Danielson Airport Master Plan

LZD
Danielson
AIRPORT
MASTER PLAN
13
31

AIP No. 3-09-0007 & State Project No 68-204

Final Report

Prepared for:

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Connecticut Department of Transportation (ConnDOT)

Prepared by:

CHA

December 2008

FINAL AIRPORT MASTER PLAN

for

DANIELSON AIRPORT

December 2008

Prepared For:
Connecticut Department of Transportation

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1.0 EXISTING AIRPORT FACILITIES & SETTING

This chapter contains an inventory of existing facilities and characteristics at Danielson Airport. The inventory is used throughout the Master Plan to determine how well the Airport meets today's demands, and to identify areas that may need improvement to accommodate future growth. An inventory of airport pavements, buildings, and other structures is presented, as well as a summary of the airport location, airspace, activity, and environment. This information is presented in the following sections:

- Airport Location, Role, and History
- Airport User and Transient Pilot Questionnaires
- Airport Service Area and Socioeconomic Characteristics
- Airport Facilities and Services
- Meteorological Conditions
- Airspace and Air Traffic Control Procedures
- Based Aircraft and Operations
- Existing Design Aircraft

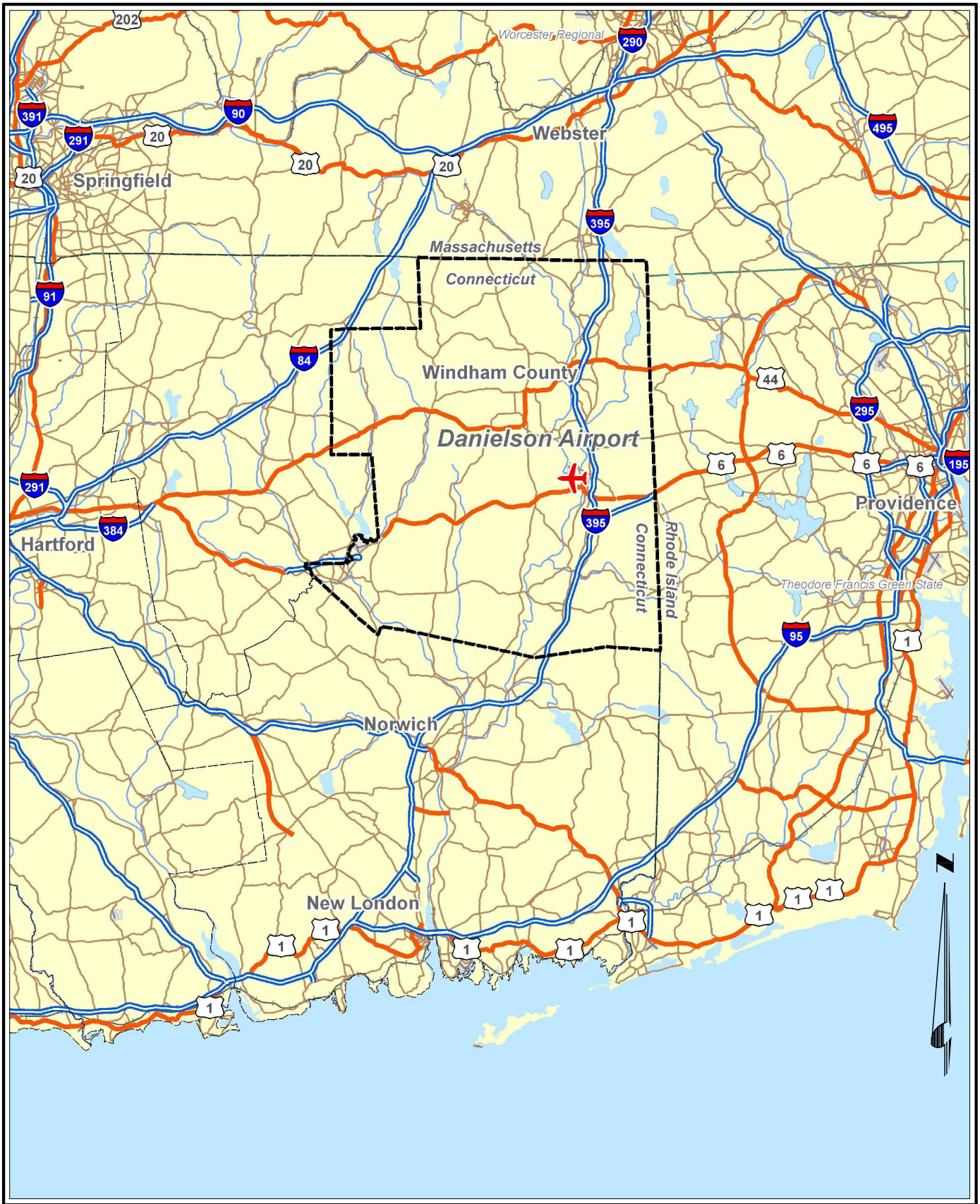
1.1 Airport Location, Role, and History

Airport Location

Danielson Airport is located in the Town of Killingly, Windham County, Connecticut (see Figure 1-1). The Airport sits in the Quinebaug River Valley (within the Quinebaug Shetucket Heritage Corridor), and is bordered by the river to the west and south. Airport access is provided from Airport Road (west off Upper Maple Street), approximately two miles north of Interstate 395 (at Exit 91) and Route 6 (Providence Pike). The Airport is open year-round, and is attended between the hours 8:00 a.m. and 7:00 p.m. (April to October), and 8:00 a.m. and 6:00 p.m. (November to March). The Federal Aviation Administration (FAA) has assigned Danielson Airport the three-letter identifier of LZD.

Windham County is located in the northeast corner of Connecticut. This area is known as Connecticut's "Quiet Corner" because of its lower population and rural character. Windham County is the least populated county in Connecticut, with approximately 115,200 inhabitants. The county borders the states of Massachusetts (to the north) and Rhode Island (to the east).

The Town of Killingly is located in the easternmost portion of Windham County, bordering the State of Rhode Island, and has a population of approximately 17,100 people. Killingly's major industries include construction, trade and distribution (e.g., the Frito and Staples distribution/ processing centers), and services.



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LOCATION MAP

Connecticut Department of Transportation
Danielson Airport
Master Plan

FIGURE 1–1

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Airport Role

As a "General Aviation" (GA) facility, Danielson Airport serves light private, corporate, and charter aircraft operating for recreational/personal, training, and business purposes, but does not offer scheduled airline service. Visitors to the area traveling on airlines arrive primarily at Providence's T.F. Green State Airport (approximately 30 miles to the east) or Hartford's Bradley International Airport (approximately 60 miles to the west). Several other GA airports are located within a half-hour drive of Danielson Airport, including Windham (Connecticut), Southbridge (Massachusetts), and North Central State (Rhode Island).

Like Danielson Airport, GA airports may be included in the National Plan of Integrated Airport Systems[1] (NPIAS) if they account for sufficient activity (usually at least 10 locally based aircraft) and are at least 20 miles from the nearest NPIAS airport. The 2,556 GA airports in the NPIAS have an average distribution of one-per-county.[2] These airports, with an average of 33 based aircraft, account for 40 percent of the Nation's GA fleet. They are the most convenient source of air transportation for approximately 19 percent of the Nation's population and are particularly important to rural areas.

Airport History

Danielson Airport opened in 1963 to serve the local community, as well as aircraft arriving and departing the adjacent Harvard H. Ellis Technical School, a school for aviation maintenance technician training.[3] The State of Connecticut paid $250,000, and the Federal Government $264,000, for the purchase and development of the 257-acre airport property.

Today, most activity consists of recreational/personal, training, and business operations, which are drawn by the Airport's convenient and easily-accessible location, services, and availability of tiedowns. Over the Airport's 40+ year history, several improvement projects have been undertaken, including runway and taxiway rehabilitation, construction of aircraft parking aprons and a segmented circle, and various security enhancements.

[1] The NPIAS identifies more than 3,300 airports that are significant to national air transportation and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). The NPIAS comprises all commercial service airports, all reliever airports, and selected GA airports.
[2] Windham County has two NPIAS airports (Danielson Airport and Windham Airport).
[3] It is anticipated that the aviation maintenance technician school will be relocated to Hartford-Brainard Airport in 2008.

1.2 Airport User and Transient Pilot Questionnaires

Airport User Questionnaire

At the beginning of the study process, a questionnaire was mailed to approximately 145 Danielson Airport users, including based aircraft owners, airport businesses, and student pilots. The mailing list was provided to the study team by New England Flight Services (NEFS) – the Airport's fixed base operator (FBO). The primary purpose of the questionnaire was to provide Danielson Airport users with the opportunity to comment on desired facility improvements, as well as to collect information regarding the Airport's service area, based aircraft, operations, and services. A summary of the Airport User Questionnaire responses is provided in Appendix A. The responses are incorporated and referenced throughout the Master Plan. The top 10 most needed facility improvements that were indicated are listed below (in rank order by number of responses).

1. Improve/expand FBO facilities (pilot's lounge, restrooms, additional services)
2. Additional hangars (T-hangars and conventional hangars) and tiedowns
3. Extend runway to 3,200 feet
4. Restaurant/cafe/coffee
5. Visual Approach Slope Indicator (VASI) or Precision Approach Path Indicator (PAPI) for Runway 31
6. Self-service fuel
7. Global Positioning System (GPS) precision instrument approach
8. Tree clearing
9. Weather reporting system (AWOS/ASOS)
10. Turf runway

Transient Pilot Questionnaire

Transient operations are those conducted by non-based aircraft or pilots. The Transient Pilot Questionnaire was administered by NEFS, and was intended to provide general observations about Danielson Airport's transient operations. Transient pilots were requested to complete and submit the questionnaire while visiting the Airport in early-2006. A summary of the Transient Pilot Questionnaire responses is provided in Appendix A. The responses are incorporated and referenced throughout the Master Plan.

1.3 Airport Service Area and Socioeconomic Characteristics

Airport Service Area

Airport service areas illustrate the location from which people are expected to use the airport as a first choice over other neighboring facilities. Based on general planning guidelines for GA facilities, airport service area boundaries comprise a 20-mile radius or a 30-minute driving time to the airport. These geographic areas encompass the majority of businesses, passengers, and based aircraft owners utilizing an airport, as well as the tourist destinations of visitors. Service area data can serve as the basis for compiling socioeconomic data to be used in developing forecasts of aviation demand.

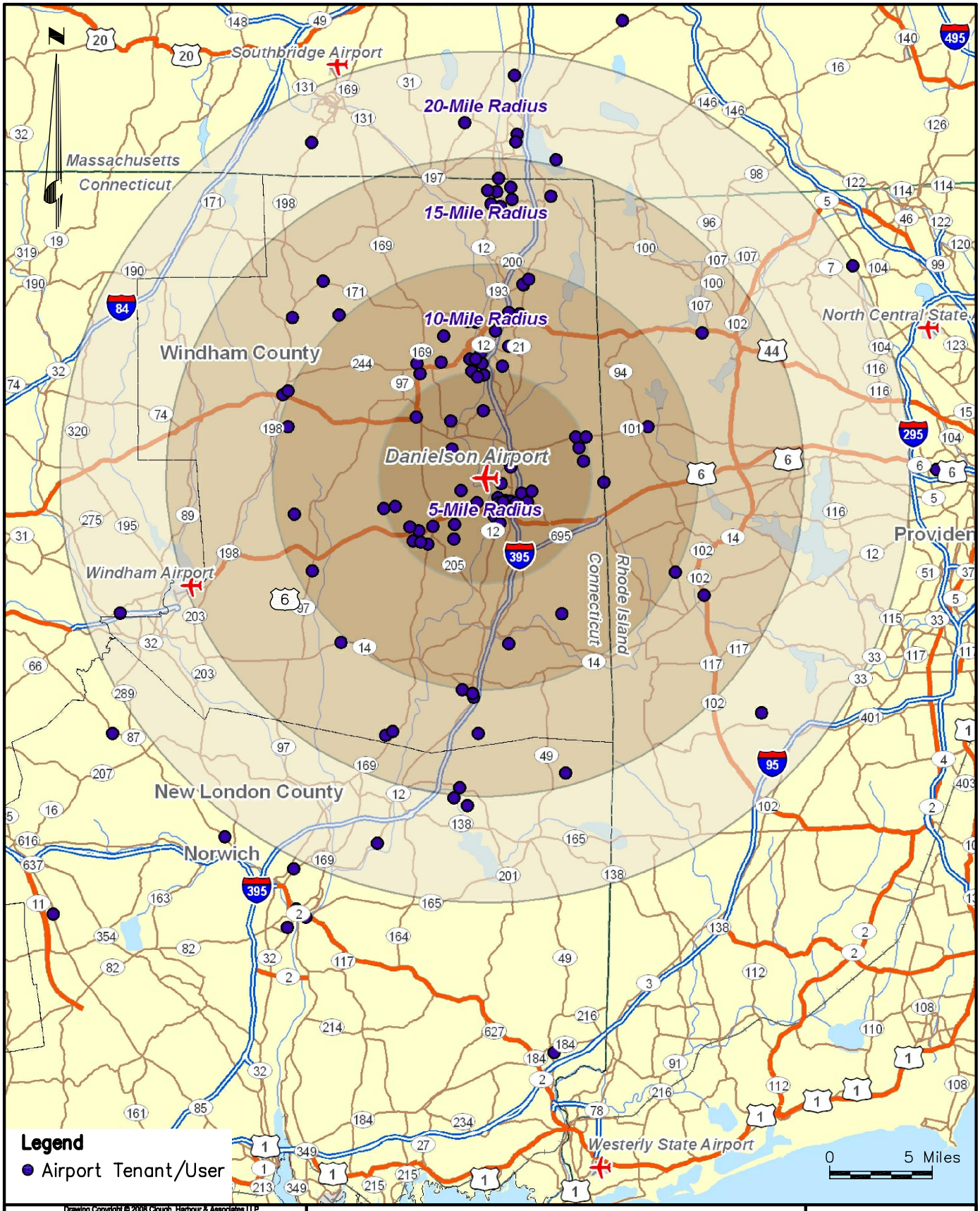
The service area for Danielson Airport was determined by plotting the addresses of tenants and users. As illustrated on Figure 1-2, Danielson Airport tenants and users generally live within 20 miles to the north and south of the Airport, and within 10 miles to the east and west.[4] This service area stretches linearly along Interstate 395 from Webster, MA (to the north) to Norwich, CT (to the south). It is likely that fewer Danielson Airport tenants and users live to the east and west of the Airport because interstate access is not provided, and due to the availability of other public-use GA airports, including those listed in Table 1-1 and illustrated on Figure 1-2.

TABLE 1-1 – REGIONAL AIRPORT FACILITIES

Airport Name	# of Runways	Runway Length	Surface Type	Instrument Approach	NM to LZD
Windham, CT	2	4,278’	Asphalt	Yes	13
Southbridge, MA	2	3,500’	Asphalt	Yes	18
North Central State, RI	2	5,000’	Asphalt	Yes	19
Westerly State Airport, RI	2	4,010’	Asphalt	Yes	29

NM: Nautical Miles

[4] Approximately 75 percent of the addresses used for the Airport User Questionnaire mailing are located within 20 miles of Danielson Airport.



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AIRPORT SERVICE AREA

Connecticut Department of Transportation
Danielson Airport
Master Plan

FIGURE 1–2

DATE DEC. 2008

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Socioeconomic Characteristics

Regional demand for aviation facilities largely depends on the demographics and economy of a given area. Population is the most important socioeconomic characteristic for determining aviation demand.

Table 1-2 lists town, county, state, and national population levels for 1990, 2000, and 2005.

TABLE 1-2 – POPULATION

Area	1990	2000	2005	Change (1990-2005)	AAGR (1990-2005)
Town of Killingly	15,889	16,472	17,098*	7.6%	0.49%
Windham County	102,525	109,091	115,206*	12.4%	0.78%
State of Connecticut	3,287,116	3,405,565	3,534,280*	7.5%	0.48%
United States	248,709,873	281,421,906	296,410,404**	19.2%	1.18%

Source: 2000 U.S. Census (*CERC Town Profile) (**U.S. Census Bureau Projection)
AAGR: Average Annual Growth Rate

As shown above, the total population of Killingly grew 7.6 percent from 1990 to 2005, which was slightly higher than the growth of the State of Connecticut population as a whole. In comparison, Windham County's population grew 12.4 percent during the same period. This growth is most likely associated with the prosperity of nearby universities (e.g., University of Connecticut and Eastern Connecticut State University), cities (e.g., Providence and Hartford), casinos (e.g., Foxwoods and Mohegan Sun), and because of increased investment by other businesses and organizations.

The unemployment rates and median household incomes of Killingly and Windham County are comparable to those of the United States as a whole. However, the unemployment rates of Killingly and Windham County are higher than that of the State of Connecticut as a whole, which partially contributes to their lower median household incomes (see Table 1-3). The median household incomes are also lower because the cost of living is less expensive in Windham County compared to most other counties in Connecticut.[5] A factor that contributed to the higher unemployment rates of Killingly and Windham County was the substantial decline of industrial and manufacturing businesses during the later half of the twentieth century.

[5] For comparison, the median household income of Hartford County (the highest populated County in Connecticut) was $55,606 in 2005.

TABLE 1-3 – UNEMPLOYMENT & INCOME		
Area	**Unemployment % (2004)**	**Medium Household Income (2005)**
Town of Killingly	6.4%	$44,893
Windham County	5.4%	$49,427
State of Connecticut	4.9%	$59,761
United States	4.8%*	$44,743**
Source: CERC Town Profile 2005 (*U.S. Census Bureau 2006) (**U.S. Census Bureau 2004)		

Recent and proposed development projects in the Windham County region (along the Interstate 395 corridor) should have a positive impact on future employment levels. One such proposed development project in Killingly is "Killingly Commons," a 525,000 square-foot retail complex that will include a Lowe's, Stop & Shop, Target, and other large chain stores.

1.4 Airport Facilities and Services

Airport Facilities

An initial step in the master plan process involves an inventory and assessment of existing facilities at an airport. Airport facilities are often described as either airside or landside. Airside (or airfield) facilities include those directly used by aircraft during takeoff and landing, such as runways, taxiways, lighting, and instrumentation. Landside facilities include support buildings and structures, such as aircraft hangars and parking (tiedown) aprons, automobile parking lots, and access roads. The existing airside and landside facilities at Danielson Airport are described below and illustrated on Figure 1-3. The conditions reported in this section are based on a review of the Airport's plans and documents, discussions with the airport manager, and the Airport User Questionnaire (see Appendix A). Table 1-4 summarizes basic airport data.

TABLE 1-4 – BASIC AIRPORT DATA	
Airport Three Letter Identifier	LZD
Airport Owner	Connecticut Department of Transportation
Year Established	1963
Airport Category	General Aviation
Airport Acreage	257
Airport Coordinates*	41°-49'-11" N 71°-54'-03" W
Airport Elevation	238 feet AMSL
*Source: U.S. Department of Transportation Northeast Airport/Facility Directory 2006 **AMSL:** Above Mean Sea Level	

FACILITIES TABLE		
#	FACILITY NAME	TOP ELEVATION
1	FBO/Maintenance Hangar	254.7
2	T–Hangar	255.0
3	Civil Air Patrol	255.3
4	Skydiving Trailer 1	307.4
5	Skydiving Trailer 2	302.5
6	Electrical Vault	242.9
7	Storage Hangar	–
8	Temporary Tiedown Apron	–
Note: Elevations Are Rooftop Elevations		

LEGEND	
ITEM	EXISTING
Paved Areas, Roads	
Unpaved road	
Runway Object Free Area (OFA)	
Runway Safety Area (RSA)	
Runway Protection Zone (RPZ)	
Airport Property Line	
Non Airport Building	
Airport Building & No.	①
Fence	
Tree Line	
Potential Wetland	
Utility Poles	
Note: Some features in the legend may not have been used	

ROTATING BEACON
AIRPORT PROPERTY LINE (APPROX.)
PARKING
AWOS
WINDSOCK WITH SEGMENTED CIRCLE
APRON
RPZ
INNER WIDTH: 250'
OUTER WIDTH: 450'
LENGTH: 1,000'
240'L x 250'W OFA
240'L x 120'W RSA
TWY "A"
TWY "A1"
RWY 13–31
2,700' x 75'
N 60° 55' 00" W
ELEV. 231.4
(LOW POINT)
LAT. 41° 49' 17.66"
LON. 71° 54' 18.97"
ELEV. 238.6
(HIGH POINT)
EXISTING AIRPORT
REFERENCE POINT (ARP)
LAT. 41° 49' 11.07"
LON. 71° 54' 03.48"
ELEV. 233.7
LAT. 14° 49' 04.47"
LON. 71° 53' 47.98"
Airport Rd.
North Street
Westfield Cemetery
H.H. Ellis Technical School
Holy Cross Cemetery
Brook
Killingly
QUINEBAUG
RIVER
0 400 800
Scale in feet

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EXISTING AIRPORT LAYOUT

Connecticut Department of Transportation
Danielson Airport
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FIGURE 1–3
DATE DEC. 2008
PROJECT No. 14002

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Airside Facilities

Originally constructed in 1963, Runway 13-31 is the main airside facility at Danielson Airport. The runway extends 2,700 feet in length and 75 feet in width on a northwest-southeast alignment (oriented on an approximate 130-310 degree magnetic alignment). The runway is served by full-length parallel Taxiway "A" on the north side, with one exit taxiway (Taxiway "A1") that provides access to the paved tiedown apron. The highest point on the runway occurs at the southeast end (Runway 31), at an elevation of 234 feet above mean seal level (AMSL). The bituminous runway pavement is rated for a 29,000-pound weight bearing capacity and was last rehabilitated in 1997; the pavement is currently in good condition.

Runway 13-31 is equipped with Medium Intensity Runway Lights (MIRL), with Runway End Identifier Lights (REIL) on the Runway 31 end. Aircraft use MIRL to identify runway edges at night. REIL are white strobe lights at a runway end that help aircraft identify the landing end of the runway during low visibility conditions (e.g., haze or fog).

The Airport is further equipped with a rotating beacon that is located on a tower approximately 2,000 feet north of the runway. The wind direction indicator consists of a lighted windsock within the Airport's segmented circle, as well as an unlighted windsock on the roof of the T-hangar building. In addition, an Automated Weather Observing System (AWOS) was recently installed at Danielson Airport. Pilots can tune into the AWOS frequency to obtain current weather conditions. No navigational aids[6] (navaids) are currently provided.

TABLE 1-5 – EXISTING AIRFIELD FACILITIES

Runway/Taxiway	Dimensions (L x W)	Last Rehab/ Construction	Lighting	Condition
Runway 13-31	2,700' x 75'	1997	MIRL Runway 31: REIL	Good
Taxiway "A"	2,700' x 40'	1997	MITL	Good
Taxiway "A1"	100' x 40'	1997	MITL	Good

MIRL: Med. Intensity Runway Lights **MITL:** Med. Intensity Taxiway Lights **REIL:** Runway End Identifier Lights

[6] Navaids are radio facilities that provide either enroute or approach guidance information to aircraft.

Landside Facilities

Danielson Airport's landside facilities consist of two conventional (or open-bay) hangars, a 10-bay T-hangar building, paved and grass aircraft tiedown areas (aprons), a fuel truck, the airport access road, parking, security features, and several tenant facilities. Table 1-6 summarizes the landside surface facilities that serve aircraft.

TABLE 1-6 – EXISTING LANDSIDE FACILITIES

Parking Aprons	Area	Tiedowns	Users	Condition
Paved Tiedown Apron	9,600 sy	26	Based	Good
FBO Ramp	8,000 sy	14	Transient	Excellent
Grass Tiedowns	N/A	33	Based	Fair
T-Hangar Pavement	2,900 sy	n/a	Based	Good

Airport Services

There are three primary tenants at Danielson Airport, including New England Flight Services (NEFS), Way Up Skydiving, and the Civil Air Patrol. In addition, the T-hangar building was privately constructed under a land lease to Danielson "T" Hangars; however, the bays are rented to individual airport users. Airport buildings are summarized in Table 1-7 and illustrated on Figure 1-3.

