds of waterfowl, including osprey, cranes, and cormorants.

Wildlife and Vegetation Management Plans

According to the FAA, between 1990 and 2000, over 33,000 bird strikes and 450 deer aircraft collisions were reported at airports across the country (Kelcey & Edwards, 2006). In order to help reduce such accidents, RIAC has established a Wildlife Management Plan (WMP) for Quonset Airport that complies with guidelines prepared by the United States Fish and Wildlife Service. Some key areas of the WMP include controlling access by birds, deer and other wildlife to aircraft movement and operations areas.

RIAC is currently in the final phases of establishing a Vegetation Management Plan (VMP) for Quonset Airport. A VMP identifies the foliage surrounding a facility and establishes a goal to use that knowledge to create a mix of vegetation that will naturally comply with the airspace restrictions around an airport. Establishment of a VMP would decrease the need for human intervention as necessitated by aviation operational requirements by instituting a natural grooming technique that would decrease the need for large-scale mechanical cutting. Periodic maintenance would still occur in order to keep the approach surfaces and at the runway ends clear. Overall the VMP will minimize the need for maintenance vehicles along runways.

Threatened and Endangered Species

According to the US Fish and Wildlife Service, no federally listed threatened or endangered species are known to exist on airport property or within a two mile radius of the airport. There are three threatened species of birds within a one-mile radius. These are the Grasshopper Sparrow (*Ammodramus savannarum*), the Upland Sandpiper (*Bartramia longicauda*), and the Least Tern (*Sternula antillarum*).

2.3.10 Parks, Recreation and Open Space

There are two primary recreational areas surrounding Quonset State Airport. North Kingstown Golf Course is located immediately west of the Airport. Calf Pasture Beach is located about two miles north of the Airport.

2.3.11 Historical, Cultural and Archaeological Resources

The Rhode Island Historical Preservation Commission surveyed the Quonset Point NAS in 1974. As a result, the area was determined by the U.S. Department of the Interior to be eligible for the National Register of Historic Places because of historic associations with World War II. Sixty individual structures and districts within the NAS were also found to be eligible. Of these, eight were at the Airport. These included Landplane Hangar 1 (one structure), the old Operations/Terminal building (one structure), and the Synthetic Training Unit (six structures). Landplane Hangar 1 is a 64,500 square foot, steel-frame, curtain-wall building that best reflects the urgency with which Quonset NAS was built. The blueprints were drawn from Kodiak, Alaska; the only changes made for Quonset were in the title block. Albert Kahn, the noted industrial architect, was the architect for this building and also for the synthetic training unit, as well as for the Operations / Terminal building.

The plans for the Operations building were also previously used at another base, in Jacksonville, Florida. The plans for this reinforced concrete building with its three-story control tower were modified in the field rather than redrawn in the shop. One distinguishing feature of the building is the sunshade over the windows. It is actually a shield to deflect falling shrapnel or debris. The synthetic training unit consists of six wood-frame, asbestos-sided buildings. They were important to the NAS when navigational training was a major activity at Quonset. They are of little architectural interest now and have been much altered.

In addition to these buildings on the airport, one building and one district not far from the airport are on the National Register. The Allen-Madison House, some 4,000 feet north of the threshold end of Runway 16, is a federal-style farmhouse. The Camp Endicott district, located about 3,300 feet west of the Runway 16 threshold is a settlement of Quonset huts dating from 1941.

The historic places at Quonset are governed by a 1978 "memorandum of agreement" among the National Advisory Council on Historic Preservation, the General Services Administration, and the Rhode Island Historical Preservation Commission. The agreement determined that the transfer of Quonset Point to the state might have an adverse effect on the historic property. To mitigate adverse effects, three stipulations were specified:

- If any of the structures were demolished or altered, the structures would be recorded by the Rhode Island Port Authority and RIEDC in a manner satisfactory to the Historic American Engineering Record.
- A written history of the station would be prepared by the Port Authority.
- After demolition or alteration, the Preservation Commission would notify the National Register so that its records would be accurate.

The written history has since been prepared, and historic structures have been recorded and are on file. If any historic structures are to be altered, the Preservation Commission should be notified in order to provide advice and to update its files and those of the National Register.

2.3.12 Air Quality

The U.S. Environmental Protection Agency (EPA) defines ambient air in Code of Federal Regulations 40, Part 50, as "that portion of the atmosphere, external to buildings, to which the general public has access". In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Amendments (CAAA), the EPA has promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the EPA has established NAAQS for

six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO2), particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10), ozone (O3), nitrogen dioxide (NO2), and lead (Pb).

There are two types of standards: primary and secondary. Primary standards are designed to protect sensitive segments of the population from adverse health effects, with an adequate margin of safety, which may result from exposure to criteria pollutants. Secondary standards are designed to protect human health and welfare and, therefore, in some cases, are more stringent than the primary standards. Human welfare is considered to include the natural environment (vegetation) and the manmade environment (physical structures). Areas that are below the standards are in "attainment," while those that equal or exceed the standards are in "non-attainment." All of Washington County is a non-attainment area for the 8-hour ozone standard, as are all other counties in Rhode Island.

Although the EPA has the ultimate responsibility for protecting air quality, each state and local government has the primary responsibility for air pollution prevention and control. The CAA requires that each state prepare and submit a plan (State Implementation Plan) describing how the state will attain and maintain air quality standards in non-attainment areas. In order for projects to comply with the CAA and the CAAA, they must conform to attainment plans documented in the State Implementation Plan. The agency responsible for implementing the State Implementation Plan in Rhode Island is the DEM, which maintains air monitoring sites.

The region surrounding Quonset State Airport is largely residential, forested, or light industrial. There are no obvious air pollution emission sources located in proximity to the airport with non-point air pollution from automobile and airplane exhaust most likely the main source of air pollution emissions in the area. It is not anticipated that these emissions are of a level that warrants concern.

Given that the Airport is a commercial service airport with less than 1.3 million annual passengers and less than 180,000 annual general aviation operations through the forecast period, in accordance with FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions (Section 47.e.(5)(c)1a), an air quality assessment for long term impacts is not required for proposed projects that will not increase these passenger and operations numbers. The FAA thresholds are based on an understanding that relatively small airports with limited operations have been found to have little or no impact on air quality.

2.3.13 Hazardous Materials and Petroleum Products

RIAC has established a hazardous waste management plan for Quonset Airport. Some examples of hazardous materials and wastes at Quonset Airport are fluids, such as engine oil, degreasers, cleaners, solvents, and fuels. As a waste generator, each airport is responsible for all steps in hazardous waste management, from generation to final disposal. Wastes are listed as hazardous because they are known to be harmful to human health and the environment when not properly managed.

Aboveground and Underground Storage Tanks

RIAC has implemented an Underground Storage Tank (UST) compliance program to meet EPA UST requirements. All USTs at the Airport have either been removed or upgraded.

The Civil Aviation Fuel Farm at Quonset Airport is operated by AvPorts and is located east of the old terminal building on the apron. It is occupied by one 12,000-gallon aboveground storage tank (AST) containing Avgas (aviation gasoline), and one 12,000-gallon AST containing Jet-A aviation fuel. Hawthorne Aviation utilizes separate fuel trucks for delivery of each fuel type.

According to the Quonset Airport Spill Prevention, Control, and Countermeasures Plan of January 1999, access to ASTs are located inside the airport and Base facility perimeter fencing and fueling areas are well signed and lighted. The Plan contains design, operation and spill prevention information as well as emergency response.

Areas of Environmental Concern

There are several identified areas of environmental concern on or adjacent to Quonset Airport, where subsurface materials have been affected by releases of oil or hazardous materials. These sites are shown on the map of Areas of Potential Environmental Concern (Fuss & O'Neill, Inc., 2004) and attached as Figure 1.17. Information on these sites is provided below. This information is taken from the 2006 Master Plan and no updated review of DEM files for these sites was conducted for the Master Plan Update.

- **Naval Air Station Firefighting Area (NASFA).** The NASFA. also referred to as Firefighting Area #1, is located just to the east of the northern extent of Runway 16-34. Historically, the approximately 5-acre NASFA was part of the 650-acre NAS at Quonset Point. The NASFA was utilized by the Navy as well as other parties for the storage, destruction, and detonation of hazardous materials and ordinance, as well as firefighting training for naval personnel. Notably, in 1991, several drums of hazardous waste were transported from the International Depository, Inc. Site (located to the west of Runway 16-34), and incinerated in the burn pit. Environmental investigations conducted at the NASFA indicated the presence of metals and semivolatile organic compounds (SVOCs) in sediment collected from Frys Cove to the east. Additionally, samples of material collected from within the burn pit were documented to contain elevated concentrations of volatile organic compounds (VOCs), SVOCs, pesticides, and metals.

  As contamination remains in this area, projects in this area will still likely require environmental evaluations relative to DEM Remediation, Solid Waste, Hazardous Waste, Oil Pollution Control, and Water Quality regulations, as well as CRMC and FAA regulations.

- **International Depository, Inc.** The former International Depository Inc. (IDI) site is located off Northrup Road just west of Runway 16-34, but off Airport property. The site is approximately 5 acres and includes two abandoned buildings, blast protection embankments, and a firing range backstop. In the 1980s to 1990s, the site was utilized mainly as a hazardous waste storage facility. Wastes stored at the facility potentially included flammables, waste oils, chlorinated solvents, toxic materials, pesticides/herbicides, corrosives, reactives, and other hazardous materials. The total storage capacity of the facility was 1,600 55-gallon drums. Over the years, IDI was cited on numerous occasions by DEM for on-site releases. Environmental investigations and clean-up actions conducted to date have indicated that dry well sediment and soil at the site contain elevated concentrations of VOCs, SVOCs, PCBs, and metals. Groundwater at the site was documented to contain concentrations of VOCs.

  Projects in this area will likely require environmental evaluations relative to DEM Remediation, UST, Underground Injection Control, Hazardous Waste, and Water Quality regulations, CRMC regulations, and FAA regulations.

- **Former Fuel Farm.** The former Quonset Airport Fuel farm is located off of Eccleston Avenue on the western side of the southern extent of Runway 5-23. As part of RIAC's UST compliance program, the former Fuel Farm was closed in 1998. The closure activities included the removal of eleven USTs, and off-site disposal of approximately 1,300 tons of petroleum contaminated soil. During the closure of the USTs, petroleum contamination was observed to extend past the limits of the tank graves.

  In 1999, a Site Investigation was performed and a Site Investigation Report (SIR) produced for the former Fuel Farm. The SI included the advancement of soil borings, the collection and analysis of soil samples, the installation of monitoring wells, and the collection and analysis of groundwater samples. The SIR documented that low levels of total petroleum hydrocarbons (TPH) and VOCs were detected in soil and groundwater in the area. However, in general, the concentrations of detected contaminants did not exceed applicable regulatory criteria, or pose a significant threat to health or the environment. Groundwater beneath the site was monitored for a period of one year following the completion of the SIR. Projects in this area may require environmental evaluations relative to DEM Remediation and UST regulations, as well as FAA regulations.

- **General Dynamics Building #480.** The General Dynamics Building #480 site is located on Eccleston Avenue, adjacent to Quonset Airport. Although the Building #480 site is located outside of Airport property, environmental conditions at that site have impacted Airport property. The Building. #480 site is currently being investigated and remediated under the jurisdiction of the DEM Office of Waste Management. Recent environmental investigations conducted at this site have documented the presence of a plume of light, nonaqueous phase liquid (LNAPL) at the site. The LNAPL plume is characterized as a weathered petroleum product. A portion of the plume has also been characterized as containing dissolved chlorinated VOC (CVOC). As of 2003, the LNAPL plume was observed to have migrated from Building #480 to the southeast, traveling beneath Eccleston Avenue, and ultimately beneath Airport property. A proposed recovery well network was to be installed at the site in 2003 to recover LNAPL.

  Additionally, a dissolved phase plume of CVOC has been observed to extend onto Airport property. In October of 2002, an investigation was proposed to delineate the extent of dissolved phase CVOC on Airport property around the southwestern extent of Runway 5-23. The results of that investigation have not yet been submitted to DEM.

  Projects in this area will, at a minimum, require environmental evaluations relative to DEM Remediation, Air Resources, UST, Hazardous Waste, and Underground Injection Control regulations, as well as FAA regulations.

- **Former Aqua Tank Farm.** The Former Aqua Tank Farm is located at the southern end of Quonset Airport. The site encompasses approximately 8 acres and is situated between Zarbo Avenue, the southwestern extent of Runway 5-23, and the southern extent of Runway 16-34. In early 1990, 39-25,000 gallon jet fuel USTs were removed from the site. Subsequent to the removal of the tanks, scattered areas of free petroleum product in groundwater and soil contamination were identified. A soil gas survey conducted across the site indicated elevated concentrations of benzene, toluene, ethyl benzene, and Xylene (BTEX) in soil gas.

  In 1997 a remediation system was installed at the site. The system was comprised of a combination of remedial technologies including bioventing, air sparge, and free product recovery. The air sparge system included 106 shallow and deep air injection wells. Shortly after installation, many of the air sparge wells silted in, and were therefore not utilized. According to the most recent observation and monitoring report submitted to DEM (July 2001), the system was still in operation. As of 2001, no exceedances of the applicable groundwater objectives were detected from the on-site monitoring wells sampled as part of the ongoing monitoring program.

- **Munitions Bunkers.** Several munitions storage bunkers are present in the central portion of the Airport to the west of the northeast end of Runway 5-23. These bunkers have been used for the storage of munitions, ordinance, and other potentially hazardous materials. Although there is no record of actual unexploded ordinance (UXO) or clean-up activities related to the storage of hazardous materials in these areas, the potential exists for hazardous conditions. Potential hazards associated with these areas include the presence of UXO, residues from historical detonations, or releases of other hazardous materials.

  Additionally, the potential exists for both unexploded and spent ordinance to be present in other areas of the former NAS. Spent and live ordinance may have been stored in other structures or may have been buried at the site as a means of disposal. Since the potential for buried or stored live ordinance exists, great care must be taken while performing any activities in suspect areas. The Omaha district of the U.S. Army Corps of Engineers (USACE) performed a site inspection in 2004 to identify any suspect UXO locations. Projects in this area will, at a minimum, require environmental evaluations relative to DEM Remediation, Solid Waste, and Hazardous Waste regulations, as well as FAA regulations.

- **Davisville Naval Construction Battalion Center.** As the largest Business Park in Rhode Island, and with a long history of military, manufacturing, distribution, research and development, and commercial activities, the QBP is home to many properties with environmental concerns. Many of the environmental sites in the area are related to historical military use. The Quonset Point area includes two major former military

installations: NAS at Quonset Point and the Davisville Naval Construction Battalion Center (NCBC-Davisville). The environmental issues associated with the NAS have been previously discussed.

Similar to the NAS, NCBC-Davisville is an expansive (approximately 900-acre) former military installation operated by the Navy. NCBC-Davisville is located adjacent to the former NAS to the north and west. NCBC-Davisville was operated by the Navy beginning in 1942, and its primary mission was to provide mobilization support to naval construction forces. The Navy has identified approximately 24 areas within NCBC-Davisville that contain potentially hazardous levels of contamination. The investigation and remediation of the majority of these sites is being carried out by the Navy under the supervision and jurisdiction of the EPA, under the Superfund/National Priorities List program. There is a library of information available at the US Navy Caretaker site office located at the QBP headquarters.

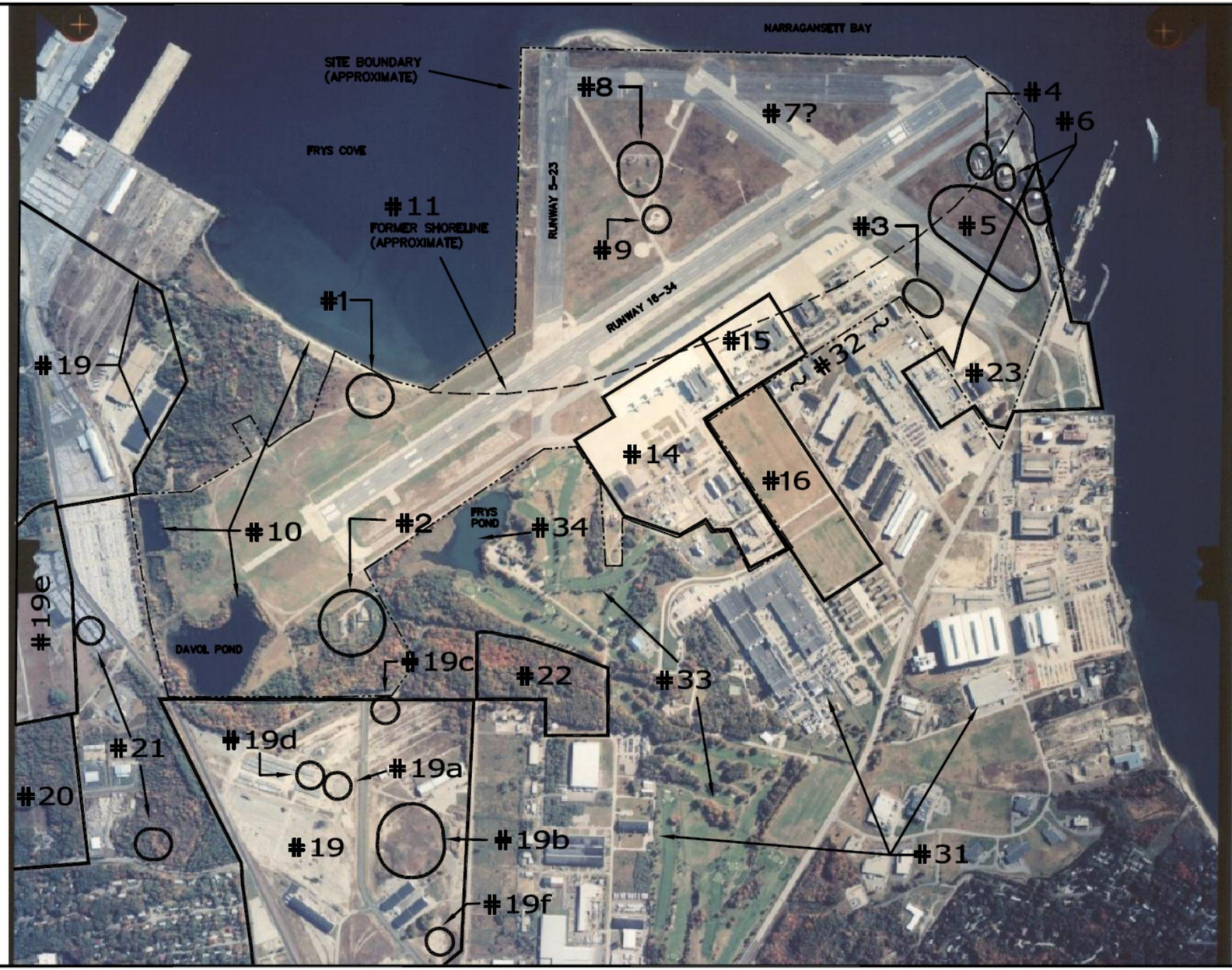
Although remaining hazardous waste sites at NCBC-Davisville are located off of the Airport, due to their proximity to areas slated for redevelopment at Quonset Airport and the potential for future land swap/transfer deals between involved parties, close attention should be considered to the identified hazardous materials release sites in close proximity to the Airport. Projects in areas directly related to the Airport will, at a minimum, require environmental evaluations relative to DEM Remediation, Solid Waste, Hazardous Waste, UST, Oil Pollution Control, Underground Injection Control, Air Resources, and Water Quality regulations, as well as CRMC and FAA regulations.

- **Quonset Business Park Commercial/Industrial Properties.** The QBP consists of approximately 1,500 acres of commercial and industrial business, and other land appropriate for development. Of the land that has been utilized for many years by commercial and industrial businesses, many properties have been impacted by releases of hazardous materials.

  The environmental condition of many sites in the business park has been degraded by point-source releases of oil or hazardous materials. Many of these sites are in various phases of investigation and clean-up under State and Federal programs. Furthermore, additional sites potentially impacted by releases of hazardous materials may still remain to be discovered. Consequently, any property potentially involved in land purchase/swap deals would require at least some level of environmental assessment.

  Projects in this area will, at a minimum, require environmental evaluations relative to DEM Remediation, Solid Waste, Hazardous Waste, UST, Oil Pollution Control, Underground Injection Control, Air Resources, and Water Quality regulations, as well as CRMC and FAA regulations.

Figure 6-12. Areas of Environmental Concern Site Plan



LEGEND

Areas of Potential Environmental Concern

On-Site Areas

1.) Naval Air Station Firefighting Area
2.) International Depository, Inc.
3.) Former Quonset Airport Fuel Farm
4.) Former Quonset Airport Radar Station
5.) Former Aqua Tank Farm
6.) Atlantic Shellfish Inc.
7.) Quonset Naval Air RIDOT Airport Diesel Fuel Spill
8.) Munitions Bunkers
9.) Engine Test Area
10.) Davol Pond, Surface Waters, and Coastal Areas
11.) Historical Filling Practices

National Guard Areas

14.) Rhode Island Air National Guard Facilities
15.) Rhode Island Army National Guard Facilities
16.) Marching Grounds

Neighboring Areas

19.) Davisville Naval Construction Battalion Center (NCBC)
19a.) NCBC—Solvent Disposal Area
19b.) NCBC—Waste Oil Disposal Area
19c.) NCBC—Transformer Oil Spill Area Building 37
19d.) NCBC—Building 38 Transformer Oil Spill
19e.) NCBC—Construction Equipment Department
19f.) NCBC—Old Firefighting Training Area
20.) NIKE Missile Site
21.) RI Clean Industry
22.) Old Quarry Disposal Site
23.) General Dynamics Electric Boat Division and plume
31.) Quonset Point/Davisville Commerce Park
32.) Former Electric Boat Buildings
33.) North Kingstown Industrial Golf Course
34.) Frye Pond and Surface Waters

QUONSET AIRPORT SITE BOUNDARY (APPROXIMATE)

FORMER SHORELINE PRIOR TO DEVELOPMENT (SOURCE: 1939 AERIAL PHOTO) (APPROXIMATE)

MAP REFERENCE:

AERIAL PHOTO PROVIDED BY EDWARDS AND KELCEY, INC.

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

SCALE: HORZ.: N.T.S. VERT.:
DATUM: HORZ.: VERT.:
GRAPHIC SCALE

FUSS & O'NEILL INC. Consulting Engineers
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QUONSET AIRPORT
SITE PLAN
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
NORTH KINGSTOWN RHODE ISLAND

PROJ. No.: 20030937.A10
DATE: NOVEMBER 2004
FIGURE 1

Rhode Island Airport Corporation

QUONSET STATE AIRPORT MASTER PLAN

Figure 2.6:
AREAS OF ENVIRONMENTAL CONCERN

The Louis Berger Group, Inc.

Source: Fuss & ONEILL, Inc.

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2.3.14 Environmental Permitting in Rhode Island

The DEM regulates activities that may affect the State's natural resources and environment through multiple permitting programs, as well as other environmental policies. The Federal and local governments also regulate activities that can affect the environment. Some of the permits that may be required for various potential projects as described in an FAA Advisory Circular for airport master planning (FAA, 2005) include:

- Clean Water Act, Section 404 Dredge and Fill Permit;
- Air Quality Permit for on-site batch plants or other construction-related activities;
- Local government construction permits;
- Growth Management Permits;
- United States Fish and Wildlife Service, National Marine Fisheries Service opinions, or State Wildlife and Game Commission permits, if protected and endangered species could be impacted; and
- Clean Water Act, National Pollution Discharge Elimination System Permits.

Many airport-related capital projects require Federal, State, or local environmental permits. A summary of some of the potential permitting requirements is provided here:

Rhode Island Pollutant Discharge Elimination System Permit. Section 46-12-15(b) of the Rhode Island General Laws, as amended, prohibits the discharge of pollutants into Waters of the State. The only exceptions are discharges in compliance with the terms and conditions of a Rhode Island Pollutant Discharge Elimination System (RIPDES) Permit issued in accordance with State regulations.

Rule 31 of the RIPDES Regulations, as amended on February 25, 2003, requires all discharges of stormwater associated with industrial activity to obtain a RIPDES permit. To be covered by the General Permit for Storm Water Discharge Associated with Construction Activity, applicants must complete a Notice of Intent Form. Provided all required information is submitted and it is determined that a general permit is appropriate for the site, a letter of authorization to discharge will be issued by the DEM.

A Storm Water Pollution Prevention Plan (SWPPP) shall be developed for construction activities covered by the permit. The SWPPP shall identify potential sources of pollutants that may reasonably be expected to affect the quality of storm water discharges associated with the construction activity. In addition, the SWPPP shall describe and ensure the implementation of best management practices to be used to reduce or eliminate the pollutants in the storm water discharge at the site and assure compliance with the terms and conditions of the RIPDES permit. Upon completion of projects completed under the RIPDES permit, the airport's Facility SWPPP for Industrial Activities shall be amended to reflect the changes/alterations resulting from the construction activities.

Rhode Island Wetlands Permit. Potential work in or adjacent to wetland areas of the airport would require permitting under the Freshwater Wetlands Program of DEM. Wetland permitting is also conducted by the USACE. Effective February 11, 1997, the New England Division of the USACE has issued a programmatic general permit (PGP) for the review of proposals in coastal and inland water and wetlands within the State of Rhode Island. This permit covers work and structures that are located in, or that affect, navigable waters of the United States, and the discharge of dredges or fill material into the waters of the United States, including wetlands and streams (regulated by the USACE under Section 404). The PGP is intended to streamline the permitting process for such activities by eliminating the need to apply to both the USACE and the DEM's Freshwater Wetlands Program. Thus any permit issued by the DEM under the PGP will also satisfy Federal wetlands permitting requirements.

Minor Source Air Permit. A Minor Source Permit may be required from the DEM Office of Air Resources to address temporary siting and emissions from a temporary batch asphalt plant should one be necessary for potential airport projects. The submission requirements for a Minor Source Permit do not include substantial information on air quality impacts or current Best Available Control Technology as would be required for a Major Source Permit but Best Available Control Technology review and screening level air quality analysis

should be performed to ascertain whether potential air impacts might be problematic. The production of such information is proposed to be the responsibility of the potential contractor and/or asphalt supplier.