TABLE 1-7 – AIRPORT BUILDINGS

Number*	Facility	Area	Use	Condition
1	FBO/Maintenance Hangar	5,000 sf	Aircraft Maintenance FBO Operations	Fair
2	T-hangar Building	11,500 sf	Aircraft Storage	Fair
3	Civil Air Patrol	1,800 sf	Operations & Storage	Fair
4	Skydiving Trailer 1	600 sf	Operations & Storage	Good
5	Skydiving Trailer 2	600 sf	Operations & Storage	Good
6	Electrical Vault	400 sf	Avionics Equipment Shelter	Good
7	Storage Hangar	3,200 sf	Aircraft Storage	Excellent

*As illustrated on Figure 1-3.

New England Flight Services is Danielson Airport's FBO. NEFS leases the 5,000 square-foot conventional hangar (Building 1) and surrounding areas, which they use for aircraft maintenance and general business activities, and recently constructed a 3,200 square-foot aircraft storage hangar (Building 7). NEFS provides the following aircraft services:

- Fueling
- Maintenance
- Rentals and sales
- Pilot training
- Charter
- Tiedowns (for based and transient aircraft)

Danielson "T" Hangars manages the 10-bay T-hangar building (Building 2). The Danielson Airport Civil Air Patrol occupies the building adjacent to the FBO/maintenance hangar (Building 3) and conducts aerospace education, cadet programs, and emergency services operations. Way Up Skydiving provides recreational skydiving services and occupies two buildings (Buildings 4 and 5) at their leased site along Airport Road (approximately 1,000 feet north of the runway).

Aircraft Fueling

Aircraft fueling is provided by a fuel truck operated by NEFS. The fuel truck stores 750 gallons of 100 Low-Lead (LL) fuel. Self-service fueling and Jet A fuel are not available at Danielson Airport, and no permanently installed fueling system or designated fueling pad is currently provided. An evaluation of aircraft fueling procedures is provided in Chapter 3.

Airport Access, Parking, Security, and Emergency Response

Airport access is provided from Airport Road (west off Upper Maple Street), approximately two miles north of Interstate 395 (at Exit 91) and Route 6 (Providence Pike).

Danielson Airport provides a total of 99 automobile parking spaces at four locations. The number of parking spaces provided at each location is listed in Table 1-8.

TABLE 1-8 – AUTOMOBILE PARKING

Area	Spaces
FBO Facility	29
Paved Apron	15
T-hangar Building	42
Skydiving Center	13
Total	**99**

Danielson Airport's security features include perimeter fencing, card reader and manual lock gates, and surveillance cameras. In addition, street lighting is provided along Airport Road. Emergency response services are provided by Danielson Fire Department (Station 61).

1.5 Meteorological Conditions

Meteorological indicators, such as wind speed and direction, largely influence the desired runway orientation and number of runways at an airport. Ideally, a runway should be orientated in the same direction as the prevailing winds to enable aircraft operations into the wind. This reduces the takeoff and landing speeds of aircraft, and increases the safety and accuracy of operations. Crosswinds refer to winds traveling across the runway, perpendicular to the runway centerline. High velocity crosswinds can create undesirable flying conditions. As such, FAA Advisory Circular 150/5300-13 specifies the maximum crosswind speed (i.e., crosswind component) that an airport can safely accommodate. In general, small aircraft can only tolerate small crosswinds. The crosswind component for Danielson Airport is 10.5 knots or 12 mph. Thus, crosswinds greater than 10.5 knots create difficulties for light aircraft operations.

According to FAA standards, airports should provide 95 percent wind coverage for aircraft that use the airport on a regular basis. Wind coverage refers to the percentage of time that winds fall below an airport's crosswind component. If an airport offers less than 95 percent wind coverage, a crosswind runway may be justified and recommended to enable safe airport use during times of unfavorable winds.

Although Danielson Airport now has an on-site weather station (i.e., the recently installed AWOS), it has not been in operation long enough to provide useful data to analyze. As such, wind data was obtained for the nearest weather station, which is located at Windham Airport in Willimantic, CT, approximately 13 miles west of Danielson Airport. The Windham Airport data was used as a substitute for Danielson Airport wind data.

Windham Airport is also located in eastern Connecticut and exists within a similar topographic environment as Danielson Airport (i.e., within a river valley and surrounded by rivers/lakes). The National Climatic Data Center (NCDC) recorded the wind data for Windham Airport. The data spans the 9-year period from 1997 to 2005. Applying the Windham Airport data to the runway at Danielson Airport resulted in 94.3 percent wind coverage during All-Weather conditions, and 94.6 percent wind coverage during Instrument Flight Rules (IFR) conditions (visibility below three miles and/or cloud ceiling of 1,000 feet or less), which are just slightly below the desired coverage of 95 percent.

One of the best sources of wind information for an airport consists of the observations of local pilots. During the Master Plan Study, local pilots stated that the winds at Danielson Airport are primarily from the northwest, favoring operations on Runway 31.

Overall, it is assumed that the 10.5-knot wind coverage at Danielson Airport ranges from 93 to 95 percent. Table 1-9 lists the crosswind components and wind coverage. The Airport Layout Plan (ALP) Drawing Set displays the wind roses for All-Weather, IFR, and VFR conditions.

TABLE 1-9 – WIND DATA			
Wind Coverage	**Crosswind Component (knots)**		
	10.5	**13**	**16**
ALL	94.3%	96.9%	99.4%
IFR	94.6%	96.9%	99.3%
VFR	94.1%	96.8%	99.4%
Input: Provided by the NCDC – IJD ASOS Observations (1997-2005) Output: FAA Airport Design Program – Standard Wind Analysis			

1.6 Airspace and Procedures

Airspace

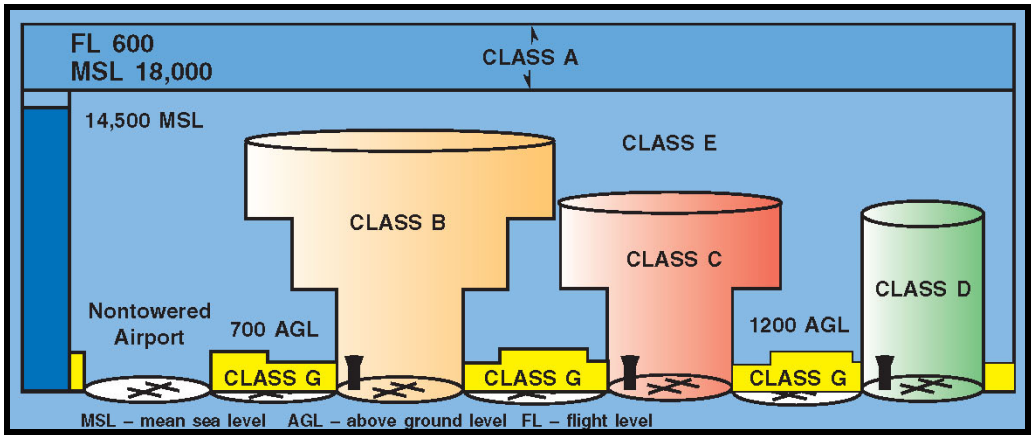
Aircraft approaching and departing Danielson Airport are subject to a system of controls designed to serve the safe separation of aircraft from one another. Aircraft are subject to varying degrees of control depending on the specific airspace and meteorological conditions in which they operate. This system of air traffic control is the responsibility of the FAA. The FAA has the statutory duty to establish, operate, and maintain air traffic control facilities and procedures. As Danielson Airport is not close to any busy commercial airports or congested airspace, there are limited restrictions. Nevertheless, all aircraft must operate in controlled airspace and adhere to specific flights rules. The airspace surrounding Danielson Airport is illustrated on Figure 1-4.

There are two basic types of aircraft flight rules in the air traffic control system: those operating under (1) Visual Flight Rules (VFR) and (2) Instrument Flight Rules (IFR). VFR operations depend primarily on visual conditions. IFR operations depend primarily on radar detection for separation by Air Traffic Control (ATC). IFR operations are controlled from takeoff to touchdown, while VFR operations are actively controlled only within the vicinity of airports.

The United States airspace is structured into Controlled, Uncontrolled, and Special Use airspace, as defined below.

- **Controlled Airspace** – Airspace that is supported by ground to air communications, navigational aids, and air traffic services. Controlled airspace is further divided into five different Classes (A, B, C, D, and E). The classification of any airspace is determined by its special location.
- **Uncontrolled Airspace** – All airspace that has not been designated as Controlled or Special Use, and within which ATC has neither the authority nor the responsibility for control. All uncontrolled airspace is considered Class G.
- **Special Use** – Designated airspace where unique or hazardous situations (e.g., military activities) require special attention and restrictions.

These airspace classifications impose several requirements upon the operations of aircraft, including visibility minimums, cloud clearances, contact with air traffic control, and special aircraft equipment. The classification system is summarized as follows:



- Class A: All airspace above 18,000 feet mean sea level (MSL). Class A airspace contains all high altitude airways (jet-routes).

- Class B and C: The airspace surrounding major commercial airports. To enter this airspace, communication and/or clearances must be received from ATC. The closest Class B airspace (covers surface to 10,000 feet MSL) surrounds Boston's Logan International Airport (BOS). The closest Class C airspace (covers surface to 4,000 feet MSL) surrounds Providence's T.F. Green State Airport (PVD) to the east and Hartford's Bradley International Airport (BDL) to the west. Within Class B and C airspace, aircraft are required to communicate with ATC.

- Class D: The terminal area airspace surrounding towered and military airports with a radius of five nautical miles. The closest Class D airspace (covers surface to 2,500 feet MSL) surrounds Worchester Airport (ORH) to the north and Groton-New London Airport (GON) to the south. Within Class D airspace, aircraft are required to communicate with ATC.

- Class E: General controlled airspace that includes most of the remaining airspace (up to 18,000 feet MSL). This airspace begins at only 700 feet above ground level at Danielson Airport, which means that all flights to and from the Airport, as well as local operations remaining within the airport traffic pattern, will enter the Class E Airspace.

  Aircraft operating in Class E airspace must follow the Federal Aviation Regulations (FAR) for controlled airspace, including a 3-mile visibility requirement for basic VFR activity, separation requirements from clouds, and all applicable operating rules.

- Class G: Uncontrolled airspace; the airspace below Class E. Although Danielson Airport itself is located within Class G airspace, all operations include aircraft climbing into or descending from the overlying Class E controlled airspace (700 feet above ground level). As such, aircraft at Danielson Airport operate in a controlled environment.

- Special Use Airspace: An area of special concern or restriction due to unusual hazards (e.g., military activity). Special Use airspace includes designated Prohibited Areas, Restricted

Areas, Warning Areas, Military Operation Areas, and Alert Areas. The closest special use airspace to Danielson Airport is Restricted Area (R-4102 A and B), which surrounds Fort Devens, located approximately 45 nautical miles to the north in Massachusetts.

Overall, the airspace surrounding Danielson Airport is relatively uncongested and will not hinder or restrict any potential improvements to the Airport.

Procedures

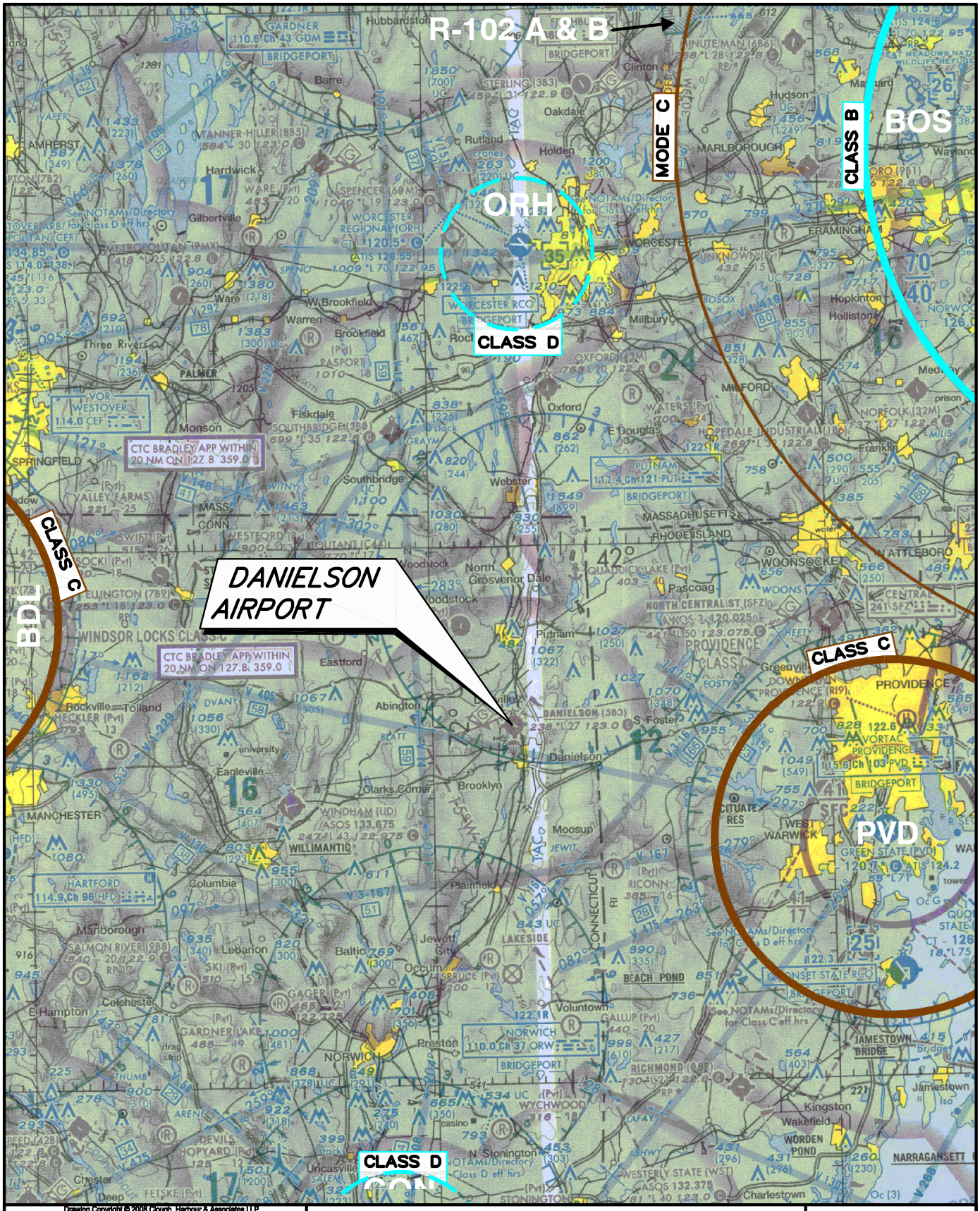
As typical with all small GA airports, Danielson Airport does not have a local Air Traffic Control Tower (ATCT) or Radar Approach Control Facility. As such, local pilots follow pre-determined traffic patterns to ensure orderly flow and operation at the Airport, and communicate with each other on the Common Traffic Advisory Frequency (CTAF) of 123.0 MHz. Both VFR and IFR procedures are established for Danielson Airport.

VFR Flight procedures at Danielson Airport follow standard traffic patterns established by the FAA. The patterns include flying straight-in to or straight-out from either runway end, or flying a standard rectangular traffic pattern with all left-hand turns. The full left-hand traffic pattern for aircraft staying in the pattern includes the departure leg, followed by left turns to the crosswind, downwind, base legs, and a final turn for landing.

Ideally, all takeoffs and landings are conducted into the wind in order to reduce aircraft ground speed and improve safety. Thus, the runway end in use is primarily determined by the current wind. The single northwest-southeast runway at Danielson Airport most frequently experiences winds from the northwest. Thus, it is estimated that 75 percent of takeoffs and landings occur on Runway 31 – landing from the southeast and departing to the northwest. The 25 percent remainder of takeoffs and landings therefore occur on the opposite Runway 13 – landing from the northwest and departing to the southeast.

During IFR conditions (visibility under 3-miles in Class E airspace), aircraft must file instrument flight plans and obtain "clearances" from ATC. IFR departure procedures all start with straight-out takeoffs with climbs to at least 1,000 feet AMSL, followed by the specific IFR flight clearance (heading and climbing instructions). These clearances are provided by ATC at the Providence Approach Control Facility on Frequency 135.4 MHz.

IFR approaches or Instrument Approach Procedures (IAP) are written and published by the FAA. The FAA has published a single non-precision IAP to Danielson Airport using a navaid called a VHF Omnidirectional Range (VOR). The VOR is located nine miles to the north of the Airport in Putnam, and enables aircraft to descend to 900 feet above Danielson Airport during IFR conditions. These older navaids and approach procedures are being replaced by the FAA with satellite-based Global Positioning System (GPS) approaches. Chapter 3 investigates the potential for providing a GPS approach at Danielson Airport.



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AIRSPACE MAP

Connecticut Department of Transportation
Danielson Airport
Master Plan

FIGURE 1–4

DATE DEC. 2008

PROJECT No. 14002

1.7 Based Aircraft and Operations

This section provides a summary of activity as of December 2005 at Danielson Airport, which is used as the base year for this study. This data is incorporated into the forecasts of aviation demand (Chapter 2).

The number of based aircraft at an airport determines the need for hangars, apron area, and other related facilities. Based aircraft are those stored at an airport on a regular basis. According to Danielson Airport's 5010-1 form (Airport Master Record), there are currently 66 based aircraft, as listed in Table 1-10.

Aircraft activity at Danielson Airport primarily consists of recreational/personal, training, and business operations. Table 1-10 lists the approximate number of annual aircraft operations conducted at Danielson Airport, with total operations provided by the 5010-1 form. An aircraft operation is defined as either a landing or a takeoff. Thus, each flight includes at least two operations – one takeoff and one landing.

TABLE 1-10 – EXISTING BASED AIRCRAFT & ACTIVITY

	Total	SE	ME	Gliders
Based Aircraft	66	62	1	3
Annual Operations	24,124	23,324	400	400
Local Operation	17,852	17,352	100	400
Itinerant Operations	6,272	5,972	300	0

Source: Based aircraft and operations data from the FAA form 5010-1. Operations mix estimated.
SE: Single-Engine Piston **ME:** Multi-Engine Piston

Aircraft operations are categorized in several ways, including the following:

- Aircraft Type (see Table 1-10)
- Type of operation (local vs. itinerant)
- Time of day (day vs. night)
- Type of operating procedure (VFR vs. IFR)

According to the Airport User Questionnaire, approximately 74 percent of all Danielson Airport operations are local. Local operations are conducted mostly by based aircraft. Itinerant operations (those arriving from outside the local area) are conducted by a mix of based and transient aircraft. Selected comparisons of Danielson Airport's operations are summarized in Table 1-11.

TABLE 1-11 – OPERATIONAL COMPARISONS	
Operational Comparison	**Percentage of Total Operations**
Runway 13 ***vs.*** Runway 31	25% ***vs.*** 75%
Day ***vs.*** Night	98% ***vs.*** 2%
Weekday ***vs.*** Weekend	50% ***vs.*** 50%
Local ***vs.*** Itinerant	74% ***vs.*** 26%
Touch & Go ***vs.*** Other	24% ***vs.*** 76%
IFR ***vs.*** VFR	4% ***vs.*** 96%
Source: Danielson Airport User Questionnaire	

1.8 Existing Design Aircraft

Many airport facility requirements are predicated on the level of activity and the largest or most demanding aircraft forecast to regularly use the Airport (at least 500 annual operations), which is referred to as the "design aircraft." Thus, the design aircraft is defined at the outset of the requirement analysis. The existing design aircraft for Danielson Airport is a single-engine piston, such as a Cessna Skyhawk or Piper Saratoga.

2.0 FORECASTS OF AVIATION DEMAND

Aviation forecasts represent a key component in the master planning process. Based aircraft forecasts largely establish the need for aircraft storage space (e.g., hangars) and other landside developments at an airport, while operations forecasts help to determine the need for airside and landside improvements.

Forecasts were developed for based aircraft and operations at Danielson Airport. The forecasts are presented in five-year intervals, with a base year of 2005 through to year 2025. This chapter describes the forecast methodologies and results. Note that the forecasts are based on an unconstrained growth scenario, which assumes that the Airport will provide adequate facilities to accommodate growth, and that potential obstacles to growth (e.g., wetlands, land use restrictions, lack of funding) can be overcome. This information is provided in the following sections:

- Airport Role and Vision
- Forecasting Methods
- Recommended Forecasts
- Derivative Forecasts
- Future Design Aircraft
- TAF Comparison
- Forecast Summary

2.1 Airport Role and Vision

As discussed in Chapter 1, Danielson Airport is classified as a "General Aviation" (GA) facility and is included in the National Plan of Integrated Airport Systems (NPIAS). Danielson Airport primarily serves light private, corporate, and charter aircraft operating for recreational/personal, training, and business purposes. Approximately 97 percent of the Airport's operations are currently conducted by single-engine piston aircraft. As such, the existing Design Aircraft was identified in Chapter 1 as a single-engine aircraft (e.g., Cessna Skyhawk or Piper Saratoga).

The Connecticut Department of Transportation (ConnDOT) envisions Danielson Airport to be a facility that can safely and effectively accommodate the majority of small aircraft,[1] including multi-engine pistons and air charter/taxi services. The future role and vision for Danielson Airport can be summarized as follows:

> *As modest growth in the population and economy of eastern Connecticut continues, improvements at Danielson Airport will be needed to adequately accommodate regional general aviation demand. Danielson Airport will provide the facilities and services necessary to ensure a safe, efficient, and convenient operating environment for small aircraft users.*

[1] The FAA defines small aircraft as those with a maximum certificated takeoff weight of 12,500 pounds or less.

2.2 Forecasting Methods

As Danielson Airport is a non-towered facility, no formal record of operations is maintained. Thus, existing operations levels are based on estimations of annual use. Numerous approaches may be investigated to forecast future airport activity levels. The most common approaches generally incorporate regional population or economic conditions, industry trends, and past airport activity levels. As existing operations levels are based on estimations, each of these approaches was investigated for Danielson Airport, categorized as the following four forecasting methods:

1. **Population Forecasting Method –** Uses the population forecasts of Windham and New London counties to represent the growth rates of Danielson Airport's based aircraft and operations.
2. **FAA Aerospace Forecasting Method –** Uses the FAA's nationwide growth rates for *Active Fleet* and *Hours Flown*.
3. **Trend Line Forecasting Method –** Uses historical Danielson Airport based aircraft data to create a trend line for predicting future activity.
4. **CSASP Forecasting Method –** Uses the Connecticut Statewide Airport System Plan (CSASP) growth rate factors for based aircraft and operations at Danielson Airport.

The forecasting methods assume that Danielson Airport will provide the facilities and services necessary to accommodate modest growth over the 20 year planning period, such as additional aircraft hangar storage and competitive fuel prices. This is a reasonable expectation, as Danielson Airport has several acres of developable space and a very distinct service area (see Figure 1-2). While there are some competing airports in the region, the general logic behind the forecasting methods is that Danielson Airport will absorb the natural growth of the defined service area. Airports that presently provide additional aircraft hangar storage, services, and fuel were considered, such as Groton-New London Airport and Westerly State Airport, but a competitive market evaluation was not conducted as part of the forecast effort.

2.2.1 Population Forecasting Method

Population is a key indicator of based aircraft and operations levels at GA airports. In general, as the population of an airport's service area increases or decreases, based aircraft and operations levels typically increase or decrease correspondingly. As summarized in Table 2-1, the population growth rate of Danielson Airport's service area is best represented by the combined population forecasts of Windham and New London counties.[2]

[2] Approximately 80% of Danielson Airport's tenants and users reside in Windham and New London counties.

TABLE 2-1 – COMBINED POPULATION FORECAST			
Year	**Windham County**	**New London County**	**Combined**
2005	115,206	267,325	382,531
2010	121,221	275,163	396,384
2015*	127,550	283,231	410,781
2020*	134,210	291,535	425,745
2025*	141,217	300,083	441,300
AAGR	1.02%	0.58%	0.72%
Change	22.3%	12.3%	15.4%

Source: CERC Town Profile 2005
*Extrapolated
AAGR: Average Annual Growth Rate

As shown in Table 2-1, the combined population of Windham and New London counties is forecast to increase at an average annual growth rate (AAGR) of 0.72 percent from 2005 to 2010. That AAGR was applied to existing based aircraft and operations levels at Danielson Airport, and extrapolated through 2025 to develop the forecasts summarized in Table 2-2 below.

TABLE 2-2 – POPULATION FORECASTING METHOD		
Year	**Based Aircraft**	**Operations**
2005	66	24,124
2010	68	25,005
2015	71	25,918
2020	73	26,865
2025	76	27,846
AAGR	0.72%	0.72%
Change	15.43%	15.43%

As shown in Table 2-2, under the Population Forecasting Method, total based aircraft are forecast to increase from 66 in 2005 to 76 by 2025, with total operations increasing to approximately 27,800 by 2025. This method provides modest growth levels (an increase of approximately 15 percent over the 20-year planning period) for both based aircraft and operations at Danielson Airport.

2.2.2 FAA Aerospace Forecasting Method

The FAA publishes nationwide forecasts for GA activity, most recently being the *Aerospace Forecasts Fiscal years 2006-2017*. This publication provides AAGR by aircraft type. As discussed below, those AAGR were applied to existing based aircraft and operations levels at Danielson Airport (by aircraft type), and extrapolated through 2025 to determine the forecasts summarized in Table 2-3.

Based Aircraft – The based aircraft forecasts were developed using the *FAA General Aviation Active Fleet Forecasts*. The FAA forecasts the total GA aircraft fleet to increase at an AAGR of 1.4 percent nationwide (from 2005 to 2017), with the greatest growth forecast for jet, rotorcraft, and experimental aircraft, and the lowest growth forecast for single- and multi-engine piston aircraft. The FAA does not develop active fleet forecasts for gliders – however, they do develop forecasts for *Active Glider Pilots* (AAGR of 0.4 percent from 2005 to 2017), which was used to forecast based gliders at Danielson Airport. Under this method, the Danielson Airport based aircraft forecasts were developed using the following AAGR by aircraft type:

- **SE Piston –** AAGR of 0.3%
- **ME Piston –** AAGR of 0.1%
- **Gliders –** AAGR of 0.4%

Operations – The operations forecasts were developed using the *FAA General Aviation Hours Flown Forecasts*. The FAA forecasts total GA hours flown to increase at an AAGR of 3.2 percent nationwide (from 2005 to 2017), with the greatest growth forecast for jet, rotorcraft, and experimental aircraft, and the lowest growth forecast for single- and multi-engine piston aircraft. Under this method, the Danielson Airport operations forecasts were developed using the following AAGR by aircraft type:

- **SE Piston –** AAGR of 1.2%
- **ME Piston –** AAGR of 1.1%
- **Gliders –** AAGR of 0.4%

TABLE 2-3 – FAA AEROSPACE FORECASTING METHOD

Year	Based Aircraft				Operations			
	SE	ME	Glider	Total	SE	ME	Glider	Total
2005	62	1	3	66	23,324	400	400	24,124
2010	63	1	3	67	24,757	422	408	25,588
2015	64	1	3	68	26,279	446	416	27,141
2020	65	1	3	69	27,894	471	425	28,790
2025	66	1	3	70	29,608	498	433	30,539
AAGR	0.30%	0.10%	0.40%	0.30%	1.20%	1.10%	0.40%	1.19%
Change	6.17%	2.02%	8.31%	6.21%	26.94%	24.46%	8.31%	26.59%

As shown in Table 2-3, under the FAA Forecasting Method, total based aircraft are forecast to increase slightly from 66 in 2005 to 70 by 2025. However, total operations are forecast to grow much stronger (approximately 27 percent) to approximately 30,500 by 2025.

2.2.3 Trend Line Forecasting Method

The forecasts summarized in Table 2-4 were developed by applying a trend line to historical based aircraft levels at Danielson Airport. The trend line is based on data recorded over the 10-year period 1995 to 2005, and was used to predict future based aircraft and operations levels at

Danielson Airport. The operations forecast was developed by applying a constant ratio of operations per based aircraft (approximately 366 operations per based aircraft) over the 20-year planning period.

TABLE 2-4 – TREND LINE FORECASTING METHOD		
Year	**Based Aircraft**	**Operations**
2005	66	24,124
2010	69	25,088
2015	73	26,600
2020	77	28,111
2025	81	29,623
AAGR	1.03%	1.03%
Change	22.80%	22.80%

As shown in Table 2-4, under the Trend Line Forecasting Method, total based aircraft are forecast to increase from 66 in 2005 to 81 by 2025, with total operations increasing to approximately 29,600 by 2025.

2.2.4 CSASP Forecasting Method

The 2005 Connecticut Statewide Airport System Plan (CSASP) was developed by ConnDOT in an effort "*to provide a comprehensive review of the current state aviation system, to support the continued operation and maintenance of Connecticut's airports, and to recommend modifications to the airport system to meet existing and projected aviation needs.*"

The AAGR used in the CSASP are based on a statewide forecast of registered aircraft. The CSASP used an AAGR of 1.8 percent to forecast based aircraft, and 1.5 percent to forecast operations. Those AAGR were applied to existing based aircraft and operations levels at Danielson Airport, and extrapolated through 2025 to develop the forecasts summarized in Table 2-5 below.

TABLE 2-5 – CSASP FORECASTING METHOD		
Year	**Based Aircraft**	**Operations**
2005	66	24,124
2010	72	25,988
2015	79	27,997
2020	86	30,161
2025	94	32,492
AAGR	1.80%	1.50%
Change	42.87%	34.69%

As shown in Table 2-5, under the CSASP Forecasting Method, total based aircraft are forecast to increase from 66 in 2005 to 94 by 2025, with total operations increasing to approximately 32,500

by 2025. Of the four forecasting methods, this method provides the greatest growth of both based aircraft and operations levels at Danielson Airport over the 20-year planning period.

2.2.5 Summary & Evaluation of Forecasting Methods

Table 2-6 summarizes the four forecasting methods developed for Danielson Airport.

TABLE 2-6 – SUMMARY OF FORECASTING METHODS

Year	1. Population		2. FAA Aerospace		3. Trend Line		4. CSASP	
	Based	Ops	Based	Ops	Based	Ops	Based	Ops
2005	66	24,124	66	24,124	66	24,124	66	24,124
2010	68	25,005	67	25,588	69	25,088	72	25,988
2015	71	25,918	68	27,141	73	26,600	79	27,997
2020	73	26,865	69	28,790	77	28,111	86	30,161
2025	76	27,846	70	30,539	81	29,623	94	32,492
AAGR	0.72%	0.72%	0.30%	1.19%	1.03%	1.03%	1.80%	1.50%
Change	15.43%	15.43%	6.21%	26.59%	22.80%	22.80%	42.87%	34.69%

As shown in Table 2-6, of the four forecasting methods, the CSASP Method provides the greatest growth of both based aircraft and operations at Danielson Airport. The FAA Aerospace Method provides the lowest growth of based aircraft, and the Population Method provides the lowest growth of operations. The four forecasting methods were evaluated based on their consistency with local, state, and national trends, as summarized in Table 2-7 below.

TABLE 2-7 – EVALUATION OF FORECASTING METHODS

Forecasting Method	Basis	Pros	Cons	Recommended
1. Population	Local	Based on anticipated trends of Danielson Airport's service area.	Assumes that population is the primary factor that influences airport activity.	**Yes**
2. FAA Aerospace	National	Based on nationwide/industry GA trends, which incorporate multiple economic & social indicators.	Not specific to Danielson Airport – does not account for local factors.	**Yes**
3. Trend Line	Local	Based on a trend of actual recorded growth at Danielson Airport.	Past growth does not necessarily indicate future growth.	**Yes**
4. CSASP	State	Based on a statewide forecast of registered aircraft.	Past growth does not necessarily indicate future growth.	**Yes**

2.3 Recommended Forecasts

As shown in Table 2-7, each forecasting method has a reasonable justification for its use, but also has limitations. As no method can be identified as more accurate than the others, a combination of all four forecasting methods is recommended for Danielson Airport. The forecasts are recommended because they incorporate local, state, and national trends, and provide a wide-range of possible future activity levels. The resulting forecasts provide a modest projection that is based on multiple factors. Table 2-8 summarizes the recommended forecasts for Danielson Airport – the average of all four forecasting methods.

TABLE 2-8 – RECOMMENDED FORECAST

Year	Based Aircraft	Operations*
2005	66	24,124
2010	69	25,420
2015	73	26,920
2020	76	28,480
2025	80	30,130
AAGR	0.99%	1.12%
Change	21.83%	24.88%

*Forecast operations are rounded

As shown in Table 2-8, under the recommended forecasts, total based aircraft are projected to increase from 66 in 2005 to 80 by 2025, with total operations increasing to 30,130 by 2025. Assuming that Danielson Airport will continue to improve to accommodate the natural growth of the previously defined service area, the recommended forecasts provide a reasonable expectation of based aircraft and activity levels.

Table 2-9 summarizes the recommended forecasts by aircraft type. The forecasts were developed by applying existing percentages of based aircraft and operations at Danielson Airport. However, to account for the anticipated increased use of the Airport by multi-engine aircraft, the forecasts assume increased growth in the based aircraft and operations percentages of multi-engine aircraft beginning in 2015.

TABLE 2-9 – RECOMMENDED FORECAST BY AIRCRAFT TYPE

Year	Based Aircraft				Operations*			
	SE	ME	Glider	Total	SE	ME	Glider	Total*
2005	62	1	3	66	23,324	400	400	24,124
2010	65	1	3	69	24,580	420	420	25,420
2015	68	2	3	73	25,840	630	450	26,920
2020	71	2	3	76	27,350	660	470	28,480
2025	75	2	3	80	28,930	700	500	30,130

*Forecast operations are rounded
SE: Single-Engine Piston **ME:** Multi-Engine Piston

As shown in Table 2-9, total based multi-engine aircraft are forecast to increase from one in 2005 to two by 2020, with their total operations exceeding 500 by 2015. In addition, a total increase of 13 based single-engine piston aircraft is forecast at Danielson Airport over the 20-year planning period.

2.4 Derivative Forecasts

The derivative forecasts help to determine requirements for facilities and services at Danielson Airport, as discussed in Chapter 3. The derivative forecasts include:

- Local and Itinerant Operations
- Day and Night Operations
- IFR and VFR Operations
- Peak Period Operations

2.4.1 Local and Itinerant Operations

Local operations are performed by aircraft that:

- Operate in a local traffic pattern or within sight of an airport
- Are arriving from (or departing to) a local practice area (within 20 miles of an airport)
- Are conducting simulated instrument approaches or low passes at an airport
- Are conducting glider, skydiving, or other recreational activity

Itinerant operations are performed by aircraft arriving from (or departing to) outside the local area. According to the Airport User Questionnaire responses (see Appendix A), the current split of Danielson Airport's local to itinerant operations is approximately 74 percent local to 26 percent itinerant. Table 2-10 summarizes the local/itinerant split forecast for operations at Danielson Airport.

TABLE 2-10 – LOCAL/ITINERANT OPERATIONS FORECAST

Year	Local	Itinerant	Total	Split %
2005	17,852	6,272	24,124	74/26
2010	18,810	6,610	25,420	74/26
2015	19,380	7,540	26,920	72/28
2020	20,510	7,970	28,480	72/28
2025	21,090	9,040	30,130	70/30

As shown in Table 2-10, the split percentage for itinerant operations is forecast to increase over the 20-year planning period. This is based on the assumption that increased use of multi-engine aircraft (including by air charter/taxi services, as well as personal and business users) will occur at Danielson Airport, resulting in more itinerant operations. However, local operations are forecast to continue to comprise the majority of the Airport's operations.

2.4.2 Day and Night Operations

It is estimated that approximately 95 percent of Danielson Airport's current operations are conducted during daylight hours. Daylight hours are defined as one hour before sunrise to one hour after sunset. Table 2-11 summarizes the day/night split forecast for operations at Danielson Airport.

TABLE 2-11 – DAY/NIGHT OPERATIONS FORECAST

Year	Day	Night	Total	Split %
2005	22,918	1,206	24,124	95/5
2010	24,150	1,270	25,420	95/5
2015	25,300	1,620	26,920	94/6
2020	26,770	1,710	28,480	94/6
2025	28,020	2,110	30,130	93/7

As shown in Table 2-11, the split percentage for night operations is forecast to increase over the 20-year planning period. This is based on the assumption that increased use of multi-engine aircraft and increased business activity will occur at Danielson Airport. However, daylight operations are forecast to continue to comprise the majority of the Airport's operations.

2.4.3 IFR and VFR Operations

According to the Airport User Questionnaire responses (see Appendix A), approximately 96 percent of Danielson Airport's current operations are flown during Visual Flight Rule (VFR) conditions, with the remaining four percent flown during Instrument Flight Rule (IFR) conditions. As discussed in Chapter 1, VFR operations can only occur during visual meteorologic conditions. IFR operations depend upon control and separation by air traffic controllers (ATC). Table 2-12 summarizes the VFR/IFR split forecast for operations at the Airport.

TABLE 2-12 – IFR/VFR OPERATIONS FORECAST

Year	VFR	IFR	Total	Split %
2005	23,159	965	24,124	96/4
2010	24,400	1,020	25,420	96/4
2015	25,570	1,350	26,920	95/5
2020	27,060	1,420	28,480	95/5
2025	28,320	1,810	30,130	94/6

As shown in Table 2-12, the split percentage for IFR operations is forecast to increase over the 20-year planning period. This is based on the assumption that aircraft will have increased capability to safely operate during IFR conditions at Danielson Airport in the future (because of enhanced aircraft technology and future instrument approaches), and that increased levels of business activity will occur. However, VFR operations are forecast to continue to comprise the majority of the Airport's operations.

2.4.4 Peak Period Operations

Peak period operations indicate the amount of activity that occurs during times of peak activity. Peak period operations can be used to determine the recommended size of administration buildings, apron spaces, and automobile parking lots. Three specific peak periods were estimated, including peak month, average day (during the peak month), and peak hour operations. Standard planning assumptions were used to derive the peak period forecasts. Definitions for these demand periods are as follows:

- **Peak Month Operations** – The month during which the most aircraft operations occur. Standard forecasting practices often assume a 10 percent increase over the other months of the year. However, due to seasonal weather variations in Connecticut and the high percentage of recreational activity, there are larger differences between summer and winter activity levels at Danielson Airport. As such, total operations were divided by 12, with the peak month assumed at a 25 percent increase over the other months.

- **Average Day Operations** – Aircraft activity that can be expected on a typical day during the peak month, derived by dividing the peak month operations by 30.

- **Peak Hour Operations** – The hour during which most activity occurs on an average day. Total peak hour operations generally equate between 12 and 20 percent of the average day total operations. Danielson Airport's peak hour operations were calculated as 15 percent of the average day total operations.

Table 2-13 summarizes the forecast peak period operations during the planning period.

TABLE 2-13 – PEAK OPERATIONS

Year	Annual Operations	Peak Month	Peak Day	Peak Hour
2005	24,124	2,513	84	13
2010	25,420	2,650	88	13
2015	26,920	2,800	93	14
2020	28,480	2,970	99	15
2025	30,130	3,140	105	16

As shown in Table 2-13, peak hour operations are forecast to increase to 16 by 2025.

2.5 Future Design Aircraft

The Design Aircraft is defined as the largest or most demanding aircraft forecast to regularly use an airport (at least 500 annual operations). The existing Design Aircraft was identified in Chapter 1 as a single-engine aircraft (e.g., Cessna Skyhawk or Piper Saratoga). However, as discussed in this chapter, multi-engine piston aircraft operations are forecast to increase at Danielson Airport,

and a demand for enhanced charter and air taxi services is anticipated. Thus, the future Design Aircraft for Danielson Airport is a multi-engine piston, such as a Beechcraft Baron or Piper Navajo. Design requirements are discussed in Chapter 3.

2.6 TAF Comparison

The FAA publishes annual forecasts (covering a 20-year period) for individual airports, known as the Terminal Area Forecasts (TAF). The TAF are based on anticipated local and national trends.[3] The TAF for Danielson Airport illustrates no growth through 2025 (i.e., illustrates existing levels through 2025). This is reflective of the relatively stable based aircraft and operations levels experienced at the Airport in the past few years.

Although the TAF illustrates no growth at Danielson Airport, some growth is anticipated (as discussed in this chapter). This is evident by the Airport User Questionnaire responses (see Appendix A) – approximately 56 percent of the responses indicated an anticipated increased usage of the Airport over the next 5 years (responses ranged from a 10 percent to 200 percent increase), with no responses indicating an anticipated decreased usage. Thus, it is concluded that the recommended forecasts are justified, and provide modest growth levels of based aircraft and operations at Danielson Airport over the 20-year planning period.

[3] The TAF for smaller airports is often less reliable than larger (towered) airports, as data is more difficult to track without operational control towers. Thus, the TAF for smaller airports often do not undergo regular and/or detailed updates.

2.7 Forecast Summary

Table 2-14 summarizes the recommended forecasts for Danielson Airport over the 20-year planning period. These forecasts are incorporated throughout the remainder of this report.

TABLE 2-14 – FORECAST SUMMARY					
Year	**2005**	**2010**	**2015**	**2020**	**2025**
Based Aircraft					
Single-Engine	62	65	68	71	75
Multi-Engine	1	1	2	2	2
Glider	3	3	3	3	3
Total	**66**	**69**	**73**	**76**	**80**
Operations					
Single-Engine	23,324	24,580	25,840	27,350	28,930
Multi-Engine	400	420	630	660	700
Glider	400	420	450	470	500
Total	**24,124**	**25,420**	**26,920**	**28,480**	**30,130**
Local & Itinerant Operations					
Local	17,852	18,810	19,380	20,510	21,090
Itinerant	6,272	6,610	7,540	7,970	9,040
Day & Night Operations					
Day	22,918	24,150	25,300	26,770	28,020
Night	1,206	1,270	1,620	1,710	2,110
VFR & IFR					
VFR	23,159	24,400	25,570	27,060	28,320
IFR	965	1,020	1,350	1,420	1,810
Peak Operations					
Month	2,513	2,650	2,800	2,970	3,140
Day	84	88	93	99	105
Hour	13	13	14	15	16

3.0 FACILITY REQUIREMENTS

Danielson Airport currently provides basic facilities for aircraft storage and operation, including a 2,700-foot long runway, a Fixed Base Operator (FBO) facility, a maintenance hangar, and a 10-bay T-hangar building. This chapter identifies the need for improved and new facilities at Danielson Airport to meet FAA standards and accommodate existing and potential users. The facility requirements are based on the aviation forecasts in Chapter 2, and FAA standards and planning guidelines.

This information is provided in the following sections:

- Airfield Capacity
- Airport Design Standards
- Runway Requirements
- Taxiway Requirements
- Landside Facilities
- Summary of Airport Facility Requirements

3.1 Airfield Capacity

This section reviews the airfield capacity of Danielson Airport, evaluates any capacity surpluses or deficiencies, and identifies airfield improvements that may be required during the 20-year planning period. Airfield capacity is defined as the maximum rate that aircraft can arrive and depart an airfield with an acceptable level of delay. It is a measure of the number of operations that can be accommodated at an airport during a given time period, which is determined based on the available airfield system (runways, taxiways, navaids, etc.) and airport activity characteristics.

The current procedure employed by the FAA to evaluate airfield capacity is described in Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. This procedure uses estimates of Hourly Airfield Capacity and Annual Service Volume (ASV), as defined below.

- **Hourly Airfield Capacity –** The maximum number of aircraft operations that can take place on the runway system in one hour. As airport activity occurs in certain peaks throughout the day, accommodating the peak hour activity is most critical.

- **Annual Service Volume** – The annual capacity or the maximum level of annual aircraft operations that can be accommodated on the runway system with an acceptable level of delay. The ASV considers peaking characteristics in its calculation. As such, an airport's ASV would increase without any system or physical airfield improvements if activity became more evenly spread throughout the day, week, and/or year. The opposite would occur if operations became more pronounced into peak periods.

For airports that have multiple runways, multiple operating procedures can be used (e.g., landing on one runway with departures on another). However, as Danielson Airport has an airfield configuration consisting of a single runway and full-parallel taxiway, the airfield capacity does not depend on various operating configurations. Therefore, the simplified method described in FAA AC 150/5060-5 was used to estimate capacity. The AC provides tables of estimated capacity based on specific airport characteristics. For Danielson Airport, the following characteristics and assumptions are applicable:

- No operations of aircraft over 12,500 pounds will occur
- The Airport will remain general aviation, with no scheduled commercial service
- No airspace limitations
- Touch and go's will remain at 24% of the total operations
- Landings generally equal takeoffs during peak periods
- Monthly peaking is significant (due to summer training activity)
- Hourly peaking is significant (due to touch & go training operations)

Based on the assumptions above, the estimated airfield capacity of Danielson Airport is as follows:

- VFR Hourly Capacity 87 Operations
- IFR Hourly Capacity 22 Operations
- Annual Service Volume 158,000 Operations

Table 3-1 provides a comparison of airfield capacity to airport activity.

TABLE 3-1 – HOURLY CAPACITY ESTIMATE

		2005	**2025**
a) Peak Hour Operations – VFR		13	16
b) Peak Hour Operations – IFR		2	3
c) Total Annual Operations		24,124	30,130
d) Peak Hour Capacity – VFR		87	87
e) Peak Hour Capacity – IFR		22	22
f) Annual Service Volume		158,000	158,000
VFR Hourly Capacity Ratio	%(a/d)	15%	18%
IFR Hourly Capacity Ratio	%(b/e)	9%	14%
Annual Capacity Ratio	%(c/f)	15%	19%

Source: Activity Forecasts, Chapter 2 & FAA AC 150/5060-5

As shown in Table 3-1, the airfield currently provides ample capacity to accommodate existing and future operations, with the VFR hourly capacity reaching only 18 percent during the 2025 peak hour. Although adequate capacity is provided for IFR operations, the Airport may consider publishing a non-precision instrument approach (IAP) to provide enhanced capability for low-visibility landings – IAP requirements are reviewed in Section 3.3.5.

3.2 Airport Design Standards

As discussed in previous chapters, the design aircraft is defined as the largest aircraft or aircraft class that uses or is anticipated to use an airport on a regular basis (i.e., at least 500 annual operations). The future design aircraft class at Danielson Airport includes small twin-engine aircraft with maximum takeoff weights of 12,500 pounds or less, such as the Beechcraft Baron or Piper Navajo aircraft (see Section 2.5).

The FAA uses the approach speed and wingspan of an airport's design aircraft to classify the airport itself. The FAA term for this classification is the Airport Reference Code (ARC). Table 3-2 lists the specifications associated with each ARC.

TABLE 3-2 – AIRPORT REFERENCE CODES

Aircraft Approach Category		Airplane Design Group	
Category	**Speed**	**Group**	**Wingspan Size**
A	Less than 91 knots	I	Up to 48'
B	91 to 120 knots	II	49' to 78'
C	121 to 140 knots	III	79' to 117'
D	141 to 165 knots	IV	118' to 170'
E	166 knots or more	V	171' to 213'
		VI	214' to 261'

The design aircraft at Danielson Airport have approach speeds of up to 100 knots, and wingspans of up to 41 feet. Danielson Airport is classified as ARC B-I and should meet the FAA standards established for ARC B-I airports with exclusively small aircraft. The FAA defines small aircraft as those with maximum takeoff weights of up to 12,500 pounds.