Coastal Resources Management Council. The CRMC has been granted broad regulatory authority to review projects under state law, Coastal Resources Management Council (RIGL 46-23-1) and federal law, Coastal Zone Management Act (16 USC 1455(c)(5)). CRMC reviews projects involving a wide variety of uses—such as construction at airports—with respect to protection of tidal waters, beaches and dunes, undeveloped and moderately developed barrier beaches, coastal wetlands (both fresh- and saltwater wetlands), cliffs, bluffs and banks, rocky shores, manmade shorelines, areas of historical and archeological significance. CRMC's freshwater wetlands regulatory review is designed to mirror reviews undertaken by the DEM.

2.3.15 Wild and Scenic Rivers

The Wild and Scenic Rivers Act (16 U.S.C. 1271 as amended) protects rivers designated for their wild and scenic values from activities which may adversely impact those values. There are no designated Wild and Scenic Rivers in Rhode Island (U.S. National Wild and Scenic Rivers System web site, 2012), and therefore no designated rivers in North Kingstown or at Quonset Airport.

2.3.16 Coastal Zone Management

The CRMC claims jurisdiction over projects within 200 feet of a coastal feature. The CRMC also claims jurisdiction over projects that affect freshwater wetlands that are contiguous with a coastal feature, and any project resulting in 20,000 square feet of impervious area located in a designated watershed of poorly flushed estuaries. Finally, CRMC technical staff reviews some specific projects due to their potential impact on coastal areas regardless of where in the state they are located (power plants, petroleum storage facilities of 2,400 barrel capacity or greater, chemical or petroleum processing, minerals extraction, desalination projects, etc.).

FAA Order 5050.4B requires that Federal actions be consistent with the objectives and purposes of approved State coastal zone management programs, if in effect.

2.3.17 Coastal Barriers

Coastal barriers are unique landforms that provide protection for diverse aquatic habitats and serve as the mainland's first line of defense against the impacts of coastal storms and erosion. Barriers are islands or spits comprised of sand and gravel, along the coast and separated from the mainland by a coastal pond, tidal water body, or coastal wetland. In addition to a beach, barriers have, in most cases, a frontal foredune zone and often, backbarrier dune fields.

As stated in Section 47.3. (14) of FAA Order 5050.4B, the Coastal Barriers Act of 1982 applies to some areas on the shores of the Atlantic Ocean, including Quonset Airport.

2.3.18 Farmland

Soil types beneath the Airport as mapped by the NRCS (1981), and are shown on Figure 2.7. As described in Section 2.1.2, primary natural soil types at Quonset Airport are Udorthends-Urban land complex, Quonset gravelly sandy loam, Merrimac soils, and Raypol silt loam. Soils suitable for farmland have been identified throughout the State of Rhode Island by the NRCS and the Rhode Island Department of Administration, Division of Planning. Farmland is broken into the following categories by the Federal Farmland Protection Policy Act: prime farmland, unique farmland, and land of statewide or local importance. The majority of land within the Airport and vicinity is not suitable farmland; however, some suitable farmland is located in the Airport vicinity.

Prime farmland is defined by NRCS as land that has the best combination of physical and chemical characteristics for producing feed, forage, fiber, and oilseed crops, and is also available for these uses. Prime farmland exists in an area immediately west of the Airport, where Merrimac sandy loam is present. The locations of these soils with respect to the proposed project areas are shown on Figure 2.7.

Farmland of statewide importance is classified as lands that, generally, are nearly prime farmland and produce high economic yields of crops when treated and managed according to acceptable farming methods. There are three soil types of state-wide importance (other than the prime farmland) in the immediate airport vicinity, including: Quonset gravelly sandy loam on 0 to 3 percent slopes, Quonset gravelly sandy loam, and Raypol silt loam.

If it is determined that proposed projects may affect soils protected under the Federal Farmland Protection Act, it may be necessary to contact the NRCS for completion of a Farmland Conversion Impact Rating Form. Based on the impact rating score developed by the NRCS based on this Form, the NRCS may recommend consideration of alternate project sites. The need for completing this form is contingent on the local zoning within the proposed project area since prime farmland does not include land already in or committed to urban development. Areas zoned for commercial, industrial, or high-density residential use may be exempt from this requirement.

QUONSET STATE AIRPORT MASTER PLAN

The Louis Berger Group, Inc.

Figure 2.7: SOIL TYPES

Rhode Island Airport Corporation

Source: RIGIS-2012

QSA_SOILS.mxd

2.3.19 Energy Supply and Natural Resources

FAA Order 5050.4B National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions notes that airport energy use typically falls into one of two categories:

- That which relates to stationary sources such as a terminal buildings, airfield lighting, etc.
- That which involves the movement of aircraft or ground vehicles.

FAA Order 5050.4B states that use of natural resources may become an issue warranting discussion only if the airport requires use of unusual materials in short supply.

2.3.20 Light Emissions

The Airport is generally well-buffered from surrounding land uses due to its location in an industrial area removed from residences. Airport lighting is not substantial and will be directed over water and not at any occupied areas. No significant impacts are anticipated and light emissions from the airport are not considered a major nuisance to surrounding property owners.

2.3.21 Socioeconomic Environmental Justice, and Children's Health and Safety Risks

The Town of North Kingston has a population of 26,486, according to the 2010 U.S. Census. The population increased by 1.6 percent from 2000 to 2010. The Town had an estimated population of 26,326 residents, according to the 2000 U.S. Census. The population of the Town had increased by 10.7 percent from 1990 to 2000.

Manufacturing, retail and service are the dominant industries in North Kingstown. The number of new, single family homes continues to grow at a rapid pace (157 single-family residences in 1999) along with a significant increase in median selling price of homes ($245,000 in 2001, a 12% increase from the previous year). With only 1,400 lots available remaining for residential development, North Kingstown will soon reach its build-out capacity (Kelcey & Edwards, 2006).

About 1.4 million square feet of commercial and industrial facilities was developed in North Kingstown in the past decade. The majority of future commercial activity will likely be focused in redevelopment areas, in that available vacant land (other than the QBP) is minimal. The RIEDC has developed a Master Plan for active revitalization of the former military base where over 3,000 acres of existing and available industrial land (including Quonset Airport) exist in the evolving "Quonset Davisville Port and Commerce Park". Future development will create demand for industrial-related employment, reversing downward trend in the manufacturing industry seen in the community over the past decade.

2.3.22 Solid Waste

The Airport's daily generation of solid waste is relatively minor and well within the capabilities of waste haulers and disposal firms in the area. Trash is removed and disposed of by a waste disposal contractor on a regular basis. Outdoor trash dumpsters and recycling bins are maintained at individual airport facilities.

2.3.23 Public Lands

The U.S. Department of Transportation Act, Section 4(f) states that:

"the Secretary shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land of an historic site of national, state or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm resulting from the use. If the proposed action involves the taking or other use of any Section 4(f) land, the initial assessment shall determine if the requirements of Section 4(f) are applicable."

Section 6(f) of the Land and Water Conservation Act (LWCA) prohibits recreational facilities funded under the LWCA from being converted to non-recreational use unless approval is received from the director of the National Park Service. Based on a review of the existing land uses, it has been determined that there is a golf course immediately northwest of the Airport, and a public beach two miles north of the Airport.

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DECEMBER 2014

Rhode Island Airport Corporation

CHAPTER 3

QUONSET STATE AIRPORT MASTER PLAN UPDATE

AVIATION FORECASTS

THE Louis Berger Group, INC.

3.0 AVIATION FORECASTS

INTRODUCTION

As the aviation industry evolves in a volatile market, forecasting aviation demand and activity levels continues to be challenging, especially with regard to General Aviation (GA). Given the existing relative instability in the U.S. and global economies there remains uncertainty as to when and how the aviation demand will rebound. However, the FAA new annual forecast, *FAA Aerospace Forecast for Fiscal Years 2013-2033* stated that they are "*cautiously optimistic*" that the hard impact of the economic recession on GA activity (jet activity in particular) may be coming to an end.

National trends provide insight for the development of aviation activity projections. While some trends may not have a pronounced impact on the state's aviation environment, others have a greater impact. Aviation forecasts at the master plan level are generally more detailed than those at the statewide level. As such, this master plan will evaluate the forecast analysis from the previous master plan. Quonset State Airport has some unique requirements that warrant testing the sensitivity of the forecasts before adopting them to justify short-term development at the Airport. Particularly critical are any elements of forecasting that would suggest a change in the character (role) of the Airport.

The 2006 Airport Master Plan Update for Quonset Airport used 2004 data as the base year and generated aviation forecasts which projected aircraft activity through the year 2025. This chapter re-evaluates those projections and considers the negative impacts the downturn in the national economy has had on aviation activity levels. A key focus of this evaluation is to assess how the negative trend could impact the "out years" through 2025 based on the 2006 forecast. Additionally, the 2011 Rhode Island State Airport System Plan and recent T.F. Green Airport Environmental Impact Statement (EIS) highlighted potential constraints in the statewide General Aviation system level. Any potential increase in general aviation activity at Quonset as a result of existing system constraints will be considered in the long term plan.

The primary objective of re-evaluating of the forecasts from the 2006 Airport Master Plan and the recently updated Rhode Island Airport System Plan is to determine if previous forecasts are valid for this planning effort. In addition to the re-evaluation, this chapter will introduce demand scenarios that could potentially increase GA activity levels at the Airport. It will also assess to what extent the Airport can manage the additional GA activity..

3.1 PREVIOUS MASTER PLAN FORECASTS

Projecting aviation demand is a critical element in the airport master planning process. The end result of any forecasting process is to reveal the Airport's ability to accommodate aircraft and operations into the future and subsequently determining the type, size, and timing of future airside and landside development. Any forecast of GA activity levels will also determine whether or not there could be a change in the role of the Airport based on the current and anticipated general aviation activities in the Rhode Island state system. If validated, the results of the previous aviation demand forecasts will be used to determine facility deficiencies and project future facility needs at the Airport.

In order to understand this re-evaluation process, it is important to explain the process used in the initial forecasting effort. The following process was used in 2006:

2006 Forecasting Methodology

For the 2006 effort, interviews were conducted with Rhode Island Airport Corporation (RIAC) staff and the Airport's only Fixed Base Operator (FBO) at the time, Piedmont Hawthorne. The interviews captured the perspective of RIAC and Hawthorne on the facility, the overall market for general aviation services in southern New England, and their opinions on how Quonset could satisfy emerging needs. An econometric model was then developed which included the application of mathematics and statistical methods to economic data which assisted in predicting general aviation activity levels from nationwide socioeconomic and demographic patterns. This method produced a top-down or regression model which is further explained on the following page.

The 2006 effort also included a series of interviews to capture specific insight and detailed information about airport specific as well as state and regional activity. This information was used to develop a series of bottom-up forecasts that reflected the major local general aviation trends and factors specific to Southern New England. Finally, the top-down and bottom-up forecasts were reconciled into a single set of forecasts that reflected all aspects of research conducted in the 2006 Airport Master Plan.

In 2006, Quonset Airport did not have an existing or foreseeable need for commercial service or measurable cargo activities. Therefore, the forecasts produced for the 2006 Master Plan Update were related to general aviation operations only. This is consistent with the forecast scenarios developed for this master plan update.

FORECASTING METHODOLOGIES EXPLAINED

There are many factors that have the ability to influence general aviation activity at an airport. They include but not limited to, local population, employment, income levels, the cost of flying, and number of based aircraft. The 2006 Master Plan Update considered several methodologies in order to develop the projections. As mentioned, of those various methodologies, a "Regression Analysis" (Top-Down) and a "Bottom Up" forecast approaches were selected. The following provides a description of these methodologies.

Top-Down Approach (Regression Analysis)

The "Top-Down" approach applies a proven industry methodology that has been successfully applied by major airports and the FAA. This approach involves the collection of historical data and the application of standard statistical techniques to identify relationships between the various elements of historical information. This data set generally includes the number of based aircraft and operations. These statistical relationships are then used to project future activity at the Airport.

For the purpose of the 2006 forecasting effort, historical general aviation operations data was compared to other selected variables to establish a statistical relationship between the independent variables (i.e., demographic and economic indicators) and the dependent variables (demand for general aviation activity in the form of based aircraft and operations). The selected independent variables for this type of exercise were those believed to have the highest historical correlation with regional demand for general aviation, which included:

- State / Regional Gross Domestic Product (GDP)
- Per capita personal income
- Annual average salaries and payrolls for management and financial employees and company presidents
- Consumer price index
- Price of aviation fuel
- Business investment
- Oil and gas price index
- General aviation fuel consumed
- General aviation hours flown

The FAA provided information on the numbers of general and corporate aviation aircraft, local and itinerant operations, and hours flown by state. Information of employees by state, annual salary and job classification were obtained from the Bureau of Labor Statistics. The Bureau of Economic Analysis provided real GDP by state. The Department of Energy provided state and federal fuel tax rates for aviation gasoline and jet fuel. Information on market prices for fuel was sought in order to incorporate operating costs into the analysis.

In summary, the Top-Down Approach utilized within the 2006 effort encompassed the following elements:

- Compilation of relevant and appropriate independent variables to compare to historical aviation activity levels
- Calculation of the mathematical relationships between dependent and independent variables
- Application of this relationship (regression equation) to develop aviation demand projections of based aircraft and operations

2006 Forecast Approach Results - The Top-Down Approach

The results of this process concluded that given an optimum level of aircraft support services and facilities, as well as a repeal of the State Aviation Sales Tax, Quonset Airport in 2006 had the potential demand of approximately 294 general aviation aircraft. The overall Top-Down forecast for based aircraft produced projections ranging from roughly 190 aircraft in 2004 to over 350 aircraft in 2025. In 2006 there were 29 based aircraft at Quonset.

Given the sizeable difference in projected and actual based aircraft, it was determined that the Top-Down forecast methodology was an unsuitable forecasting approach for the 2006 Airport Master Plan. However, it was noted in the 2006 Plan that the significance of this approach's results should not be diminished, because it indicated a demonstrable latent demand at Quonset Airport, most likely due to the particular factors at the time.

The Top-Down Approach utilized in the 2006 forecasting effort resulted in the following projections of aircraft operations. These projections assumed 3% Annual Growth through 2025, and 10% in Growth in 2005 due to the elimination of the Rhode Island Aviation Sales Tax. With the 10% factored in to the planning period, the Average Annual Growth Rate is approximately 4%.

FIGURE 3-1 / 2006 TOP DOWN APPROACH. *AIRCRAFT OPERATIONS*

2006 MASTER PLAN TOP DOWN FORECAST RESULTS							
	2002	2003	2004	2005	2010	2015	2025
Air Carrier	0	0	0	0	0	0	0
Air Taxi	1,388	1,430	1,472	1,664	1,929	2,236	3,006
GA Local	38,292	39,441	40,624	45,905	53,217	61,693	82,910
GA Itinerant	10,537	10,853	11,179	12,632	14,644	16,977	22,815
Military	33,497	34,502	35,537	40,156	46,552	53,967	72,527
Total	**83,714**	**86,225**	**88,812**	**100,358**	**116,342**	**134,872**	**181,257**
Total Less Military	**50,217**	**51,724**	**53,275**	**60,201**	**69,790**	**80,906**	**108,730**

Bottom-Up Approach

The "Bottom-Up" forecast approach involved the collection and evaluation of more practical data such as levels of based aircraft in the region, development activities at the time, market-based insights, local knowledge, and professional judgment to assess general aviation demand for the Airport's market area. The approach used in the 2006 Master Plan also took into consideration the possibility of relocating of aircraft to Quonset from other regional general aviation airports.

The base year for the forecasts contained in the 2006 Master Plan Update was 2005 with projections of aviation activity for the near-term (2010), mid-term (2015), and long-term (2025) periods.

Based on the 2006 role of Quonset Airport in the state and national system as a GA reliever airport to T.F. Green, the "bottom-up" technique used in the 2006 Master Plan was an effort to; assess local and regional market conditions, and quantify demand for general aviation services and estimate the level of activity that could occur at the Airport based on the impacts of known and specific market-related forces at play when the 2006 forecasts were developed.

For the purpose of the 2006 Master Plan, the regional market area for Quonset Airport was considered to be those areas within a one hour drive-time, however the Airport receives a considerable amount of air traffic from those who would otherwise use T.F. Green Airport to its north and Newport Airport to its southeast.

FIGURE 3-2 / 2006 QUONSET AIRPORT MARKET AREA. *ONE HOUR DRIVE TIME.*

Inquiries to Base Aircraft

In 2006 RIAC representatives reported being approached on several occasions by corporations and other aircraft owners that wished to base their aircraft at Quonset if new hangars and tie-downs became available. These ranged from corporate operators with up to 3 corporate aircraft similar to a Gulfstream 100 and Challenger 605; to individual aircraft owners with the need for as many as 15 tie-downs and 20 T-hangars. While none of these proposals have materialized, over the last few years similar requests and development proposals were presented to RIAC for consideration.

Fractional Ownership Operations

In 2006 RIAC was in negotiations with a fractional jet ownership company that considered establishing an operations base at Quonset Airport. It was assumed that such an operation would eventually base up to 25 very light Adams or Eclipse Jets at Quonset in a new 135,000 square foot facility to be built in three phases. However, these negotiations never came to fruition.

2006 Bottom-Up Forecast Assumptions

Due to the inherent difficulty in; (a) assessing local and regional market conditions, (b) quantifying GA demand within a geographical area, and (c) estimating the level of activity based on the impacts of specific market-related forces at play, three scenarios were established to produce a range of forecasts. The forecast scenarios were broken down into Baseline, Medium Growth and High Growth projections. The forecasts were based on assumptions that could occur within the forecast window.
The three forecasting scenarios included the following assumptions:

Baseline Forecast

- 3 % growth in GA, Corporate, National Guard and Reserve operations for the entire planning horizon.
- 10% additional growth in 2005 due to the elimination of the Rhode Island Aviation Sales Tax.

Median Forecast

- All Baseline Forecast Assumption
- In year 2006, Phase One of the new FBO Facility is completed creating 12 mid- to large corporate jet positions or 24 single engine prop positions.
- In year 2007, Phase Two of the new FBO Facility is completed, creating 12 additional mid- to large corporate jet positions or 24 single engine prop positions.

High Forecast

- All Median Forecast Assumptions
- In year 2006 Phase One of the Fractional Jet Facility is completed with 7 based aircraft.
- In year 2007 Phase Two of the Fractional Jet Facility is completed with 6 additional based aircraft.
- In year 2008 Phase Three of the Fractional Jet Facility was completed with 6 additional based aircraft.

2006 Master Plan Fleet Mix Assumptions

The 2006 Master Plan developed the future based aircraft fleet mix by using 2004 fleet mix data provided by Piedmont Hawthorne. It was determined that this mix provided the most current and accurate data. In the year 2004 the Quonset Fleet Mix breakdown for each aircraft group was 86% Single Engine, 7% Multi Engine and 7% Jet. This fleet mix percentage was applied directly to the Base Line forecast.

The Median Growth forecast utilized the same baseline fleet mix, but it was adjusted using specific input from RIAC and Piedmont Hawthorne. Much of this input consisted of inquires that RIAC and Piedmont Hawthorne had received from corporations, individuals and other aircraft owners who were interested in basing their aircraft at Quonset when new tie-downs, hangars and other facilities came online. For this forecast the Base Line fleet mix was modified on a yearly basis to reflect these inputs and the Median Growth development scenario considerations.

The High Growth forecast utilized the Median Growth fleet mix, but was adjusted based on the assumption that a fractional jet operator would establish an operation utilizing 25 jet aircraft based at Quonset by the year 2008. It was assumed that this growth would occur incrementally.

2006 Forecast Approach Results - The Bottom-Up Approach

The resulting forecast of aircraft operations and GA based aircraft are summarized in Figure 3.3 and 3.4. Note that the data is broken down into the three forecasting scenarios described above. The Bottom-Up Approach utilized within the 2006 effort encompassed the following:

- Development plans presented to RIAC at the time which included a specific number of aircraft storage positions as they related to three development scenarios (Base Level, Median, and High Growth).

- Estimation of number of transient owners and operators who have approached the Airport about available storage facilities, and the types of aircraft that may choose to base at OQU if storage was available.
- Consideration of negotiations with a fractional jet ownership firm, with specific needs to support their business plan and the considerable financial backing necessary to support a successful project.

FIGURE 3-3 / 2006 BOTTOM UP APPROACH. *AIRCRAFT OPERATIONS.*

2006 MASTER PLAN BOTTOM-UP FORECAST RESULTS										
Baseline Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	AAG
Air Carrier	0	0	0	0	0	0	0	0	0	0%
Air Taxi	352	609	627	646	666	686	706	819	1,100	2.85%
GA Local	7,633	5,380	5,541	5,708	5,879	6,055	6,237	7,230	9,717	
GA Itinerant	3,074	11,260	11,598	11,946	12,305	12,674	13,054	15,133	20,338	
Total	**15,265***	**17,249**	**17,767**	**18,300**	**18,849**	**19,414**	**19,997**	**23,182**	**31,154**	
Median Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	AAG
Air Carrier	0	0	0	0	0	0	0	0	0	0%
Air Taxi	352	609	962	1,325	1,365	1,406	1,448	1,679	2,256	6.44%
GA Local	7,633	5,380	8,496	11,706	12,058	12,419	12,792	14,829	19,929	
GA Itinerant	3,074	11,260	17,783	24,502	25,237	25,994	26,774	31,039	41,713	
Total	**15,265***	**17,249**	**27,242**	**37,534**	**38,660**	**39,820**	**41,014**	**47,547**	**63,899**	
High Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	AAG
Air Carrier	0	0	0	0	0	0	0	0	0	0%
Air Taxi	352	609	1,092	1,571	1,729	1,781	1,835	2,127	2,859	7.64%
GA Local	7,663	5,380	9,646	13,875	15,276	15,735	16,207	18,788	25,250	
GA Itinerant	3,074	11,260	20,189	29,041	31,974	32,934	33,922	39,324	52,849	
Total	**15,265***	**17,249**	**30,926**	**44,487**	**48,980**	**50,450**	**51,963**	**60,239**	**80,957**	

** Acknowledges error in summing 2004 operations (taken from 2006 Master Plan)*
Note: Does not include military operations; AAG = Average Annual Growth rate calculated by The Louis Berger Group.

FIGURE 3-4 / 2006 BOTTOM UP APPROACH. *AIRCRAFT OPERATIONS SCENARIOS.*

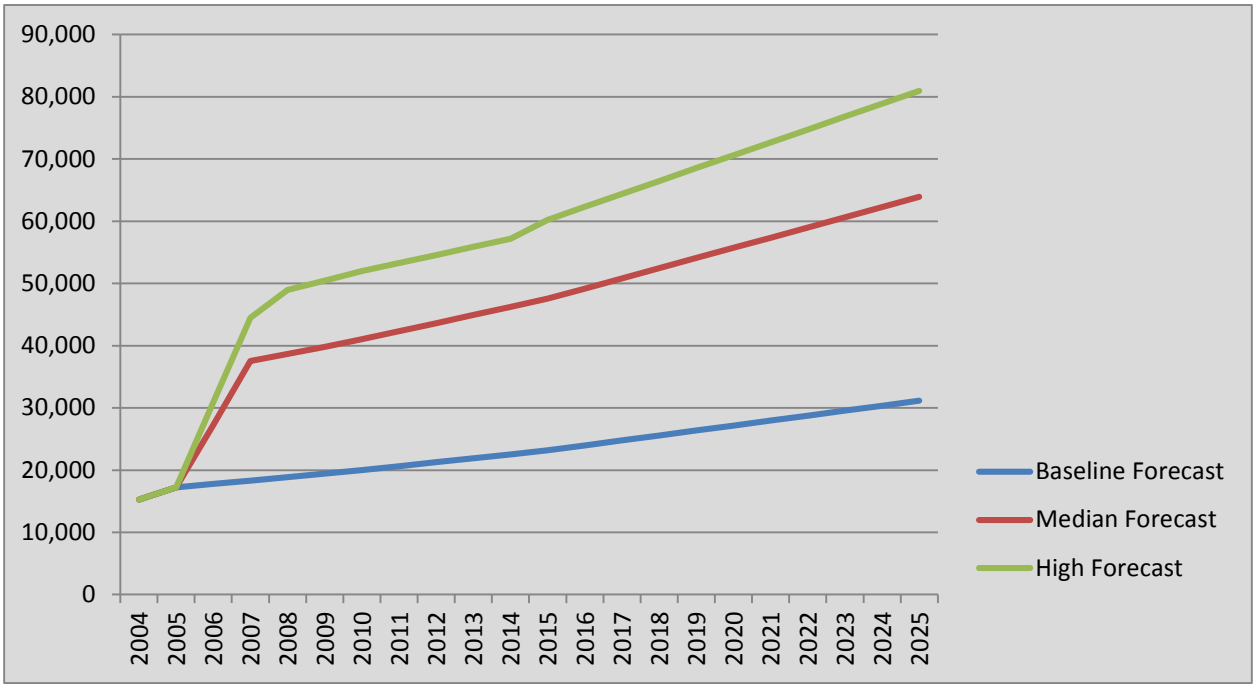
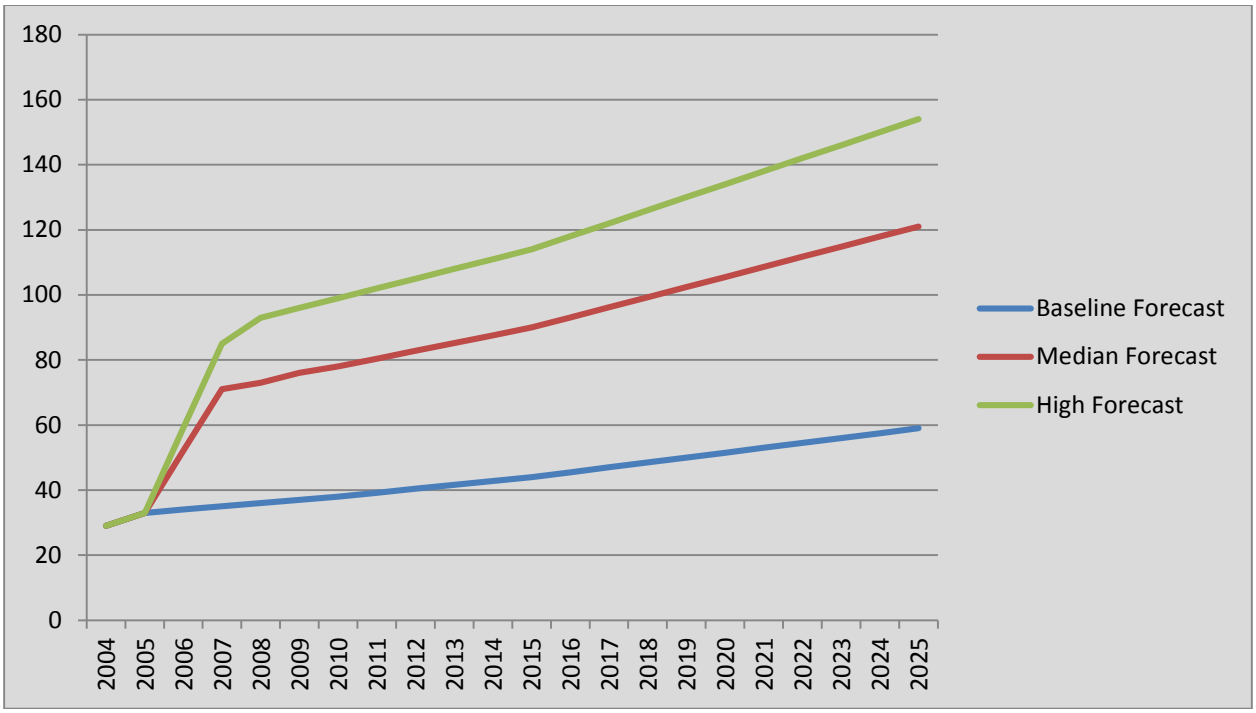


FIGURE 3-5 / 2006 BOTTOM UP APPROACH. *BASED AIRCRAFT.*

2006 MASTER PLAN BASED AIRCRAFT FORECAST RESULTS										
Baseline Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	Forecasted AAG
Single-Engine Piston	25	28	29	30	31	32	33	38	51	2.85%
Multi-Engine Piston	2	2	2	2	2	3	3	3	4	
Jet	2	2	2	2	2	3	3	3	4	
Helicopter	0	0	0	0	0	0	0	0	0	
Total	**29**	**33**	**34**	**35**	**36**	**37**	**38**	**44**	**59**	
Median Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	Forecasted AAG
Single-Engine Piston	25	28	35	42	43	45	46	53	72	6.44%
Multi-Engine Piston	2	2	8	15	15	15	16	18	25	
Jet	2	2	8	15	15	15	16	18	25	
Helicopter	0	0	0	0	0	0	0	0	0	
Total	**29**	**33**	**52**	**71**	**73**	**76**	**78**	**90**	**121**	
High Forecast	2004	2005	2006	2007	2008	2009	2010	2015	2025	Forecasted AAG
Single-Engine Piston	25	28	35	42	43	45	46	53	72	7.64%
Multi-Engine Piston	2	2	8	15	15	15	16	18	25	
Jet	2	2	15	28	35	36	37	43	57	
Helicopter	0	0	0	0	0	0	0	0	0	
Total	**29**	**33**	**59**	**85**	**93**	**96**	**99**	**114**	**154**	

Note: Does not include military aircraft; AAG = Average Annual Growth rate calculated by The Louis Berger Group.