FAA AC 150/5300-13, *Airport Design*, contains federal design standards for each ARC. For example, according to the AC, a B-I airport should provide a Runway Safety Area that extends 240 feet beyond the runway end and 120 feet in width. If taxiways are provided, airfield signage should also be provided.

Danielson Airport is forecast to remain a B-I airport throughout the planning period. Therefore, B-I standards were used to assess the future airfield requirements. The three primary runway design standards are defined below.

- **Runway Safety Area (RSA) –** A defined surface surrounding a runway prepared for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. This area must also support snow removal, aircraft rescue, and fire fighting equipment. The RSA should be free of objects, except for objects that must be located in the area because of their function.

- **Runway Object Free Area (ROFA) –** A ground area surrounding runways that should be

clear of objects (e.g., roads, buildings, etc.), except for objects that need to be within the area due to their function.

- **Runway Protection Zone (RPZ) –** Areas off the runway ends that are used to enhance the protection of people and property on the ground. The RPZ is achieved through airport owner control and the clearing of objects and undesired activities.

Table 3-3 provides the FAA standards associated with ARC B-I (exclusively small aircraft).

TABLE 3-3 – ARC B-I (SMALL) AIRFIELD DESIGN STANDARDS

Airfield Facility	Existing	2025 Requirement	Deficit
Runway Width	75’	60’	None
Taxiway Width	40’	25’	None
Runway Wind Coverage	92 to 95% All-Weather	95% All-Weather	Up to 3%
Runway Safety Area (RSA): Length (beyond Runway 13) Length (beyond Runway 31) Width	 240’ 240’ 120’	 240’ 240’ 120’	 None None None
Object Free Area (OFA): Length (beyond Runway 13) Length (beyond Runway 31) Width	 240’ 240’ 250’	 240’ 240’ 250’	 None None None
Runway Protection Zone (RPZ): Inner Width Outer Width Length	 250’ 450’ 1,000’	 250’ 450’ 1,000’	 RPZs not entirely owned/controlled by the Airport. RPZ beyond Runway 31 contains one (1) home.
Runway Centerline To: Parallel Taxiway Centerline Edge of Aircraft Parking	 150’ 195’	 150’ 125’	 None None
Taxiway Centerline To: Fixed or Moveable Object	 44.5’	 44.5’	 None
Taxiway Safety Area Width	49’	49’	None
Taxiway OFA Width	89’	89’	None

As shown in Table 3-3, deficits exist at Danielson Airport in relation to the requirements for runway wind coverage and RPZs. The wind coverage requirements are presented in Section 3.3.4. A a brief discussion of the RPZ requirements is provided below.

Airport ownership and control of RPZs, either through easement or acquisition, is desirable to prevent future development, clear tree obstructions, and ensure compatible land use. Although RPZs are primarily designated to protect people and property on the ground, the FAA considers

the clearing of all objects within RPZs a safety benefit, particularly objects that obstruct the runway approach surface.

At Danielson Airport, the RPZ beyond Runway 13 does not contain any residential or commercial development, but is not entirely owned or controlled by the Airport. Thus, easement or acquisition of the non-airport property should be considered. However, as much of the area within the RPZ is floodplain, future development would be unlikely, potentially making acquisition a low priority.

The RPZ beyond Runway 31 extends off the airport property to the south, and contains one home on Maryland Street. Note that if a runway extension is pursued at the Airport, the FAA would require that any homes within the proposed RPZs be acquired. The RPZ beyond Runway 31 also contains a small portion of the southernmost parking lot of the H.H. Ellis Technical School, but the State already has an avigation easement for the property. The existing and potential RPZ issues are further discussed in the subsequent chapters of this study.

3.3 Runway Requirements

Runway 13-31 at Danielson Airport is currently 2,700 feet long and 75 feet wide. This section includes an evaluation of the following runway requirements:

- Runway Pavement Strength
- Runway Length
- Runway Width
- Runway Orientation
- Runway Lighting & Instrumentation
- Turf Runway

3.3.1 Runway Pavement Strength

The pavement at Danielson Airport can currently accommodate aircraft with takeoff weights of 29,000 pounds, which exceeds the requirement for the planning period, as aircraft over 12,500 pounds are not anticipated to use the Airport. The last runway reconstruction project was conducted in 1997, and the pavement is currently in good condition. Pavement rehabilitation is typically conducted every 20 years, with crack sealing and other minor repairs conducted in the interim years as necessary. Thus, rehabilitation of Runway 13-31 would likely be required after 2017. A visual inspection of the runway pavement identified minor surface weathering and

cracking, but no subgrade or drainage issues. As such, the rehabilitation needs of the runway would likely be limited to a mill and overlay of the asphalt surface.

3.3.2 Runway Length

Runway length requirements depend on the most demanding aircraft group anticipated to use an airport on a regular basis. The FAA groups general aviation aircraft by maximum takeoff weight (e.g., small, large, or heavy) and number of passenger seats. The aircraft group for Danielson Airport includes small aircraft (i.e., 12,500 pounds or less) with less than 10 passenger seats. Runway length requirements also depend on a number of specific physical and meteorological factors, as listed below for Danielson Airport.

- Airport Elevation: 239 feet
- Mean Maximum Temperature: 86°F (hottest month – July)
- Wind: Calm (worst case)
- Runway Gradient: Less than one percent

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, describes the procedure for determining recommended runway lengths. The AC provides "Runway Length Curves" that use specific airport characteristics to determine recommended runway lengths for the following two general aviation categories:

- ***Category 1 – To accommodate 95% of the small aircraft fleet –*** This category applies to airports that are primarily intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. Their inclusion recognizes that these airports in many cases develop into airports with higher levels of aviation activity.

- ***Category 2 – To accommodate 100% of the small aircraft fleet –*** This type of airport is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.

Applying the "Runway Length Curves" to the specific physical and meteorological factors of Danielson Airport, the following runway lengths were determined:

- ***Category 1 –*** 3,100 feet recommended for Danielson Airport
- ***Category 2 –*** 3,700 feet recommended for Danielson Airport

Based on the information in the AC, Danielson Airport appears to fit best in Category 1 because it serves a diversity of users, has modest activity levels, and is not located in a large population area. Thus, a minimum runway length of 3,100 feet (i.e., a 400-foot extension) is recommended to accommodate 95 percent of the small aircraft fleet.

The FAA has indicated that a minimum runway length of 3,200 feet is required to publish a non-precision instrument approach (IAP) – IAP requirements are reviewed in Section 3.3.5. As IAPs are conducted during periods of reduced visibility, the FAA has established this minimum runway length to provide an added margin of safety. The responses to the *Airport User & Transient Pilot Questionnaires* (Appendix A) indicate a desire by several Danielson Airport users to provide both a longer runway and an IAP. To enable the publication of an IAP, a runway length of 3,200 feet (i.e., a 500-foot extension to Runway 13-31) is also justified and should be considered.

In summary, a minimum runway length of 3,100 feet is recommended for Danielson Airport. However, to enable the publication of an IAP, a runway length of 3,200 feet is needed. The additional runway length and potential IAP would benefit many airport users, especially business and charter services.

3.3.3 Runway Width

The current width of Runway 13-31 is 75 feet. This width exceeds the minimum design standard of 60 feet for ARC B-I airport, but provides added safety for operations during crosswind conditions. As optimal wind coverage may not be provided at Danielson Airport (see Section 3.3.4 below), no change in the runway width is recommended.

3.3.4 Runway Orientation

The ideal orientation of a runway is a function of wind speed and direction, and the ability of aircraft to operate under crosswind conditions. As a general rule, runways should be oriented as closely as practical in the direction of the prevailing winds. This enables aircraft to takeoff and land in the direction of the wind, which improves the safety and efficiency of operations. The most ideal runway alignment provides the highest wind coverage percentage. The desired wind coverage for Runway 13-31 (currently oriented on a 120 degrees true heading) has been set by the FAA at 95 percent. This assumes that small aircraft can handle crosswinds of no greater than 10.5 knots (12 mph), and is referred to as the crosswind component.

As previously discussed in Chapter 1, to determine the existing wind coverage at Danielson Airport, wind data was collected from an Airport Surface Observing System (ASOS) installed at Windham Airport (IJD), located approximately 13 miles to the west. Based on this data, it is estimated that the 10.5-knot wind coverage at Danielson Airport ranges from 92 to 95 percent. Although it is likely that wind coverage is somewhat below the desired level, a second runway is not typically justified for a small general aviation facility, due to modest activity levels and substantial development and maintenance costs. In addition, the wider runway at Danielson Airport (i.e., 15 feet wider than the required) provides added safety for operations during crosswind conditions.

Based on the wind data from IJD, it is estimated that a runway alignment of approximately a 165 degrees true heading would provide the best wind coverage at Danielson Airport. However, the

wind data from IJD may not reflect the localized conditions created by the topography surrounding Danielson Airport. Thus, the ideal alignment can only be estimated without on-site wind data. Local operators at Danielson Airport report that the existing runway alignment provides sufficient wind coverage the majority of the time. With the recent installation of an Airport Weather Observation System (AWOS) at Danielson Airport, a more accurate representation of wind coverage can be determined in the future. It is recommended that the runway alignment stay as it is presently and the AWOS-recorded wind data be collected and reviewed in the future to better understand the localized conditions surrounding the Airport. Note that at least three years of wind data is typically needed to draw useful conclusions about localized wind conditions.

3.3.5 Runway Lighting and Instrumentation

Runway lighting and instrumentation allows for the safe operation of aircraft during nighttime hours and low visibility conditions. As previously discussed in Chapter 1, Runway 13-31 at currently contains Medium Intensity Runway Lights (MIRLs), with Runway End Identifier Lights (REILs) on the Runway 31 end.[1] These are adequate runway lighting facilities for Danielson Airport. However, it is recommended that REILs also be installed on the Runway 13 end, to provide enhanced visibility and safety for landings.

On an individual runway end, a Visual Glide Slope Indicator (VGSI) provides lights that guide a pilot to the appropriate approach slope to the runway touchdown point. These systems improve safety and help standardize approach altitudes. Several responses to the *Airport User & Transient Pilot Questionnaires* indicated a desire by Danielson Airport users for a VGSI to Runway 31. The wind data from IJD indicates that during Instrument Flight Rule (IFR) or low-visibility conditions, approaches to Runway 13 are preferred at Danielson Airport. The FAA's standard equipment for VGSIs at small airports is a Precision Approach Path Indicator (PAPI), two-box system. A PAPI system is recommended for both runway ends at Danielson Airport, if clearance surfaces permit.

Danielson Airport does not currently have an FAA-published straight-in instrument approach procedure (IAP), although there is a published non-precision IAP based on the Putnam VHF Omnidirectional Range (VOR). An IAP is a flight procedure that is designed and published by the FAA to enable aircraft approaches/landings at an airport during periods of low clouds and poor visibility (e.g., less than 3 miles).

Today, new IAPs are developed primarily using satellite-based Global Positioning System (GPS) technology. These procedures provide varying degrees of horizontal and vertical guidance to the pilot, depending on the specific IAP procedure utilized. At Danielson Airport, the following actions would be necessary to publish an IAP:

- Extension of Runway 13-31 to 3,200 feet
- Off-airport tree clearing beyond both runway ends

[1] MIRLs identify the runway edges, while REILs identify the runway ends.

- Preparation of an obstruction survey (per FAA Advisory Circular 150/5300-13, *Airport Design*, and FAA No. 405, *Standards for Aeronautical Surveys*)
- As the runway approach capability would change, the runway markings would have to be upgraded from visual to non-precision (NPI)

Visual Runway Markings

NPI Runway Markings (Sample)

If provided, the IAP would benefit many existing and potential users of Danielson Airport – business users in particular. To further investigate the potential for an IAP at Danielson Airport, initial coordination is recommended with the FAA National Flight Procedures Office (NFPO). The coordination would supply specific information regarding the Airport and type of IAP desired. The FAA would be asked to provide an opinion of IAP feasibility, or other advanced guidance specific to Danielson Airport. This coordination is recommended prior to any investment in an obstruction survey or facility upgrades.

3.3.6 Turf Runway

The justification for a turf runway at Danielson Airport would require a survey effort to determine the overall demand and need for a turf runway. The justification would consist of a study that investigates whether there is sufficient evidence that existing airport users need a turf runway for the safe operation of aircraft such as gliders, ultralights, or taildraggers. Thereafter, it must be shown that a turf runway can effectively be developed to satisfy FAA design standards, provide sufficient wind coverage, and enhance airfield safety. If desired by ConnDOT, such a study should be conducted to investigate the potential for a turf runway at Danielson Airport.

Note that aircraft are not permitted to operate on the grass areas adjacent to Runway 13-31.[2] If a turf runway is constructed in this area, it is anticipated that substantial tree removal, grading, fill,

[2] The U.S. Government Flight Information Publication, *Airport/Facility Directory*, indicates "NO TURF USE AUTHORIZED" at Danielson Airport.

and wetland mitigation may be necessary. Chapter 4 presents a potential alternative for turf runway development at the Danielson Airport.

3.3.7 Summary of Runway Requirements

Table 3-4 summarizes the runway requirements at Danielson Airport. In general, the runway requirements include a longer runway with enhanced approach capability. These requirements are justified based on FAA guidelines, as well as the responses to the *Airport User & Transient Pilot Questionnaires* (Appendix A), and are intended to improve airfield safety.

TABLE 3-4 – SUMMARY OF RUNWAY REQUIREMENTS

Runway Category	Existing	Required	Future Action[1]
Strength	29,000 lbs.	12,500 lbs.	None
Length	2,700'	3,100' (95% small aircraft) 3,200' (to provide an IAP)	Extend runway
Width	75'	60'	Maintain existing runway width
Orientation (Wind Coverage)	92-95%	95%	None
Lighting	REIL (Runway 31), MIRL	REIL (Runways 13 & 31), MIRL	REIL (Runway 13)
VGSI	None	PAPI (Runways 13 & 31)	PAPI (Runways 13 & 31)
Instrumentation	None	Non-Precision GPS IAP	Publish IAP
Markings	Visual	Non-Precision	Non-Precision
Turf Runway	None	Undetermined	Evaluate Feasibility
Airfield Signage	Provided	Demarcating taxiways and runway ends	None

[1]To support the facility requirements identified above.

3.4 Taxiway Requirements

A taxiway system provides safe access to and from the runway(s) and landside areas. For paved runways, a full-parallel taxiway should be provided. A full-parallel taxiway improves safety by enabling aircraft to quickly exit the runway, and alleviates delays and possible runway incursions that may occur when aircraft must back-taxi on the runway. The minimum required taxiway width for ARC B-I facilities is 25 feet. The taxiway system should have the same pavement strength as the runway, and possess at least one exit taxiway. If paved aprons are provided, connector taxiways are also necessary.

Danielson Airport currently has a full-parallel taxiway and one exit taxiway, which have widths of 40 feet and pavement strengths of 29,000 pounds. Thus, the taxiways exceed the minimum width and strength requirements for the Airport. The Airport's existing 150-foot runway-taxiway offset satisfies ARC B-I design standards. Thus, no change in the runway-taxiway offset is recommended.

An additional exit taxiway near the existing T-hangar building could be considered to provide direct access from the runway. In addition, as the majority of landings occur on Runway 31, it would be beneficial to provide an exit taxiway on the western half of the runway. Most aircraft that land at the Airport are prepared to exit the runway by the time they reach the T-hangar building. An exit taxiway in this location would be particularly beneficial if the runway is extended to the east (i.e., extension to the Runway 31 end).

Other locations for exit taxiways should be considered depending on the specific development pursued at the Airport. For example, a new exit taxiway could be tied into the construction of new T-hangars or an apron. This would enable aircraft to more rapidly exit the runway, thereby reducing the taxi-time to their parking destination.

With any extension to Runway 13-31, the current parallel taxiway should be extended to the new runway end. Also, if a turf runway is developed at Danielson Airport, additional taxiways, most likely turf taxiways, would be necessary.

3.5 Landside Facilities

This section describes the guidelines and methodologies used to develop the landside facility requirements for Danielson Airport. The following categories were examined as part of the landside facility analysis:

- Hangar Areas
- Aircraft Aprons (Parking and Tiedowns)
- Maintenance Hangar
- Terminal/Operations Building
- Automobile Parking
- Fueling Facilities
- Roadway Access

3.5.1 Hangar Areas

For general aviation airports, hangar requirements are a function of the number of based aircraft, type and relative value of aircraft to be accommodated, owner preferences, hangar rental costs, and area climate. The requirements for hangar space at Danielson Airport were estimated based on standard planning ratios, discussions with the airport owner/manager, and a survey of airport users. The requirements were calculated using the following standard planning assumptions:

Aircraft Type	Desired Storage Type	Requirement
Single-Engine	50% T-Hangar	1,200 sf
	50% Paved Tiedown	300 sy
Multi-Engine	100% T-Hangar/Hangar	1,200 sf
Glider	100% Turf Tiedown	300 sy

The based aircraft forecasts for Danielson Airport are summarized in Table 3-5 below.

TABLE 3-5 – BASED AIRCRAFT FORECAST SUMMARY

Year	Current	2025
Single-Engine	62	75
Multi-Engine	1	2
Glider	3	3
Total	**66**	**80**

Based on the assumptions and forecasts above, the hangar space requirements were calculated for Danielson Airport, as summarized in Table 3-6. Tiedown space was allocated as part of the airport apron area, and is discussed in Section 3.4.2.

TABLE 3-6 – BASED AIRCRAFT HANGAR & STORAGE REQUIREMENTS				
Location/Aircraft	**Current**		**2025**	
	Aircraft	**Area**	**Aircraft**	**Area**
T-Hangar				
Multi-Engine	1	1,200 sf	2	2,400 sf
Single-Engine	31	37,200 sf	38	45,600 sf
Total T-Hangar	32	38,400 sf	40	48,000 sf
Existing Availability	10	12,000 sf	10	12,000 sf
Surplus (Deficit)	(22)	(26,400 sf)	(30)	(36,000 sf)
Paved Tiedown				
Single-Engine	31	9,300 sy	37	11,400 sy
Existing Availability	40	12,000 sy	40	12,000 sy
Surplus (Deficit)	9	2,700 sy	3	900 sy
Turf Tiedown				
Glider	3	900 sy	3	900 sy
Existing Availability	33	9,900 sy	33	9,900 sy
Surplus (Deficit)	30	9,000 sy	30	9,000 sy
Total Based Aircraft	**66**	**---**	**80**	**---**

As shown in Table 3-6, a substantial need for additional T-hangar storage currently exists at Danielson Airport. There is currently one 10-bay T-hangar building at the Airport, while there is an estimated total demand of 32 T-hangar bays (i.e., 22 additional bays currently required). In 2025, there is anticipated to be a total demand of 40 T-hangar bays (i.e., ultimate requirement of 30 additional bays). Thus, the development of new T-hangar bays is considered a high priority at Danielson Airport.[3]

3.5.2 Aircraft Aprons (Parking and Tiedown)

Aircraft aprons provide parking and tiedown positions for based and transient aircraft, as well as staging areas for aircraft stored in conventional hangars. As shown in Table 3-6, with the construction of the new paved transient ramp and turf temporary tiedown apron, there will be a total of 40 paved and 33 turf tiedowns at Danielson Airport. The general aviation apron area requirements are described below.

Due to the large hangar storage deficit at Danielson Airport, all of the paved tiedowns are currently occupied. This situation forces several powered aircraft to utilize the turf tiedowns, which can present problems for year-round aircraft operation, as it is difficult to remove snow in grass areas and cut grass surrounding the planes. Although Table 3-6 shows no immediate need for paved tiedowns, the large hangar storage deficit results in increased utilization and demand for both paved and turf tiedowns. As shown in Table 3-7, assuming that no new hangars are developed, a total of 27 additional paved tiedowns would be necessary to satisfy the combined long-term hangar and paved tiedown deficits (T-hangar deficit – paved tiedown surplus = 27).

[3] Note that although T-hangars are typically preferred for light aircraft, the deficit is for hangar space in general. Other types of storage hangars could also satisfy the demand.

TABLE 3-7 – PAVED TIEDOWN REQUIREMENTS WITHOUT NEW HANGARS				
Paved Tiedowns	**Current**		**2025**	
	Positions	**Area**	**Positions**	**Area**
Required Paved Tiedowns*	53	15,900 sy	67	20,100 sy
Existing Paved Tiedowns	40	12,000 sy	40	12,000 sy
Paved Tiedown Surplus (Deficit)	(13)	(3,900 sy)	(27)	(8,100 sy)
*Equals = (Paved Tiedown Requirement + Hangar Requirement)				

The requirements for turf tiedowns were estimated for gliders only. As gliders are not typically operated during winter months, snow removal is not an operational issue. As shown in Table 3-6, the turf tiedown requirement is satisfied throughout the planning period. However, as discussed above, several turf tiedowns are currently utilized to accommodate the hangar storage overflow demands. Many of these aircraft would likely prefer paved tiedown or T-hangar storage if it were available.

Transient aircraft include visiting corporate and private general aviation aircraft, and aircraft using maintenance services. Transient aircraft parking is needed on a short-term basis, typically from a few hours to several nights. The size of the apron necessary to satisfy future transient aircraft demands was estimated from the forecast number of itinerant operations, using the following procedure:

- From the itinerant operations forecasts (Table 2-14), calculate the average number of daily itinerant landings.
- Assume a busy day is 10 percent busier than the average day.
- Assume that 25 percent of itinerant landings are conducted by transient aircraft needing apron parking (the remaining 75 percent are returning based aircraft).
- Calculate the transient ramp requirements using a factor of 300 sy per aircraft.

Applying this approach to the itinerant operations forecasts yields the apron requirements summarized in Table 3-8. Four transient parking positions (requiring 1,200 square yards of apron) are needed to accommodate future demand. However, as a new transient ramp is being constructed with 10 paved tiedowns (for both based and transient aircraft), transient apron parking should be adequate throughout the planning period.

TABLE 3-8 – TRANSIENT AIRCRAFT APRON REQUIREMENTS		
Activity/Requirement	**Current**	**2025**
Annual Itinerant Operations	6,272	9,040
Busy Day Itinerant Landings	10	14
Transient Tiedowns Required	3	4
Transient Apron Area Required	900 sy	1,200 sy
Existing Transient Tiedowns	10	10
Note: Annual Itinerant Operations Source: Table 2-14 Busy Day Itinerant Landings = [(Annual Itinerant Operations / 365) / 2]*1.1		

A summary of the general aviation apron requirements is provided in Table 3-9.

TABLE 3-9 – PAVED TIEDOWN REQUIREMENTS SUMMARY				
Aircraft/Requirement	**Current**		**2025**	
	Positions	**Area**	**Positions**	**Area**
Based Aircraft	31	9,300 sy	37	11,400 sy
Transient Aircraft	3	900 sy	4	1,200 sy
Total Aircraft	34	9,200 sy	41	12,300 sy
Existing Paved Tiedowns	40	12,000 sy	40	12,000 sy
Paved Tiedown Surplus (Deficit) – With New hangars	6	1,800 sy	(1)	(300 sy)
Paved Tiedown Surplus (Deficit) – No New Hangars*	(16)	(4,800 sy)	(31)	(9,300 sy)
*Equals = (Existing Paved Tiedowns) – (Paved Tiedown Requirement + Hangar Requirement)				

Overall, Danielson Airport's total long-term aircraft storage requirements could be satisfied by one of the following scenarios:

- ***Scenario 1 –*** Development of 30 additional T-hangar bays and one additional paved tiedown
- ***Scenario 2 –*** Assuming that no additional T-hangars are provided, development of 31 additional paved tiedowns
- ***Scenario 3 –*** Any combination of the above

3.5.3 Maintenance Hangar

For general aviation airports with similar activity and based aircraft levels as Danielson Airport, a 3,000 to 5,000 square-foot hangar typically meets aircraft maintenance needs. A hangar of this size could house two to three light aircraft and maintenance equipment. Approximately half of the FBO's 5,000 square-foot hangar at Danielson Airport is used for aircraft maintenance purposes, and currently satisfies the needs of existing airport users. However, to accommodate the forecast increase in based aircraft and activity at the Airport, space for an additional maintenance hangar, including surrounding apron area, should be reserved in case it is needed.