FIGURE 3-6 / 2006 BOTTOM UP APPROACH. *BASED AIRCRAFT PROJECTION*



The results of this forecasting process through the three development scenarios demonstrate a broad range of potential growth that produces annual averages ranging from 2.85% to 7.64%. The underlying assumption of this approach was to establish these scenarios on existing or reasonable development opportunities at Quonset Airport, with each building upon the previous one. All scenarios incorporated a modest 3% annual growth rate, along with an initial 10% immediate increase that results from the repeal of the State Aviation Sales Tax. The Median and High Growth scenarios incorporated development opportunities that were being pursued at the time.

The 2006 Master Plan determined that the Bottom-Up approach, and the Baseline Growth scenario in particular, provided the most reasonable and practical view of Quonset Airport's future. Therefore, the Baseline scenario was selected as the basis of forecast for the 2006 Master Plan.

Both the Median and High Growth scenarios were based on the existence of planned aviation facilities that were not yet in place. However, FAA did acknowledge that the scenarios were reasonable given the short-term development plans for the Airport at the time. Additionally, due to the development opportunities presented, as well as the potential facility and environmental challenges that needed to be overcome to realize them, it was determined to incorporate the Median Growth and High Growth scenarios in order to maximize flexibility in the forecasts.

Rhode Island State Airport System Plan (State Guide Plan Element 640)

The Airport System Plan was incorporated into the Statewide Planning Program Guide Plan (Element 640) in September 2011. Among other items, this Plan developed forecast of based aircraft and GA operations for the State airport system, including Quonset Airport. The System Plan reviewed various forecasting methodologies and selected a market share methodology based on the FAA Aerospace Forecast for Fiscal Years 2010-2030. This resulted in utilizing a 0.9% average annual growth rate for based aircraft, and a 2.5 % average annual growth rate for GA operations. A summary of those forecasts are presented in the figure below.

FIGURE 3-7 / 2011 RHODE ISLAND STATE AIRPORT SYSTEM PLAN FORECASTS.

2011 RHODE ISLAND STATE AIRPORT SYSTEM PLAN FORECASTS FOR QUONSET (OQU)					
Type	2009	2014	2019	2029	AAG
Based Aircraft	25	26	27	30	0.9%

GA Operations	22,597	25,500	28,800	36,800	2.5%

Source: State Guide Plan 640; Rhode Island State Airport System Plan, 2011.
Note: 2009 is the base data year for this forecast.

In addition, for Quonset Airport, the State System Plan identified a 2029 fleet mix of 25 (83%) single-engine; 2 (7%) multi-engine; and 3 (10%) jet for a total of 30 based aircraft. With regard to operations, it identified the local/itinerant split remains at 80% local and 20% itinerant through 2029.

Federal Aviation Administration (FAA) Forecasts (2013 – 2033)

The FAA recently released their new forecast, *FAA Aerospace Forecast for Fiscal Years 2013-2033*. The forecast indicates that after a period of rapid growth in the last decade followed by a slowing over the recent years, the FAA is cautiously optimistic that the hard impact of the economic recession on jet activity may be coming to an end. As a result, they are predicting the active general aviation fleet to increase at an average annual rate of 0.5%, and turbine growth ranging from 2.8% to 3.5%. Further, GA operations are expected to rise at an annual rate of 0.6% with a 1.5% increase in Local operations (operations performed by aircraft that remain in the local traffic pattern, execute simulated instrument approaches or low passes at the airport, and the operations to or from the airport and a designated practice area within a 20–mile radius of the tower).

3.2 SUMMARY OF PREVIOUS FORECASTS VERSUS ACTUALS

This 2013 Master Plan Update for Quonset State Airport chose to review previously completed forecasts of activity as the basis for this 2013 update. It looks to validate and update a series of scenarios that can be utilized for potential development through 2025.

The following is a summary of each forecasts average annual growth rates.

GA Operations

- 2.85% Baseline Forecast, 2006 Master Plan (Selected 2006 AMP Forecast)
- 6.44% Median Forecast, 2006 Master Plan
- 7.64% High Forecast, 2006 Master Plan
- 0.90% Rhode Island State Airport System Plan
- 0.60% 2013-2033 FAA Aerospace Operations Forecast (1.5% Local Operations)

Based Aircraft

- 2.85% Baseline Forecast, 2006 Master Plan (Selected 2006 AMP Forecast)
- 6.44% Median Forecast, 2006 Master Plan
- 7.64% High Forecast, 2006 Master Plan
- 2.50% Rhode Island State Airport System Plan
- 0.50% 2013-2033 FAA Aerospace Operations Forecast (2.8 to 3.5% for turbines)

The Baseline Forecast scenario was approved by the FAA as the 20-year forecast for the 2006 Master Plan Update. In examining the validity of the 2006 master plan forecasts for this 2013 master plan, actual aircraft operations and actual based aircraft data from 2004 through 2012 was analyzed. This provided and actual annual and average annual growth rates during this period. Since military operations were not forecasted in the 2006 effort they have been omitted from the actual operations figures shown.

FIGURE 3-8 / 2004-2012 ACTUAL AIRPORT ACTIVITY WITH AVERAGE GROWTH RATES.

2004 to 2012 Actual Activity – Quonset State Airport						
Year	Operations	% Change	AAG (2004 to 2012)	Based Aircraft	% Change	AAG (2004 to 2012)
2004	15,782	-	0.57%	22	-	3.41%
2005	15,347	-2.7%		21	-4.6%	
2006	15,997	4.2%		20	-4.8%	
2007	19,979	24.9%		20	0.0%	
2008	19,863	-0.5%		23	15.0%	
2009	22,597	13.8%		25	8.7%	
2010	23,934	5.9%		24	-4.0%	
2011	17,122	-28.5%		25	1.7%	
2012	16,498	-3.6%		28	12.0%	

Source: Airport Records, RISASP

Conclusion of 2006 Forecast Evaluation

Of the three forecast scenarios developed in the 2006 Master Plan that used the bottom-up approach, the actual activity shown above is most consistent with the Baseline Forecast that was selected. Furthermore, discussions with the Airport revealed that OQU experiences a number of aircraft owners who base their aircraft at the Airport on a seasonal basis. This results in the reported number of based aircraft being subject to when the data was collected and appear to be fluctuating from year to year. Therefore, considering the availability and reliability of airport data, and through coordination with the Airport, the Project Team believes the 2006 based aircraft forecast is validated. While the aircraft operations were lower than the forecasted rate, fluctuations in year-to-year activity have seen growth that validates the overall baseline forecast from 2006. In line with the planned forecast objective of this Master Plan Update, this information along with a review of the airport role and demand factors will be applied to develop three forecast scenarios presented herein.

3.3 AIRPORT ROLE AND DEMAND FACTORS

Airports can play a variety of functional roles and can contribute at varying levels to sustain or improve the transportation and economic needs on national, regional, state and local levels. Identifying and understanding the various roles that the Airport plays is essential since recommended airport development with regard to facilities and services must be consistent with its respective roles.

In the 2006 Master Plan, Quonset State Airport was identified as a Reliever (RL) airport. This was taken directly from the 2001-2005 National Plan of Integrated Airport Systems (NPIAS). A Reliever designation in the NPIAS means it is a GA airport, which helps relieves congestion at a Primary Service airport, like T.F. Green Airport (PVD). Basically a Reliever can provide general aviation with an alternative point of access to the overall service area. Quonset already has most of the appropriate facilities to serve the GA Reliever role. It has a precision instrument landing system (ILS) and the complementary approach lighting system, an air traffic control tower and a runway with adequate length to accommodate virtually all GA aircraft.,

Published in May of 2012, a recent FAA classification study entitled "FAA ASSET Study" has suggested changes on how the FAA will identify an airport's role. The ASSET Study was consistent with the NPIAS and reported Quonset's service level as "Reliever", and identified its role as "Local". The primary characteristics of Local airports as identified in the ASSET Study include:

- Close to metropolitan areas and provides access for the community to the national airspace system
- Some flying by sophisticated aircraft
- Most operations within the state or the region
- May be important access for aeromedical and emergency services
- 10 or more annual IFR departures reported in FAA data
- 15 or more based aircraft

Local airports account for 42% of the general aviation airports eligible for federal funding. Most of the activity at local airports includes piston driven aircraft used in support of business and personal needs. As described in the ASSET Study, local airports typically accommodate flight training, emergency services, and charter services. The average number of based aircraft at Local airports nationwide is 37 and of the 1,236 airports identified in the ASSET study as local airports, Quonset is one of 42 airports designated as a Reliever airport.

Potential demand consistent with the type of development that was assumed in the 2006 Master Plan, but never realized continues with Quonset. Currently, development proposals have identified hangar opportunities of both the conventional and T-hangar type. This type of development is consistent with the Airport's role as defined above.

Conclusion of Airport Role evaluation

There is no indication that the role of Quonset State Airport will change during the planning period. This type of development activity will be incorporated and absorbed into the forecast scenarios derived under this Master Plan Update.

3.4 ACTIVITY SCENARIOS

The primary forecast objective of this Master Plan Update was to review, assess and validate previous forecasts. Based on information obtained above, three forecast scenarios have been developed for this Airport Master Plan. These scenarios include and will utilize the following:

- Scenario A – Low Activity Level, Existing FAA/RISASP Forecasts
- Scenario B – Medium Activity Level, 2006 Baseline Forecast Growth Rate
- Scenario C – High Activity Level, Absorb Development Potential

3.4.1 SCENARIO A – LOW ACTIVITY LEVEL, EXISTING FAA/RISASP FORECASTS

Scenario A presents a low activity level forecast that applies the FAA forecasted growth rates for GA. This amounts to 0.6% annual growth for itinerant operations and a 1.5% annual growth for local operations. It also applies a 0.5% annual growth rate to single and multi-engine piston based aircraft, and applies a more aggressive 3.5% annual growth for jet aircraft. The results of the forecast are presented below.

FIGURE 3-9 / 2012 SCENARIO A – LOW ACTIVITY LEVEL FORECAST.

SCENARIO A – LOW ACTIVITY LEVEL FORECAST								
Operations	2012	2013	2014	2015	2016	2017	2020	2025
Air Taxi	685	689	693	697	702	706	719	740
GA Local	9,971	10,121	10,272	10,426	10,583	10,742	11,232	12,100
GA Itinerant	5,842	5,877	5,912	5,948	5,983	6,019	6,128	6,314
Total	16,498	16,687	16,878	17,072	17,268	17,467	18,079	19,155

Based Aircraft	2012	2013	2014	2015	2016	2017	2020	2025
Single	22	22	22	22	22	23	23	24
Multi	5	5	5	5	5	5	5	5
Jet	1	1	1	1	1	1	1	2
Total	**28**	**28**	**28**	**28**	**28**	**29**	**29**	**31**

3.4.2 SCENARIO B – MEDIUM ACTIVITY LEVEL FORECAST

As a result of actual activity over the last several years tracking relatively consistent with the Baseline Forecast from the 2006 Master Plan, this forecast is validated. The annual growth rate of 2.85% is utilized for Scenario B with regard to single and multi-engine aircraft. This forecast also assumes the addition of two additional based jet aircraft every five years which is reasonable considering the on-going interest in private hangar development at the Airport. The results of the Medium forecast are presented in Figure 3-10.

FIGURE 3-10 / 2012 SCENARIO B – MEDIUM ACTIVITY LEVEL FORECAST.

SCENARIO B – MEDIUM ACTIVITY LEVEL FORECAST								
Operations	2012	2013	2014	2015	2016	2017	2020	2025
Air Taxi	685	705	725	745	766	788	858	987
GA Local	9,971	10,255	10,547	10,848	11,157	11,475	12,485	14,368
GA Itinerant	5,842	6,008	6,180	6,356	6,537	6,723	7,315	8,418
Total	16,498	16,968	17,452	17,949	18,461	18,987	20,657	23,773
Based Aircraft	2012	2013	2014	2015	2016	2017	2020	2025
Single	22	23	23	24	25	25	28	32
Multi	5	5	5	5	6	6	6	7
Jet	1	1	1	3	3	3	5	7
Total	**28**	**29**	**29**	**30**	**32**	**34**	**39**	**46**

3.4.3 SCENARIO C – HIGH ACTIVITY LEVEL

The 2006 Master Plan forecast discussed and considered development at the Airport that did not materialize; however, today there are new, on-going discussions with RIAC, that if developed, have the potential of bringing additional based aircraft to OQU. Scenario B considered this potential conservatively with regard to additional based jet aircraft.

The following Scenario C was developed to demonstrate a High-Growth scenario that considers the possibility of additional aircraft by applying a growth rate of 7.125% for the number of based single and multi-engine aircraft that falls between the median growth rate of 6.44% and high growth rate of 7.64% presented in the 2006 forecast. Scenario C also assumes relatively robust development through the planning period that results in six based jets by 2020 and 10 based jets by 2025. At this rate, the forecasted operations that would result were determined by applying 589 annual operations per based aircraft which was calculated by dividing the actual operations for 2012 (16,498) by the actual based aircraft for 2012 (28).

FIGURE 3-11 / 2012 SCENARIO C – HIGH ACTIVITY LEVEL FORECAST.

SCENARIO C – HIGH ACTIVITY LEVEL FORECAST								
Operations	2012	2013	2014	2015	2016	2017	2020	2025
Air Taxi	685	734	786	910	974	1,029	1,285	1,860
GA Local	9,971	10,678	11,438	13,240	14,183	14,983	18,712	27,076
GA Itinerant	5,842	6,256	6,702	7,757	8,310	8,779	10,963	15,864
Total	16,498	17,667	18,926	21,906	23,467	24,791	30,960	44,800
Based Aircraft	2012	2013	2014	2015	2016	2017	2020	2025
Single	22	24	25	27	29	31	38	54
Multi	5	5	6	6	7	7	9	12
Jet	1	1	1	4	4	4	6	10
Total	**28**	**30**	**32**	**37**	**40**	**42**	**53**	**76**

Summary of Forecast Scenarios

The forecast scenarios described above are summarized in Figure 3-12 and Figure 3-13 on the following page. Scenario A reflects a relatively flat low growth scenario that suggests just over 19,000 GA Operations and 30 based aircraft by 2025. Scenario B applies the validated forecast from the 2006 master plan and projects almost 24,000 GA operations and 46 based aircraft by 2025. Scenario C depicts a robust high growth scenario that results in approximately 45,000 GA operations and just over 75 based aircraft by 2025.

Military operations at OQU have remained relatively consistent and thus were not considered in these forecasts. However, the development scenarios presented as part of this master plan will acknowledge military activity in terms of operations existing airport capacity and will also provide a designated area where the Airport could accommodate the future needs of the Air Guard.

FIGURE 3-12 /2012 PROPOSED FORECAST SCENARIOS. *AIRCRAFT OPERATIONS PROJECTION*

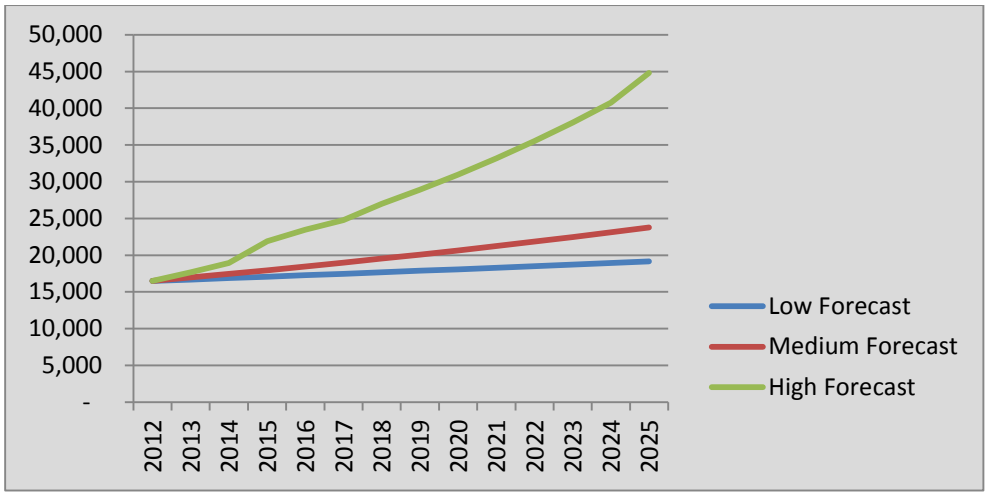
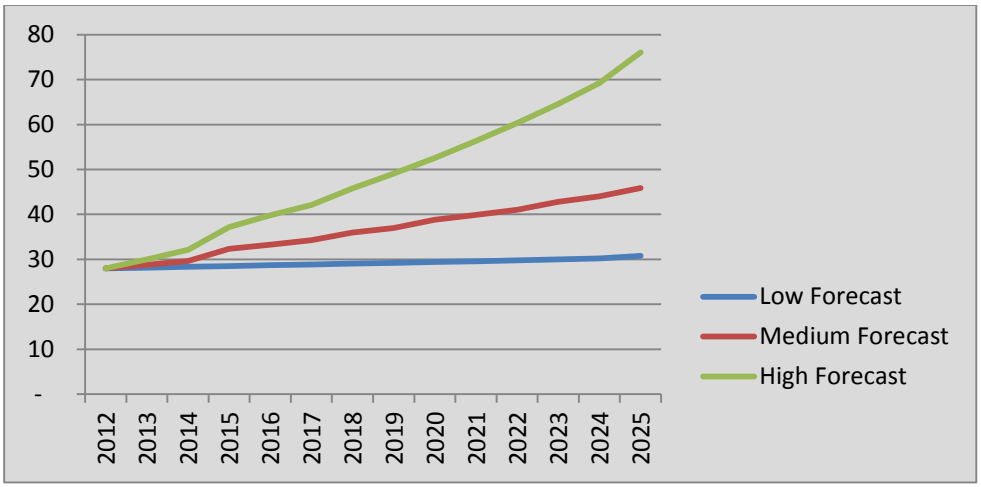


FIGURE 3-14 /2012 PROPOSED FORECAST SCENARIOS. *BASED AIRCRAFT PROJECTION*



3.5 FORECAST CONCLUSION

After coordination with the FAA and the projects Airport Advisory Committee it was determined that the medium forecast scenario be adopted through the planning period of 2025. As shown in the previous tables, the medium forecast scenario suggests that by 2025 the Airport could see 46 based aircraft which includes 7 jets and civilian operational counts at approximately 24,000 annually.

DECEMBER 2014

Rhode Island Airport Corporation

CHAPTER 4

QUONSET STATE AIRPORT MASTER PLAN UPDATE

DEVELOPMENT ISSUES & OPTIONS

THE Louis Berger Group, INC.

4.0 DEVELOPMENT ISSUES AND OPTIONS

INTRODUCTION

At the outset of this study it was acknowledged that the 2006 AMP was a very comprehensive planning process and the need to expend similar resources to conduct this study was not necessary. Moreover, in 2008 a Strategic Plan was developed for OQU outlining recommendations in terms of a strategy for business development. Therefore, the focus of this master plan was to update the inventory (Chapter 1) and modify the forecasts (Chapter 3) based on the industry changes over the past 10 years. Based on that information, this chapter represents a "re-evaluation" of the 2006 master plan. The chapter combines "Facility Requirements" and "Alternative Analysis" into one chapter entitled "Development Issues and Options".

This chapter identifies airside and landside facility requirements and recommendations through the 2025 planning period. This chapter reviews the previous development recommendations, considers the changes at the airport based on the updated forecasts or physical conditions since those studies were completed and validates or revises the recommendations as they were previously presented. Furthermore, this chapter introduces new development scenarios and includes a summary of seawall improvements derived from the seawall analysis presented in the full report. The appropriate changes will then be incorporated into a new Airport Layout Plan (ALP) and provided as part of the final Airport Master Plan Update.

The facility requirements described herein are completed in a manner consistent with the guidelines and standards established in the FAA Advisory Circulars. Typically the analysis is conducted without consideration of any constraints to understand the requirements under an ideal situation. However, considering previous efforts and the confirmation of constraints earlier in this process, the physical, financial, and environmental impacts that constrain the airport were incorporated to know what can and cannot be achieved in any development option. Ultimately, the existing and future facility requirements and development standards are identified by comparing the airport's existing facilities to future facility needs based on forecasts of aviation demand prepared for Quonset in Chapter Three.

This chapter is presented in the following sections:

- Review and Summary of Previous Development Plans
- Airfield Facility Requirements
  - Runway System and Development Options/Conclusions
  - Taxiways System and Development Options/Conclusions
  - Other Airfield Pavements and Conclusions
  - Navigational Aids and Options
- Aircraft Storage and Tie-Down Requirements
  - Based and Transient Aircraft Storage (Hangar) and Tie-Down Needs and Development Options
  - Aircraft Storage (Hangar) and Tie-Down Development Options
- General Aviation Support Facilities and Development Options
  - Airport Terminal Parking
  - Airport Fuel Farm Facility
  - Snow Removal Equipment/Maintenance Building
  - Quonset Air Museum
- Seawall Improvements
- Airport System Plan Performance Assessment
- Facility Requirements and Preferred Development Summary
- Environmental Review

4-1 REVIEW AND SUMMARY OF PREVIOUS DEVELOPMENT PLANS

Based upon facility needs and development issues at the time, the 2006 Airport Master Plan and the 2008 Airport Strategic Plan ("Business Plan") identified areas for both aeronautical and non-aeronautical use. These areas are shown in Figure 4-1. The red areas numbered 1,2 and 3 were designated for non-aeronautical use, while the blue areas identified A through F were designated for aeronautical use.

FIGURE 4-1/ 2006 & 2008 DEVELOPMENT SUMMARY. *AERONAUTICAL AND NON-AERONAUTICAL DEVELOPMENT PARCELS*

The physical development recommendations provided in the 2008 Strategic Plan are summarized as follows:

- RIAC should continue to implement the 2006 Airport Master Plan recommendations, particularly regarding development of Area A in the vicinity of the existing terminal area, additional hangars for corporate aircraft, support construction of a new control tower, and removal or renovation of old or dilapidated buildings. Curb appeal in the form of attractive facilities is important in attracting corporate traffic.
- RIAC should relocate the Quonset Air Museum to a site in the north end of the airport as shown in the master plan (Area 1). That will provide additional space for corporate aircraft tie-downs and hangars in Area F.

The development issues and options presented in this update considered the size and capacity of each area shown on Figure 4-1 and reviewed the 2006 AMPU and 2008 Strategic Plan recommendations. As you will notice, a number of the 2006 development options have been validated and should be carried forward through the 2025 planning period. More importantly, the chapter makes suggestions and presents recommendations for reconfiguration and/or re-use of areas that have been previously planned, developed or where conditions have changed the recommendations of the previous studies.

The goal of the development options provided in this chapter is to ensure that the options provide for the optimal development plan to (1) meet FAA design requirements, (2) increase the efficiency of the runway and taxiway system and (3) create the best land re-use for the other components of the airport, both aeronautical and non-aeronautical.

In doing so, the areas depicted for a particular use in 2008 (Figure 4-1), has been revised for this update and is shown in Figure 4-2 on the next page. The uses depicted are generally the same but allow for more flexibility within the areas of the airport previously reserved for non-aeronautical use. Major differences in Figure 4-2 are depicted in orange and include:

- Area D encompasses Area 1 in Figure 4-1 and now designates the total area for either aeronautical or non-aeronautical development as needed.
- Area C is now designated for either aeronautical or non-aeronautical development as needed.
- Area 3 is now designated for either aeronautical or non-aeronautical development as needed.
- A new Area G that allows for re-use of the new Terminal Building parking area.

FIGURE 4-2/ 2014 DEVELOPMENT PLAN. *AERONAUTICAL AND NON-AERONAUTICAL DEVELOPMENT PARCELS*

4.2 AIRFIELD FACILITY REQUIREMENTS

The planning and design of an airport is based not only on the number of annual operations, but also on its local and regional role in serving aviation demand. It is important to note that the recommended improvements are intended to address needs of a broad range of general aviation users.