3.5.4 Terminal/Operations Building

A general aviation terminal/operations building provides space for a management office, flight planning, a pilot lounge, and restrooms. The building may consist of a separate facility, or a space attached to a hangar. For airports similar to Danielson Airport, 500 square feet of terminal/operations space typically meets management and pilot needs. The FBO building was recently reconfigured to provide additional space for all of these activities. Thus, it is anticipated that sufficient terminal/operations space is provided at Danielson Airport, and no additional facilities should be necessary during the planning period.

3.5.5 Automobile Parking

The number of automobile parking spaces at a general aviation airport primarily depends on aircraft activity. For State-owned airports in Connecticut, such as Danielson Airport, the

Minimum Standards dictate the requirements for automobile parking, based on tenant type, number of activities, leased area, etc. The *Minimum Standards* for Danielson Airport (last published in 1998) are currently being revised, and may therefore change the number of required automobile parking spaces.[4] As such, the parking space requirements discussed herein are based on other general observations and comparisons.

Danielson Airport currently provides approximately 100 parking spaces in various locations (see Table 1-8). As such, the number of automobile parking spaces exceeds the number of average daily operations expected by 2025 (i.e., approximately 83 operations), as well as the total number of based aircraft expected by 2025 (i.e., 80 based aircraft). Thus, it is not anticipated that additional automobile parking facilities would be necessary during the planning period.

However, according to the Airport Manager, many based aircraft owners prefer to park their cars inside the fence near their aircraft. As there are no designated automobile parking spaces on any of the aircraft aprons, options for providing parking on or adjacent to these areas is investigated in Chapter 4. Automobile access to these areas must be designed to prevent use of the operational airfield (e.g., taxiways).

3.5.6 Fueling Facilities

For small general aviation airports, such as Danielson Airport, it is typically recommended that a minimum storage capacity of 5,000 to 10,000 gallons of 100 Low Lead (LL) fuel be provided. Danielson Airport currently has two fuel trucks, with a total storage capacity of 3,750 gallons of 100 LL fuel.

At Danielson Airport, it is the FBO's responsibility to provide aircraft fueling services (through lease agreement), and therefore determines the method and amount of fuel storage. However, to be in compliance with federal spill regulations, one of the following options should be considered at Danielson Airport, and will be incorporated in the Master Plan:

- ***Option 1 –*** Construction of a concrete parking pad for each airport fuel truck, with curb containment structures, oil/water separators, security fencing, and lighting.
- ***Option 2 –*** Constructing of new stationary bulk storage tanks (e.g., aboveground fuel farm).

If a permanent fuel storage system is desired at Danielson Airport, the installation of an aboveground tank with a minimum storage capacity of 5,000 gallons of 100 LL fuel should be considered. To avoid the need for staffing, a self-serve fueling system may also be considered (with credit/debit card capabilities).

[4] Based on a review of the 1998 *Minimum Standards*, it is anticipated that Danielson Airport provides a sufficient number of automobile parking spaces.

3.5.7 Roadway Access

As previously discussed in Chapter 1, roadway access to the Airport is provided from Airport Road (off Upper Maple Street). Although there are no specific requirements pertaining to roadway access, many individuals have commented that the current access to Danielson Airport is not highly-visible off Upper Maple Street, and that Airport Road itself is cumbersome in its length and number of turns.

From Upper Maple Street to the FBO building, automobiles must travel on Airport Road for approximately 3,300 feet (approximately two-thirds of a mile) and navigate six separate turns. The first 1,400 feet of Airport Road consists of heavily-treed roadway, which may be problematic for emergency vehicle access, or access by other large construction and delivery trucks. Thus, the alternatives analysis (Chapter 4) may consider a revised or secondary access road for the Airport.

3.6 Facility Requirements Summary

Table 3-10 summarizes the airfield and landside facility deficits that have been identified in this chapter.

TABLE 3-10 – SUMMARY OF FACILITY DEFICITS			
Airfield Facility	**Existing**	**2025 Requirement**	**Deficit**
AIRFIELD DEFICITS			
Runway Wind Coverage	92 to 95% All-Weather	95% All-Weather	Up to 3%
Runway Protection Zone (RPZ): Inner Width Outer Width Length	 250' 450' 1,000'	 250' 450' 1,000'	RPZs not entirely owned by Airport. RPZ beyond Runway 31 contains one home.
Runway Length	2,700'	3,100' (95% small aircraft) 3,200' (to provide an IAP)	400-500'
Lighting	REIL (Runway 31), MIRL	REIL (Runways 13 & 31), MIRL	REIL (Runway 13)
VGSI	None	PAPI (Runways 13 & 31)	PAPI (Runways 13 & 31)
Instrumentation	None	Non-Precision GPS IAP	Publish IAP
Markings	Visual	Non-Precision	Non-Precision
Turf Runway	None	Undetermined	Evaluate feasibility
LANDSIDE DEFICITS			
T-Hangar	10 Bays	40 Bays	30 Bays
Paved Tiedowns (with new hangars)	40 Positions	41 Positions	1 Position
Paved Tiedowns (no new hangars)	40 Positions	71 Positions	31 Positions
Maintenance Hangar	2,500 sf	5,000 sf	2,500 sf
Automobile Parking	99 Spaces	Apron Parking	Apron Parking
Fueling Facilities	3,750 Gallons (in trucks)	Minimum 5,000 Gallons (aboveground tanks)	Minimum 5,000 Gallons (aboveground tanks)
Roadway Access	¾-Mile	New Access	New Access

4.0 DEVELOPMENT ALTERNATIVES

This chapter identifies and evaluates potential development alternatives for Danielson Airport. The alternatives have been designed to address the airport facility deficits identified in Chapter 3, and are presented in the following order:

- Airfield Alternatives
  - Runway Extension
  - Turf Runway
  - Paved Exit Taxiway
  - Runway Lighting and Instrumentation

- Landside Alternatives
  - Automobile Parking
  - T-hangar
  - Conventional Hangar
  - Fueling Facilities
  - Access
  - Fencing

- Non-Aviation Property Alternative

- Preliminary Recommended Plan

The goal of this chapter is to identify a wide range of alternatives for airfield and landside development that are consistent with FAA guidelines and standards. Based on a review of environmental, physical, and financial constraints, Section 4.4 presents the preliminary recommendations for Danielson Airport. Note that prior to the development of any airport project, environmental analysis and permitting may be required.

4.1 Airfield Alternatives

This section describes the airfield alternatives for Danielson Airport. As shown in Table 4-1, the alternatives are intended to satisfy the airfield facility deficits identified in Chapter 3.

TABLE 4-1 – SUMMARY OF AIRFIELD FACILITY DEFICITS

Airfield Facility	Existing	2025 Identified Facility	Deficit
Runway Length	2,700'	3,100' (95% of small aircraft) 3,200' (to provide an IAP)	400-500'
Lighting	REIL (Runway 31), MIRL	REIL (Runways 13 & 31), MIRL	REIL (Runway 13)
VGSI	None	PAPI (Runways 13 & 31)	PAPI (Runways 13 & 31)
Instrumentation	None	Non-Precision GPS IAP	Publish IAP
Markings	Visual	Non-Precision	Non-Precision
Turf Runway	None	Undetermined	Evaluate Feasibility

IAP – Instrument Approach **REIL** – Runway End Identifier Light **MIRL** – Medium Intensity Runway Light
VGSI – Visual Glide Slope Indicator **PAPI** – Precision Approach Path Indicator **GPS** – Global Positioning System

4.1.1 Runway Extension Alternatives

The current length of Runway 13-31 is 2,700 feet. The following runway length requirements were identified for Danielson Airport:

A. 3,100 feet to accommodate 95 percent of the small aircraft fleet
B. 3,200 feet to publish an instrument approach (IAP)

Note: Although **A.** and **B.** above are referred as "runway length requirements," this does not necessarily mean that a runway extension would be developed or even pursued at Danielson Airport. Several factors must be considered when deciding whether to pursue a runway extension or any new airport development, including public opinion, funding, documented need, environmental impacts, etc. Thus, the runway extension alternatives below must be carefully evaluated by all relevant parties before an ultimate recommendation can be made for Danielson Airport.

The requirements above identify the runway length that would accommodate the maximum demands of the recommended design aircraft (e.g., takeoff/landing weight, fuel capacity). Danielson Airport's design aircraft was identified as a small twin-engine aircraft with a maximum takeoff weight of 12,500 pounds or less (i.e., Airport Reference Code (ARC) B-I small aircraft). These are the largest aircraft that currently operate at the Airport. Thus, the runway extension alternatives would not accommodate a larger class of aircraft, but would provide enhanced flexibility to support the maximum demands of most existing airport users. The current runway length will continue to safely accommodate existing users; however, "additional runway length" was a desire of existing users (see Appendix A: *Airport User &*

Transient Pilot Questionnaire). As previously mentioned in Chapter 2, the future role and vision for Danielson Airport can be expressed as follows:

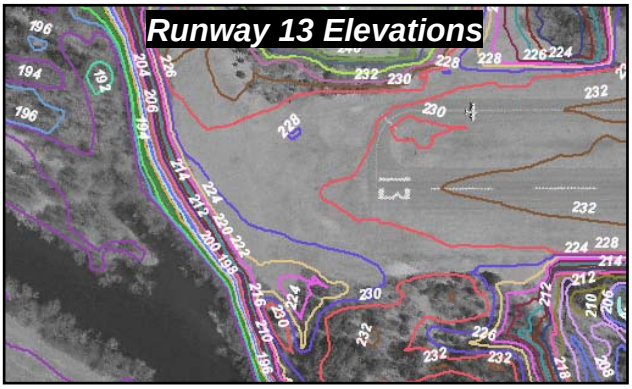
> *As modest growth in the population and economy of eastern Connecticut continues, improvements at Danielson Airport will be needed to adequately accommodate regional general aviation demand. Danielson Airport will provide the facilities and services necessary to ensure a safe, efficient, and convenient operating environment for small aircraft users.*

The runway extension alternatives are intended to be considered independently (i.e., only one could potentially be recommended for development). All of the alternatives include extending the parallel taxiway to the new runway end, and the Runway 31 alternatives include relocation of the Runway End Identifier Lights (REILs). A potential compatible land use issue associated with runway extensions is homes within Runway Protection Zones (RPZs). The FAA may require the "***voluntary acquisition***" of any home(s) located within the RPZ beyond Runway 31 in order to approve a runway extension at Danielson Airport. Under a voluntary acquisition program, sale of the homes is entirely at the homeowners discretion and eminent domain is never a possibility (i.e., a homeowner may choose to remain in their home indefinitely).

The following four runway extension alternatives are presented in this section for consideration:

- *Alternative 1* (Figure 4-1) – 300-foot extension to Runway 13
- *Alternative 2* – 300-foot extension to Runway 31
- *Alternative 3* – 400-foot extension to Runway 31
- *Alternative 4* (Figure 4-2) – 500-foot extension to Runway 31

Runway Extension Alternative 1



As illustrated on Figure 4-1, Runway Extension Alternative 1 would include a 300-foot extension to Runway 13, increasing the total runway length to 3,000 feet. Overall, the added runway length would improve the safety of operations for existing airport users, but would not satisfy the recommended runway lengths.

Other potential drawbacks would need to be considered as well, including the greatest sitework requirements, environmental impacts, and development costs of the four runway extension alternatives. As the ground slopes down substantially near the beginning of the RSA (see "Runway 13 Elevations" graphic), a large amount of fill would be required to raise the grade of the area. Approximately one acre of wetland would be impacted by the RSA grading and

OFA clearing.[1] In addition, several acres of tree removal, including some in wetland areas, would be necessary for this alternative.

Runway Extension Alternatives 2 and 3

Runway Extension Alternative 2 would include a 300-foot extension to Runway 31, increasing the total runway length to 3,000 feet. Runway Extension Alternative 3 would include a 400-foot extension to Runway 31, increasing the total runway length to 3,100 feet. An initial evaluation of these alternatives identified the same potential impacts as a 500-foot extension (see Runway Extension Alternative 4 see below), but would not enable an instrument approach. Thus, Alternatives 2 and 3 were eliminated from further consideration.

Runway Extension Alternative 4

As illustrated on Figure 4-2, Runway Extension Alternative 4 would include a 500-foot extension to Runway 31, increasing the total runway length to 3,200 feet. Overall, the added runway length would provide the highest level of safety and capability for operations by existing airport users, and satisfy the runway length requirements throughout the 20-year planning period. Note that a 3,200-foot long runway is typically only suitable for small general aviation aircraft operations (i.e., aircraft with less than six passenger seats) – commercial aircraft operations are never anticipated at Danielson Airport. As previously mentioned, the potential drawbacks of this alternative (described below) would be similar to Runway Extension Alternatives 2 and 3.

Although the runway extension pavement would remain entirely on the airport property (owned by ConnDOT), portions of the Runway Safety Area (RSA) and Runway Object Free Area (ROFA) would extend onto the adjacent high school property (owned by the Connecticut Department of Education).[2] As such, realignment of the fence (on the adjacent high school property) would be necessary (see potential realignment on Figure 4-2).

In addition, one home is located within the RPZ of the existing runway (the *existing RPZ*), and three different homes would be located within the RPZ of the extended runway (the *potential RPZ*). If this alternative is implemented, the FAA may require the acquisition of the three homes

[1] Depending on the type of wetland mitigation pursued, a mitigation ratio ranging from 3:1 to 20:1 could be sought by the Army Corps of Engineers (ACOE).

[2] A section of the airport fence is currently located on the adjacent high school property. ConnDOT currently has an avigation easement for use of this property. Any relocation of the airport fence may require a revision of the avigation easement.

located within the *potential RPZ*, and if desired by the homeowner, may grant the acquisition of the home located within the *existing RPZ*. As previously stated, sale of the homes would be entirely voluntary and eminent domain would not be considered. Residents would be offered fair market value (FMV) for their homes, plus an allowance for relocation and closing costs.

For all three Runway 31 extension alternatives, the development area is relatively level (see "Runway 31 Elevations" graphic), with the exception of the far end of the RSA, which slopes upward in elevation. Obstructions to the approach surface, including trees, structures, and ground, would have to be identified and addressed (potential tree removal areas are illustrated on Figure 4-2). Only additional pavement, grading, and obstruction removal would be necessary for this alternative. Thus, cost would be the primary difference between all three Runway 31 extension alternatives.

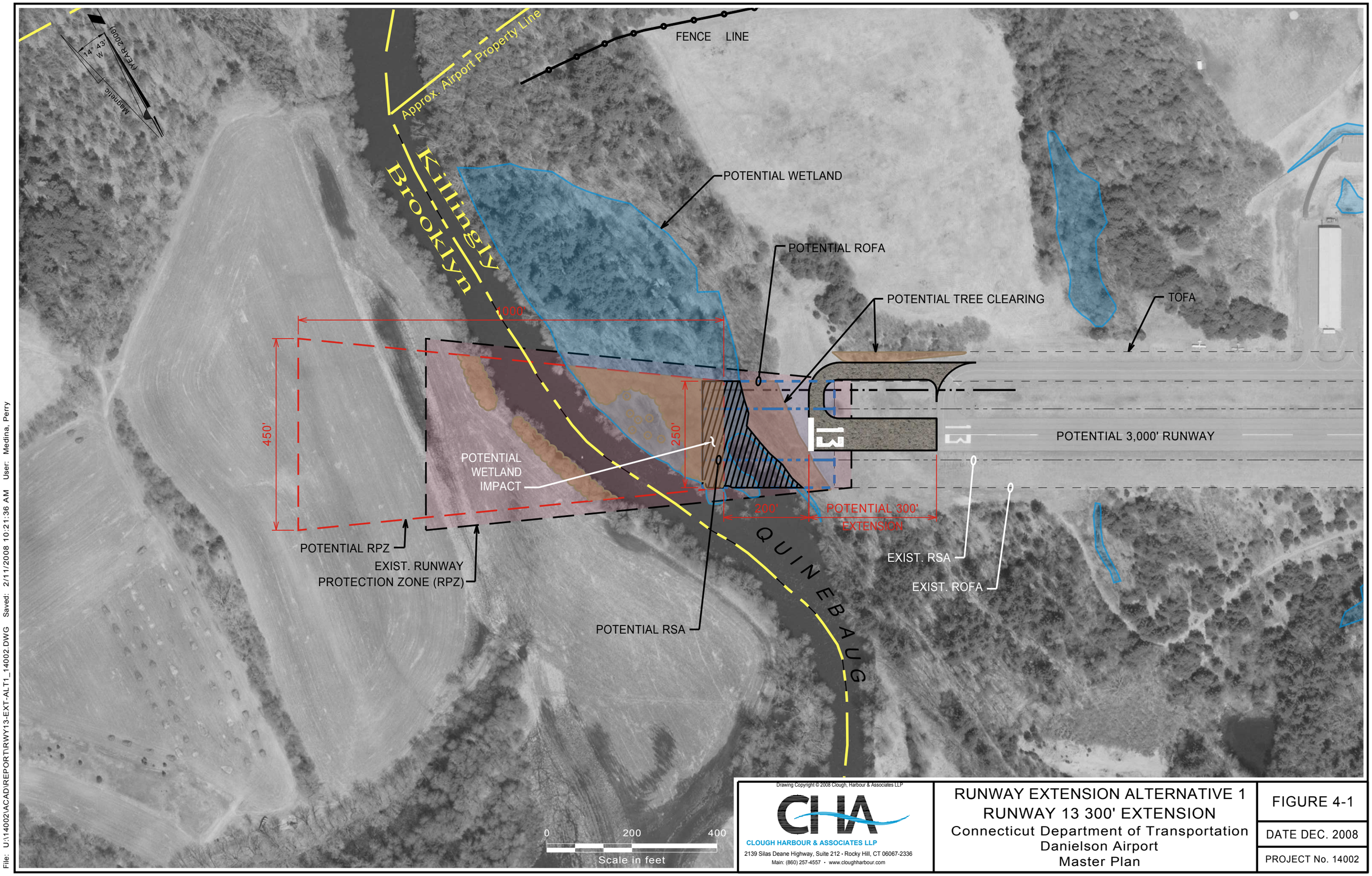
Summary and Evaluation of Runway Extension Alternatives

Table 4-2 includes the preliminary cost estimates for the runway extension alternatives, as well as an overview of the potential development requirements.

TABLE 4-2 – SUMMARY AND EVALUATION OF RUNWAY EXTENSION ALTERNATIVES

Alternative	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Satisfies Requirements	None	None	**A.**	**A. & B.**
Property Acquisition	None	3 Homes	3 Homes	3 Homes
Wetland Impacts	≈ 1 Acre	None	None	None
Tree Removal	≈ 4 Acres	≈ 1 Acre	≈ 1 Acre	≈ 1 Acre
Preliminary Cost	$2.3 Million	$1.9 Million	$2.1 Million	$2.3 Million

Note that ConnDOT may also consider retaining the runway in its current configuration. This would not satisfy either runway length requirement, and would still require tree removal and pavement repairs, as necessary.



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RUNWAY EXTENSION ALTERNATIVE 1
RUNWAY 13 300' EXTENSION
Connecticut Department of Transportation
Danielson Airport
Master Plan

FIGURE 4-1

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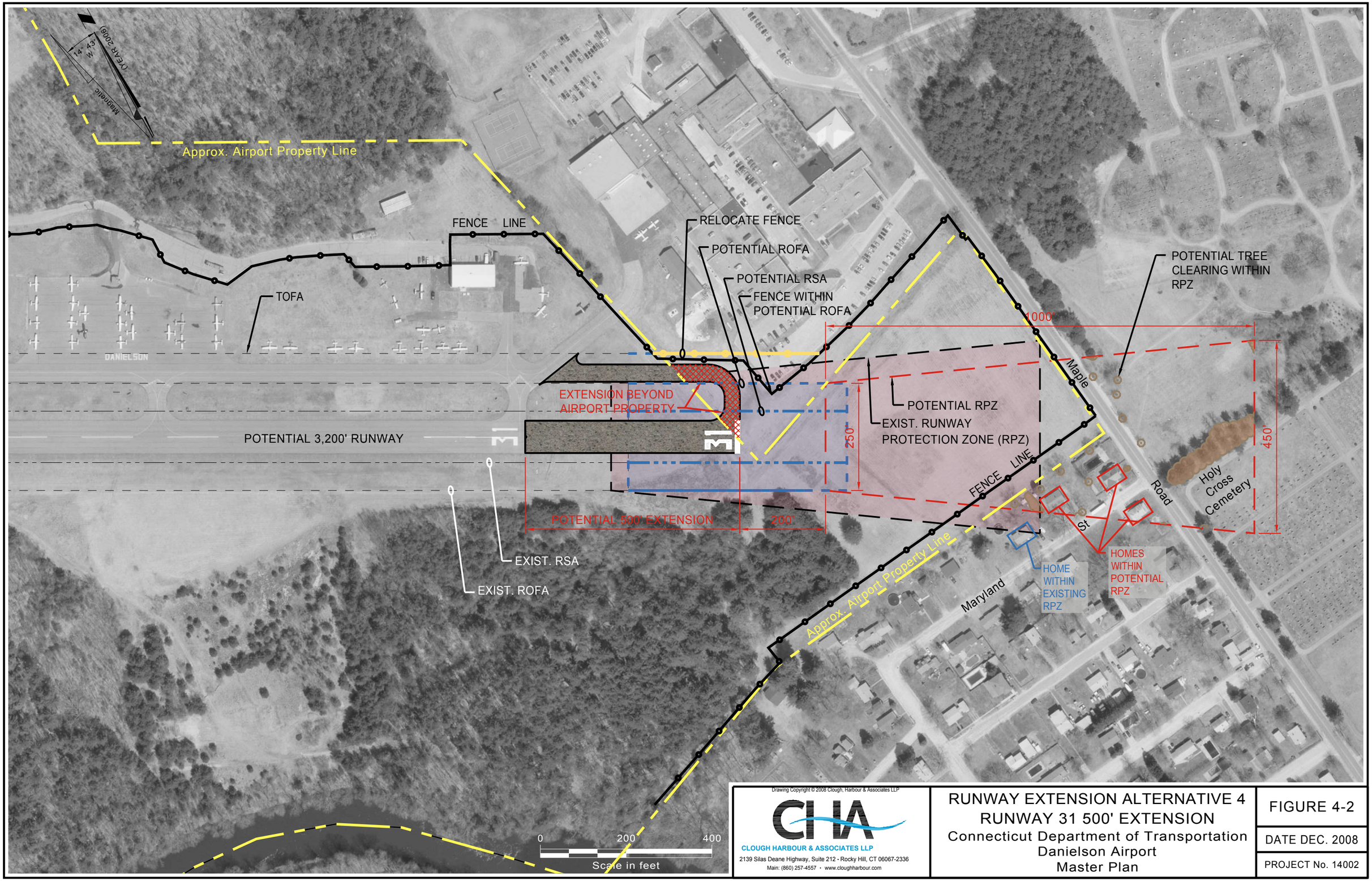

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RUNWAY EXTENSION ALTERNATIVE 4
RUNWAY 31 500' EXTENSION
Connecticut Department of Transportation
Danielson Airport
Master Plan

FIGURE 4-2

DATE DEC. 2008

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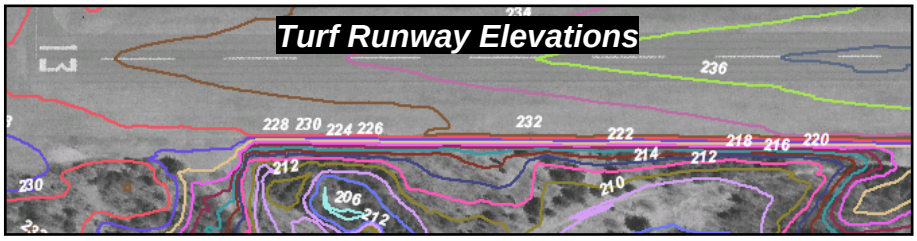
4.1.2 Turf Runway

Although the forecasts only show modest growth for gliders, accommodating their potential use should be planned. In addition to being desired by several airport users (see Appendix A), a separate turf runway would be beneficial at Danielson Airport to segregate non-powered gliders from powered aircraft. As gliders must be manually pushed from the operational airfield, a separate turf runway would reduce the potential for delays. Turf surfaces are also typically preferred by older historic aircraft (e.g., taildraggers) and newer light aircraft.