This section identifies existing and future airfield facility requirements and examines their design. It includes:

- Runway System
- Taxiway System
- Other Pavements
- Navigational Aids

Runway System

The first step in determining airfield development needs is to determine the critical aircraft. The critical design aircraft determination is an important aspect of airport design. It sets dimensional requirements on an airport, such as distance between taxiways and runways, and the size of certain areas protecting the safety of operations. An accurate determination of the critical design aircraft helps ensure proper development of the airport as well as the effective investments of RIAC and federal funds in airport facilities. An accurate critical design aircraft determination ensures that the aircraft operational area dimensions are adequate in serving the most demanding aircraft that make regular use of the runways, taxiways, and apron areas.

The physical characteristics of the aircraft have operational and economic significance which materially affect an airport's design, development, and operation. They influence the design aspects of runways, taxiways, aprons, servicing facilities, and safety areas. Their consideration while improving existing airport facilities maximizes their utilization and safety. Unique to Quonset is that military aircraft frequently operate at the airport. Therefore, joint-use airports, such as OQU must also meet the physical characteristics for military aircraft. Hence, in addition to civil aircraft this analysis also considered routine military operations of the Army and Air National Guard training missions. By determining the type of aircraft expected to use the airport, it is possible to establish a critical design aircraft whose characteristics are used to determine facility requirements.

FAA guidance on dimensional standards is based on a coding system known as the Airport Reference Code (ARC). This system is used to relate airport design criteria to the operational and physical characteristics of the critical aircraft that will operate at the airport. Existing and future ARC classifications are determined from a review of the aviation demand forecasts and an understanding of the existing and projected role of the airport in the air transportation system. The components that determine the ARC include the Aircraft Approach Category (AAC), and the Aircraft Design Group (ADG), which is based on wingspan and tail height. These components also determine the Runway Design Group (RDG) and the Taxiway Design Group (TDG). The first component of the ARC is the aircraft approach category, which refers to approach speed of the critical aircraft. In the ARC, the aircraft approach category is depicted by a letter as shown in Figure 4-3, and the wingspan, shown in Figure 4-4.

FIGURE 4-3 / AIRPORT REFERENCE CODE. *Aircraft Approach Category Classification*

Approach Category	Approach Speed (Knots)	Typical Aircraft Type
A	Less than 91	Beech Baron 55, Cessna 172
B	91 but less than 121	King Air, Citation II
C	121 but less than 141	Global Express, Gulfstream III, IV, V
D	141 but less than 166	B747, B777
E	166 or greater	Blackbird 71, Tupolev 144

Source: FAA Advisory Circular 150/5300-13, Airport Design

As mentioned, the second component refers to the critical aircraft's wingspan. Generally, aircraft approach speed determines the specifications of runways and runway related facilities, while wingspan determines the separation criteria for the positioning of taxiways and taxilanes.

FIGURE 4-4 / AIRPORT REFERENCE CODE. *Aircraft Wingspan Category Classification*

Design Group	Wingspan (feet)	Typical Aircraft
I	Less than 49	Cessna 172, Cessna 414, Piper PA-23,
II	49 but less than 79	Falcon 50, Beech King Air E-90, Gulfstream III
III	79 but less than 118	Global Express, Convair 580, Gulfstream V
IV	118 but less than 171	A-300, B-707, B-757, C-130, L1011, DC-10
V	171 but less than 197	B-747
VI	197 but less than 262	Future

Source: FAA Advisory Circular 150/5300-13, Airport Design

A critical aircraft designation requires documenting aeronautical use of airport facilities in a detailed manner. In this case we compared the military demand versus the civil needs. Currently, the largest based civilian aircraft at the airport is the Bombardier Global Express. It has an Airport Reference Code (ARC) of C-III. The C-130 most regularly used by the Air National Guard is a C-IV category aircraft.

Other larger multi-engine and jet aircraft such as the Cessna Citation X, Learjet 35, and Gulfstream IV are utilizing the airport with increasing frequency. In addition to the larger aircraft noted operations at Quonset also include the smaller single and multi-engine piston aircraft. Corporate jet aircraft have higher approach speeds than smaller aircraft, and require particular facilities to allow for their safe operation. These corporate jet type aircraft can be accommodated on the Primary Runway 16-34 while the smaller single and multi-engine piston aircraft can be accommodated on both Runways 16-34 and 5-23. It is important to note that the prevailing wind direction, especially under IFR conditions actually suggests that Runway 5-23 is the preferred approach for the smaller aircraft

However this analysis highlights what previous studies have shown; the existing physical and environmental constraints limits the ability to alter the existing airfield configuration. The analysis also sustains the opinion that it is important to maintain Runway 5-23 at its current length to support the current single and multi-engine aircraft users that are either based at the airport or use Runway 5-23 on a regular basis. This is especially true as recommendations in this study support the expansion of the projected based aircraft population.

The two aircraft mentioned are depicted in the following photos.

http://www.aircraftinformation.info/Images/Global_Express

http://www.willepadnos.net/jmkasunich/C130-0486.jpg

The picture below is indicative of the corporate type aircraft that use the airport on a regular or seasonal basis.

In considering the existing and future requirements for Runway 16-34 this master plan update considered the specifications of the Air National Guard's C-130. This introduces all aircraft with wingspans between 79 and 118 feet. In addition, based on the projected levels of operations by based and transient jet aircraft, through 2025 the design criteria specified under Airplane Design Group IV are recommended for Quonset State.

It should be noted that it is not necessary for both Runway 16-34 and Runway 5-23 to be improved to comply with ARC C-IV design standards. The identification of Runway 16-34 as the focus for facility improvements is sufficient to accommodate future demand by aircraft classified in an ARC C-IV.

Defining the ARC establishes the design parameters for the runway and taxiway setback requirements. Defining the number of runways and the length is primarily based on the airport capacity and critical aircraft respectively. When comparing the existing rated airfield capacity – also referred to as Air Service Volume (ASV) – of the airport to current and forecasted operational demand (Chapter 3) it is clear that the airport does not require any expansion to the current airfield (runway configuration) during the planning period.

The existing length of the primary Runway 16-34 is 7,504 feet. Based on the 2006 AMP analysis and this re-evaluation, it has been determined that this length is adequate to meet the requirements of the ANG C-130 aircraft. It is also capable of supporting the operational requirements of the corporate jet fleet during the project planning period. In conjunction with the secondary runway, it provides adequate wind coverage. With regard to the pavement condition of Runway 16/34, the existing pavement is in good condition and is not anticipated to require rehabilitation within the planning period.

The secondary Runway 5-23 is 4,003 feet in length, which can adequately accommodate the small aircraft (under 12,500 lbs) that are projected to utilize the runway. With respect to crosswind runways, the FAA planning guidelines suggest that a crosswind runway be 80% of the length of its primary runway. On the basis of that parameter a runway length up to 6,000 feet (7500 feet x .8) could be justified for Runway 5-23. While it may be ideal to increase the runway length in order to accommodate a greater range of aircraft, the 2006 Master Plan indicated that such an extension would incur environmental impacts on Narragansett Bay. Moreover, the financial investment required for such a project would far outweigh the benefits since the primary runway is more than adequate in serving the existing fleet. For those reasons this master plan update supports the conclusion of the 2006 AMP. With regard to the

pavement condition of Runway 5-23, the existing pavement is currently rated in good condition but is anticipated to require rehabilitation within the planning period. It is recommended that the pavement condition of 5-23 be monitored such that the Capital Improvement Plan for the airport reflects this need accordingly.

Runway System Conclusions:

- The C-130 is the critical aircraft based on its current and projected use by the ANG.
- Based on the critical aircraft, the recommended Airport Reference Code (ARC) is C-IV
- For Runway 16-34 the FAA design standards will be determined using Approach Category "C" and, Design Group "IV".
- Use of Runway 5-23 is limited to smaller piston and turbine aircraft. On that basis, the current FAA design standards of a B-II ARC on Runway 5-23 should be maintained.
- The existing physical and environmental constraints limit the ability to alter the existing airfield configuration.
- At 7,504 feet the length of Runway 16-34 can accommodate all civil and military aircraft operations projected for the 2025 planning period.
- Runway 5-23 at 4,003 feet in length can adequately accommodate the small aircraft (under 12,500 lbs.) projected to utilize the runway. However the existing length is a minimum and essential to support the other investments made at the airport to attract aircraft, i.e., new hangars.
- Runway Pavement on 5-23 should be monitored and scheduled for Rehabilitation accordingly.

Taxiway System

When considering airfield design, it is important to provide an adequate taxiway/taxilane network to provide flexibility in aircraft movements throughout the airport. The taxiway and taxilane network should provide for safe and efficient access between airport facilities and the runway system. Specifically, the taxiways function as the airport's paved network for aircraft movement between the runways and the aprons, while the taxilanes provide aircraft routes on the aprons between the taxiways and terminal area. Both taxiways and taxilanes must adhere to appropriate dimensional criteria based on FAA design standards.

Quonset Airport has a parallel taxiway system (Taxiway A) with stub connectors serving Runway 16-34, and a partial parallel taxiway system (Taxiway W) serving Runway 5-23. There are two primary taxiway deficiencies that exist.

<u>Taxiway A</u>

Approximately 3500 feet of Taxiway A (from Taxiway N to the threshold of Runway 34) does not comply with the FAA design standard for centerline separation from a C-IV runway having visibility minimums below ¾ of a mile. The design standard that must be met is 400 feet. The current separation is only 375 feet.

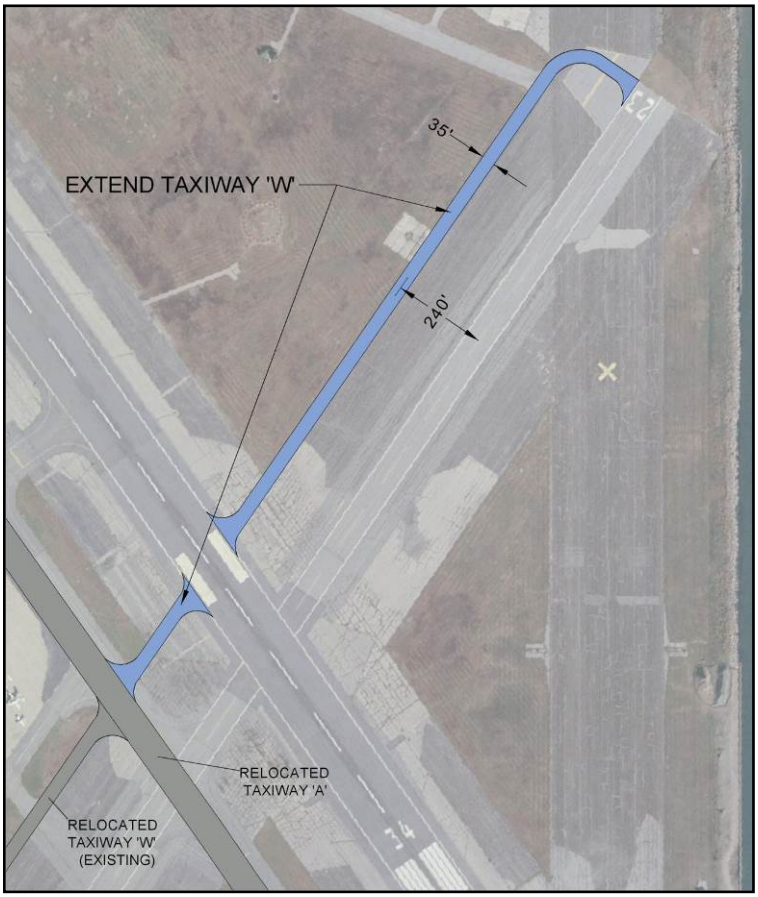
It is recommended that when Taxiway A is due to be reconstructed, it should be relocated such that the runway centerline to taxiway centerline separation is increased to meet the design standard of 400 feet as shown in Figure 4-3. If from a cost – benefit standpoint it is not prudent to move and reconstruct taxiway A, and it can be shown to FAA that it does not compromise an "acceptable level of safety" RIAC should seek an approval for a Modification to Standards from FAA. A Modification to Standards is defined by the FAA as a deviation from the established FAA standards to accommodate a unique condition. As part of this master plan, a request for a modification will be prepared and submitted on behalf of RIAC.

If the facts presented in the request warrant a modification, one will be granted on either a temporary (the Modification of Standards will have an expiration date when it is expected that current standards will be met), or a permanent basis (the Modification of Standard is approved without any time restriction but it is to be re-evaluated in any future project associated with the airport element for which the Modification of Standard was approved).

Taxiway W

The partial parallel Taxiway W has been reconstructed, and meets category B-II separation criteria of 240 feet. It is recommended that this taxiway be extended to the threshold end of Runway 23 in order to eliminate the back-taxi operations that regularly occur on that runway. Such development would not only improve the efficiency of the runway, but will also improve the safety of operations for aircraft using Runway 5-23.

FIGURE 4-5 / TAXIWAY W EXTENSION. *Design and Construct to B-II Standards.*



Taxiway Widths

Pavement width requirements for taxiing airplanes are outlined by the FAA and are based on Taxiway Design Group (TDG) standards which are determined by the undercarriage dimensions of the critical aircraft. For Quonset, that is the overall main gear width (MGW) and the distance from the cockpit to main gear (CMG) of the C-130. The dimensions for the C-130 correlate to a TDG 3 and taxiway widths of 50 feet for those taxiways serving Runway 16-34. Currently Taxiway A and its supporting connector stubs (Taxiways A1, A2, and N) are 60 feet wide and exceed C-IV design requirements.

During the master planning process the ANG has indicated a desire to have Taxiway A widened to 75 feet to support the occasional operations of larger military aircraft. It is important to note that when the taxiway is reconstructed the FAA is likely to only fund the requirements needed to accommodate the critical aircraft (C-130). Since the C-130 only requires a 50 foot taxiway width, any reconstruction costs in excess would be at the expense of the military.

FIGURE 4-6 / TAXIWAY "A" RELOCATION. *Design and Construct to C-IV Standards or Beyond (with military funding)*

Taxiway System Conclusions:

- Prepare a Modification to Standards requesting the FAA to allow the existing 375 foot Taxiway A separation to remain as is.
- When prudent, relocate and reconstruct Taxiway A to meet the 400 foot standard separation requirements.
- Design and construct an extension of Taxiway W to the threshold of Runway 23.
- Upon all future taxiway reconstruction, taxiways serving 16-34 should be designed and constructed to C-IV standards, and taxiways serving 5-23 are should be designed and constructed to B-II standards unless excess design and construction standards are warranted through ANG operational needs and associated funding requirements can be met.

Other Airfield Pavements

As highlighted in the 2006 Master Plan, Quonset has runway and taxiway pavement that far exceeds the current requirements for today's joint civil/military operations.

The current standard width for Runway 16-34 and Runway 5-23 is 150 feet and 75 feet respectively. The former width of these runways for military purposes was 500 feet. While no longer in use, this pavement is still exists albeit in a deteriorated condition. In addition, the pavement for the former Runway 10-28 and Runway 1-19 has never been

removed. The estimated total area of non-essential airfield pavement derived from the 2006 Master Plan is 173,882 square yards or 107.7 acres. It is shown in Figure 4.7.

FIGURE 4-7 / NON-ESSENTIAL AIRFIELD PAVEMENT. *Recommended pavement removal areas*

The deteriorating pavement is generally a contributor to what is referred to as Foreign Object Debris (FOD), and the excessive pavement on each side of Runway 5-23, as well as its similar pavement color, has the potential of causing confusion to pilots in recognizing the defined runway. Additionally, the closed runways may also contribute to any potential confusion.

Therefore, the removal of all unnecessary pavements over time, and the construction of appropriately graded infields will enhance the ability of pilots recognizing the appropriate runway environment and provide environmental benefits to the airport with regard to stormwater.

Other Airfield Pavement Conclusions:

- It is recommended that non-essential pavement be monitored and removed overtime during pavement reconstruction and removed as needed to offset any new pavement development. Further, it would be prudent that as the non-essential pavement is removed over time, the old runway pavement on the east side of the airfield remain in place or be removed last. When it comes time to provide a specific use in those areas, maintaining the integrity of those surfaces may provide a benefit to potential development.

Navigational Aids/Visual Aids and Instrument Approaches

Navigational aids (NAVAIDs) are any visual or electronic devices, airborne or on the ground, that provide point-to-point guidance information or position data to aircraft in flight. Airport NAVAIDs provide guidance to a specific runway end or to an airport. An airport is equipped with precision, non-precision, or visual capabilities in accordance with design standards that are based on safety considerations and airport operational needs. The type, mission, and volume of aeronautical activity used in association with meteorological, airspace, and capacity considerations determine an airport's eligibility and need for various NAVAIDs.

Runway end identifier lights (REILs)

REILs are installed at many airports to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. They are especially effective for identifying a runway during reduced visibility and are recommended at the threshold of a non-precision approach runway when it is not practicable to provide other approach lighting aids. Currently there are no Runway End Identifier lights installed on 34. Upgrading to REILs on the 34 end would provide a significant navigational aid improvement for the airport since that runway end is not served by an approach lighting system.

Instrument Landing System- Runway 16

An instrument landing system (ILS) provides precision guidance to an aircraft approaching and landing on a runway, using a combination of radio signals and lighting arrays to enable a safe landing during conditions such as low ceilings or reduced visibility due to fog, rain, or snow. The existing 8 array Localizer antenna serving the Runway 16 ILS is located approximately 40 feet from the seawall on the approach end of runway 34. It is being replaced with a new 14 array antenna and relocated by the ANG, primarily because maintaining the 8 array antenna is becoming increasingly difficult. This is due to the age of the existing localizer and the availability of replacement parts for repair.

Since the 14 array antenna is much wider, replacing the existing antenna in its current location would require improving a portion of the perimeter road pavement that slopes down toward the seawall in order to support the localizer and reduce the current space used by airport vehicles traveling along the airport perimeter. This can be seen in the photo below. The area in yellow depicts the sloping pavement.

Navaids Conclusions:

- Coordinate with ANG and their efforts to replace the existing localizer 20 feet further from the seawall.
- To improve pilot recognition of the runway environment it is recommended that runway 34 be upgraded to have runway end identifier lights (REILs).

Aircraft Storage and Tie-Down Requirements

Physical requirements of based GA users vary from tie-down aprons to large conventional hangars with major maintenance services and transient aircraft aprons. Conventional hangars and T-hangars protect aircraft from the weather and provide security against vandalism or theft. This section will evaluate the square footage allocated to outdoor aircraft parking versus hangars based on demand. The demand for hangars is generally higher in northern climates such as Rhode Island where winter weather conditions are more severe.

Based Aircraft Tie-downs and Hangars

Aircraft currently based at the airport are accommodated by either a 60,000 SF paved tie-down parking area or in an aircraft hangar. The number of aircraft stored on tie-downs versus hangars varies according to the economics of providing hangars. Currently, there is approximately 18,000 SF of T-hangar space provided for based aircraft. The existing physical condition and layout of many of the existing temporary hangars are in question and is recommended to be improved. The temporary hangars are privately owned with an associated ground lease to RIAC in one month increments.

Airport planning standards with regard to aircraft parking and hangar requirements assume the following:

- 30% of all based single-engine, and multi-engine (non-jet) aircraft will desire tie-down space.
- 70% of all based single-engine, and multi-engine (non-jet) aircraft will desire hangar space.
- All based jet aircraft utilizing conventional hangar space will have a 6,500 SF requirement.
- Each single and multi-engine aircraft on a tie-down will translate to a 300 square yard (2,700 SF) requirement for the aircraft position, inclusive of a factor considering wingtip separation and associated taxilanes.
- A standard 10 Unit T-Hanger measures 231 long by 51 feet wide. This translates into each single-engine aircraft requiring approximately 1180 SF for t-hangar storage space.
- It is assumed that each multi-engine aircraft requiring t-hangar space will have a 1,850 SF requirement.
- A Single-engine aircraft in a conventional hangar is assumed to require 1,500 SF of hangar space.
- A Multi-engine aircraft in a conventional hangar is assumed to require 2,500 SF of hangar space.
- When considering actual build-out potential it is assumed that a single or multi-engine aircraft in t-hangar will require 3,000 SF of total space, including necessary movement areas.
- When considering actual build-out potential it is assumed that a single or multi-engine tie-down aircraft will require 5,000 SF of total space, including necessary movement areas.

Figure 4-8 on the following page depicts the based aircraft storage requirements based on the above criteria and the medium activity forecast scenario identified in Chapter 3.

FIGURE 4-8 / BASED AIRCRAFT STORAGE REQUIREMENTS. *Tie-down/T-hangar/conventional hangar*

MEDIUM FORECAST APRON REQUIREMENTS (30% Of Total)												
Based Aircraft	2013	30%	Total SF Req'd 2013	2015	30%	Total SF Req'd 2015	2020	30%	Total SF Req'd 2020	2025	30%	Total SF Req'd 2025
Single	23	6.9	18,630	24	7.2	19440	28	8.4	22,680	32	9.6	25,920
Multi	5	1.5	4,050	5	1.5	4,050	6	1.8	4,860	7	2.1	5,670
Total	28	8.4	22,680	29	-	23,490	34		27,540	39		31,590
MEDIUM FORECAST T- HANGAR REQUIREMENTS (50% of Total)												
Based Aircraft	2013	50%	Total SF Req'd 2013	2015	50%	Total SF Req'd 2015	2020	50%	Total SF Req'd 2020	2025	50%	Total SF Req'd 2025
Single	23	11.5	13,570	24	12	14,160	28	14	16,520	32	16	18,880
Multi	5	2.5	4,625	5	2.5	4,625	6	3	5,550	7	3.5	6,475
Total	28	13	18,195	29	-	18,785	34		22,070	39		25,355
MEDIUM FORECAST CONVENTIONAL HANGAR REQUIREMENTS (20% of Total SE & ME, and 100% of Jet)												
Based Aircraft	2013	20%	Total SF Req'd 2013	2015	20%	Total SF Req'd 2015	2020	20%	Total SF Req'd 2020	2025	20%	Total SF Req'd 2025
Single	23	4.6	6,900	24	12	7,200	28	5.6	8,400	32	6.4	9,600
Multi	5	1	2,500	5	2.5	2,500	6	1.2	3,000	7	1.4	3,500
Jet	1	N/A	6,500	3	N/A	19,500	5	N/A	32,500	7	N/A	45,500
Total	29	6.6	15,900	29	6.7	29,200	34	11.8	43,900	39	-	58,600

Based on the medium forecast presented in Chapter 3, the requirements for based aircraft are presented in Figure 4-9 below.

FIGURE 4-9 / BASED AIRCRAFT STORAGE REQUIREMENTS. *Summary*

BASED TIE-DOWN, T-HANGAR, AND CONVENTIONAL HANGER REQUIREMENTS (Square Feet)					
	Existing	2013	2015	2020	2025
APRON	60,000	22,680	23,490	27,540	31,590
T-HANGAR	18,000*	18,195	18,785	22,070	25,355
CONVENTIONAL HANGAR	10,000*	15,900	29,200	43,900	58,600

* There are 11 units (of (varying type and design located on the aircraft ramp south of the terminal providing a total of approximately 18,000 square feet of coverage.
* Conventional Hangar space is currently provided by AvPorts who operates a 20,000 square foot hangar, approximately half of which is used for based aircraft and half of which is used for transient aircraft (at the time inventory was collected).

Transient Aircraft Parking and Hangars

Temporary parking for visiting aircraft may be provided on a transient apron adjacent to the terminal building, or on aprons managed or leased by an FBO.

At Quonset, transient aircraft parking is provided in front of the existing terminal. It consists of an area of approximately 65,000 square feet. Existing operations data suggests that this area is sufficient for transient aircraft parking. However, due to the seasonal nature of aircraft operations at OQU, there are periods of high volume when the transient apron is filled to capacity. The photo below depicts the transient apron and the constrained conditions at OQU during peak times.

Average Day Peak Month Operations

ADPM is defined as the peak month divided by 30.5 (365 days/12 months) days. For the purposes of this analysis and based on general planning guidelines, the peak month was assumed to be 10 percent of the total annual operations for the given year. The ADPM operations for the Medium Forecasts are presented in Figure 4-10. Based upon operations data, it is assumed that 30% of the ADPM is comprised of transient traffic, 50% of which is assumed to be jet operations, and the remaining 50% assumed to be single and multi-engine aircraft operations.

Of the total transient operations, it is assumed that 75% will require tie-down space and 25% will require hangar space. The space requirements are assumed to be as follows:

- Jet Aircraft will require 6,500 square feet of transient tie-down apron space

- Single and Multi-Engine aircraft will require 1,600 square feet of transient tie-down apron space

- Jet Aircraft will require 6,500 square feet of transient hangar space.
- Single and Multi-Engine aircraft will require 1,300 square feet of transient hangar space.

FIGURE 4-10 / AVERAGE DAY PEAK MONTH (ADPM) TRANSIENT OPERATIONS.

AVERAGE DAY PEAK MONTH (ADPM) TRANSIENT OPERATIONS				
Operations	2013	2015	2020	2025
Total Operations	16,968	17,949	20,657	23,773
ADPM Transient Activity 10 % of Ops/30.5 * .3	17	18	20	23
Daily Transient Jet Operations	2013	2015	2020	2025
Total Daily Jet	8.5	9	10	12.5
Daily Transient SE & ME Operations	2013	2015	2020	2025
Total Daily Single & Multi-Engine	8.5	9	10	12.5

FIGURE 4-11 / AVERAGE DAY PEAK MONTH (ADPM) TRANSIENT AIRCRAFT REQUIREMENTS. *Apron and Hangar*

AVERAGE DAY PEAK MONTH (ADPM) TRANSIENT REQUIREMENTS				
Year	2013	2015	2020	2025
Total Operations	16,968	17,949	20,657	23,773
ADPM Transient Activity 10% of Ops/30.5 * .3	17	18	20	23
Year	2013	2015	2020	2025
Daily Transient Jet Operations	8.5	9	10	12.5
Transient Jet Apron and Hangar Requirements				
Apron Requirements (75% of Ops * 6,500 SF)	41,500	43,875	48,750	60,950
Hangar Requirements (25% of Ops * 6,500 SF)	13,815	14,625	16,250	20,315
Year	2013	2015	2020	2025
Daily Transient SE & ME Operations	8.5	9	10	12.5
Transient Single and Multi-Engine Apron and Hangar Requirements				
Apron Requirements (75% of Ops * 1,600 SF)	10,200	10,800	12,000	15,000
Hangar Requirements (25% of Ops * 1,300 SF)	2,800	3,000	3,250	4,065
Total Transient Aircraft Requirements	**2013**	**2015**	**2020**	**2025**
Apron/Tie-Down	**51,700**	**54,675**	**60,750**	**75,950**
Hangar	**16,650**	**17,625**	**19,500**	**24,380**

FIGURE 4-12 / AVERAGE DAY PEAK MONTH (ADPM) TRANSIENT REQUIREMENTS. *Summary*

Total Transient Aircraft Storage	Existing Available (SF)	2013	Surplus/ (Deficit)	2015	Surplus/ (Deficit)	2020	Surplus/ (Deficit)	2025	Surplus/ (Deficit)
Apron/Tie-Down	65,000	51,700	13,300	54,675	10,325	60,750	4,250	75,950	(10,950)
Hangar	10,000	16,650	(6,650)	17,625	(7,625)	19,500	(9,500)	24,380	(14,380)

Based on the requirements presented above, a summary of based and transient aircraft storage requirements include the following:

- Existing conditions at the Airport provide sufficient based tie-down space through the planning period of 2025.
- Existing based T-hangar accommodations are insufficient.
- Transient apron space is forecasted to be deficient between the year 2020 and 2025.
- Existing transient hangar space is currently deficient.