Hartford-Brainard Airport (HFD) is the only ConnDOT-owned airport with a turf runway. HFD's turf runway has a length of 2,309 feet and a width of 150 feet. This exceeds the minimum width requirement of 60 feet for ARC B-I design standards, but enables touchdown points to be more dispersed, which reduces turf wear and rutting.



A turf runway could be developed parallel to Runway 13-31 at Danielson Airport. The turf runway shown on Figure 4-3 is 2,200 feet long and 100 feet wide, although the actual dimensions may vary based on user requirements and development constraints. Turf connections to the existing paved runway would be provided on both ends. To avoid unnecessary property acquisition, the turf runway could be positioned to maximize the runway length while keeping residences outside the RPZ. Note that a tree buffer would remain between the turf runway and adjacent residential development to prevent any visual disturbances.

As summarized in Table 4-3, substantial fill requirements (see "Turf Runway Elevations" graphic), and tree removal may be necessary for the turf runway development, in addition to potential wetland impacts. The approximate cost to develop the turf runway, including the turf exit taxiway, would be $500,000. Unfortunately, this high cost would likely make the runway infeasible. With the limited budget for capitol projects, higher priority projects are anticipated to require all available funding.

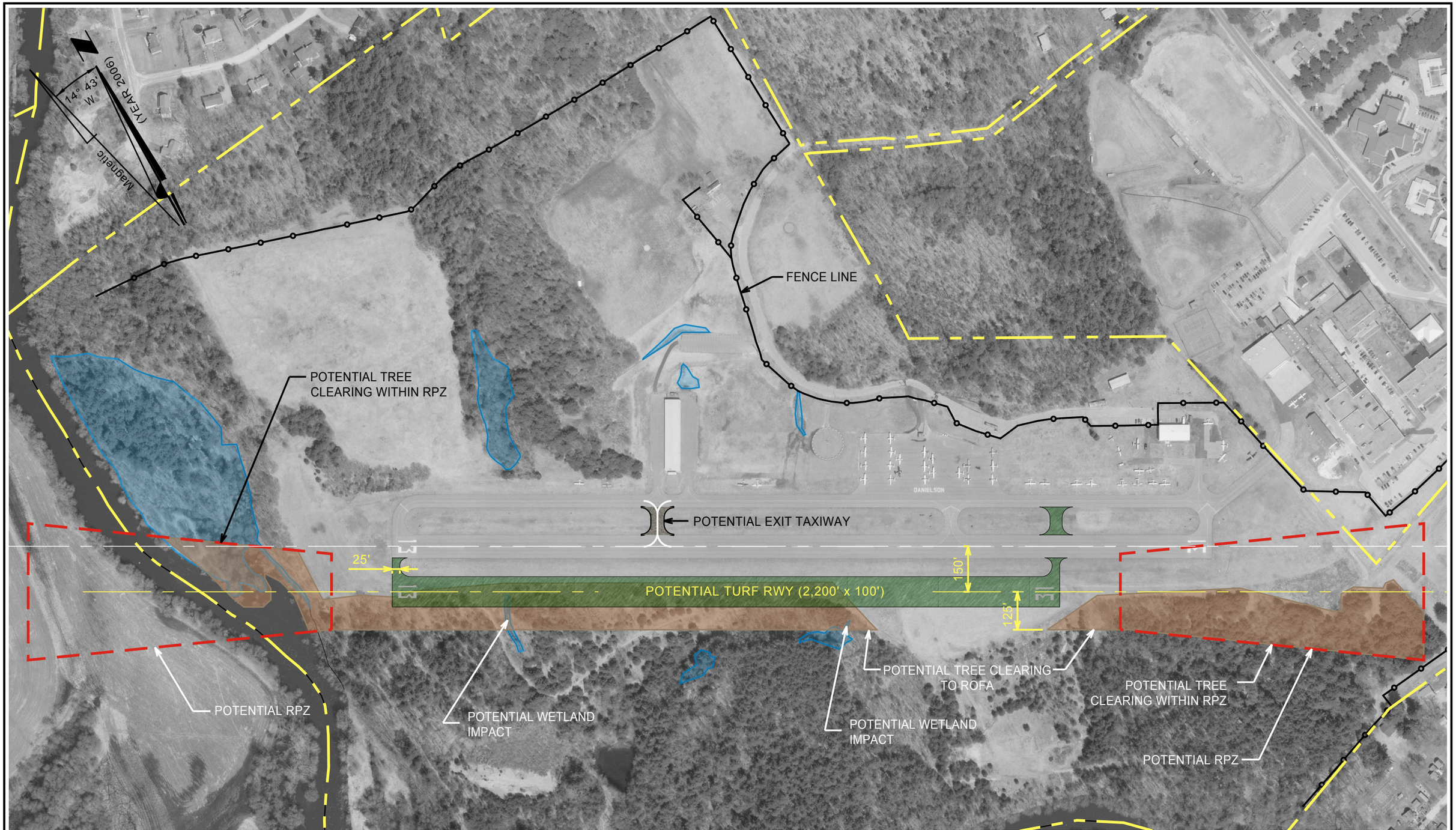
TABLE 4-3 – TURF RUNWAY ALTERNATIVE	
Wetland Impacts	≈ .05 Acre
Tree Removal	≈ 12 Acres
Preliminary Cost	$500,000

4.1.3 Paved Exit Taxiway

As previously described in Chapter 3 and illustrated on Figure 4-3, an additional exit taxiway could be considered near the existing T-hangar building to provide direct access to the runway.

Most aircraft landings on Runway 31 are prepared to exit the runway by the time they reach this point. As such, this exit taxiway would reduce runway occupancy time and improve operational efficiency. A turf exit taxiway is also illustrated on Figure 4-3, and would be intended for aircraft utilizing a turf runway.

The approximate cost to develop the paved exit taxiway would be $100,000. The turf exit taxiway cost is factored into the total cost for the turf runway development.



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TURF RUNWAY ALTERNATIVE

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FIGURE 4-3

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4.1.4 Runway Lighting and Instrumentation

As summarized in Table 4-4, the facility requirements in Chapter 3 identified the following additional runway lighting and instrumentation facilities for Danielson Airport:

TABLE 4-4 – SUMMARY OF LIGHTING & INSTRUMENTATION DEFICITS

Airfield Facility	Existing	2025 Identified Facility	Deficit
Lighting	REIL (Runway 31), MIRL	REIL (Runways 13 & 31), MIRL	REIL (Runway 13)
VGSI	None	PAPI (Runways 13 & 31)	PAPI (Runways 13 & 31)
Instrumentation	None	Non-Precision GPS IAP	Publish IAP
Markings	Visual	Non-Precision	Non-Precision

IAP – Instrument Approach **REIL** – Runway End Identifier Light **MIRL** – Medium Intensity Runway Light
VGSI – Visual Glide Slope Indicator **PAPI** – Precision Approach Path Indicator **GPS** – Global Positioning System

The recommended development plan will illustrate the location of these facilities. As their locations are "fixed-by-function," development alternatives are not necessary for these items.

4.2 Landside Alternatives

This section describes the landside alternatives for Danielson Airport. As shown in Table 4-5, the alternatives are intended to satisfy the landside facility deficits identified in Chapter 3.

TABLE 4-5 – SUMMARY OF LANDSIDE FACILITY DEFICITS

Landside Facility	Existing	2025 Identified Facility	Deficit
T-Hangar	10 Bays	40 Bays	30 Bays
Paved Tiedowns (with new hangars)	40 Positions	41 Positions	1 Positions
Paved Tiedowns (no new hangars)	40 Positions	71 Positions	31 Positions
Maintenance Hangar	2,500 sf	5,000 sf	2,500 sf
Automobile Parking	99 Spaces	Relocate*	None*
Fueling Facilities	3,750 Gallons (in trucks)	Minimum 5,000 Gallons (aboveground tanks)	Minimum 5,000 Gallons (aboveground tanks)

*The number of automobile parking spaces is adequate. However, the parking locations should be repositioned for security and loading purposes.

4.2.1 Automobile Parking Alternatives

Although Danielson Airport provides a sufficient number of total automobile parking spaces, many individuals prefer to park inside the fence for security and loading purposes. As none of the aircraft aprons currently have designated automobile parking spaces, a potential alternative is illustrated on Figure 4-4. This alternative would provide designated parking areas for

automobiles, as well as vehicle access routes that prevent the use of the operational airfield (e.g., taxiways).

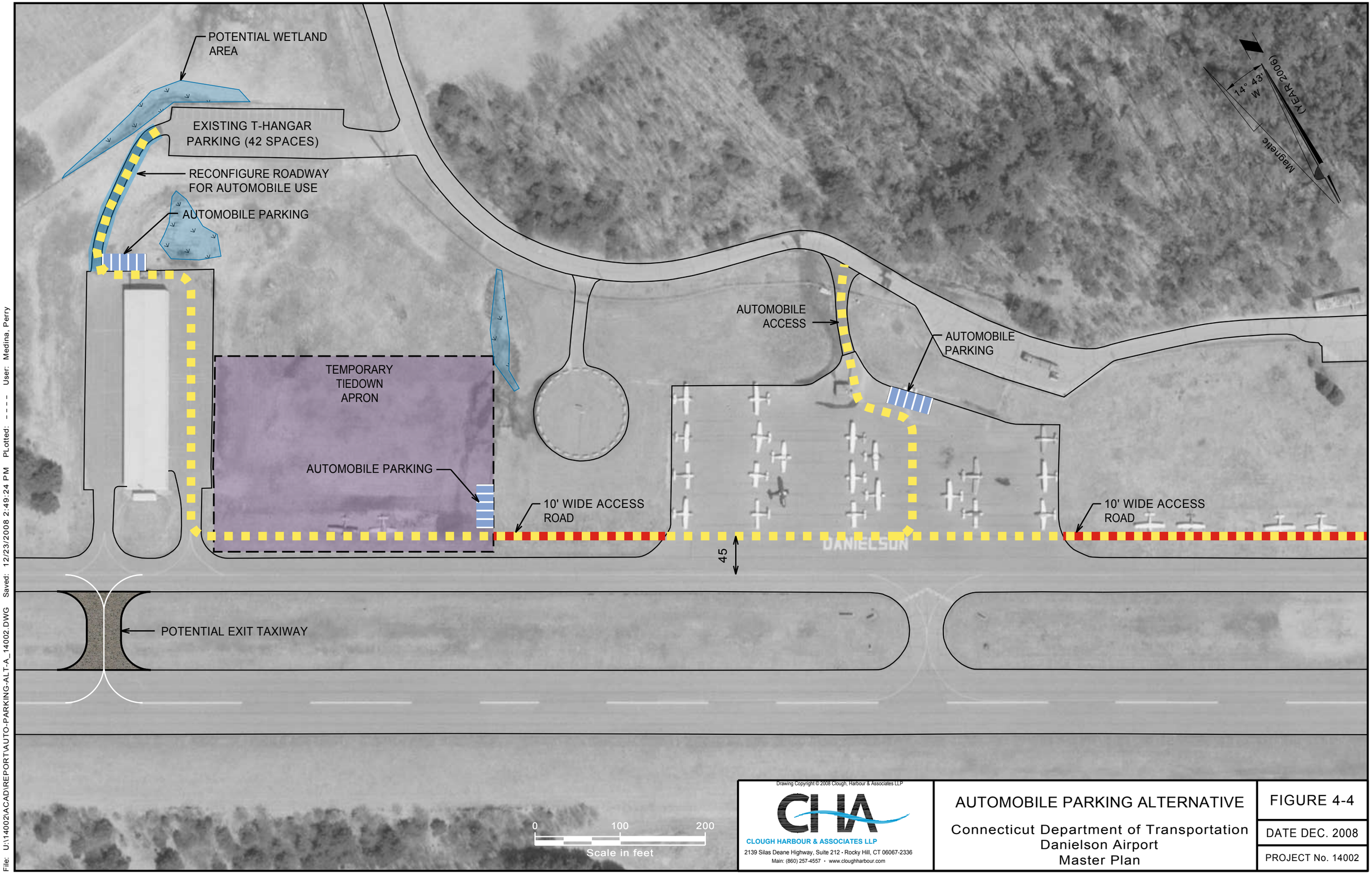
This alternative would provide new automobile parking areas in the following three locations inside the airport fence:

1. Behind the T-hangar building
2. On the Temporary Tiedown Apron
3. On the Paved Tiedown Apron

The new parking areas would provide options for parking inside the airport fence, and would not replace the existing parking areas. Access to the new parking areas would be provided by: (1) minor re-grading of the roadway between the T-hangar parking lot and the T-hangar building, (2) constructing a service road between the Temporary Tiedown Apron and the Paved Tiedown Apron, and (3) constructing a service road between the Temporary Tiedown Apron and the FBO area. This would prevent automobiles from using the operational airfield.

A more important role of this alternative would be providing new access routes for airport service vehicles that avoid use of the operational airfield. For example, the fuel truck could deliver fuel to any aircraft without using the taxiway. Thus, the implementation of this alternative would enhance the safety of the airfield.

The approximate cost to develop the three parking areas and associated access routes would be $250,000.



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AUTOMOBILE PARKING ALTERNATIVE

Connecticut Department of Transportation
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FIGURE 4-4

DATE DEC. 2008

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4.2.2 T-hangar Alternatives

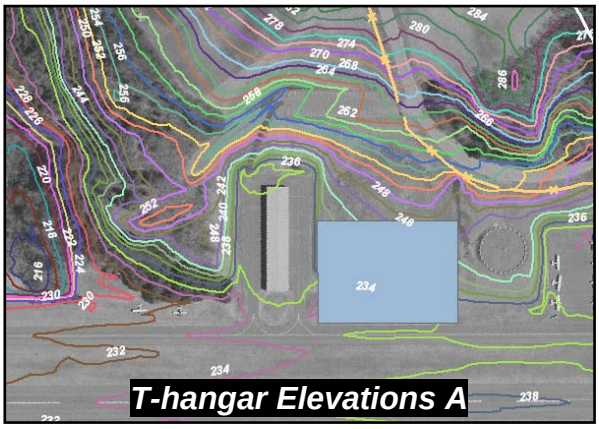
As illustrated on Figure 4-5, Danielson Airport currently has one 10-bay (i.e., storage capacity of 10 aircraft) T-hangar building. The following T-hangar storage deficits were identified in Chapter 3:

- Current Deficit – 22 aircraft
- Deficit by 2025 – 30 aircraft

Three T-hangar alternatives were developed to provide potential layouts for accommodating the short and long term storage deficits (see Figure 4-5). As all three alternatives are shown in different locations, any or all of them could be considered for development. T-hangars are typically developed by private businesses, through a property lease from ConnDOT. Thus, the ultimate configuration and scale of any T-hangar development depends on the developer/lessee.

T-hangar Alternative 1 (16 Bays)

T-hangar Alternative 1 would be located on the area previously constructed as a Temporary Tiedown Apron, and includes the development of two T-hangar buildings, each with eight bays. This location would have the least sitework requirements and costs. Although this alternative alone would not satisfy the identified T-hangar deficits, it may be considered in combination with one or both of the other alternatives.



This alternative would allow for use of the existing automobile parking lot.[3] Aircraft access to the new T-hangar buildings would be provided by taxilanes connected to the parallel taxiway.

Because much of the area was previously graded, only modest sitework would be required for this alternative, although some earth removal and grading would be necessary (see "T-hangar Elevations A" graphic). Note that prior to the construction of the Temporary Tiedown Apron, there were a handful of turf tiedowns in this area. As there is currently a large surplus of turf tiedowns at the Airport, it would not be necessary to provide replacement locations.

To further minimize sitework and costs, this alternative could be refined to include a single 12-bay T-hangar building aligned parallel to the runway. The T-hangar could be located entirely on the Temporary Tiedown Apron area.

[3] The automobile parking lot for the existing T-hangar building has 42 spaces. It is assumed that new T-hangar development would not necessitate the expansion of this lot.

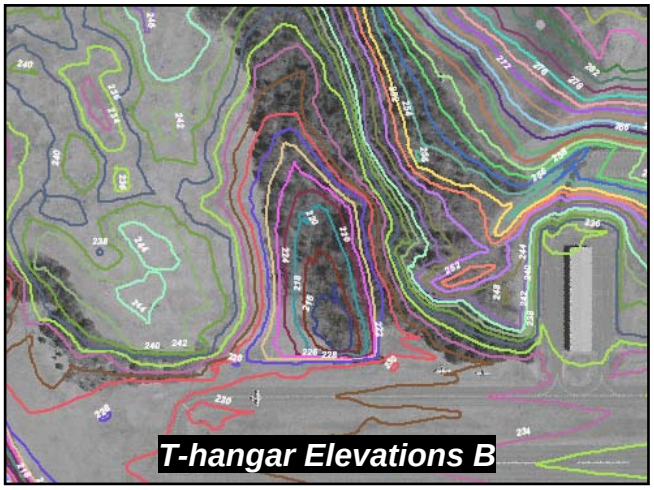
T-hangar Alternative 2 (20 Bays)

T-hangar Alternative 2 would be located in the forested area to the west of the existing T-hangar building, and would include the development of two T-hangar buildings, each with 10 bays. Although this alternative alone would not satisfy the identified T-hangar deficits, it may be considered in combination with one or both of the other alternatives. This alternative would allow for use of the existing automobile parking lot.[3] Aircraft access to the new T-hangar buildings would be provided by taxilanes connected to the parallel taxiway.

This alternative would require substantial earth removal and grading due to large elevation changes (see "T-hangar Elevations A and B" graphics). In addition, approximately 1.5 acres of tree removal would be necessary. As such, any T-hangar development in this area would have substantially greater costs than T-hangar Alternative 1. This alternative would also displace a handful of turf tiedowns. However, as there is currently a surplus of turf tiedowns at the Airport, it would not be necessary to provide replacement locations.

T-hangar Alternative 3 (40 Bays)

T-hangar Alternative 3 would be located in the open field area near the end of Runway 13, and would include the development of two T-hangar buildings, each with 20 bays. This alternative alone would satisfy the short and long term T-hangar deficits, but may still be considered in combination with one or both of the other alternatives.


T-hangar Elevations B

Aircraft access to the new T-hangar buildings would be provided by an extension of the parallel taxiway with taxilane connections. Automobile access would be provided by the construction of a new access road. As illustrated on Figure 4-5, the access road would begin near the existing automobile parking lot, connecting through the forested area to a parking area adjacent to the T-hangar buildings. Ideally, the access road would be designed to avoid impacts to wetlands. However, minor wetland impacts may be unavoidable due to the wetland that traverses the area. Nearly one acre of tree removal would be necessary for the access road construction.

The T-hangar development itself would require a considerable amount of earth removal and grading (see "T-hangar Elevations B" graphic), comparable to the level required for T-hangar Alternative 2. Nearly one acre of tree removal would also be necessary.

Summary and Evaluation of T-hangar Alternatives

Table 4-6 includes the preliminary cost estimates for the T-hangar alternatives, and a summary of the discussion above.

TABLE 4-6 – SUMMARY OF T-HANGAR ALTERNATIVES

Alternative	**Alternative 1**	**Alternative 2**	**Alternative 3**
Storage Capacity	16 Aircraft	20 Aircraft	40 Aircraft
Wetland Impacts	None	None	≈ ¼ Acre
Tree Removal	None	≈ 1.5 Acres	≈ 1.7 Acres
Preliminary Cost	$1.1 Million	$2.2 Million	$4.2 Million
Estimated Cost Per Unit	$69,000	$110,000	$105,000

The estimated cost per unit is high for T-hangar Alternatives 2 and 3 due to the need for a substantial amount of sitework, grading, and paving. If implemented, developers may look into cost reduction measures to make these facilities more affordable (e.g., portable hangars, reduced pavement area, non-steel construction).

POTENTIAL TREE REMOVAL (0.8 AC.)

T-HANGAR ALTERNATIVE 3

POTENTIAL ACCESS ROAD

POTENTIAL WETLAND AREA

POTENTIAL PARKING

POTENTIAL WETLAND IMPACT

EXISTING T-HANGAR PARKING (42 SPACES)

SECURITY FENCE

MAGNETIC (YEAR 2008) 14° 43' W

20-BAY T-HANGAR

20-BAY T-HANGAR

T-HANGAR ALTERNATIVE 2

10-BAY T-HANGAR

10-BAY T-HANGAR

EXISTING 10-BAY T-HANGAR

T-HANGAR ALTERNATIVE 1

8-BAY T-HANGAR

8-BAY T-HANGAR

TEMPORARY TIEDOWN APRON

POTENTIAL TREE REMOVAL (0.9 AC.)

POTENTIAL TREE REMOVAL (1.5 AC.)

RUNWAY PROTECTION ZONE (RPZ)

POTENTIAL EXIT TAXIWAY

RWY 13-31 (ASPHALT)

13

31

0 100 200

Scale in feet

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T-HANGAR ALTERNATIVES

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FIGURE 4-5

DATE DEC. 2008

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4.2.3 Conventional Hangar Alternatives

Although the facility requirements in Chapter 3 only identified an aircraft storage deficit for T-hangars, conventional hangars may also appeal to individuals seeking indoor aircraft storage. Conventional hangars are typically developed by a private business, through a lease with ConnDOT, which means their ultimate configuration, scale, and actual development depends on the desires and resources of the developer/lessee. At Danielson Airport, an additional conventional hangar may be necessary to provide for long term aircraft maintenance demands. Thus, four conventional hangar alternatives were developed, as described below and illustrated on Figure 4-6.

Conventional Hangar Alternative 1

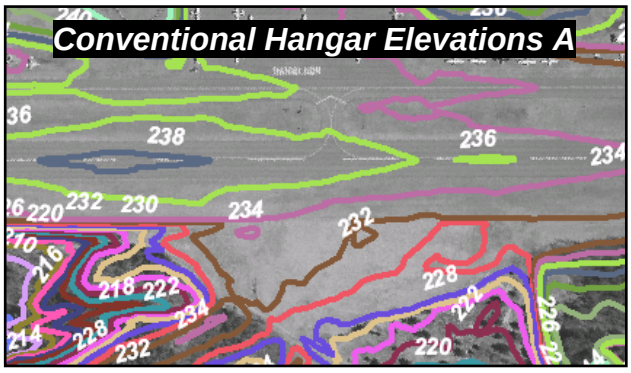
Danielson Airport's FBO recently constructed a 3,200 square foot conventional hangar adjacent to their office/maintenance facility. As illustrated on Figure 4-6, this alternative would include the development of two additional 3,200 square foot conventional hangars, each with a storage or maintenance capacity of two to three aircraft.

This alternative also would include a new paved tiedown apron with approximately 16 paved tiedown positions. The apron would displace several turf tiedowns, but due to the large surplus of turf tiedowns at the Airport, replacement locations would not be necessary. Although the development of the conventional hangars would require private funding, the apron development could be funded through state and federal grants. This may reduce the overall investment required by a private developer, as some of the sitework could be conducted as part of the apron project.

Conventional Hangar Alternative 2

As illustrated on Figure 4-6, Conventional Hangar Alternative 2 includes the development of a 5,000 square foot (or greater) conventional hangar on the Temporary Tiedown Apron.

Although the development of the conventional hangar would require private funding, it would tie into the existing Temporary Tiedown Apron. This may be attractive to a private developer, as much of the necessary sitework is already completed, reducing the overall investment required. This alternative would also include paving the Temporary Tiedown Apron and could provide a few new tiedown positions. Thus, this alternative would contribute to the reduction of both the hangar and paved tiedown storage deficits.



Conventional Hangar Alternative 3

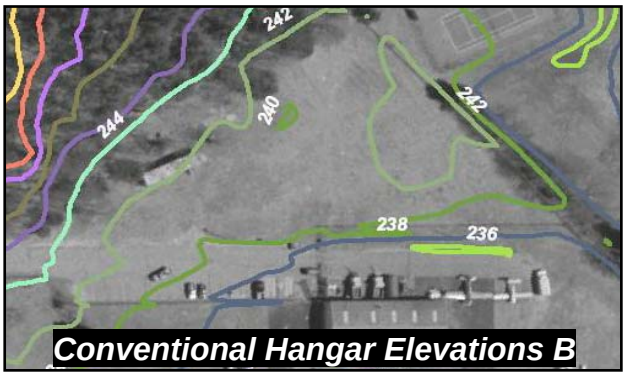
As illustrated on Figure 4-6, Conventional Hangar Alternative 3 would include the development of two 5,000 square foot conventional hangars on the south side of the runway. Overall, this alternative could provide hangar storage for up to 10 aircraft. The hangars would be situated in an area with only minor tree removal and sitework requirements (see "Conventional Hangar Elevations A" graphic). As this may be an ideal setting for a glider club or flying camp, several turf tiedown positions are shown.

A major drawback to this alternative would be automobile access, as automobiles should not cross the runway. A potential roadway alignment is illustrated on Figure 4-6. The roadway begins at Maple Road and extends to the new facility.[4]

Note that this alternative could not be developed if the Turf Runway Alternative is pursued, or vice versa.

Conventional Hangar Alternative 4

Conventional Hangar Alternative 4 includes the development of a 5,000 square foot (or greater) conventional hangar in grass area to the north of the FBO building. As this area is relatively flat, any combination of conventional hangar or T-hangar development could be considered (see "Conventional Hangar Elevations B" graphic).



The hangar layout illustrated on Figure 4-6 is positioned to avoid impacts to the Civil Air Patrol office. The southern portion of the hangar facility would tie into the new transient aircraft parking ramp, allowing for reduced development costs and easy access to the airfield. Automobile parking would be provided in the existing parking lot next to the FBO facility, or by constructing spaces behind the new hangar.

[4] According to FAA AC 150/5300-13 (Change 11), automobile parking facilities are not permitted within the central portion of the RPZ. This does not preclude the development of access roadways.

Summary and Evaluation of Conventional Hangar Alternatives

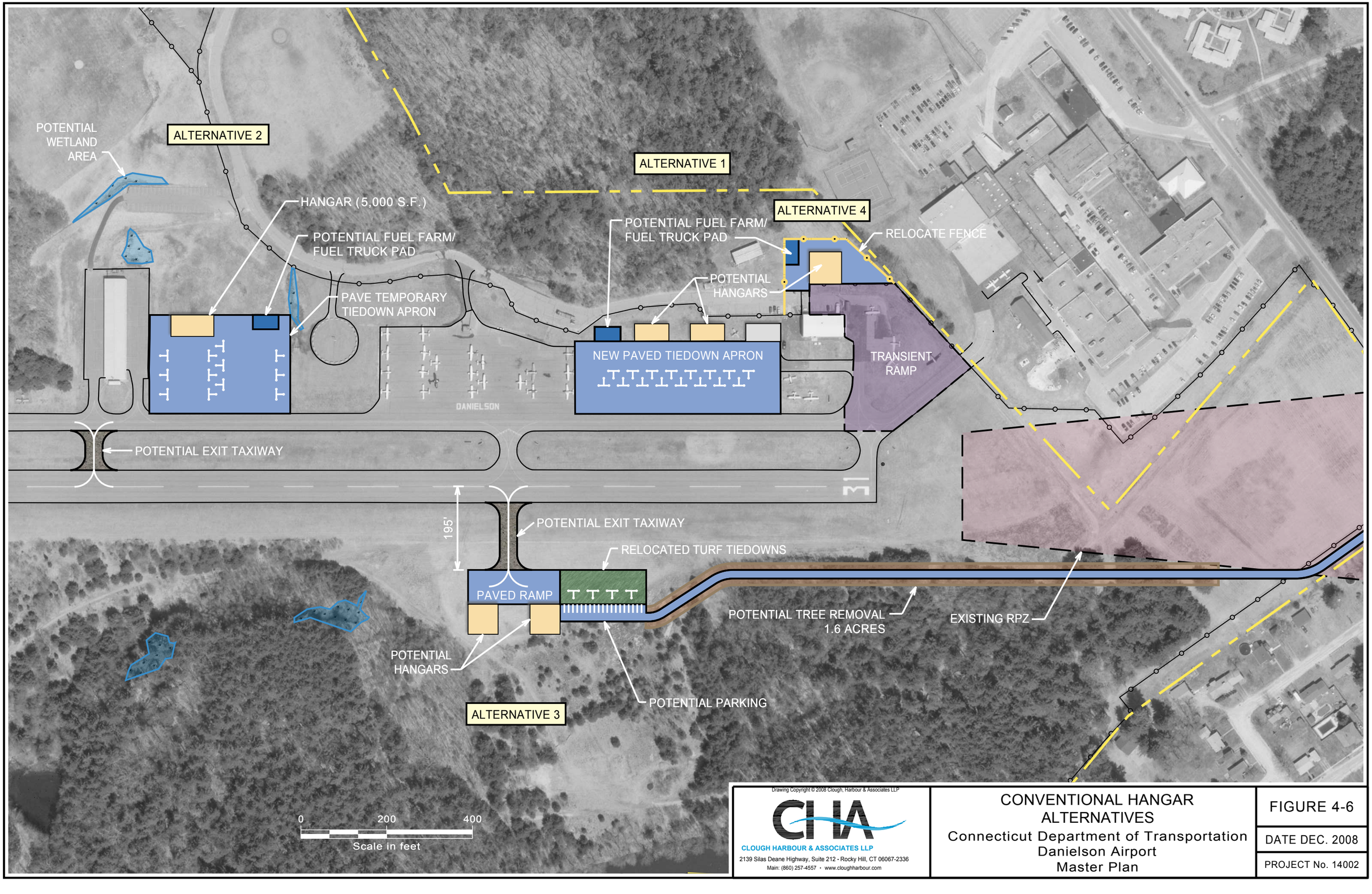
Table 4-7 includes the preliminary cost estimates for the conventional hangar alternatives, and a summary of the discussion above.

TABLE 4-7 – SUMMARY AND EVALUATION OF CONVENTIONAL HANGAR ALTERNATIVES

Alternative	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Hangar Storage	6,400 sf (2 x 3,200 sf)	5,000 sf	10,000 sf (2 x 5,000 sf)	5,625 sf
Tiedowns	16 Paved	12 Paved	4 Turf	None
Wetland Impacts	None	None	None	None
Tree Removal	None	None	≈ 1.6 Acres	None
Preliminary Cost	$2.1 Million	$1.4 Million*	$2.1 Million	$800,000

*A lower pavement cost was assumed for Alternative 2, as the Temporary Tiedown Apron may not require complete reconstruction

The costs for the conventional hangar alternatives vary greatly due to the size and location of the developments. As many of the conventional hangar alternatives provide both public and private use facilities, the construction costs would be shared between ConnDOT and the private developer. Actual costs could vary greatly based on final development plans.



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CONVENTIONAL HANGAR ALTERNATIVES

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FIGURE 4-6

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4.2.4 Fueling Facilities

Danielson Airport currently stores aircraft fuel in two trucks, and has an overall storage capacity of 3,750 gallons of 100 Low Lead (LL) fuel. As it is typically recommended for a small general aviation airport to provide at least 5,000 gallons of 100 LL fuel, and to comply with federal spill regulations, the following two options were identified in Chapter 3:

- ***Option 1 –*** Construction of a concrete parking pad for each airport fuel truck, with curb containment structures, oil/water separators, security fencing, and lighting.
- ***Option 2 –*** Construction of a new stationary bulk storage tank (e.g., aboveground fuel farm).

Potential locations for providing these options are illustrated on Figure 4-6. The sizes, requirements, and costs for these facilities would depend upon the types of systems constructed. Any new fueling facility must be developed in accordance with National Fire Protection Association (NFPA) requirements.

4.2.5 Access Alternatives

Roadway access to Danielson Airport is currently provided from Airport Road (off Upper Maple Road). As discussed in Chapter 3, Airport Road is cumbersome in its length and number of turns and may be problematic for emergency and large construction vehicles. To address these issues, a potential secondary access road alternative was identified. As illustrated on Figure 4-7, the alternative focuses on providing a shorter and more visible route to the Airport, forming a complete loop roadway for efficient access.

The secondary access road alternative would provide a new 1,300 foot access road from Maple Road, near the southern boundary of the high school, to Airport Road at the FBO building. As the new road is designed to stay outside of the existing RPZ, it would traverse the southern parking lot of the high school and displace several parking spaces. Thus, relocation of the displaced parking spaces may be necessary. With the construction of a new fence, the new airport access road could be completely separated from the high school property. The approximate cost for the secondary access road alternative would be $400,000.

In addition to the secondary access road alternative, a potential emergency access gate is illustrated on Figure 4-7. The gate would provide emergency access to the Airport through use of the high school's roadway and parking network. The gate would only be used in emergency situations, and would not serve as a secondary access road to the Airport. The approximate cost for the emergency access gate would be $50,000.

4.2.6 Fencing Alternative

The airport property currently runs along the Quinebaug River to the west and south. At the western end of the runway, the airport fence stretches close to the banks of the river, but does not provide a complete perimeter. As such, there is unrestricted access to the property for

approximately one-mile along the banks of the Quinebaug. Although the river provides a natural border, it does not adequately control against deer intrusions (or other animals that may be a nuisance to airport operations). Pedestrians and All-Terrain Vehicles (ATV) can also access the airport property near the river, by going around the ends of the fence.

To provide complete perimeter security around Danielson Airport, Figure 4-7 illustrates a potential fence along the western and southern edges of the airport property. The fence is positioned to avoid impacts to any wetland and floodplain areas, and to be as close to the operational airfield as possible while remaining outside the OFA of the existing runway and the potential turf runway. Approximately one mile of new fence (eight foot high with barbed wire) would be necessary to construct the illustrated fence, with an approximate cost of $250,000.

4.3 Non-Aviation Property Alternative

To maximize the development potential of the airport property, there may be areas where non-aviation facilities could be considered (e.g., warehouse or garage facility not necessarily dependent upon aviation). This may be beneficial to ConnDOT, as the leases from such facilities could offset some of the Airport's operating costs, and would be useful in areas where the development of aviation-dependent facilities is not feasible or desired.

As illustrated on Figure 4-7, ConnDOT may choose to permit the development of a non-aviation facility in the area labeled "reserved for potential non-aviation use." This site is at a higher elevation and is segregated from the Airport's operating area. Thus, if there is a future demand, this may serve as an ideal development site for a non-aviation facility. Due to accessibility issues at Danielson Airport, and proximity to adjacent residential development, no other sites have been identified for potential non-aviation development at this time.

This area is currently being used as a practice field for a local soccer club. Several members of the Advisory Committee (AC) said they would like this area to remain available for recreational activities, as there is limited recreational space in the Town of Killingly and to be consistent with the Town's Plan of Conservation and Development.

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PROPERTY AND ACCESS ALTERNATIVES

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FIGURE 4-7

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4.4 Preliminary Recommended Plan

Based on a review of environmental, physical, and financial constraints, the alternatives were refined to form a preliminary recommended plan for Danielson Airport, as illustrated on Figure 4-8. The preliminary recommended plan identifies facilities that would provide added flexibility for existing airport users, as well as various types of facilities that would increase the Airport's aircraft storage capacity. Changes or additions to the preliminary recommendations may be considered based on comments from the Advisory Committee, public, and other involved parties.

The preliminary recommended plan is divided into the following three categories:

- Airfield Recommendations (Facilities **A1** through **A6** on Figure 4-8)
- Landside Recommendations (Facilities **L1** through **L12** on Figure 4-8)
- Non-Aviation Property Recommendation (Facility **P1** on Figure 4-8)
- Tree Obstruction Removal Recommendation (**T**)

4.4.1 Airfield Recommendations

Paved Runway Recommendations

Several alternatives were presented for extending Runway 13-31. Although the operating environment at Danielson Airport is currently safe, a runway extension would provide the enhanced flexibility to support the potential demands (e.g., takeoff/landing weight, fuel capacity) of existing airport users (i.e., small general aviation aircraft with up to six passenger seats). A runway extension would also enable the provision of an improved instrument approach procedure for use during reduced visibility conditions.

Due to the potential impacts associated with a runway extension, the preliminary recommendations do not include a runway extension. However, based on comments from the Advisory Committee, public, and other involved parties, a runway extension may ultimately be considered as a long-term recommendation of the Master Plan.

The lighting, instrumentation, and approach capability for Runway 13-31 could be significantly enhanced through the addition of the recommended facilities in Table 4-8. Tree obstruction removal would be necessary to provide clear approach surfaces for the recommended Precision Approach Path Indicators (PAPI) and GPS instrument approach (IAP).[5] Without extending the Runway 13-31 to 3,200 feet, the FAA would require sufficient justification before publishing a GPS IAP at Danielson Airport.

[5] PAPI boxes/lights are typically positioned on the left side of the approach end of a runway. However, due to the location of a potential turf runway at Danielson Airport, it may be necessary to position the PAPI for Runway 31 approaches on the right side of the runway, as illustrated on Figure 4-8. The location of the PAPI would be listed in the Airport/Facility Directory.

TABLE 4-8 – RECOMMENDED LIGHTING & INSTRUMENTATION			
Airfield Facility	**Runway 13 End**	**Runway 31 End**	**Fig. 4-8 Label**
Lighting	REIL	N/A	**A1**
VGSI	PAPI	PAPI	**A2**
GPS IAP	GPS IAP	N/A	**N/A**
Markings	Non-Precision	Non-Precision	**A3**
REIL – Runway End Identifier Light **VGSI** – Visual Glide Slope Indicator **PAPI** – Precision Approach Path Indicator			

Exit Taxiway Recommendation

An additional exit taxiway is recommended near the existing T-hangar building to provide direct access to the runway (**A4**). As most aircraft landings on Runway 31 are prepared to exit the runway by the time they reach this point, the recommended exit taxiway would reduce runway occupancy time and improve operational efficiency.

Turf Runway Recommendation

Due to frequent operations by gliders, older historic aircraft (e.g., taildraggers), and newer light aircraft, which typically prefer turf surfaces, and a desire by several airport users (see Appendix A), a turf runway would be beneficial. However, during the review and comment period for the Draft Report, the FAA determined that they would not support a designated turf runway at Danielson Airport unless a full 700 foot separation could be achieved between the existing paved runway and the potential parallel turf runway. The 700 foot separation is the FAA standard for parallel runways that permit simultaneous operations. Although only sequential operations would be permitted at Danielson Airport, the FAA felt that as a non-towered airport the additional separation distance was warranted to provide adequate operational safety. As such, a review of a potential 700 foot runway to runway separation was conducted and found to be impractical from both a cost and environmental standpoint. Therefore, the turf runway is not recommended in the final plan.

Nevertheless, in order to support turf operations and glider activity, ConnDOT and the FAA determined that limited use of the turf area adjacent to Runway 13-31 could be permitted upon completion of tree clearing along the southwest side of the runway. The trees in this location are planned for removal in order to maintain a safe clearance from the runway. These trees had been removed as part of the original development of the Airport, but have re-grown over the past several decades. The tree removal project would enable limited use for the adjacent turf area for aircraft operations by local airport users and tenants. As such, the tree clearing would enable ConnDOT to remove the existing restriction on operations in the turf area adjacent to the runway (i.e., the Airport/Facility Directory currently indicates "*No Turf Use is Authorized*").

Airfield Recommendations Summary

In summary, the following airfield facilities are included in the preliminary recommended plan for Danielson Airport:

A1. Runway End Identifier Lights (REIL) on Runway 13 end
A2. Precision Approach Path Indicator (PAPI) on both runway ends
A3. Non-precision runway markings and GPS instrument approach
A4. Exit taxiway near existing T-hangar building

Note that the preliminary airfield recommendations are subject to change, and are not prioritized based on development need or timeframe. A summary of the entire preliminary recommended plan, including cost estimates and anticipated funding sources, is provided in Chapter 6.

4.4.2 Landside Recommendations

Automobile Parking Recommendations

The preliminary recommended plan includes several facilities for improving automobile parking and access within the airport fence. Although there is currently a sufficient number of automobile parking at the Airport, the recommendations below are intended to improve the ability for airport users to safely access their aircraft.

The automobile parking recommendations would serve a number of beneficial roles at Danielson Airport, including the following:

- Prevent automobiles from using the operational airfield (i.e., runway and taxiway)
- Provide a new access route for airport service vehicles (e.g., fuel truck)
- Allow airport users safe access for loading their aircraft and secure areas for parking their car overnight

As illustrated on Figure 4-8, the preliminary recommendations include three new automobile parking areas inside the airport fence (**L1**). Access to the new parking areas would be provided by: (1) minor re-grading of the roadway between the T-hangar parking lot and T-hangar building (**L2**), and (2) constructing a service road between the Temporary Tiedown Apron and Paved Tiedown Apron (**L3**).[6]

T-hangar Recommendations

Two of the T-hangar alternatives are recommended to fulfill the Airport's long-term requirement of 30 aircraft bays. Note that T-hangars are typically developed by private businesses through a property lease with ConnDOT. Thus, the ultimate configuration and scale of new T-hangars would depend on the developer/lessee.

The first T-hangar recommendation (i.e., T-hangar Alternative 1) is located on the area previously constructed as a Temporary Tiedown Apron, and would include the development of two T-hangar buildings, each with eight bays (**L5**). Aircraft access to the new T-hangars would be provided by taxilanes connected to the parallel taxiway. As much of the development area was previously graded for the Temporary Tiedown Apron, the sitework requirements would be

[6] Due to the layout of the recommended T-hangar facilities, the "automobile access" pathway was refined from the original alternative depicted on Figure 4-4.

modest. As illustrated on Figure 4-8, there would be space for a few paved tiedown positions on the unused portion of the Temporary Tiedown Apron.

The second T-hangar recommendation (i.e., T-hangar Alternative 2) is located in the forested area to the west of the existing T-hangar building, and would include the development of two T-hangar buildings, each with 10 bays (**L6**). Aircraft access to the new T-hangars would be provided by taxilanes connected to the parallel taxiway. This recommendation would require substantial earth removal and grading due to large elevation changes, resulting in high costs per bay (see Table 4-6). In addition, approximately 1.5 acres of tree removal would be necessary. A few turf tiedowns would also be displaced by the new T-hangar development; however, as there is currently a surplus of turf tiedowns, it would not be necessary to provide replacements.

Overall, with the recommended T-hangar facilities described above, a total of 36 or more T-hangar bays could be developed, which would satisfy the long-term deficit at Danielson Airport.

Conventional Hangar Recommendations

Two of the conventional hangar alternatives are included in the preliminary recommended plan. Although no long-term deficit of conventional hangar storage was identified for Danielson Airport, if a private developer wishes to construct conventional hangars through a property lease with ConnDOT, conventional hangars may be attractive to individuals seeking indoor aircraft storage (in lieu of T-hangar storage). In addition, if activity and based aircraft levels continue to rise at the Airport, the construction of a larger consolidated maintenance hangar may be desired.

Danielson Airport's FBO recently constructed a 3,200 square foot conventional hangar adjacent to their office/maintenance facility. As illustrated on Figure 4-8, the first conventional hangar recommendation (i.e., Conventional Hangar Alternative 1) would include the development of two additional 3,200 square foot conventional hangars, each with a storage or maintenance capacity of two to three aircraft (**L7**).

The recommended plan also includes a new paved tiedown apron with up to 16 paved tiedown positions (**L8**). The apron would displace several turf tiedowns, but replacement locations would not be necessary due to an existing surplus. Although the development of the conventional hangars would require private funding, the apron development could be funded through state and federal grants. This may reduce the overall investment required by a private developer, particularly compared to the T-hangar recommendations, as some of the sitework could be conducted as part of the apron project.

The second conventional hangar recommendation (i.e., Conventional Hangar Alternative 4) includes the development of a 5,000 square foot (or greater) conventional hangar in the grass area to the north of the FBO building (**L9**). The hangar is positioned to avoid impacts to the Civil Air Patrol office. The southern portion of the hangar facility would connect to the new transient aircraft parking ramp, allowing for reduced development costs and easy access to the airfield.

Overall, if developed, the recommendations above would include over 10,000 square feet of new conventional hangar storage and up to 16 paved tiedown positions at the Airport.

Fueling Recommendations

To bring Danielson Airport into compliance with federal spill regulations, the following two options were identified:

- ***Option 1 –*** Construction of a concrete parking pad for each airport fuel truck, with curb containment structures, oil/water separators, security fencing, and lighting.
- ***Option 2 –*** Construction of a new stationary bulk storage tank (e.g., aboveground fuel farm).

Two locations are recommended for providing one or both of these options, as illustrated on Figure 4-8 (**L10**). Based on the suggestions of the Advisory Committee, the preliminary recommendations have been modified to include a new fueling location on the Transient Ramp. The new fueling location could be easily accessed by aircraft and is conveniently located adjacent to the FBO's office. The sizes, requirements, and costs for these facilities would depend upon the types of systems constructed. Any new fueling facility must be developed in accordance with National Fire Protection Association (NFPA) requirements.

Access Recommendation

The secondary access road alternative is not included in the preliminary recommended plan. This is due to potential property issues with the adjacent high school (e.g., parking lot removal, fence relocation), the construction of the new Transient Ramp, and location within the RPZ. Without use of the high school's roadway and parking network, which is not desired, there are limited feasible scenarios for a new secondary access road. However, based on the suggestions of the Advisory Committee, a new access road is depicted on the recommended plan (**L4**). As illustrated, the new access road reconfigures Airport Road, through the property of the adjacent high school, to provide a new primary roadway to the Airport. The new road would significantly cut down on the number of turns and overall distance required to access the Airport, although high development costs and property issues must be carefully considered.

A refinement to the emergency access gate depicted on Figure 4-7 is recommended for the Airport (**L11**). As illustrated on Figure 4-8, the recommended emergency access gate avoids the recommended conventional hangar development (i.e., Conventional Hangar Alternative 4). The gate would provide emergency access to the Airport through the high school property. The gate would only be used in emergency situations, and would not serve as a secondary access road.

Fencing Recommendation

To provide complete perimeter security around Danielson Airport, new fencing to enclose the western and southern portions of the airport property is included in the preliminary recommended plan (**L12**). The recommended fence would prevent deer and other animals, as well as pedestrians and ATVs, from entering the airport property and disrupting operations. As illustrated on Figure 4-8, in order to avoid wetland and floodplain impacts and to be as close to the operational airfield as possible while remaining outside the OFA of the existing paved runway, approximately one mile of new fencing (eight foot high with barbed wire) would be necessary.

Landside Recommendations Summary

In summary, the following landside facilities are included in the preliminary recommended plan for Danielson Airport:

L1. Automobile parking (inside fence)
L2. Reconfigured roadway
L3. Paved service road
L4. New airport access road
L5. T-hangar 1
L6. T-hangar 2
L7. Conventional hangar 1
L8. Paved tiedown apron
L9. Conventional hangar 2
L10. Fuel farm/fuel truck parking pad
L11. Emergency access gate
L12. Airport fence

A summary of the entire preliminary recommended plan, including cost estimates and anticipated funding sources, is provided in Section Chapter 6.