Aircraft Storage and Tie-Down Development Capabilities

Figure 4-2, and Figure 4-13 provide the estimated aircraft storage potential of Area A, B, and F. The calculations indicate that these three areas are sufficient to accommodate aircraft hangar requirements through the 2025 planning period, and beyond. When RIAC conducts a future update to this plan, Areas C and D, would require re-evaluating automobile access to those areas. For planning purposes, Area E in the northwest quadrant in the vicinity of the golf course is reserved for potential ANG expansion and is not accounted for in Figure 4-13 or the portion of Figure 4-14 that follows.

FIGURE 4-13 / DEVELOPMENT AREAS A, B AND F CAPACITY. *Estimate based on fixed space and movement requirements and fleet mix.*

AREA A	Existing Avialable (SF)	Jet Capacity 20% of Total @ 6,500 sf/aircraft	Single/Multi Tie-Down 30% of non-jet @ 5,000 sf/aircraft	Single/Multi T-Hangar 50% of non-jet @ 3,000 sf/aircraft	Single/Multi Engine Conventional Hangar 20% of non-jet @ 2,000 sf/aircraft	Total
OLD TERMINAL AREA	147,250	5	7	20	12	50
EXISTING BASED APRON	120,000	4	6	16	10	41
PARCEL EAST OF ATCT	19,000	0	1	3	2	7
PROPOSED DEVELOPMENT	202,000	*Predetermined(0)*	*Predetermined(0)*	*Predetermined(45)*	*Predetermined(0)*	45
AREA A TOTAL	488,250	9	14	84	14	121
AREA B						**Total**
	510,000	15	25	68	40	148
AREA F						**Total**
	290,000	9	14	39	23	85
AREAS A, B, F						**Total**
	1,288,250	33	53	191	77	354

Figure 4-13 shows that based on storage requirements and movement area assumptions for aircraft T-hangars. The full build out of Areas A, B, and F, can realistically accommodate 350 aircraft. This is based on the assumed fleet mix and space requirements for tie-downs, T-hangars, and conventional hangars. It also utilizes the proposed layout for the private development referred to as "The Landings at Quonset". These calculations assume that the space is designed in the most efficient manner, and assumes the percentages of tie-down and hangar needs as indicated above. "The Landings at Quonset" development proposal does not currently provide the most efficient use of the area. Therefore an evaluation was conducted by the study team to determine the most efficient layout for T-hangers on the proposed parcel. The analysis concluded that a more efficient use of that space could accommodate approximately 60 aircraft as opposed to the 45 aircraft suggested by the proposed private development.

Since actual transient and based aircraft space requirements are based on aircraft type and vary greatly, the actual capacity of these individual areas are difficult to estimate. Therefore, when proposals are submitted to RIAC for aircraft storage development on a particular parcel in the future, it is recommended that RIAC evaluate the layout proposed and compare it to the maximum build-out capacity and forecasted needs of the Airport.

Figure 4-14 on the following page shows a suggested development scenario within Areas A and F throughout the planning period. The areas are sufficient to accommodate both transient and based development needs through 2025. It is understood that the development shown is contingent upon actions that must occur for this plan to be realized. These include the following:

- Existing temporary T-hangars relocated to the proposed development area between the control tower and the Air Museum.
- Proposed development reconfiguration
- Removal of the Old Terminal building

FIGURE 4-14/ AREAS A, B AND F DEVELOPMENT SCENARIO. *Based on fixed space and movement requirements and fleet mix.*

The particular areas shown with proposed development can be seen in more detail in Chapter 6 (Airport Layout Plan) of this report.

Hangar and Apron Conclusions:

- There is sufficient apron tie-down space for based aircraft through 2025.
- There is insufficient T-hangar space for the existing based.
- There is insufficient conventional hangar space for transient aircraft.
- Based on the forecast there is insufficient apron space for transient aircraft after 2020.
- The "temporary T-hangars" area should be relocated to the area between the ATCT and the Air Museum. The area freed of the temporary T-hangars should be redeveloped so the area is effectively used for based aircraft.
- The Old Terminal building should be demolished and the area developed for conventional hangars.
- The proposed layout of "The Landings at Quonset" and its efficiency should be re-evaluated by RIAC.

General Aviation Support Facilities

General aviation (GA) encompasses a variety of users and activities, such as corporate flight departments, cargo operators, recreational flyers, business commuters, flight training, agricultural applications, law enforcement, and fixed base operators (FBOs). As such, GA needs include aircraft storage facilities, transient parking aprons, terminal facilities, automobile parking areas, vehicle access from adjacent roads, as well as facilities that support and promote the activities of airport operators. This section analyzes the following:

- Fuel Farm Facilities
- Snow Removal Equipment (SRE) Facilities
- Automobile Parking
- Quonset Air Museum

Fuel Farm Facilities

Airport fuel farm facilities primarily exist in centralized locations either near the terminal building or near the perimeter of the airport property boundary. Depending on the airport size, fuel facilities can be a single, self-service station; or for larger operations, it may include a fuel farm with multiple storage tanks. At GA facilities, fuel farms serve as a source for mobile fuel trucks to re-supply aircraft. Fuel farm facilities may also provide storage for ground service equipment (GSE) that operates on the airport.

At Quonset they are located east of the old terminal building in the vicinity of the based aircraft tie-downs, the existing fuel farm is comprised of one above ground 12,000-gallon Avgas tank, and one 12,000-gallon Jet-A tank The current capacity is sufficient for existing operations. However, the fuel farm is located within the Runway Visibility Zone (RVZ) and does not meet FAA standards. The standard requires the RVZ to remain clear of all permanent objects and thus requires the fuel farm to be relocated. The existing fuel farm relative to the RVZ is shown in Figure 4-15.

FIGURE 4-15 / EXISTING FUEL FARM LOCATION INSIDE THE RVZ

It is recommended that the fuel farm be relocated to a portion of the existing terminal parking lot within Area G on Figure 4-14. This area appears to be a suitable location that would provide adequate access for fuel deliveries and would also provide an area for expansion should the airport require additional fuel storage in the future. An alternative area between the existing based aircraft tie-down area and the new Air Traffic Control Tower was considered in the 2006 Master Plan. That area encompasses a parcel that has been used to relocate the Airport's electrical vault. When reviewing future GA development plans, RIAC should also consider an area that is suitable for a general aviation self-fueling island.

Airport Snow Removal Equipment (SRE) and Maintenance Facilities

A wide range of services falls under the umbrella of airport maintenance. The facilities that support these services generally consist of buildings for the maintenance of equipment and general supply storage. Specifically, these types of buildings include those for ground service equipment (GSE) storage and maintenance, electrical repair (buildings and visual navigational aids), painting (buildings and airfield markings), and mechanical repair. Airport Ground Service (GSE) facilities may house equipment and vehicles such as those used for snow removal equipment (SRE), general property maintenance (lawn care), materials storage (sand and salt), and aircraft ground servicing.

To protect and service this expensive investment, specifically designed maintenance buildings with adequate storage areas are needed. It is also advantageous to include additional space within such buildings to store non-winter type equipment, such as airfield lighting and vegetation management equipment.

As described in the Inventory chapter, the only facility for SRE, GSE, and Airfield Maintenance, are the two maintenance bays located on the north end of the old terminal building. This building must be removed within the planning period to provide for development space adjacent to the new terminal building. Currently, there is no storage facility for any of the airport's snow removal equipment. The equipment is currently parked airside southwest of the new Air Traffic Control Tower, and is exposed to the elements year-round.

Based on discussions with Airport Management and Operations staff it is recommended that a portion of the approximate 90,000 SF area east of the existing waste treatment facility (Area "3") be reserved for future SRE and Maintenance building development.

This area is also shown in Figure 4-14 and would require coordination with QDC. Alternate areas were considered within area "A", "C", and "D" but those areas were determined to be best reserved for future aeronautical use, or deemed too remote to provide a suitable location. The Figure below shows a more detailed view of the recommended area.

FIGURE 4-16 / PROPOSED SRE DEVELOPMENT AREA. *Approximately 90,000 SF*

Automobile Parking Facilities

Generally, at GA facilities, automobile parking is provided in surface lots, facing the terminal or on the side of the terminal. This section will look at the existing automobile parking area provided at the airport relative to airport activity.

Existing automobile parking is provided adjacent to the existing terminal. It consists of approximately 130 spaces and as previously mentioned is in excess of what is needed. Airport administration and FBO personnel have indicated that the automobile lot associated with the terminal is currently used to 50% capacity during peak operations. This supports the previous conclusion that a portion of this automobile lot (Approximately 30 spaces) be used for fuel farm relocation while still being able to provided necessary automobile parking.

Quonset Air Museum

The Quonset Air Museum Shown in Figure 4-16, occupies approximately 180,000 SF of Parcel F. The entirety of Parcel F is approximately 290,000 SF. The area currently used for the Air Museum is, by virtue of its location adjacent to the runway/taxiway system, ideally suited to provide expansion to Parcel A shown in Figure 4-14. As documented in the previous master plan, in September 1992 the Air Museum signed a 30-year lease with the State of Rhode Island. The current lease extends through August of 2022. Any such expansion of Parcel A before the lease is expired would necessitate the relocation of the museum to another suitable site on the airport. That requirement would fulfill the conditions of the original lease. This plan concurs with the 2006 AMP recommendation that; Area "1", currently designated for non-aeronautical use, would provide a suitable location for the Air Museum. Considering the airside access of Area F, a relocation of the Air Museum would provide for expansion of Area A for aeronautical uses.

FIGURE 4-17 /QUONSET AIR MUSEUM AND ADJACENT AREA. *Approximately 290,000 SF*

Preferred Seawall Improvements

As mentioned in the introduction to this report, a special focus of this master plan update was to conduct a condition assessment of the seawall and provide recommendations for repair.

Alternatives to repair the existing 8,969 linear feet of bulkhead/shoreline in the condition survey area have been analyzed and described in detail within Appendix A: Seawall Analysis. The report provided two potential alternatives to repair the existing seawall.

The first alternative involves over sheeting the existing bulkhead system using a new vertical steel bulkhead system. This alternative can be an anchored bulkhead system, as currently exists, or it can be a cantilever bulkhead system.

The second alternative is to construct a sloped revetment system behind the entire bulkhead area. It is anticipated that any new or modified revetment system will need to be located behind the existing bulkhead due to the potential for RICRMC, Rhode Island Department of Environmental Management (RIDEM), and United States Army Corp of Engineering (USACOE) permits.

It was determined that the over sheeting alternative would maximize the land area at the airport by allowing the fill to be graded relatively flat to the location of the new bulkhead system. In this repair alternative, new steel sheet piles would be installed approximately 1-foot beyond the face of the existing sheets and would minimize impacts to the airport's existing footprint.

Airport System Plan Performance Assessment

The State of Rhode Island Airport System Plan was adopted as a component of the State Guide Plan (SGP) Element 640 in 2011. It established a Performance Assessment for the six State airports to examine the airport system as a whole and how the individual airports interact together. The plan provided clearly defined roles for each airport in consideration of state, regional, and local goals and policies. The plan documented the public use airports, assessed their needs, and recommended improvements in order for the airports to function effectively in their designated roles. The Table below summarizes the existing facility performance of OQU, based on the performance measures published in the 2011 plan and compares them to the existing conditions (2013).

FIGURE 4-18 / 2011 STATE OF RHODE ISLAND SYSTEM PLAN. *Facility performance measures summary.*

RHODE ISLAND STATE AIRPORT SYSTEM PLAN FACILITY PERFORMANCE – QUONSET STATE AIRPORT		
BENCHMARK	2011-MEETS PERFORMANCE MEASURE	2013-MEETS PERFORMANCE MEASURE
Access Road Functionality	Yes	Yes
Auto Parking	No	Yes
On-Site Ground Transportation	Yes	Yes
Precision Approach	Yes	Yes
Non-Precision Approach	Yes	Yes
Weather Reporting	Yes	Yes
Primary Runway Length	Yes	Yes
Crosswind Runway Length	No	Yes
Runway/Taxiway Separation	No	No
"Good" Pavement	Yes	Yes
Runway Safety Area	Yes	Yes
Primary Surfaces	Yes	Yes
Runway Protection Zones	No	No
Runway Object Free Areas	No	No
Unobstructed Approaches	No	No
Security	No	No
Runway System Capacity	Yes	Yes
Aircraft Hangar Storage Capacity	Yes	No
Aircraft Apron Capacity	Yes	Yes

The System Plan noted that the general aviation activity in Rhode Island has been artificially suppressed by the lack of adequate facilities. In order to gain a clearer airport user perspective, the ASP conducted a user survey. The following table summarizes the top facility improvements for Quonset provided by 55 pilots that completed the survey.

FIGURE 4-19 / 2011 STATE OF RHODE ISLAND SYSTEM PLAN. *User Survey Results.*

2011 RHODE ISLAND STATE AIRPORT SYSTEM PLAN USER SURVEY RESULTS (Facilities)	
Improvement	Description
Hangars	Pilots noted Hangars as the most needed facility at the Airport
Restaurant	Pilots noted their desire of a full service restaurant at the Airport
Parallel Taxiway	Pilots noted their desire for a full parallel taxiway servicing RWY 5/23
NAVAIDS	Pilots noted their desire for Visual NAVAIDS for RWY 5/23

Facility Requirements and Preferred Development Summary

- Runway 16-34's parallel taxiway (Taxiway A) does not fully meet the FAA standard separation requirements (400 feet) for a Group C runway having visibility minimums below ¾ mile. It is deficient by 25 feet.
    - In the interim, a "Modification to Standard" request will be prepared and submitted.
    - Meanwhile, RIAC should plan to relocate Taxiway A to meet the FAA separation standard of 400 feet.
- Runway 5-23 has been planned for rehabilitation in 2019.
    - Although the runway pavement is currently rated in good condition, RIAC should seek to rehabilitate this runway in conjunction with the ANG in a manner that supports the mission of the ANG.

- Upon the construction or improvement of airport runways, taxiways, or aprons, RIAC should remove areas of unnecessary pavement to provide airfield environment and drainage benefits.

- Taxiway W serves as a partial parallel taxiway that serves Runway 5-23
    - It is recommended that Taxiway W be extended to the threshold end of Runway 23 in order to eliminate the back-taxi operations that regularly occur on that runway. This improvement will improve the safety and efficiency of the runway.

- Runway 34 is not equipped with Runway End Identifier Lights.
    - It is recommended that this runway obtain a navigational upgrade by installing REILs on Runway 34

- The existing fuel farm is recommended to be relocated outside of the RVZ, to a portion of the existing terminal automobile parking lot which would provide sufficient area for additional fuel storage if necessary.

- The existing 8 array localizer is scheduled to be replaced by a new 14 array system. Doing this requires grading improvements at the approach end of Runway 34.
    - It is recommended that RIAC support the ANG's efforts and prepare the pavement such that the new localizer can be properly installed.

- The existing fuel farm is currently within the Runway Visibility Zone (RVZ).
    - It is recommended that the fuel farm be relocated outside of the RVZ, to a portion of the existing terminal automobile parking lot which would provide sufficient area for additional fuel storage if necessary.

- The airport currently stores its snow removal equipment (SRE) outside which makes it subject to the elements and the potential of reducing the equipment's useful service life.
    - It is recommended that the airport coordinate with QDC and construct a dedicated SRE/Maintenance Building on a parcel of land adjacent to the airport, east of the wastewater treatment facility.

- The Quonset Air Museum is currently located on a parcel of land that is best suited for aeronautical use and future aircraft storage and tie-down development expansion.
    - It is recommended that RIAC monitor corporate aviation development interests on that site and upon lease termination in 2022; suggest the relocation of the Air Museum to a parcel of land in the northeast quadrant of the airport that has been suggested for non-aeronautical use.

- This APMPU looked to determine and document the existing seawall condition and provide repair alternatives.
    - As described in Appendix A, it is recommended that RIAC repair and over sheet the existing bulkhead system using a new vertical steel bulkhead system, in the phased approach outlined in Appendix A.

4.3 ENVIRONMENTAL REVIEW

The purpose of this section is to provide an overview of the environmental effects of the recommended projects and to define the potential extent of future environmental analyses that are needed to implement the airfield improvements shown on the ALP.

This environmental review, while not a formal environmental assessment (EA), will consider the environmental elements described in FAA Advisory Circular 150/5070-6A, FAA Order 5050.4B, Airport Environmental Handbook, and relevant Rhode Island environmental regulations and procedures. Unless otherwise identified as "Categorically Exempt" an EA will be necessary for the projects on the ALP that are anticipated to be implemented in the short-term (5 year) planning period. An EA would be conducted after FAA approval of the ALP for those projects identified in the short-term planning period, known as Phase 1. An EA will include an opportunity for public comment and involvement. This section will also define any "Categorically Exempt" improvements as defined by FAA Order 5050.4B, as well as identify any possible mitigation measures or modifications to the Draft ALP to avoid or mitigate environmental impacts.

With regard to the development options, this section addresses the following:

- Noise Impacts
- Land Use
- Air Quality
- Water Quality
- U.S. Department of Transportation Act Section 4(f) Lands
- Historic, Architectural, Archaeological, and Cultural Resources
- Biotic Communities
- Threatened or Endangered Species of Flora and Fauna
- Wetlands
- Floodplains
- Coastal Zone Management
- Coastal Barriers
- Wild and Scenic Rivers
- Farmland
- Energy Supply and Natural Resources
- Light Emissions
- Solid Waste Impact
- Environmental Justice
- Summary

Noise Impacts

Aircraft noise is often one of the most significant environmental issues associated with airports because of the potential it has to disrupt communities adjacent to airports. Because this issue is so important, standard noise models have been developed to analyze the effects of aircraft noise on land both on and off the airport. To address and alleviate noise problems where they exist around an airport various measures are available to address these problems.

With respect to Quonset State Airport, the projects proposed in this Master Plan are not designed to generate any changes in the type, size or number of aircraft operating to or from the airport. As a result significant noise impacts are not anticipated. If necessary, noise impacts will be evaluated as part of the subsequent EA process.

During construction, short term increases in noise levels associated with standard construction activities will occur in the project areas during standard daylight working hours due to the use of equipment that may include bulldozers, loaders, and dump trucks. Increased noise levels are only expected on a temporary basis, and are not expected to

occur beyond the project's completion. Some change in noise patterns on the airport could occur as a result of the potential construction of new T-hangars, relocation of the fuel farm and Quonset Aviation Museum, and other proposed projects.

Land Use

All project components are located on Airport property and are consistent with aviation uses. The project is not growth inducing and will not have land use ramifications, such as disruption of communities or relocation, beyond the airport boundaries. Some minor changes in traffic patterns may occur if the Quonset Air Museum is relocated from its current location at 488 Eccleston Avenue on the west side of the airport to a location off of Thompson Road northeast of the airport. An increase in traffic volume along Thompson Road is expected to be minimal, on the order of 10-20 additional vehicles per day based on discussion with RIAC staff. Consequently, no potential adverse effect is anticipated.

Air Quality

As stated in Section 2 of the Draft Master Plan, an air quality assessment for long term impacts is not required for proposed projects that will not increase the current OQU passenger and operations numbers. The FAA thresholds are based on an understanding that small airports with limited operations like OQU have been found to have essentially no impact on air quality.

The proposed projects would pose no permanent impact to air quality. A temporary effect would potentially occur as a result of use of fresh asphalt necessary for construction of expanded taxiways and parking areas, etc. Additional construction vehicle traffic and activity would also have a temporary impact on air quality resulting from fugitive dust emissions as well as short-term emission of air pollutants originating as the by-product of construction equipment fuel combustion during the construction and demolition phases. Air pollutant emissions would be minimized by the relatively short duration of the proposed projects and the limited amount of earth disturbance associated with the demolition phases of the projects. In addition, air quality impacts are not expected to extend beyond the immediate vicinity of each project area and no impacts are expected following completion of the projects.

The appropriate mitigation measures identified in FAA AC 1505370-10, Standards for Specifying Construction at Airports, should be followed during the proposed projects. In addition, FAA specifications included in *Temporary Air and Water Pollution, Soil Erosion, and Siltation Control* should be included in the project contract documents to ensure that construction impacts to air quality be minimized.

Water Quality

Any new development, such as the construction of new corporate or conventional hangars, T-hangars, the extension of Taxiway "W", relocating the Quonset Aviation Museum, and development of a snow removal equipment (SRE) facility will require that water runoff be properly collected and treated. As such, any new development projects at OQU requires consultation with federal, state, and local agencies with respect to water quality. The coordination process requires that a description of the proposed development be sent to the appropriate agencies requesting a determination of water quality impacts.

AvPorts Management (AvPorts) is responsible for airfield deicing activities at OQU. AvPorts applies minimal quantities of sand and ice melting products to airport roads, parking lots, and sidewalks during the winter, as necessary. Potassium acetate has been used at the airport as a runway deicer since 2007. The potassium acetate is in liquid form and is applied by a truck equipped with spray bars. Potassium acetate is stored in a tow behind a trailer with a capacity of 1,000 gallons and a fiberglass storage tank with a capacity of 5,000 gallons. AvPorts maintains daily usage logs and provides RIAC monthly usage and inventory reports. The proposed projects are not expected to change deicing activities in any way that would have significant impacts on surface water or groundwater quality.

Surface Water

Section 401 of the Federal Clean Water Act (1972) requires applicants for Federal permits for projects that result in a discharge to waters (including wetlands) of the State of Rhode Island to obtain a State Water Quality Certification (WQC). Projects that fall under the U.S. Army Corps of Engineers (USACOE) Programmatic General Permit (PGP) and require a RI Department of Environmental Management (DEM) Freshwater Wetlands Act (FWA) permit receive the WQC through the PGP review process. For projects that require a so-called individual permit from the USACOE and a DEM FWA permit, the WQC will be issued through the FWA review process.

Applicable activities that likely will require a WQC include those involving any filling of wetlands and/or the waters of the State of Rhode Island. These potentially include repair of the existing 8,969 linear feet of seawall along Narragansett Bay and upgrade of the visual NAVAIDs along Runways 5 and 23. Alternatives for both of these proposed projects could include encroachment into Narragansett Bay. These alternatives would likely require permitting through the Rhode Island Coastal Resources Management Council (CRMC), DEM, and the USACOE. Potential impacts of the proposed projects on wetlands are discussed further in Section 7.9. Since erosion controls will be maintained throughout the duration of the proposed projects, adverse impacts to surface water are not expected to occur during or following completion of the proposed projects.

Ground Water

The Airport is located within an area with groundwater classification GB, meaning water that is unsuitable for drinking water purposes without treatment. The airport is connected to the municipal sewer system and the proposed projects would therefore not have potential impacts on groundwater via sewage discharge. The proposed projects will result in an increase in the amount of disturbed lands to approximately 6 acres should all development alternatives be realized. Proper erosion controls will be maintained throughout the duration of the proposed projects and therefore the proposed projects will not result in the discharge of water or pollutants to groundwater.

The final design of the proposed airport projects must take groundwater protection into account and ensure that all state and local groundwater protection regulations are followed or exceeded.

Drinking Water

The airport receives its drinking water supply from a system of three wells operated by the Quonset Development Corporation (QDC) and fed by the Hunt River Aquifer in the southern part of the City of Warwick, north of, and upgradient from the airport. There are no wellhead protection areas within one mile of the airport, as mapped by the DEM (2010). Based on the lack of significant adverse effects to surface water and groundwater described in Sections 7.4.1 and 7.4.2, no significant adverse impacts to drinking water on the airport property or its vicinity are anticipated as a result of the proposed projects.

Stormwater

Construction projects that disturb one acre or more of land and where stormwater runoff drains to waters of the United States are required to seek coverage under a Rhode Island Pollutant Discharge Elimination System permit. To receive coverage under the permit, an applicant must complete and certify a Notice of Intent and implement a Storm Water Pollution Prevention Plan (SWPPP) to control sedimentation and erosion during construction. Upon completion of the project, the applicant must complete and submit a one-page NOI certifying that disturbed soils at the construction site are stabilized, temporary erosion and sediment control measures have been removed and all stormwater discharges associated with the construction activity have been eliminated.

Airport operations are regulated by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) authorized by Section 402 of the Clean Water Act. The NPDES permit program controls water pollution by regulating "point sources," i.e., pipes, man-made ditches and so on, that discharge pollutants into waters of the United States. The State of Rhode Island is authorized by the EPA to administer this program within Rhode Island, and the DEM Office of Water Resources is the administering authority within Rhode Island. Accordingly, consistent with this authority, DEM has issued its own general permit for industrial activity. Specific activities at Quonset Airport subject to NPDES include aircraft maintenance, cleaning and deicing activities, among others. Portions of the airport are also within the jurisdiction of the CRMC.

Original development of the airport property and the subsequent construction of additional facilities and support structures altered the site's natural hydrology by installation of runways, buildings, parking areas, etc. Slight additional alterations to stormwater flow at the Airport will result from the proposed projects, including changing the amount of impervious surface by:

- New general aviation hangars and taxiway W connection at the current location of the Quonset Aviation Museum (The Landings at Quonset Development);
- Movement of Taxiway A and reconstruction of this taxiway to meet the design standard separation requirements;
- Extension of partial parallel Taxiway W to the threshold end of Runway 23;
- Relocation of the fuel farm outside of the Runway Visibility Zone;
- Development of a new SRE/Maintenance facility;
- Removal of unnecessary pavement in the runways, which have widths in excess of those required for GA use, due to the former military use of the airport. The estimated total area of unnecessary airfield pavement derived from the 2006 Master Plan is 107.7 acres;
- Hangar development west of Runway 5 starting with Phase 1 development that includes two 60' x 60' box hangars;
- Removal of the Old Terminal Building; and
- Relocation of Quonset Aviation Museum.

Construction of these features would require construction of new storm drainage best management practices and modification of the airport SWPPP. Mitigation measures will be developed as necessary to prevent stormwater-related impacts that might occur during construction. The removal of 107.7 acres of pavement over time will enhance the infiltration of stormwater into the subsurface and reduce the amount of runoff. The total area of new impervious surface would be approximately 6 acres if the proposed projects were implemented over the planning period. Although there would be a net decrease in impervious surface at the airport, temporary increases in pavement area could result depending on the timing of the proposed projects. Engineering controls to eliminate the potential effects of increased impervious surface, including increased peak stormwater runoff, would be considered in design of the proposed projects.

U.S. Department of Transportation Act Section 4(f) Land

No adverse impacts to Section 4(f)/6(f) properties (publicly owned parks, recreation areas or wildlife refuges) are anticipated as a result of the proposed projects. The development of GA hangars at The Landings at Quonset on Eccleston Avenue may result in more GA flights over Compass Rose Beach (QDC, 2013); however it is not believed that these additional flights will adversely impact use of the beach. No measures to mitigate potential impacts resulting from the proposed action appear warranted.

Historic, Architectural, Archaeological, and Cultural Resources

Effects on cultural resources within the airport can result from project-related activities such as facility operations, modifications to project facilities, or other project-related ground-disturbing activities. The type and level of effects on cultural resources can vary widely, depending upon the setting, size, and visibility of the resource, as well as whether there is public knowledge about the location of the resource.

Eight structures within the airport have been determined to be eligible for the National Register of Historic Places as part of the former Quonset Point Naval Air Station, including Landplane Hangar 1, the Old Terminal Building, and the Synthetic Training Unit (six structures). The Old Terminal Building is planned for demolition as part of the proposed projects. Under Section 106 of the National Historic Protection Act (NHPA), any undertaking that uses any form of federal funds must be reviewed by federal and state preservation agencies if a property listed in or eligible for the National Register is affected. Prior to potential demolition of listed structures consultation with the Rhode Island State Historic Preservation Office should occur. The SHPO may require mitigation that could include moving an affected structure, documentation or salvage.

As described in the 2003 Master Plan Update the historic places at Quonset Point are governed by the 1978 "memorandum of agreement" among the national Advisory Council on Historic Preservation, the General Services Administration, and the Rhode Island Historical Preservation & Heritage Commission (RIHPHC). The three stipulations specified for mitigation of adverse effects described in Chapter 2 (Environmental Inventory) shall be followed for any historic features affected by the proposed projects.

A field inspection of the airport prior to implementation of the proposed projects will involve a walkover, photographic documentation of the existing conditions at OQU including all buildings, and a review of documentation available at the facility regarding the land-use history at the facility (e.g., cut and fill areas, documented depth of disturbance, etc.) and development through time.

Following the site visit and a review of the findings, research will be conducted at the RIHPHC and the Rhode Island Historical Society (RIHS) to develop historic and prehistoric contexts of the OQU vicinity. After compiling and interpreting the field inspection and background research findings, Berger will meet with the RIHPHC to discuss potential cultural resource impacts and possible mitigation alternatives. Project work will be coordinated with local tribal representatives, as needed.

Biotic Communities

As described in Section 2, Quonset Airport is located on the Narragansett Bay shoreline and has the highest number of bird strikes and wildlife incursions among Rhode Island airports. The airport consists of previously cleared and developed lands, runways, roads and support structures. The majority of the vegetation found within the developed area of the airport consists of mowed grasslands. Although there are natural habitats including managed grasslands and wetlands within and surrounding the airport property, the proposed projects would be largely confined to developed areas of the airport, thereby avoiding large impacts on natural areas. Wildlife species that congregate around the airport are typically highly mobile and may be temporarily displaced or disturbed during construction and demolition activities. However, potential impacts to biotic communities are not expected to be adverse. Potential increases in aviation traffic could result in corresponding impacts on numbers of bird and wildlife strikes. This potential impact would be addressed through compliance with the Quonset Airport Wildlife Management Plan described in Section 2.3.9.

Threatened or Endangered Species of Flora and Fauna

According to the U.S. Fish and Wildlife Service (FWS), no Federally-listed or proposed, threatened or endangered species are known to occur on airport grounds and there are no critical habitats in the project area. Based on a letter provided by the FWS in response to an inquiry by Berger, preparation of a Biological Assessment or further consultation under Section 7 of the Endangered Species Act is not required. A copy of the letter is included within this report. The 2006 Master Plan listed the Least Tern (Sternula antillarum) as a federally-listed threatened species known to nest on airport property; however, the Least Tern was not listed by the FWS during the current consultation. The Least Tern is no longer listed as threatened or endangered in Rhode Island, based on a review of the FWS website database and consultation. The proposed projects are not expected to have adverse effects on threatened or endangered species and any required mitigation measures will be identified during consultation with the DEM and CRMC.

Wetlands

Work in wetland areas in Rhode Island is regulated by the DEM's Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (1998). Under those regulations, a proposed project or activity which may alter freshwater wetlands requires a permit from DEM. Altering or filling of wetlands is administered on the federal level by the EPA and USACOE. As described in Section 2 (Environmental Inventory) the USACOE's programmatic general permit (PGP) for the review of proposals in coastal and inland water and wetlands within the State of Rhode Island eliminates the need to apply to both the USACOE and the DEM's Freshwater Wetlands Program. Thus any permit issued by the DEM under the PGP will also satisfy Federal wetlands permitting requirements. The proposed projects would also be subject to CRMC review due to proximity to coastal wetlands.

The airport is largely on filled, developed, paved land and it is largely lacking in wetlands. A wetland system exists to the west of the threshold end of Runway 16 at the north side of the airport, including adjacent to or within proposed development Area E. Narragansett Bay, considered Estuarine Open Water, bounds the eastern and southern edge of the airport. Several projects are proposed adjacent to Narragansett Bay including NAVAID improvement, seawall repair and maintenance, pavement removal, and Quonset Aviation Museum relocation. Figure 4-20 shows wetland areas proximate to Quonset Airport based on this delineation.

DEM regulates a 50 foot perimeter wetland (i.e. buffer zone) around wetlands (swamps, marshes, bogs, ponds); and 100- and 200-foot riverbank wetlands (i.e. buffer zone) adjacent to rivers and streams depending on their width. When the mean channel width is less than ten feet, the riverbank wetland is 100 feet. When the mean channel width is ten feet or more, the riverbank wetland is 200 feet. Based on these criteria, if the ANG chose to expand beyond Area E as shown in Figure 4-8, the potential exists that such development would be located partially within a wetland buffer zone. As previously stated the proposed projects adjacent to Narragansett Bay would be subject to CRMC review.

FIGURE 4-20 / WETLAND LOCATION MAP.

Floodplains

Much of the airport lies within the 1% annual-chance flood event (also known as 100-year flood) of Narragansett Bay and a coastal high hazard area. Some of the airport lies within the 0.2% annual chance flood event (also known as 500-year flood). The only portion of the airport that lies outside of these flood zones is the northern end, off of Runway 16.

The most recent Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Washington County, Rhode Island at the time of review was dated October 19, 2010. As described in Section 2.3.8 FEMA issued a Letter of Map Revision in July 2011 that described its determination that a revision to the flood hazards depicted in the 2010 FIRM was required. This change resulted in a portion of the airport previously identified as "VE" (areas at additional risk of wave damage) being reclassified as "AE", portions of the 1% annual-chance flood outside of the higher wave damage risk area. This reclassification may have some effects for the proposed projects as less fill material and reduced height requirements may be required in AE areas than in VE areas. Development in these areas is not prohibited, but must meet floodplain management requirements. Proposed structures are also subject to the Rhode Island State Building Code. Determination of specific land development and building requirements will be made during project design and regulatory review.

The removal of 107.7 acres of impervious surface over the 20 year planning period will more than offset proposed new areas of impervious surface, estimated to be about 20 acres. This reduction would have potential beneficial effects on the occurrence and frequency of flooding on the airport property.

Coastal Zone Management

The proposed projects will have to undergo review for coastal and freshwater wetlands since the projects are within CRMC jurisdiction. Primary project impacts could occur during construction of new NAVAIDs and during rehabilitation of the existing seawall; however, appropriate mitigation measures will be put in place to eliminate impacts from construction. Construction of the proposed projects is not expected to have a significant impact on the coastal environment.

Coastal Barriers

The Coastal Barriers Resource Act of 1982 (Public Law 97-348) prohibits most federally financed projects from occurring within the Coastal Barriers Resource System along the Atlantic or Gulf coasts. The Act applies to some areas on the shores of the Atlantic Ocean, including Quonset Airport. Coastal barriers are natural landforms such as islands or spits that are comprised of sand and gravel, along the coast and separated from the mainland by a coastal pond, tidal water body, or coastal wetland. Quonset Airport is fully developed and does not contain any coastal barriers; some do exist to the south of the airport in North Kingstown (Edwards & Kelcey, 2006). The proposed projects are not anticipated to impact any coastal barriers.

Wild and Scenic Rivers

The U.S. Department of the Interior maintains an inventory of river segments nationwide that appear to qualify for inclusion in the National Wild and Scenic River System. Since there are no rivers, including rivers designated by The Wild and Scenic Rivers Act, in Rhode Island or the airport vicinity, the proposed projects will not have any significant effect on Wild and Scenic Rivers.

Farmland

The Federal Farmland Protection Act is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assists in ensuring that Federal programs are administered to be compatible with state and local government, and private programs and policies to protect farmland.

Farmland is broken into the following categories by the Federal Farmland Protection Policy Act: prime farmland, unique farmland, and land of statewide or local importance. Prime farmland (Merrimac sandy loam, MmB) exists within the airport property, including in the proposed development area "Area E." west of the Runway 16 end. Soils of statewide importance (Quonset gravelly sandy loam and Raypol silt loam) are also located in this area. The location of these soils with respect to the proposed project areas are shown on Figure 4-21.

FIGURE 4-21 / SOIL TYPE LOCATION MAP.

If it is determined that the proposed projects may affect soils protected under the Federal Farmland Protection Act, it may be necessary to contact the U.S. Natural Resources Conservation Service (NRCS) for completion of a Farmland Conversion Impact Rating Form. Based on the impact rating score developed by the NRCS based on this Form, the NRCS may recommend consideration of alternate project sites. The need for completing this form is contingent on the local zoning within the proposed project area since prime farmland does not include land already in or committed to urban development. Areas zoned for commercial, industrial, or high-density residential use may be exempt from this requirement. Aviation and certain marine related uses are permitted in the Quonset Airport District, in accordance with Town of Kingstown and Quonset Business Park Development Regulations. As such, proposed projects in the areas of mapped farmland soils would be approved.

Energy Supply and Natural Resources

The use of energy to support the proposed projects would largely involve the use of additional fuels in construction and demolition machinery. The proposed airport improvement program does not require use of unusual materials in short supply; therefore, energy supplies and natural resources are not affected by the proposed airport improvement program.

Light Emissions

Changes to airport lighting associated with the proposed projects could occur as a result of the upgrade of the approach lighting system to have Runway End Identifier Lights (REILs) and precision approach path indicator (PAPIs) at Runways 5 and 23. In the development of the proposed projects, care will be taken to ensure that light emissions do not impact adjacent properties or appropriate mitigation measures considered. These lights are not substantial and would be directed over water and not at any occupied land areas. Project review will be required through the CRMC for portions of this lighting upgrade projects that encroach on Narragansett Bay.

Solid Waste Impact

Waste disposal during project implementation will be managed separately from normal airport solid waste management operations. There will be temporary solid waste management issues during potential demolition of the Old Terminal Building, and relocation of the Quonset Aviation Museum. There may also be waste generated during removal of pavement across the airfield; however, this material could be recycled at an asphalt batching facility to reduce solid waste. The proposed projects will not significantly increase long term solid waste volumes; therefore, solid wastes are not expected to be affected by the proposed airport improvement program.

Environmental Justice

The development on the airport has few if any off-airport impacts. In addition, there are no known areas of minority and low-income residents in the airport vicinity. Therefore, the principles are environmental justice are not triggered here.

Summary

The recommended projects for the five year planning period do not appear to have a significant impact on the surrounding community or environment. There will be a need however, to complete coordination with federal, state, and local agencies when the recommended projects are initially designed. This coordination can be done on a per-project basis or as a group, and will most likely be in the form of an EA.

A summary of the recommendations identified in this analysis are as follows:

- Activities in or adjacent to wetland areas will require a State Water Quality Certification (WQC) and DEM permit;
- Projects within the CRMC jurisdiction area will require review. The regulatory authority of the CRMC generally includes waters and coastal features from three miles offshore to 200 feet inland;
- Engineering controls should be incorporated as part of the proposed projects project design to eliminate the potential effects of increased peak stormwater runoff resulting from increased impervious surface;
- Prior to construction activities, the OQU SWPPP should be modified to control sedimentation and erosion during construction;
- A field inspection and research at the RIHPHC and RIHS should be conducted to identify potential cultural resources sites within the project vicinity prior to implementation of the proposed projects; and
- If it is determined that the proposed projects may affect soils protected under the Federal Farmland Protection Act, it may be necessary to contact the NRCS for completion of a Farmland Conversion Impact Rating Form
- Potential light impacts of the NAVAIDs upgrades should be evaluated as part of the EA process.

REFERENCES

Quonset Development Corporation, Letter report, The Landings at Quonset - General Aviation Hangars Environmental and Socio-Economic Review Forms, May 31, 2013.

DECEMBER 2014

Rhode Island Airport Corporation

CHAPTER 5

QUONSET STATE AIRPORT MASTER PLAN UPDATE

IMPLEMENTATION PLAN

THE Louis Berger Group, INC.

5.0 Implementation Plan

Introduction

This chapter is the culmination of the analytical work accomplished in the previous four chapters. Those tasks included:

- Inventory – collecting the latest airport data since the 2006 AMPU;
- Forecasting – reviewing and reaffirming future operational activity;
- Facility Requirements – the new projected demand versus current airport standards;
- Alternative Analysis – evaluating the requirements to determine future projects.

To understand why the Implementation phase of the AMPU process is important, it is essential to understand the FAA's 5-year Airport Capital Improvement Plan (ACIP) process. The ACIP is the primary mechanism utilized by FAA to evaluate projects for their Airport Improvement Program (AIP). Ultimately, the ACIP represents what FAA and RIAC considers their highest priority airport needs. Working with FAA to develop a viable ACIP is an on-going process.

The 5-year ACIP cycle consists of projects which are eminent (first two years) and those "in the queue" (next three years). The "eminent projects" represents projects where funding is a high priority and RIAC "must be prepared" to submit FAA grant applications. Being prepared essentially means having a significant degree of understanding as to the environmental and engineering requirements of the project. Projects "in the queue" are those projects that should come on line within the next three years. The key here is that RIAC must exhibit flexibility because of; changes in project requirements, new priorities or possible limitations on FAA funding allocations. Flexibility usually equates to improved opportunities for funding.

In addition to the FAA/RIAC ACIP coordination meetings, the FAA effort to support RIAC projects at any one airport in the RI airport system is typically based on:

- Utilization of entitlement and apportionment funds for highest priority projects;
- The discretionary funds allocated to the FAA, New England Region;
- The project priority rating based on the FAA National Priority Rating (NPR) system; and
- The status of project (ability to complete engineering and environmental requirements)

As you might expect the projects recommended beyond the 5-year ACIP, essentially represent the next horizon (6 – 10 year window). They are more speculative and eventually subject to further evaluation. They are typically less reliable and planning to implement these projects depends to a large extent on whether the forecasted activity is approached, whether the condition of the infrastructure remains intact, and whether unforeseen conditions occur. They represent an estimate of the eligible projects that should be included in the FAA National Plan of Integrated Airport System (NPIAS). The NPIAS is a report to Congress and it provides them with a 10-year outlook of national airport needs. Generally speaking it is a macro-analysis of the nation's airport needs.

Finally, there are the long-term projects (beyond 10-years). Because the scope of work for this planning project was limited to an update of the 2006 AMP, this OQU AMP did not evaluate projects for the long-term. Long-term development is very often a speculative range of projects that make up an outlook for the future. Projects are likely to change in the long-term and are often subject to re-evaluation. Regardless, it is helpful in considering land-use development both on and off the airport. Therefore, less consideration can be given to long-term projected costs compared to current and near-term financial planning.

In setting out to develop an Implementation Plan for Quonset State Airport the goal was to prioritize projects with the following objectives in mind:

- Preserve the existing infrastructure
- Ensure the airports meet FAA design standards
- Accommodate where practical the forecasted demand
- Comply with environmental policies and demonstrate environmental stewardship

The financial planning is based on the assumption that:

- Funding projects at GA airports like OQU are eligible for 90% AIP assistance;
- The presence of the military at OQU must also be considered for improvement costs;
- The availability of FAA discretionary funds is based on a FAA NPR system; and,
- The costs estimates are largely based on a planning level, and are considered "order-of-magnitude" cost estimates. (Some level of engineering was considered in the cost estimates prepared for this AMPU which will enable RIAC to more effectively execute their capital program.)

Generally, AIP grants can be obtained for most airfield capital improvements except for terminals, hangars and non-aviation development. Eligible projects include improvements related to enhancing airport safety, capacity, security and environmental concerns. The current RIAC policy is to promote private investment in hangar development and that such development must be consistent with the approved Airport Layout Plan (ALP). In keeping with that policy the master plan identified potential sites for conventional hangars and T-hangars if there is an interest by private investment. It is important to note that regardless of the funding source; even military and private development must be consistent with the ALP and is therefore subject to FAA and RIAC review.

There are some elements of the Implementation Plan that are highly dependent on the activity forecasts. If activity does not meet the forecasted demand, implementation of the project schedule should be re-evaluated and modified as necessary. But others, like providing an obstruction free Runway Visual Zone (RVZ), and relocating Taxiway A are not activity dependent but are required meeting FAA safety standards. Rehabilitating Taxiway "B", on the other hand is needed to preserve the airport infrastructure. Even the Snow Removal Equipment (SRE) building is an important RIAC development need but unfortunately it is considered a low priority based on the FAA NPR and unlikely to receive AIP funds anytime soon. An Air National Guard collateral effort to replace the localizer will maintain the current instrument approach to Runway 16.

A more unusual airport need, and costly one at that, is the rehabilitation of the seawall. Clearly an infrastructure improvement that is inherently important to maintaining the airport runways. This AMPU used considerable engineering resources to evaluate the current condition of the seawall and offered several options to restore it to a safe condition. It is all explained in Appendix A. What is significant in this "Implementation" chapter is to understand that the importance of coming to grips with the fact that it will need attention in the next 5 – 10 year period. Moreover, because of the financial resources required it will have an overall impact on the RI airport system. Whether it is eligible for AIP assistance is a question to be debated, but there are merits to making the case that it is. Even if it is eligible there is still a matter of how much AIP could be reasonably provided. Neither case is made in this chapter. What is important is that it has been reflected on the "Summary of Development" provided on the following page.

SUMMARY OF DEVELOPMENT

A summary of the development that results from the update of the OQU 2006 AMP is identified in Table 5-1 below. The Table has been displayed to show AIP Eligible Projects, RIAC Projects and projects By Others.

FIGURE 5-1 SUMMARY OF AIRPORT DEVELOPMENT AND ESTIMATED COSTS / *PROJECT AND ESTIMATED COSTS (2014 DOLLARS)*

I. AIP Eligible Projects					
Project Description	**RIAC $**	**FAA $**	**ANG $**	**Private $**	**Total Cost**
Request Modification to Standard – T/W "A"[1]	0	0	0	0	0
Relocate Fuel Farm Outside the RVZ[2]	18,200	163,800	0	0	182,000
Conduct EA for Transient Apron/Hangars	7,500	142,500	0	0	150,000
Design and Rehabilitate Runway 5-23[3]	275,000	2,475,000	TBD	0	2,750,000
Relocate Taxiway A[4]	455,000	4,095,000	0	0	4,550,000
Design Extension of T/W "W" [5]	8,500	161,500	0	0	170,000
Construct Extension of Taxiway "W"	170,000	1,530,000	0	0	1,700,000
Construct Snow Removal Equipment Building[6]	290,000	2,610,000	0	0	2,900,000
Rehabilitate the Seawall[7]	NA	NA	0	0	12,470,000

II. RIAC Projects					
Project Description	**RIAC $**	**FAA $**	**ANG $**	**Private $**	**Total Cost**
Demolish Old Terminal Building[8]	1,600,000	0	0	0	1,600,000
Relocate Air Museum Relocation[9]	NA	0	0	0	NA

III. By Others					
Project Description	**RIAC $**	**FAA $**	**ANG $**	**Private $**	**Total Cost**
Replace 8 array Localizer antenna[10]	0	0	TBD	0	TBD
Install REILs on Runway 34[11]	0	0	91,000	0	91,000
Develop Hangars for Based Aircraft[12]	0	0	0	8,500,000	8,500,000
Construct Transient Aircraft Parking/Storage[13]	0	0	0	3,500,000	3,500,000
ANG Expansion[14]	0	0	NA	0	NA
Non-Aeronautical Land Use Investments[15]	0	0	0	NA	NA

[1] AMPU task by Consultant
[2] To be relocated to the new terminal automobile parking area as shown on approved ALP.
[3] An ACIP carry over. The pavement condition should be monitored and the time frame adjusted if necessary.
[4] Project is dependent on "Modification to Standards" determination.
[5] Provides Runway 5-23 with a full parallel taxiway to eliminate back taxiing operations on the runway.
[6] It is essential to house and maintain SRE but it has a low FAA NPR for AIP funds.
[7] This project should be evaluated independent of the AIP eligibility and priority. Cost shown in table includes only Phase One improvements. Phase two is approximately 8.5M and Phase three 26.1M. Details can be found in Appendix A.
[8] Demolition is needed to make prime airfield property available for future hangar development.
[9] Future space need for based aircraft apron expansion.
[10] To be funded by the ANG. Some RIAC "ops" support will be provided.
[11] As part of the Localizer antenna project the in-pavement lighting will be replaced by REILs.
[12] Phase I of this development is currently in progress.
[13] Assumes removal of old terminal building and EA completed for private investment interests.
[14] Area reserved by RIAC is shown on approved ALP.

AIP Eligible Projects

The AIP Eligible Projects list refrains from being labeled a "priority listing". However it does reflect due consideration of the FAA National Priority Rating system, but other local factors could influence decisions on the relative importance or viability of the project. The AIP Eligible Projects however represents a working list of projects that should be considered in developing the 5-Year ACIP. The seawall has been listed at the bottom of the list not because it is the least important but because it needs further discussion by both RIAC and FAA as to the relative means of funding such a project. The costs shown for the FAA eligible projects assume 90% funded by the FAA and 10% by RIAC.

Financial Resources

For the eligible airfield improvements the FAA's Airport Improvement Program (AIP) is expected to be the primary source of funding. There are three categories of AIP funds to draw from:

- Apportionment Funds – Funding provided to each State based on the area and population. It is to be used for GA airports in the state based on need and priority.
- Non-Primary Entitlement Funds – Funding allocated to GA airports and it is currently set at a maximum of $150,000 per airport, per year.
- Discretionary Funds – Awarded at the discretion of the FAA to airport projects which meet a nationwide FAA priority system.

Note: Apportionment and non-primary entitlement funds can be accumulated over 3-years.

The key to developing a viable and effective Airport Capital Improvement Plan (ACIP) is for RIAC to work closely with FAA on a routine basis. The FAA funding program is so dependent on the New England Region's allocation of discretionary funding from Washington, as well as the national and regional priorities that each project is highly dependent on those decisions. What this Implementation Plan has done is establish a RIAC perspective of needs over the next 10-years with due consideration of the national ratings. The ability to implement the plan is highly dependent on the FAA's ability to provide AIP funding for eligible work.

RIAC Projects

The essence of both these projects is to provide development opportunities for future expansion opportunities for hangar and apron space. Removal of the old terminal building is a more eminent opportunity to increase needed corporate hangar space. RIAC financial resources for that work should be a short-range consideration.
The Air Museum on the other hand is a long-range opportunity for based aircraft apron and hangar expansion. The location of the museum on prime airfield access property makes it a logical area for future airport use. The need is more dependent on the growth of that segment of activity in the future. Additional funding sources available to RIAC include General Aviation Revenue Bonds, Short-term and Long-term borrowing, and Operating Proceeds.

Other Projects

These are projects involving investment by others (ANG or Private) but have an impact on airport operations or land use. Several are already in progress; others are dependent on future growth opportunities. RIAC's role is limited to planning or environmental approvals. Non-Eligible revenue generating development such as T-hangars and corporate hangars are generally funded in whole by a private developer who negotiates a land lease with RIAC.

[15] Area shown on the Eastside of R/W 16-34 is shown on the approved ALP.

Detailed Project Cost Estimates *(developed 8/2014)*

Relocate existing fuel farm outside the RVZ and upgrade systems				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$15,000	$15,000
Airport Safety and Security	LS	1	$5,000	$5,000
Demo Existing Pad and Electrical	LS	1	$5,000	$5,000
Install pavement at existing fuel farm location	Ton	100	$150	$15,000
Prepare concrete pad for two relocated AST	SF	2,000	$16	$32,000
Epoxy Coated Steel	LS	1	$10,000	$10,000
Install bollards	EA	50	$800	$40,000
Install pavement apron around new pad	Ton	150	$150	$22,500
Electrical Service Connection	LS	1	$25,000	$25,000
Install electrical utilities to site[16]	LS	1	$20,000	$20,000
Relocate AST, pumps, and ancillary equipment	LS	1	$50,000	$50,000
Install lighting	LS	1	$25,000	$25,000
Relocate tank monitoring systems[17]	LS	1	$51,000	$51,000
Self Serve / Fire Suppression	LS	1	$200,000	$200,000
Site Restoration and Closeout	LS	1	$10,000	$10,000
			Subtotal =	$525,500
	25%		Contingency =	$131,375
			Engineering and Inspection[18] =	$157,650
			Total =	$814,525
				$815,000

[16] Assume power will be spliced into service within roadway ROW. Cost to include primary connection and secondary infrastructure.
[17] Assume: 200 LF of trench, conduit, cable, pave repair - $70/LF = $14,000, 2 Manholes - $6,000. Total - $16,000
[18] Assume: Data Collection: $8000, Design: $20,000, Bidding: $7,000, Admin: $6,000, Construction: $10,000

Install REILS on RWY 34				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$5,000	$5,000
Airport Safety and Security	LS	1	$8,000	$8,000
L-849 REIL	EA	2	$5,000	$10,000
Junction Cans	EA	4	$1,500	$6,000
REIL Foundation	EA	2	$2,000	$4,000
Install Transformer and Interface	EA	2	$2,000	$4,000
Installation and Connection to Runway Circuit	LS	1	$5,000	$5,000
Site Restoration and Closeout	LS	1	$3,000	$3,000
			Subtotal =	$45,000
	10%		Contingency =	$4,500
			Engineering and Inspection[19] =	$41,000
			Total =	$90,500
			Say =	**$91,000**

[19] Assume: Data Collection: $4000, Design: $20,000, Bidding: $7,000, Admin: $3,000, Construction: $7,000

Relocate TWY A to meet FAA separation standards (50 FT Width)				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$30,000	$30,000
Airport Safety and Security	LS	1	$20,000	$20,000
Erosion and Sedimentation Control	LS	1	$15,000	$15,000
Demo Existing Pavements	SY	50,000	$6	$300,000
Earthwork	CY	6,700	$8	$53,600
Subbase	CY	3,500	$32	$112,000
Base	CY	1,400	$45	$63,000
Reclaim and Reuse Existing Pavements	SY	28,000	$8	$224,000
Bituminous Pavement	Ton	8,700	$120	$1,044,000
Widen to a Total Width of 75FT	SF	167,000	$6	$1,002,000
Drainage Improvements[20]	LS	1	$580,000	$580,000
Edge Lights[21]	EA	80	$1,000	$80,000
Signage	EA	10	$3,500	$35,000
Markings	LS	1	$25,000	$25,000
Topsoil and Seed	SF	26,000	$2	$52,000
Site Restoration and Closeout	LS	1	$15,000	$15,000
			Subtotal =	$3,650,600
	10%		Contingency =	$365,060
			Engineering and Inspection[22] =	$530,000
			Estimated Total =	$4,545,660
			Say =	**$4,550,000**

[20] Approx 8,000 LF RCP at $35 per feet = $280,000, 40 Catch Basins at $5,000 each = $200,000, 8 EA Manholes at $5000 each = $40,000, Outlets and Connections = $50,000
[21] Assume full TW, 8,600 LF of TW or 13,900 LF of edge lights - 70 EA say 80 EA
[22] Assume:Data Collection: $50,000, Design: $250,000, Bidding: $14,000, Admin: $50,000, Construction: $160,000

Construct new SRE Building				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$10,000	$10,000
Airport Safety and Security	LS	1	$10,000	$10,000
Erosion and Sedimentation Control	LS	1	$12,000	$12,000
Excavation[23]	CY	4,000	$10	$40,000
Foundations[24]	LS	1	$82,000	$82,000
80' x 120' SRE Building	SF	9,600	$150	$1,440,000
Subbase	CY	1,800	$35	$63,000
Base	CY	900	$45	$40,500
Bituminous Pavement	Ton	200	$130	$26,000
Drainage Improvements	LS	1	$90,000	$90,000
Sewer / Water / Electrical	LS	1	$150,000	$150,000
Fuel Farm (Diesel and Gas)	LS	1	$130,000	$130,000
Topsoil and Seed	SF	16,000	$2	$32,000
Site Restoration and Closeout	LS	1	$20,000	$20,000
			Subtotal =	$2,145,500
	10%		Contingency =	$214,550
			Engineering and Inspection[25] =	$450,000
			Estimated Total =	$2,810,050
			Say =	**$2,900,000**

[23] Site - 200'x200'x20" = 2500CY, Foundation Slab - 120'x80'x2' = 800 CY, Frost Wall - 400LF x 15SF = 250 CY, Total = 3550 CY
[24] 6" Slab = 9600 SF x $4.00 = $38,400, Frost Wall and Footing = 8 CY / LF = 120 CY x $350 = $42,000
[25] Assume:Data Collection: $20,000, Design: $300,000, Bidding: $10,000, Admin: $100,000, Construction: $200,000

RWY 5/23 Design and Rehabilitation				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$20,000	$20,000
Airport Safety and Security	LS	1	$25,000	$25,000
Erosion and Sedimentation Control	LS	1	$20,000	$20,000
12" Deep Pavement Reclamation[26]	SY	45,000	$6	$270,000
6" P-209 Aggregate Base	CY	7,500	$50	$375,000
4" P-401 Bituminous Pavement	Ton	12,000	$138	$1,656,000
Pavement Surface Treatment (Shoulders)[27]	SY	130,500	$6	$783,000
Runway Edge Lighting and Vault Upgrades	LS	1	$325,000	$325,000
Markings	LS	1	$18,000	$16,000
Site Restoration and Closeout	LS	1	$20,000	$12,000
			Subtotal =	$3,502,000
	25%		Contingency =	$875,500
			Engineering and Inspection[28] =	$572,000
			Estimated Total =	$4,949,500
			Say =	**$4,950,000**

[26] 4,000 FT x 100 FT
[27] This is to coat the exiting shoulder pavement to prevent the spread of FOD
[28] Assume: Data Collection: $80,000, Design: $250,000, Bidding: $12,000, Admin: $50,000, Construction: $180,000

Demolish Old Terminal Building				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$35,000	$35,000
Airport Safety and Security	LS	1	$15,000	$15,000
Erosion and Sedimentation Control	LS	1	$15,000	$15,000
Temporary Fencing	LS	1	$3,000	$3,000
Demo Building (including Asbestos abatement)[29]	SF	28,084	$11	$308,924
Hazardous Material Abatement[30]	LS	1	$300,000	$300,000
Demo Pavement	SY	6,000	$5	$30,000
Demo Misc. Site Items	LS	1	$50,000	$50,000
Terminate Utilities	LS	1	$100,000	$100,000
Topsoil and Seed	SF	130,000	$2	$260,000
Perimeter Fencing	LF	500	$40	$20,000
Site Restoration and Closeout	LS	1	$30,000	$30,000
			Subtotal =	$1,166,924
	10%		Contingency =	$116,692
			Engineering and Inspection[31] =	$150,000
			Estimated Total =	$1,433,616
			Say =	**$1,500,000**

[29] SF per floor area
[30] Study, remove, Dispose
[31] Assume:Data Collection: $5,000, Design: $50,000, Bidding: $10,000, Admin: $20,000, Construction: $45,000

TWY "W" extension. Design & Construct (Confirm or update old cost estimate)				
Items	**Unit**	**Quantity**	**Unit Cost**	**Cost**
Mobilization and Incidentals	LS	1	$22,000	$20,000
Airport Safety and Security	LS	1	$20,000	$18,000
Erosion and Sedimentation Control	LS	1	$15,000	$15,000
Demo Existing Pavements	SY	15,000	$5	$75,000
Relocate PAPI	LS	1	$30,000	$30,000
Earthwork	CY	10,000	$10	$100,000
Subbase	CY	4,700	$35	$164,500
Base	CY	1,800	$45	$81,000
Bituminous Pavement	Ton	2,000	$120	$240,000
Drainage Improvements	LS	1	$180,000	$180,000
Edge Lights[32]	EA	60	$1,000	$60,000
Signage	EA	12	$3,500	$42,000
Markings	LS	1	$10,000	$10,000
Topsoil and Seed	SF	24,000	$2	$48,000
Site Restoration and Closeout	LS	1	$25,000	$25,000
			Subtotal =	$1,108,500
	10%		Contingency =	$110,850
			Engineering and Inspection [33]=	$480,000
			Estimated Total =	$1,699,350
				$1,700,000

[32] Assume entire length
[33] Assume: Data Collection: $30,000, Design: $200,000, Bidding: $12,000, Admin: $50,000, Construction: $160,000

DECEMBER 2014

Rhode Island Airport Corporation

CHAPTER 6

QUONSET STATE AIRPORT MASTER PLAN UPDATE

AIRPORT LAYOUT PLAN

THE Louis Berger Group, INC.

6.0 Airport Layout Plan

Introduction

One of the key products of a master plan is a set of drawings that provides a graphic representation of the long-term development plan for an airport. The primary drawing in this set is the Airport Layout Plan (ALP). Other drawings may also be included, depending on the size and complexity of the individual airport.

The ALP depicts existing airport facilities and proposed developments as determined from the planners' review of the aviation activity forecasts, facility requirements, and alternatives analysis. The ALP drawing set is a set of planning drawings and is not intended to provide design engineering accuracy.

The primary functions of the ALP that define its purpose are:

- To receive financial assistance under the terms of the Airport and Airway Improvement Act of 1982 (AIP).
- To create a blueprint for airport development.
- To serve as a record of aeronautical requirements.
- To enable RIAC to plan for facility improvements.
- To provide a working tool for RIAC and AvPorts in the development and maintenance of the airport.

Airport Layout Plan Drawing Set

The ALP drawing set contains several sheets depicting the existing facilities, planned development, and other pertinent information concerning the airport. The ALP drawing set contains the following drawings:

Sheet 1 - Title Sheet

Sheet 2 - Existing Airport Facilities

Sheet 3 - Airport Layout Plan

Sheet 4 - FAR Part 77 Imaginary Surfaces

Sheet 5 - Terminal Area Plan

Sheet 6 – Land Use Plan

These sheets are discussed on the following page. A full set of sheets is presented at the end of this Chapter.

Title Sheet

The Title Sheet is the introductory sheet of the drawing set. Basic information about the Airport is shown on this sheet including an index to the drawing sheets, location map, vicinity map, and relevant text. The Title Sheet is identified as Sheet 1 and is depicted at the end of this Chapter.

Existing Airport Facilities Plan

The Existing Airport Facilities Plan depicts the existing facilities of the Airport at the time this Master Plan was prepared. The purpose of the drawing is to show the existing layout and act as a reference for future development shown on the Airport Layout Plan. Information provided on this drawing includes data tables, airfield facilities, surrounding transportation infrastructures, off airport buildings, and relevant topography. The Existing Airport Facilities Plan is identified as Sheet 2 and is located at the end of this Chapter.

Airport Layout Plan

The Airport Layout Plan depicts the proposed projects identified in Chapter 4, Development Issues and Options. The projects shown are for the planning period through 2025.

Additional information shown on the ALP includes data blocks identifying existing and proposed facilities; VFR and IFR wind roses; existing buildings; revision blocks; and signature blocks for the FAA and RIAC. Topography, local road infrastructure, and surrounding buildings are also shown on this drawing. The ALP is identified as Sheet 3 at the end of this Chapter.

FAR Part 77 Surfaces Plan

This drawing shows the full FAR Part 77 Imaginary Surfaces. This drawing includes a plan view of all 14 CFR Part 77 surfaces. The FAR Part 77 Surfaces Plan is identified as Sheet 4 at the end of this Chapter. In agreement with RIAC, Runway Plans and Profiles were not completed as a part of this effort.

Terminal Area Plan

The Terminal Area Plan shows the location and configuration of existing and proposed buildings and paved areas in the terminal area of the Airport, including hangars and parking lots. The contents of the Terminal Area Plan include a large scale plan view of the area; building data table; legend table; and title and revision blocks. Additionally, the Terminal Area Drawing identifies each building's height if available. The Terminal Area Plan is identified as Sheet 5 at the end of this Chapter.

Land Use Plan

The Airport Land Use Plan, identified as Sheet 6 at the end of this Section, shows existing land use in the airport vicinity. As was agreed upon between RIAC and the Consultant at the time of project scoping, an updated Land Use Plan was not prepared as part of this task. This drawing adopts the land use as depicted on the 2006 Quonset State Airport Layout Plan sheet set.

RHODE ISLAND AIRPORT CORPORATION

AIRPORT LAYOUT PLAN

FOR

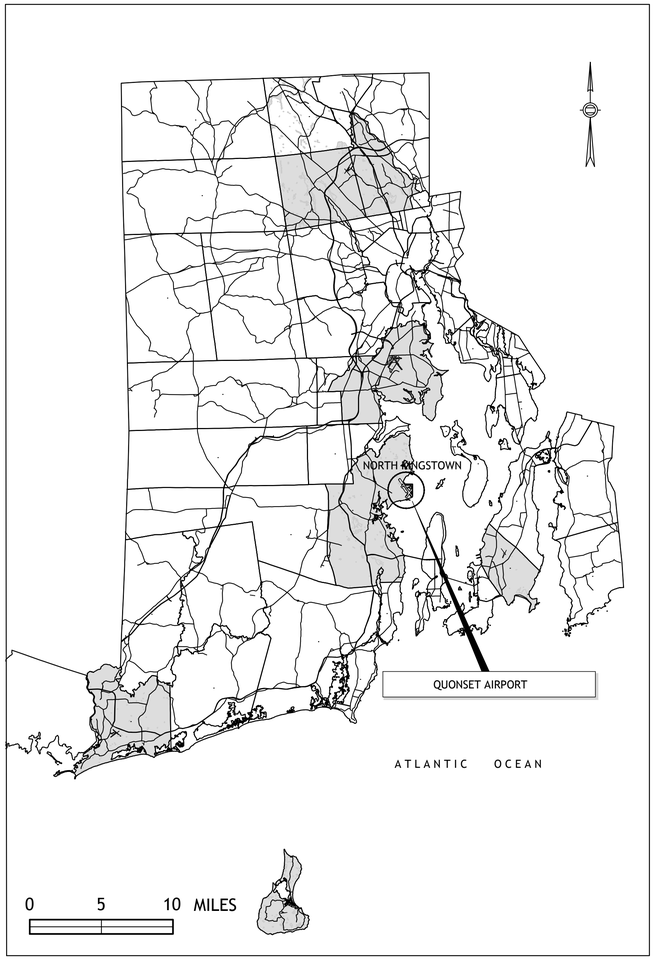
QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

DECEMBER 2014

AIP NO. 3-44-0006-17-2012

RIAC CONTRACT NO. 24331

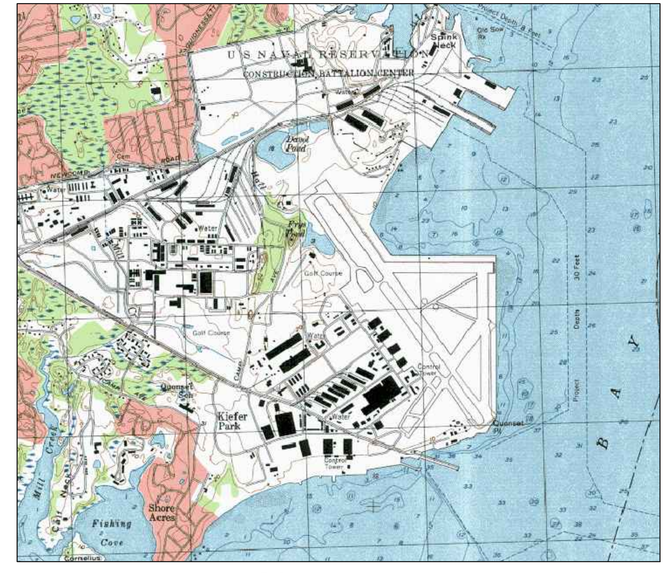


LOCATION MAP

SCALE IN MILES

INDEX OF DRAWINGS

NUMBER	DESCRIPTION
1	TITLE SHEET
2	EXISTING AIRPORT FACILITIES
3	AIRPORT LAYOUT PLAN
4	TERMINAL AREA PLAN
5	FAR PART 77 SURFACES
6	LAND USE PLAN



SITE MAP

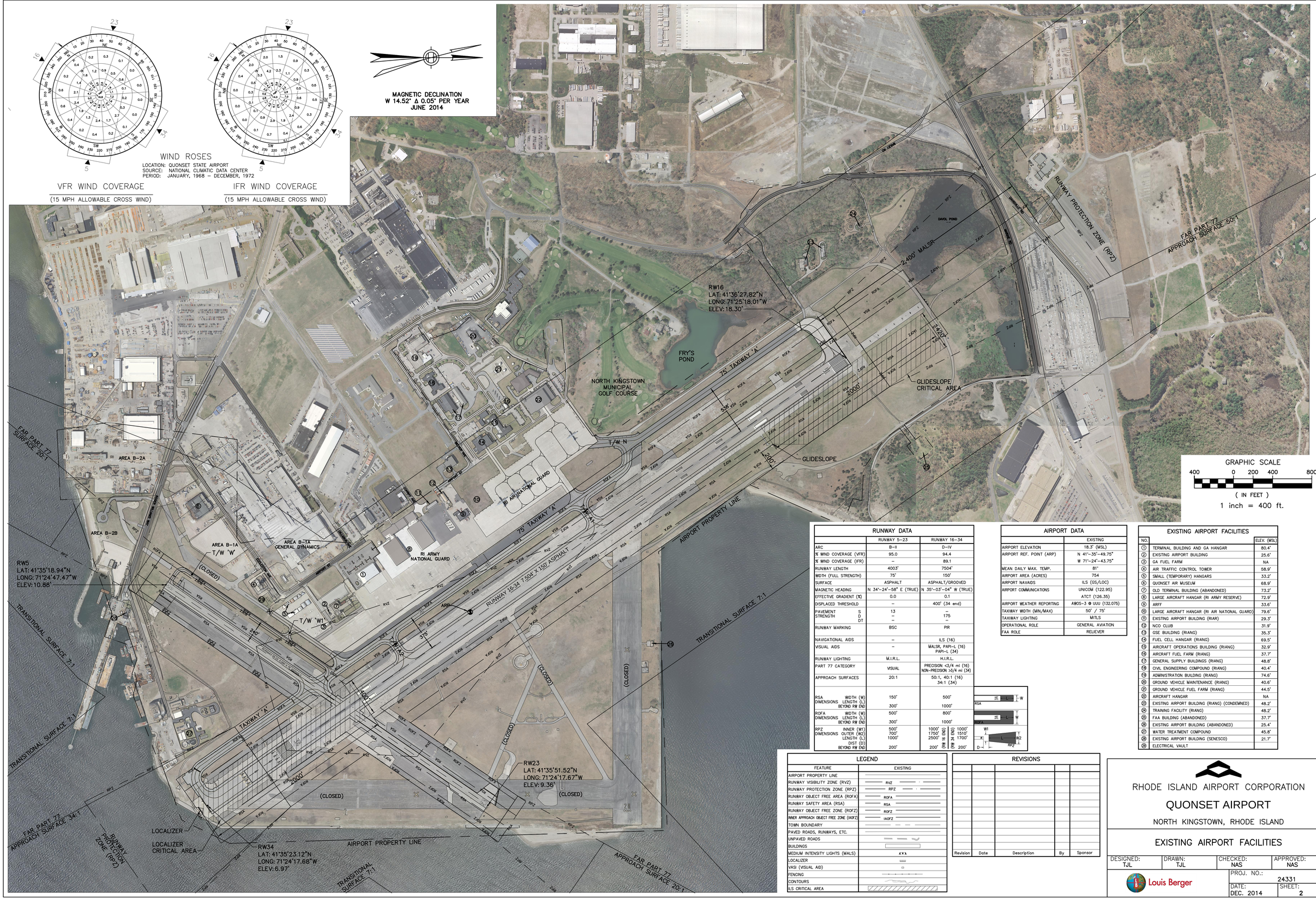
USGS – WICKFORD, RI – 1995

VFR WIND COVERAGE
(15 MPH ALLOWABLE CROSS WIND)

IFR WIND COVERAGE
(15 MPH ALLOWABLE CROSS WIND)

WIND ROSES
LOCATION: QUONSET STATE AIRPORT
SOURCE: NATIONAL CLIMATIC DATA CENTER
PERIOD: JANUARY, 1968 – DECEMBER, 1972

MAGNETIC DECLINATION
W 14.52° Δ 0.05° PER YEAR
JUNE 2014



RUNWAY DATA

	RUNWAY 5–23	RUNWAY 16–34
ARC	B–II	D–IV
% WIND COVERAGE (VFR)	95.0	94.4
% WIND COVERAGE (IFR)	–	89.1
RUNWAY LENGTH	4003'	7504'
WIDTH (FULL STRENGTH)	75'	150'
SURFACE	ASPHALT	ASPHALT/GROOVED
MAGNETIC HEADING	N 34°–24'–58" E (TRUE)	N 35°–03'–04" W (TRUE)
EFFECTIVE GRADIENT (%)	0.0	0.1
DISPLACED THRESHOLD	–	400' (34 end)
PAVEMENT STRENGTH S	13	175
PAVEMENT STRENGTH D	–	–
PAVEMENT STRENGTH DT	–	–
RUNWAY MARKING	BSC	PIR
NAVIGATIONAL AIDS	–	ILS (16)
VISUAL AIDS	–	MALSR, PAPI–L (16) PAPI–L (34)
RUNWAY LIGHTING	M.I.R.L.	H.I.R.L.
PART 77 CATEGORY	VISUAL	PRECISION <3/4 mi (16) NON–PRECISION >3/4 mi (34)
APPROACH SURFACES	20:1	50:1, 40:1 (16) 34:1 (34)
RSA WIDTH (W)	150'	500'
RSA DIMENSIONS LENGTH (L) BEYOND RW END	300'	1000'
ROFA WIDTH (W)	500'	800'
ROFA DIMENSIONS LENGTH (L) BEYOND RW END	300'	1000'
RPZ INNER (W1)	500'	1000'
RPZ DIMENSIONS OUTER (W2)	700'	1750'
RPZ LENGTH (L)	1000'	2500'
RPZ DIST (D) BEYOND RW END	200'	200'

(RW 16 END) 1000' 1510' 1700'
(RW 34 END) 200'

AIRPORT DATA

	EXISTING
AIRPORT ELEVATION	18.3' (MSL)
AIRPORT REF. POINT (ARP)	N 41°–35'–49.75" W 71°–24'–43.75"
MEAN DAILY MAX. TEMP.	81°
AIRPORT AREA (ACRES)	754
AIRPORT NAVAIDS	ILS (GS/LOC)
AIRPORT COMMUNICATIONS	UNICOM (122.95) ATCT (126.35)
AIRPORT WEATHER REPORTING	AWOS–3 @ UUU (132.075)
TAXIWAY WIDTH (MIN/MAX)	50' / 75'
TAXIWAY LIGHTING	MITLS
OPERATIONAL ROLE	GENERAL AVIATION
FAA ROLE	RELIEVER

EXISTING AIRPORT FACILITIES

NO.		ELEV. (MSL)
1	TERMINAL BUILDING AND GA HANGAR	80.4'
2	EXISTING AIRPORT BUILDING	25.6'
3	GA FUEL FARM	NA
4	AIR TRAFFIC CONTROL TOWER	58.9'
5	SMALL (TEMPORARY) HANGARS	33.2'
6	QUONSET AIR MUSEUM	68.9'
7	OLD TERMINAL BUILDING (ABANDONED)	73.2'
8	LARGE AIRCRAFT HANGAR (RI ARMY RESERVE)	72.9'
9	ARFF	33.6'
10	LARGE AIRCRAFT HANGAR (RI AIR NATIONAL GUARD)	79.6'
11	EXISTING AIRPORT BUILDING (RIAR)	29.3'
12	NCO CLUB	31.9'
13	GSE BUILDING (RIANG)	35.3'
14	FUEL CELL HANGAR (RIANG)	69.5'
15	AIRCRAFT OPERATIONS BUILDING (RIANG)	32.9'
16	AIRCRAFT FUEL FARM (RIANG)	37.7'
17	GENERAL SUPPLY BUILDINGS (RIANG)	48.8'
18	CIVIL ENGINEERING COMPOUND (RIANG)	40.4'
19	ADMINISTRATION BUILDING (RIANG)	74.6'
20	GROUND VEHICLE MAINTENANCE (RIANG)	40.6'
21	GROUND VEHICLE FUEL FARM (RIANG)	44.5'
22	AIRCRAFT HANGAR	NA
23	EXISTING AIRPORT BUILDING (RIANG) (CONDEMNED)	48.2'
24	TRAINING FACILITY (RIANG)	48.2'
25	FAA BUILDING (ABANDONED)	37.7'
26	EXISTING AIRPORT BUILDING (ABANDONED)	25.4'
27	WATER TREATMENT COMPOUND	45.8'
28	EXISTING AIRPORT BUILDING (SENESCO)	21.7'
29	ELECTRICAL VAULT	

LEGEND

FEATURE	EXISTING
AIRPORT PROPERTY LINE	
RUNWAY VISIBILITY ZONE (RVZ)	RVZ
RUNWAY PROTECTION ZONE (RPZ)	RPZ
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFZ
INNER APPROACH OBJECT FREE ZONE (IAOFZ)	IAOFZ
TOWN BOUNDARY	
PAVED ROADS, RUNWAYS, ETC.	
UNPAVED ROADS	
BUILDINGS	
MEDIUM INTENSITY LIGHTS (MALS)	
LOCALIZER	
VASI (VISUAL AID)	
FENCING	
CONTOURS	
ILS CRITICAL AREA	

REVISIONS

Revision	Date	Description	By	Sponsor

RHODE ISLAND AIRPORT CORPORATION

QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

EXISTING AIRPORT FACILITIES

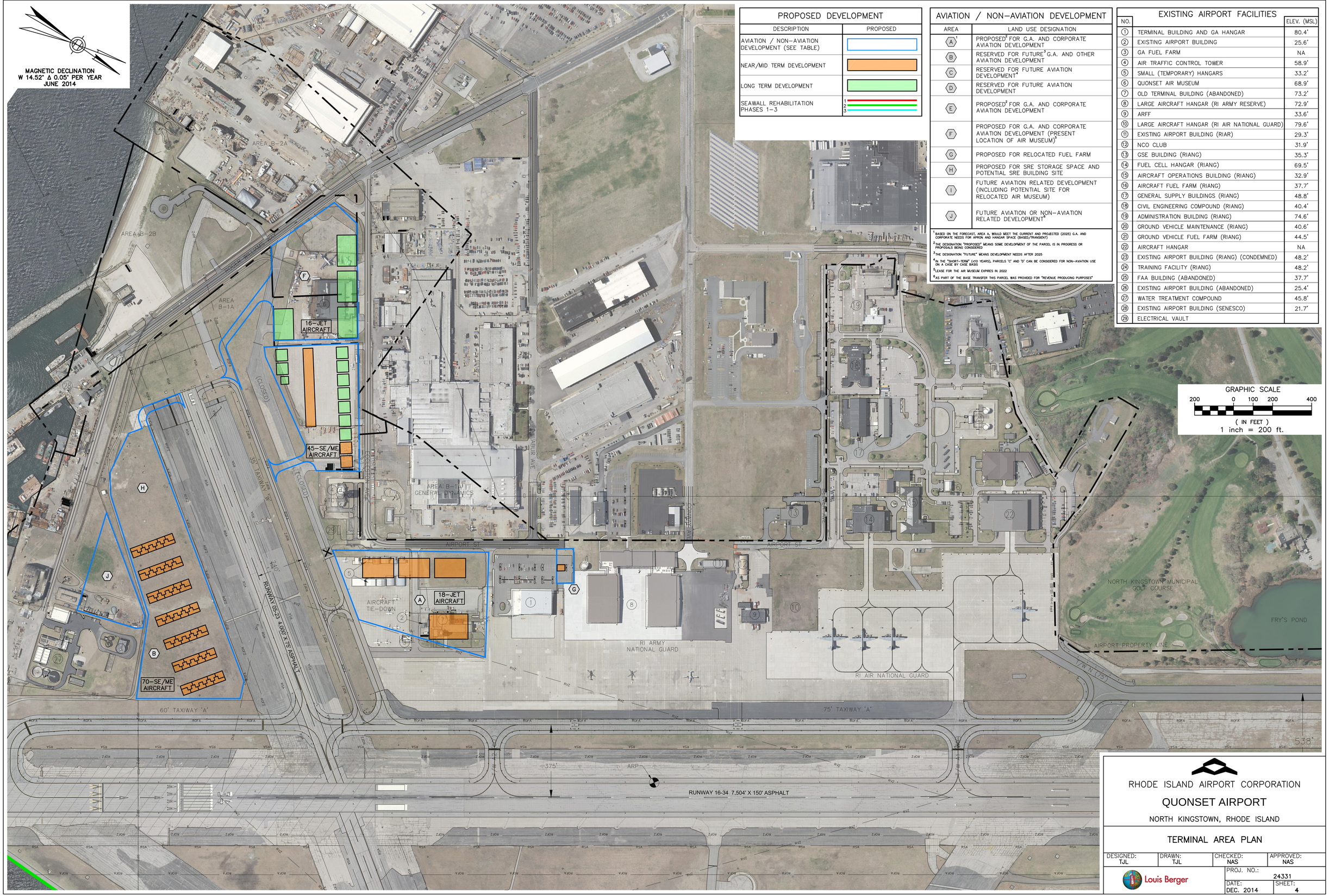
DESIGNED:	DRAWN:	CHECKED:	APPROVED:
TJL	TJL	NAS	NAS

Louis Berger

PROJ. NO.: 24331

DATE: DEC. 2014

SHEET: 2



PROPOSED DEVELOPMENT

DESCRIPTION	PROPOSED
AVIATION / NON-AVIATION DEVELOPMENT (SEE TABLE)	
NEAR/MID TERM DEVELOPMENT	
LONG TERM DEVELOPMENT	
SEAWALL REHABILITATION PHASES 1-3	1 2 3

AVIATION / NON-AVIATION DEVELOPMENT

AREA	LAND USE DESIGNATION
A[1]	PROPOSED[2] FOR G.A. AND CORPORATE AVIATION DEVELOPMENT
B	RESERVED FOR FUTURE[3] G.A. AND OTHER AVIATION DEVELOPMENT
C	RESERVED FOR FUTURE AVIATION DEVELOPMENT[4]
D	RESERVED FOR FUTURE AVIATION DEVELOPMENT
E	PROPOSED[2] FOR G.A. AND CORPORATE AVIATION DEVELOPMENT
F	PROPOSED FOR G.A. AND CORPORATE AVIATION DEVELOPMENT (PRESENT LOCATION OF AIR MUSEUM)[5]
G	PROPOSED FOR RELOCATED FUEL FARM
H	PROPOSED FOR SRE STORAGE SPACE AND POTENTIAL SRE BUILDING SITE
I	FUTURE AVIATION RELATED DEVELOPMENT (INCLUDING POTENTIAL SITE FOR RELOCATED AIR MUSEUM)
J	FUTURE AVIATION OR NON-AVIATION RELATED DEVELOPMENT[6]

[1] BASED ON THE FORECAST, AREA A, WOULD MEET THE CURRENT AND PROJECTED (2025) G.A. AND CORPORATE NEEDS FOR APRON AND HANGAR SPACE (BASED/TRANSIENT)

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[3] THE DESIGNATION "FUTURE" MEANS DEVELOPMENT NEEDS AFTER 2025

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[6] AS PART OF THE BASE TRANSFER THIS PARCEL WAS PROVIDED FOR "REVENUE PRODUCING PURPOSES"

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NO.		ELEV. (MSL)
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2	EXISTING AIRPORT BUILDING	25.6'
3	GA FUEL FARM	NA
4	AIR TRAFFIC CONTROL TOWER	58.9'
5	SMALL (TEMPORARY) HANGARS	33.2'
6	QUONSET AIR MUSEUM	68.9'
7	OLD TERMINAL BUILDING (ABANDONED)	73.2'
8	LARGE AIRCRAFT HANGAR (RI ARMY RESERVE)	72.9'
9	ARFF	33.6'
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11	EXISTING AIRPORT BUILDING (RIAR)	29.3'
12	NCO CLUB	31.9'
13	GSE BUILDING (RIANG)	35.3'
14	FUEL CELL HANGAR (RIANG)	69.5'
15	AIRCRAFT OPERATIONS BUILDING (RIANG)	32.9'
16	AIRCRAFT FUEL FARM (RIANG)	37.7'
17	GENERAL SUPPLY BUILDINGS (RIANG)	48.8'
18	CIVIL ENGINEERING COMPOUND (RIANG)	40.4'
19	ADMINISTRATION BUILDING (RIANG)	74.6'
20	GROUND VEHICLE MAINTENANCE (RIANG)	40.6'
21	GROUND VEHICLE FUEL FARM (RIANG)	44.5'
22	AIRCRAFT HANGAR	NA
23	EXISTING AIRPORT BUILDING (RIANG) (CONDEMNED)	48.2'
24	TRAINING FACILITY (RIANG)	48.2'
25	FAA BUILDING (ABANDONED)	37.7'
26	EXISTING AIRPORT BUILDING (ABANDONED)	25.4'
27	WATER TREATMENT COMPOUND	45.8'
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29	ELECTRICAL VAULT	

RHODE ISLAND AIRPORT CORPORATION

QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

TERMINAL AREA PLAN

DESIGNED:	DRAWN:	CHECKED:	APPROVED:
TJL	TJL	NAS	NAS

Louis Berger

PROJ. NO.: 24331

DATE: DEC. 2014

SHEET: 4

AIRPORT DATA

AIRPORT ELEVATION: 18.3' (MSL)

AIRPORT REFERENCE POINT: LAT 41° 35' 49.75" N
LONG 71 ° 24' 43.75" W

PRIMARY SURFACE

	RUNWAY 5–23	RUNWAY 16–34
RUNWAY TYPE	VISUAL	PRECISION
LENGTH (OFF RW END)	200'	200'
WIDTH	500'	1000'

HORIZONTAL SURFACE

	RUNWAY 5–23	RUNWAY 16–34
HEIGHT (AGL)	150'	
(MSL)	168.3'	
ARC RADIUS	5,000'	10,000'

CONICAL SURFACE

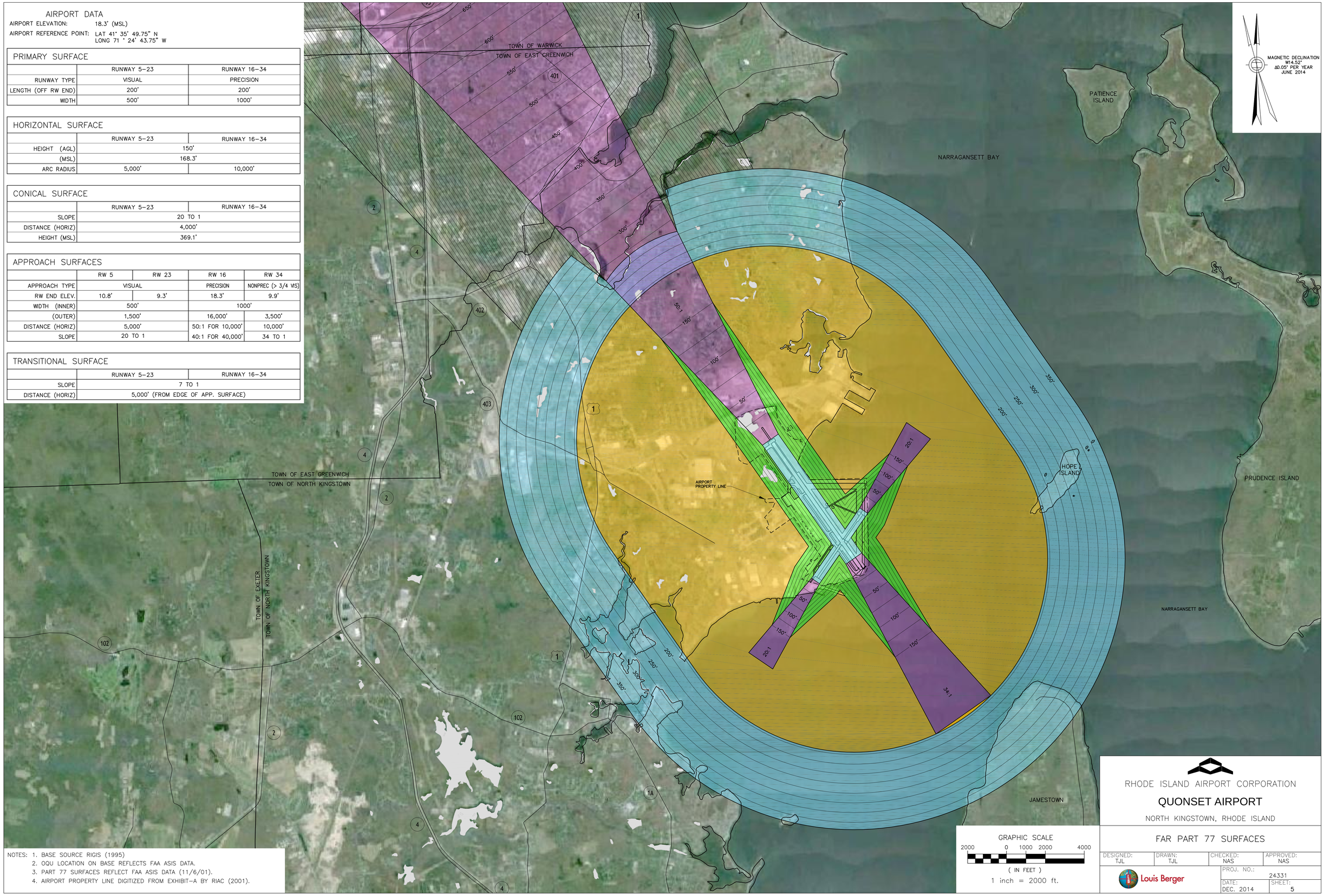
	RUNWAY 5–23	RUNWAY 16–34
SLOPE	20 TO 1	
DISTANCE (HORIZ)	4,000'	
HEIGHT (MSL)	369.1'	

APPROACH SURFACES

	RW 5	RW 23	RW 16	RW 34
APPROACH TYPE	VISUAL		PRECISION	NONPREC (> 3/4 VIS)
RW END ELEV.	10.8'	9.3'	18.3'	9.9'
WIDTH (INNER)	500'		1000'	
(OUTER)	1,500'		16,000'	3,500'
DISTANCE (HORIZ)	5,000'		50:1 FOR 10,000'	10,000'
SLOPE	20 TO 1		40:1 FOR 40,000'	34 TO 1

TRANSITIONAL SURFACE

	RUNWAY 5–23	RUNWAY 16–34
SLOPE	7 TO 1	
DISTANCE (HORIZ)	5,000' (FROM EDGE OF APP. SURFACE)	



NOTES:
1. BASE SOURCE RIGIS (1995)
2. OQU LOCATION ON BASE REFLECTS FAA ASIS DATA.
3. PART 77 SURFACES REFLECT FAA ASIS DATA (11/6/01).
4. AIRPORT PROPERTY LINE DIGITIZED FROM EXHIBIT–A BY RIAC (2001).

RHODE ISLAND AIRPORT CORPORATION

QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

FAR PART 77 SURFACES

DESIGNED:	DRAWN:	CHECKED:	APPROVED:
TJL	TJL	NAS	NAS

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PROJ. NO.: 24331

DATE: DEC. 2014

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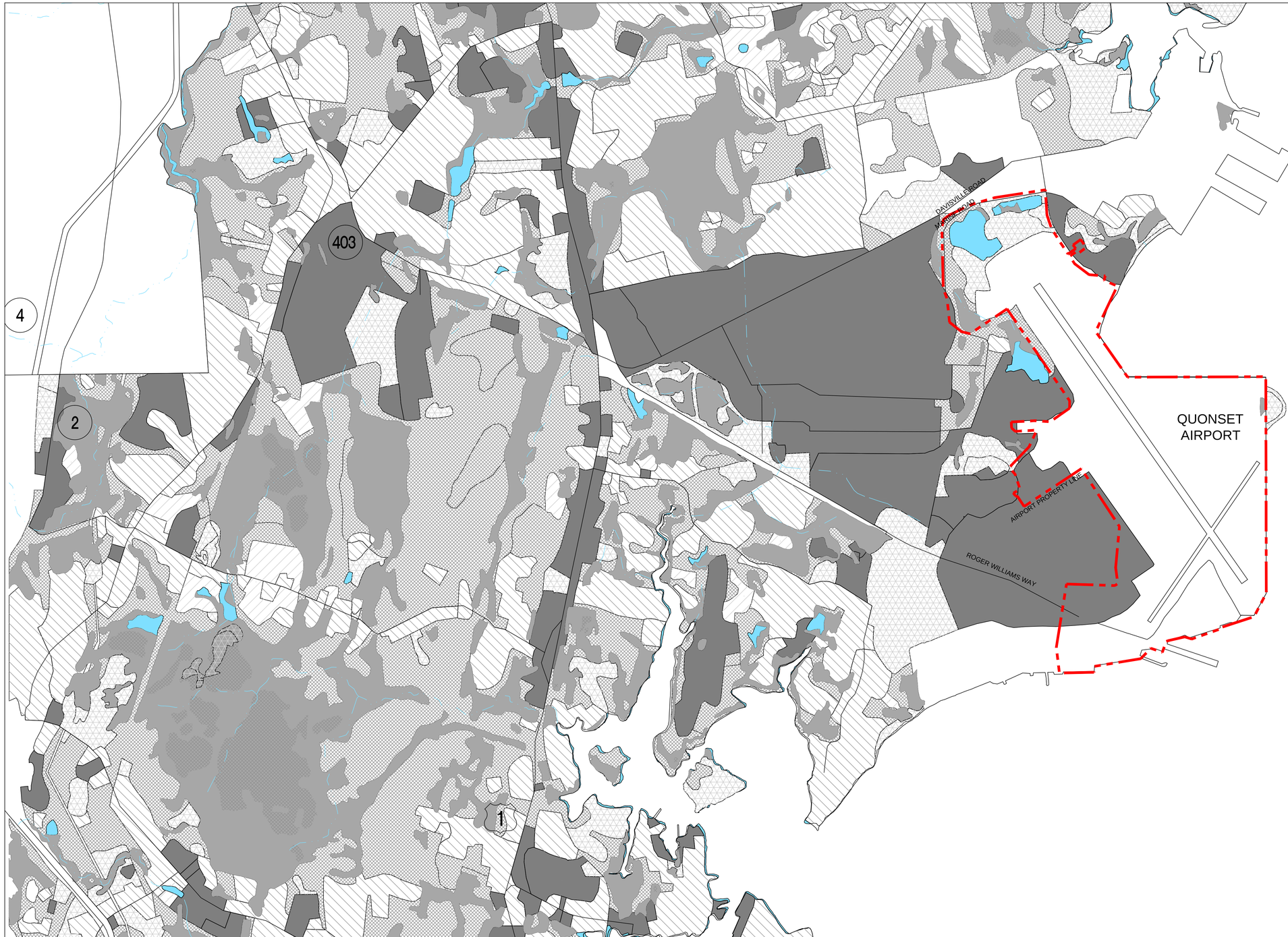


BASE SOURCE RIGIS (1995)

AGRICULTURE
BARREN/BRUSH
COMMERCIAL/URBANIZED
FOREST
RESIDENTIAL
TRANSPORTATION/UTILITIES
WATER
WETLANDS
ROADS
STREAMS
AIRPORT PROPERTY LINE

HORIZONTAL SCALE
1" = 500'
500' 0 250 500' 1,000'

RHODE ISLAND AIRPORT CORPORATION

QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

LAND USE PLAN

DESIGNED:	DRAWN:	CHECKED:	APPROVED:
TJL	TJL	NAS	NAS

Louis Berger

PROJ. NO.: 24331

DATE: DEC. 2014

SHEET: 6

RUNWAY DATA

	RUNWAY 5–23 EXISTING	RUNWAY 16–34 EXISTING	RUNWAY 16–34 PROPOSED
ARC	B–II	D–IV	SAME
% WIND COVERAGE (VFR)	95.0	94.4	SAME
% WIND COVERAGE (IFR)	–	89.1	SAME
RUNWAY LENGTH	4003'	7504'	7484'
WIDTH (FULL STRENGTH)	75'	150'	SAME
SURFACE	ASPHALT	ASPHALT/GROOVED	SAME
MAGNETIC HEADING	N 34°–24'–58" E (TRUE)	N 35°–03'–04" W (TRUE)	SAME
EFFECTIVE GRADIENT (%)	0.0	0.1	SAME
DISPLACED THRESHOLD	–	380' (34 END)	SAME
PAVEMENT STRENGTH S	13	–	SAME
PAVEMENT STRENGTH D	–	175	
RUNWAY MARKING	BSC	PIR	SAME
NAVIGATIONAL AIDS	–	ILS (16)	SAME
VISUAL AIDS	–	MALSR, PAPI–L (16) PAPI–L (34)	SAME
RUNWAY LIGHTING	M.I.R.L.	H.I.R.L.	SAME
PART 77 CATEGORY	VISUAL	PRECISION <3/4 mi (16) NON–PRECISION >3/4 mi (34)	SAME
APPROACH SURFACES	20:1	50:1, 40:1 (16) 34:1 (34)	SAME
RSA DIMENSIONS WIDTH (W)	150'	500'	SAME
RSA DIMENSIONS LENGTH (L) BEYOND RW END	300'	1000'	
ROFA DIMENSIONS WIDTH (W)	500'	800'	SAME
ROFA DIMENSIONS LENGTH (L) BEYOND RW END	300'	1000'	
RPZ DIMENSIONS INNER (W1)	500'	1000' (RW 16 END) 1000' (RW 34 END)	SAME
RPZ DIMENSIONS OUTER (W2)	700'	1750' (RW 16 END) 1510' (RW 34 END)	
RPZ DIMENSIONS LENGTH (L)	1000'	2500' (RW 16 END) 1700' (RW 34 END)	
RPZ DIMENSIONS DIST (D) BEYOND RW END	200'	200' (RW 16 END) 200' (RW 34 END)	
TAKE OFF RUN AVAIL.	4000'	7100' (RW 16 END) 7480' (RW 34 END)	7100' (RW 16 END) 7480' (RW 34 END)
TAKE OFF DIST. AVAIL.	4000'	7100' (RW 16 END) 7480' (RW 34 END)	7100' (RW 16 END) 7480' (RW 34 END)
ACLT STOP DIST. AVAIL.	4000'	7100' (RW 16 END) 7480' (RW 34 END)	7100' (RW 16 END) 7480' (RW 34 END)
LANDING DIST. AVAIL.	4000'	7100' (RW 16 END) 7100' (RW 34 END)	7100' (RW 16 END) 7100' (RW 34 END)

MODIFICATION OF AIRPORT STANDARDS

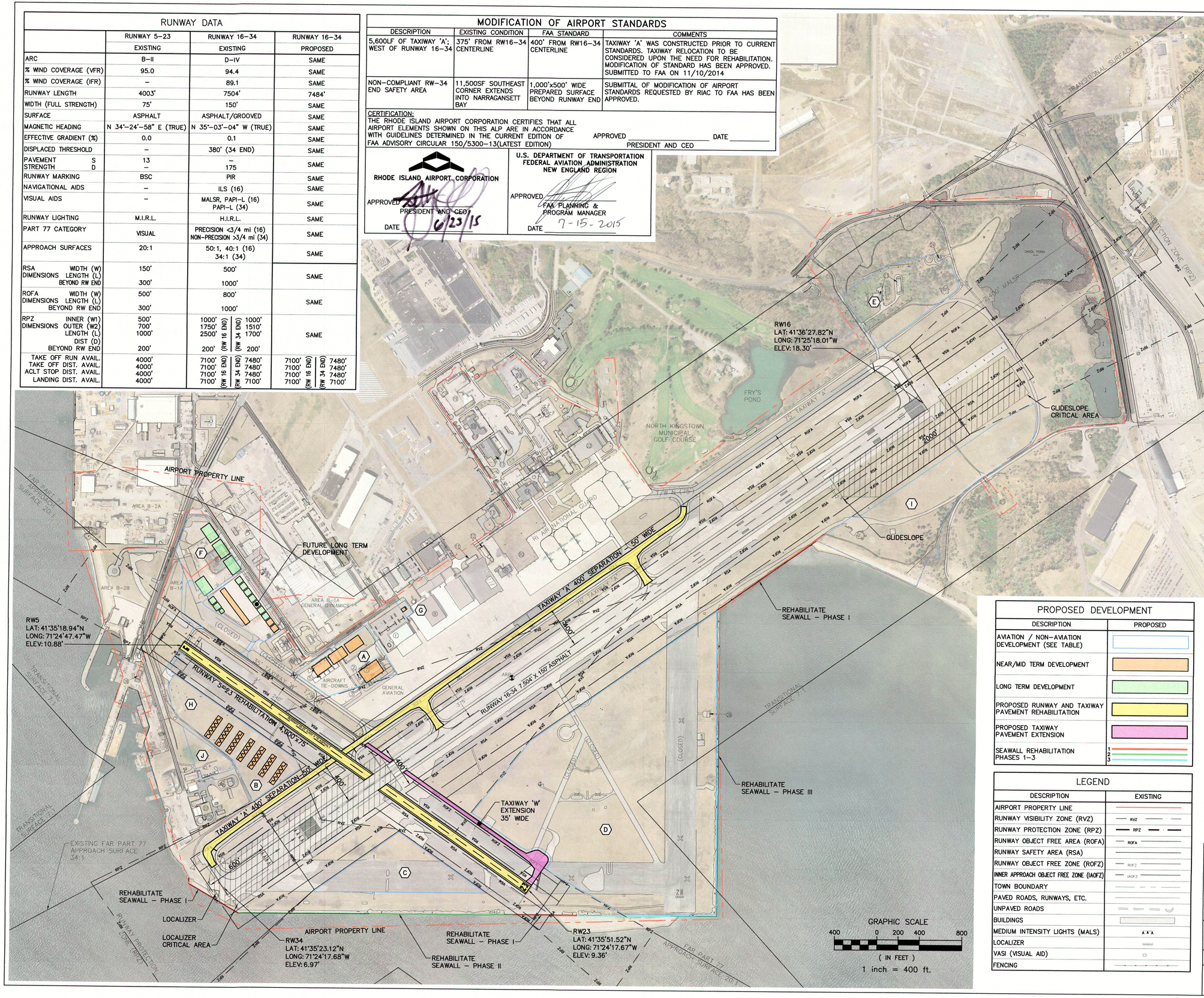
DESCRIPTION	EXISTING CONDITION	FAA STANDARD	COMMENTS
5,600LF OF TAXIWAY 'A'; WEST OF RUNWAY 16–34	375' FROM RW16–34 CENTERLINE	400' FROM RW16–34 CENTERLINE	TAXIWAY 'A' WAS CONSTRUCTED PRIOR TO CURRENT STANDARDS. TAXIWAY RELOCATION TO BE CONSIDERED UPON THE NEED FOR REHABILITATION. MODIFICATION OF STANDARD HAS BEEN APPROVED. SUBMITTED TO FAA ON 11/10/2014
NON–COMPLIANT RW–34 END SAFETY AREA	11,500SF SOUTHEAST CORNER EXTENDS INTO NARRAGANSETT BAY	1,000'x500' WIDE PREPARED SURFACE BEYOND RUNWAY END	SUBMITTAL OF MODIFICATION OF AIRPORT STANDARDS REQUESTED BY RIAC TO FAA HAS BEEN APPROVED.

CERTIFICATION:
THE RHODE ISLAND AIRPORT CORPORATION CERTIFIES THAT ALL AIRPORT ELEMENTS SHOWN ON THIS ALP ARE IN ACCORDANCE WITH GUIDELINES DETERMINED IN THE CURRENT EDITION OF FAA ADVISORY CIRCULAR 150/5300–13(LATEST EDITION)

APPROVED _____ DATE _____
PRESIDENT AND CEO

RHODE ISLAND AIRPORT CORPORATION
APPROVED _____
PRESIDENT AND CEO
DATE 6/23/15

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGION
APPROVED _____
FAA PLANNING & PROGRAM MANAGER
DATE 7-15-2015



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NEAR/MID TERM DEVELOPMENT	
LONG TERM DEVELOPMENT	
PROPOSED RUNWAY AND TAXIWAY PAVEMENT REHABILITATION	
PROPOSED TAXIWAY PAVEMENT EXTENSION	
SEAWALL REHABILITATION PHASES 1–3	1 2 3

LEGEND

DESCRIPTION	EXISTING
AIRPORT PROPERTY LINE	
RUNWAY VISIBILITY ZONE (RVZ)	RVZ
RUNWAY PROTECTION ZONE (RPZ)	RPZ
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RUNWAY SAFETY AREA (RSA)	
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFZ
INNER APPROACH OBJECT FREE ZONE (IAOFZ)	IAOFZ
TOWN BOUNDARY	
PAVED ROADS, RUNWAYS, ETC.	
UNPAVED ROADS	
BUILDINGS	
MEDIUM INTENSITY LIGHTS (MALS)	
LOCALIZER	
VASI (VISUAL AID)	
FENCING	

RHODE ISLAND AIRPORT CORPORATION

QUONSET AIRPORT

NORTH KINGSTOWN, RHODE ISLAND

AIRPORT LAYOUT PLAN

DESIGNED:	DRAWN:	CHECKED:	APPROVED:
TJL	TJL	NAS	NAS

Louis Berger

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