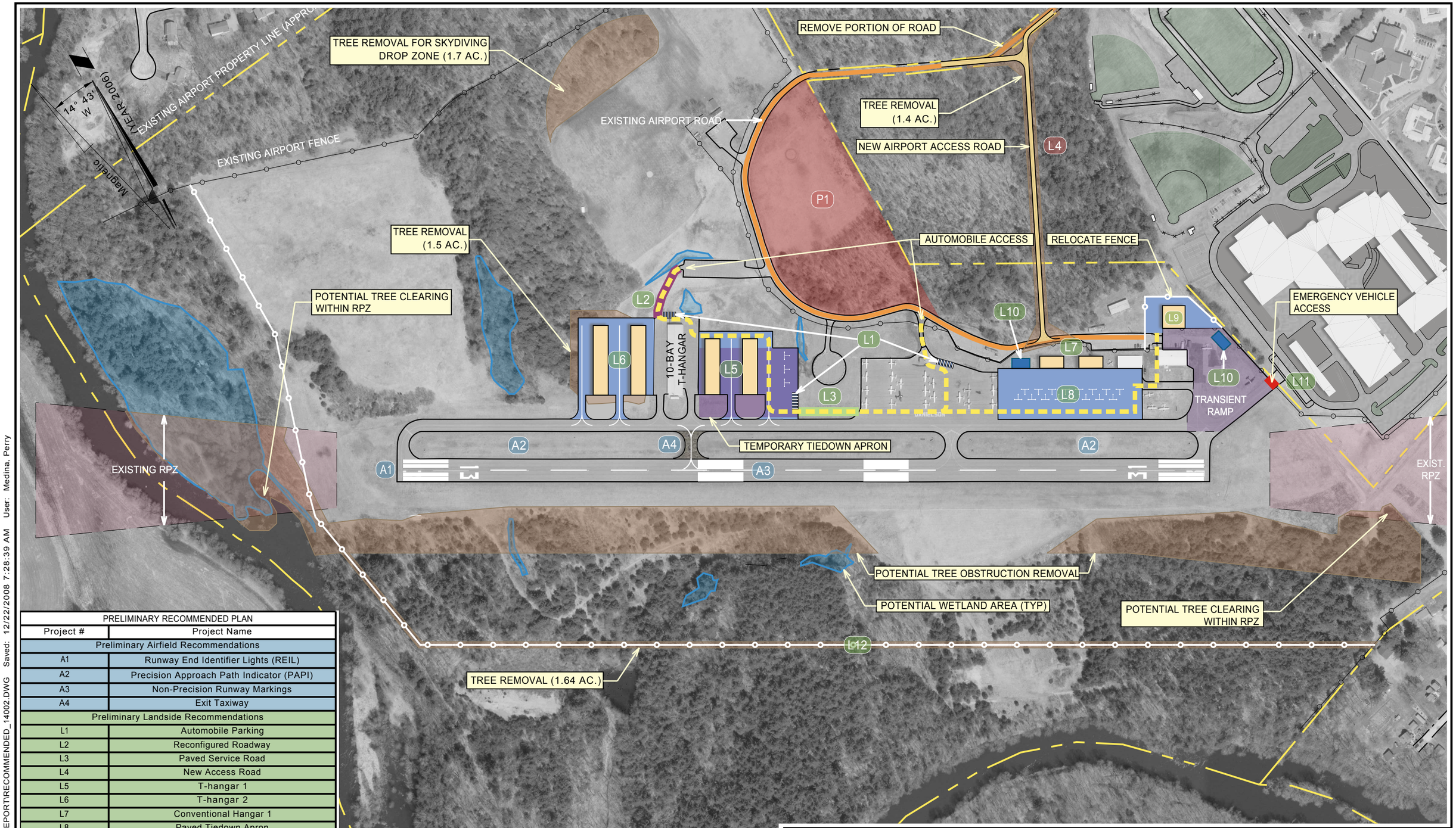
4.4.3 Non-Aviation Property Recommendation

To maximize the development potential of the airport property, the highlighted area on Figure 4-8 is recommended to be "reserved for potential non-aviation use" (**P1**), if such a need arises. Due to the elevated grade and segregation of this site from the Airport's operating area, this would be an ideal development site for a non-aviation facility (e.g., warehouse or garage facility not necessarily dependent upon aviation). Such a facility may be beneficial to ConnDOT, as the lease of the property could help offset some of the Airport's operating costs.

This area is currently being used as a practice field for a local soccer club. Several members of the Advisory Committee (AC) said they would like this area to remain available for recreational activities, as there is limited recreational space in the Town of Killingly and to be consistent with the Town's Plan of Conservation and Development.

4.4.4 Tree Obstruction Removal Recommendation

As illustrated on Figure 4-8, tree clearing would be required in order to develop several of the preliminary recommendations. For existing conditions at Danielson Airport, tree clearing is currently necessary to remove obstructions to the Federal Aviation Regulations (FAR) Part 77 Imaginary Surfaces of Runway 13-31. As such, a project exclusively for tree obstruction removal should be conducted independently from the other recommendations. The existing tree obstruction removal requirements are further discussed in Chapters 5 and 6. It is anticipated that over 10 acres of tree clearing is currently necessary, both on and off the airport property, to remove obstructions to the Imaginary Surfaces of Runway 13-31. The cost for the existing tree obstruction removal, including the acquisition of easements for off airport locations, is estimated to be approximately $250,000.



PRELIMINARY RECOMMENDED PLAN	
Project #	Project Name
Preliminary Airfield Recommendations	
A1	Runway End Identifier Lights (REIL)
A2	Precision Approach Path Indicator (PAPI)
A3	Non-Precision Runway Markings
A4	Exit Taxiway
Preliminary Landside Recommendations	
L1	Automobile Parking
L2	Reconfigured Roadway
L3	Paved Service Road
L4	New Access Road
L5	T-hangar 1
L6	T-hangar 2
L7	Conventional Hangar 1
L8	Paved Tiedown Apron
L9	Conventional Hangar 2
L10	Fuel Farm/Fuel Truck Pad
L11	Emergency Access Gate
L12	Airport Fence
Preliminary Non-Aviation Property Recommendation	
P1	Reserved For Potential Non-Aviation Use

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PRELIMINARY RECOMMENDED PLAN

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FIGURE 4-8

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4.4.5 Summary of Preliminary Recommended Plan

Table 4-9 provides a summary of the preliminary recommended plan for Danielson Airport, including cost estimates and anticipated funding sources. The information in the table is separated by project type (e.g., airfield, landside, non-aviation property), and is not prioritized based on development need or timeframe.

Preliminary Airfield Recommendations (A)

A1. Runway End Identifier Lights (REIL) on Runway 13 end
A2. Precision Approach Path Indicator (PAPI) on both runway ends
A3. Non-precision runway markings
A4. Exit taxiway near existing T-hangar building

Preliminary Landside Recommendations (L)

L1. Automobile parking (inside fence)
L2. Reconfigured roadway
L3. Paved service
L4. Pedestrian stairway
L5. T-hangar 1
L6. T-hangar 2
L7. Conventional hangar 1
L8. Paved tiedown apron
L9. Conventional hangar 2
L10. Fuel farm/fuel truck parking pad
L11. Emergency access gate
L12. Airport fence

Preliminary Non-Aviation Property Recommendation (P)

P1. Property reserved for potential non-aviation use

Tree Obstruction Removal Recommendation (T)

T. Tree obstruction removal from existing FAR Part 77 Imaginary Surface

TABLE 4-9 – SUMMARY OF PRELIMINARY RECOMMENDED PLAN				
Project	**Total Estimated Cost**	**Anticipated Funding Source**		
		FAA	**State**	**Private**
Preliminary Airfield Recommendations				
A1	$50,000	$47,500	$2,500	
A2	$100,000	$95,000	$5,000	
A3	$20,000	$19,000	$1,000	
A4	$100,000	$95,000	$5,000	
Subtotals	**$270,000**	**$256,500**	**$13,500**	**$0**
Preliminary Landside Recommendations				
L1	$5,000		$5,000	
L2	$75,000	$71,250	$3,750	
L3	$50,000	$47,500	$2,500	
L4	$10,000	$9,500	$500	
L5	$1,100,000			$1,100,000
L6	$2,200,000			$2,200,000
L7	$750,000			$750,000
L8	$1,400,000	$1,330,000	$70,000	
L9	$800,000			$800,000
L10	TBD			
L11	$25,000	$23,750	$1,250	
L12	$250,000	$237,500	$12,500	
Subtotals	**$6,665,000**	**$1,719,500**	**$95,500**	**$4,850,000**
Preliminary Non-Aviation Property Recommendation				
P1	N/A			
Subtotals	**$0**	**$0**	**$0**	**$0**
Tree Obstruction Removal Recommendation				
T	$250,000	$237,500	$12,500	
Subtotals	**$250,000**	**$237,500**	**$12,500**	**$0**
Grand Totals	***$7,185,000***	***$2,213,500***	***$121,500***	***$4,850,000***

5.0 ENVIRONMENTAL OVERVIEW

This chapter provides an overview of the environment surrounding Danielson Airport and an initial evaluation of the potential environmental impacts associated with the recommended development alternatives. The information herein was considered during the development of the alternatives, as well as the recommendations. Note that this review is not intended to satisfy the environmental documentation needed to address the National or Connecticut Environmental Policy Acts (NEPA/CEPA). However, this information may be used to facilitate the preparation of such an environmental document, if necessary.

This overview was prepared based on the guidelines of FAA Advisory Circular 150/5070-6B, "*Airport Master Plans,*" and FAA orders 5050.4B and 1050.1E, which require a review of the potential impacts associated with the recommendations for the following environmental categories:

- Air Quality
- Coastal Resources
- Compatible Land Use
- Construction
- USDOT Act: Section 4(f)
- Farmlands
- Fish, Wildlife, and Plants
- Floodplains
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Historical, Architectural, Archeological, and Cultural Resources
- Light Emissions and Visual Impacts
- Natural Resources and Energy Supply
- Noise
- Secondary (Induced) Impacts
- Socioeconomic and Environmental Justice
- Property Acquisition
- Water Quality
- Wetlands
- Wild and Scenic Rivers

The subsequent sections of this chapter summarize each of these environmental categories as they apply to the recommendations for Danielson Airport.

5.1 Air Quality

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants (i.e., ozone, carbon monoxide, particulates, sulfur dioxide, nitrogen dioxide, and lead). States must identify geographic areas, termed "nonattainment" areas, which do not meet the NAAQS. Areas that meet the NAAQS are termed "attainment" areas.

For states without indirect source review for airports,[1] such as Connecticut, the FAA has established thresholds to determine the need for air quality analyses for proposed projects. At civilian airports, FAA regulations specify that an air quality analysis is not needed if all of the following conditions are met:

- The airport is forecast to accommodate less than 1.3 million annual passengers
- The airport is forecast to accommodate less than 180,000 annual general aviation operations
- The airport is located within an attainment area

If all of the above conditions are met, it is assumed that the proposed project would not cause significant air quality impacts.

Although Danielson Airport is not forecast to exceed the first two thresholds, the EPA (as of December 5, 2006) classifies all of Windham County as a Moderate nonattainment area for 8-hour ozone. Therefore, an air quality analysis would potentially be required as part of a NEPA/CEPA environmental study for Danielson Airport. However, no air quality impacts would be anticipated from the implementation of the recommended development alternatives, as the projects would be small in scale and would not generate substantial levels of air pollutant emissions.

5.2 Coastal Resources

Danielson Airport is not located within a coastal zone and is not within the jurisdiction of the Coastal Zone Management Program. Thus, the recommended developments would not impact coastal resources.

5.3 Compatible Land Use

As previously discussed in Chapter 1, Danielson Airport is located within the Town of Killingly, Windham County. The area surrounding Danielson Airport primarily consists of open, wooded, residential, and institutional areas. A summary of nearby features is provided below.

- The Quinebaug River creates the western and southern borders of the airport property.

[1] Some states require a review of emissions from indirect sources. Indirect sources are stationary sources that attract or may attract sources of pollution, and thus, indirectly cause the emission of air contaminants (FAA *Air Quality Procedure for Civilian Airports & Air Force Bases*, 1997).

- Residential development is located immediately northwest and southeast of the airport property.
- The Harvard H. Ellis Technical High School is located immediately east of the airport property.
- Cemeteries, light industrial, and senior housing developments are located along Maple Road to the east.
- Large open and wooded areas provide a buffer between the airport property and surrounding areas (except to the east).

Zoning regulations and land uses within the Town of Killingly, as well as the bordering Town of Brooklyn, are discussed below and illustrated on Figure 5-1.

Town of Killingly

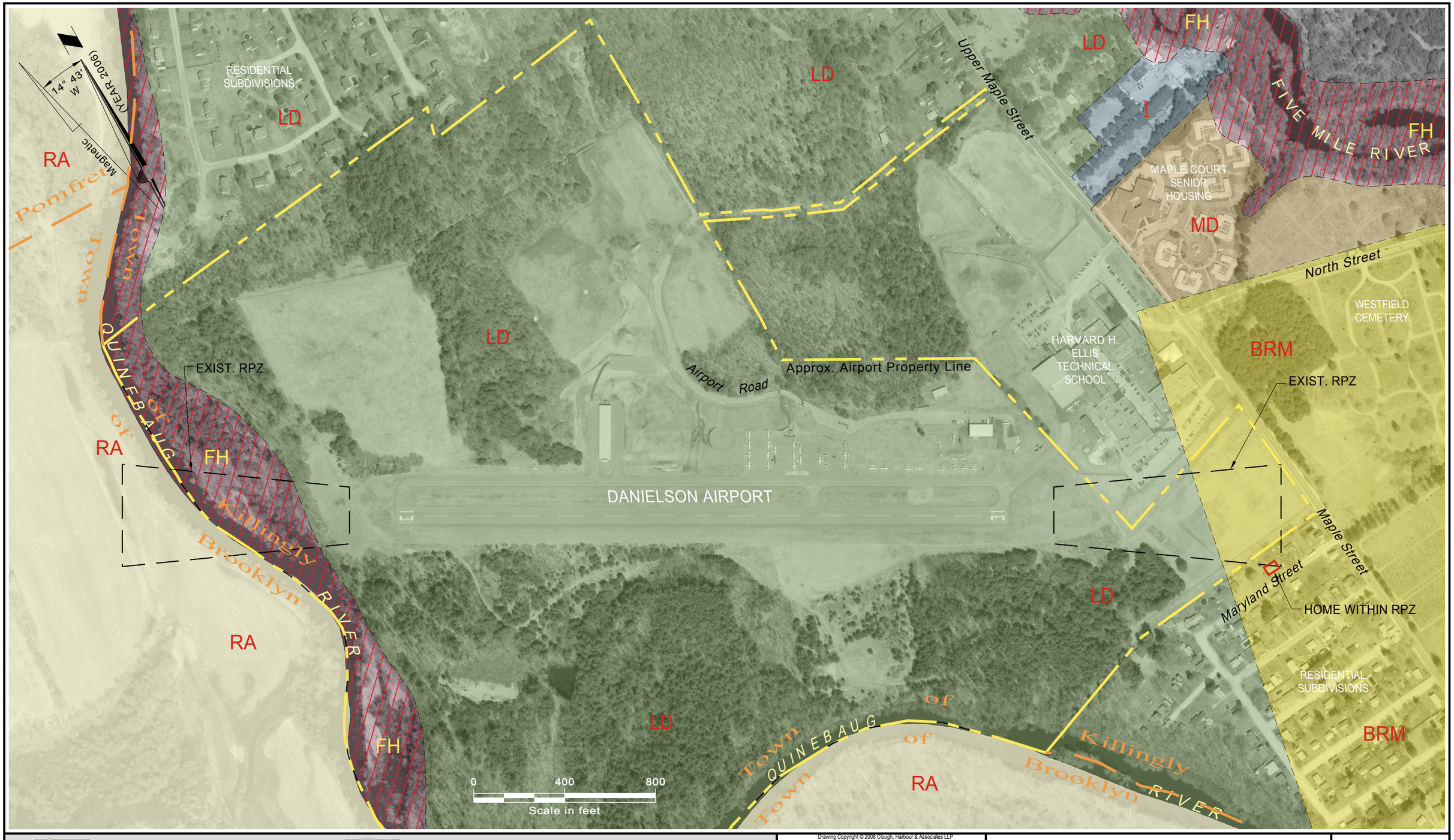
Danielson Airport is located on the eastern side of the Town of Killingly, along the border of the Town of Brooklyn. As per the Town of Killingly Zoning Regulations, Danielson Airport and surrounding areas are zoned as Low Density Development (See Figure 5-1). Permitted uses within this zone include single family residential dwellings, two family residential dwellings, churches, professional offices, livestock, municipal, and fire.

The FAA uses a Day-Night Average Noise Level (DNL) of 65 dB as a threshold to determine if incompatible activities exist in the vicinity of an airport. As described in Section 5.13, DNL levels for existing and future conditions indicate a maximum noise level of DNL 60 dB at Danielson Airport. Thus, no incompatible land use impacts would be anticipated as a result of aircraft noise in the Town of Killingly. It should be noted that single-event airport noise levels currently exceed 65 dB; however, as described above, the FAA evaluates airport noise exposure based on the annualized DNL metric.

To control the land use immediately beyond runway ends, the FAA recommends easements or acquisition of property within Runway Protection Zones (RPZs). The existing RPZ beyond Runway 31 contains one home. Voluntary acquisition of the one home located within the existing RPZ should be considered for compatible land use purposes.

Town of Brooklyn

The land across the Quinebaug River to the west of Danielson Airport is located in the Town of Brooklyn and is zoned Residential-Agricultural. It is not anticipated that the recommended developments would result in increased aircraft noise exposure or property acquisition in the Town of Brooklyn. Thus, no significant land use impacts would be anticipated.



MD	MEDIUM DENSITY	LD	LOW DENSITY
FH	100 YEAR FLOOD HAZARD	RA	RESIDENTIAL AGRICULTURAL
I	INDUSTRIAL	BRM	BOROUGH - RESIDENTIAL MEDIUM (ZONING OVERLAY DISTRICT)

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ZONING

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FIGURE 5-1

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5.4 Construction Impacts

Temporary environmental disturbances can occur during construction, such as noise from equipment, air quality impacts from dust, soil erosion and sedimentation, and disruption of off-site and local traffic patterns. These impacts can be mitigated through careful planning and consideration, as well as quality construction supervision.

Noise impacts from construction equipment can be lessened through the use of properly mufflerized vehicles. Requiring the contractor to conduct activities within the daytime work hours (8:00 a.m. to 5:00 p.m.) would prevent nighttime noise impacts. The majority of the recommended projects would not cause disruptions to aircraft operations; however, if pursued, short term disruptions to aircraft operations may occur during the development of the paved exit taxiway.

As described in Section 1.10 of the State of Connecticut Department of Transportation, *Standard Specifications for Roads, Bridges and Incidental Construction, Form 816*, the construction specifications for the recommended projects at Danielson Airport would incorporate the appropriate "Best Management Practices" for the control of erosion, sedimentation, and stormwater runoff. The recommended projects would also be developed in conformance with the 2004 Connecticut Stormwater Quality Manual, and would therefore include proper Erosion and Sediment Control plans.

The proposed modifications at Danielson Airport would require the importation of construction materials from off-site locations. A designated haul route would be supplied to the contractor, and the contractor would repair any damage to roadways at the end of construction. Overall, with the standard safeguards described above, significant construction impacts would not be anticipated.

5.5 USDOT Section 4(f)

The U.S. Department of Transportation (USDOT) regulations prevent transportation projects from developing or taking publicly-owned land from a Section 4(f) resource (i.e. public park, recreational area, wildlife or waterfowl refuge, or historic site) unless there are no feasible alternatives, and planning to minimize harm and mitigation measures have been incorporated.

Since public use or historic sites are not located within or near the airport boundaries, no impacts to Section 4(f) resources are anticipated.

5.6 Farmland

The Natural Resource Conservation Service (NRCS), within the United States Department of Agriculture (USDA), has established guidelines under the Farmland Protection Policy Act (FPPA) for federal activities that involve directly undertaking, financing, or approving a project that would convert farmland soils. The guidelines recognize that the quality of farmland varies based on soil conditions, and places higher value on soils with high productivity potential. To preserve these highly productive soils, the NRCS classifies soil types as prime or of statewide

importance. The NRCS requires that soils in these categories be given proper consideration before they are converted to non-farming uses by federal programs.

As illustrated on Figure 5-2, the proposed project area contains the following soil types:

- Agawam fine sandy loam, 0 to 3 % slopes (29A) – Prime Farmland Soil
- Hinkley gravelly sandy loam 3 to15 % slopes (38C) – Statewide Important Soil
- Merrimac sandy loam, 0 to 3 % slopes (34B) – Prime Farmland Soil
- Suncook loamy fine sand (100) – Statewide Important Soil
- Sutton fine sandy loam 3 to 8 % slopes (50B) – Prime Farmland Soil
- Udorthents - Urban land complex soil type (306)

As illustrated, the airport property is largely composed of Udorthents – urban land complex soil (comprises the non-shaded areas on Figure 5-2). The majority of the recommended modifications would not impact farmland soils. Note that the airport property does not contain farming operations and cannot be used for agricultural purposes under any foreseeable scenario. Thus, the recommended projects would not result in impacts to farmland soils.

Soil Key	Soil Description
34B	Merrimac sandy loam, 0 to 3 % slopes
38C	Hinkley gravelly sandy loam 3 to15 % slopes
50B	Sutton fine sandy loam 3 to 8 % slopes
100	Suncook loamy fine sand

CT IMPORTANT FARMLAND SOIL

PRIME FARMLAND SOIL

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FARMLAND SOILS

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FIGURE 5-2

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5.7 Floodplains

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRMs) that depict 100-year and 500-year floodplains in many areas throughout the country. ConnDEP regulates actions within floodplains that are initiated by State of Connecticut agencies

Initial review of FEMA FIRMs indicates that a 100-year floodplain runs along the Quinebaug River on western and southern borders of the airport property. The proposed airport fence has been purposely positioned outside any floodplain areas. None of the recommended modifications would be located in the floodplain areas, and therefore no impacts to floodplains would be anticipated. Figure 5-3 illustrates the location of the 100-year and 500-year floodplain in the vicinity of Danielson Airport.

5.8 Fish, Wildlife and Plants

The United States Fish and Wildlife Service (USFWS) was contacted to request information regarding the presence of federally-listed and proposed endangered or threatened species. The response to the inquiry (see Appendix B) indicated that no federally-listed threatened or endangered species are known to occur within the project area. The USFWS does not require the preparation of a Biological Assessment or further consultation under Section 7 of the Endangered Species Act (for a period of one year from the date of the correspondence). Updated correspondence with the USFWS and ConnDEP would be required as a part of an environmental study.

According to the ConnDEP Natural Diversity Data Base (NDDB) website, no state listed species or significant natural communities occur within the project area. Thus, no further consultation with ConnDEP is required. However, the NDDB should be reviewed prior to any airport development as the data is periodically updated.

5.9 Hazardous Materials, Pollution Prevention, and Solid Waste

The 1988 Airport Layout Plan identified no hazardous waste disposal sites on or in the vicinity of the airport property. However, as discussed in Section 4.2.4, there are two fuel trucks at the Airport with an overall storage capacity of 3,750 gallons of 100 Low Lead (LL) fuel. Federal regulations require Danielson Airport to be in compliance with regulation 40 CFR Part 112, Oil Pollution Prevention, through the preparation and implementation of a Spill Prevention, Control, and Countermeasure (SPCC) Plan. To comply with the regulations, a SPCC Plan should be developed, in addition to the construction of a concrete pad with curb containment for each fuel truck, as described in Chapter 4.

100 YEAR FLOODPLAIN

500 YEAR FLOODPLAIN

1 DELINEATED WETLANDS

INTERMITTENT WATER COURSE

The wetland delineation was conducted in June 2006 on portions of the airport property with the potential to be considered for future development. Other wetlands may exist elsewhere on the airport property.

0 400 800

Scale in feet

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WETLANDS AND FLOODPLAINS

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FIGURE 5-3

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5.10 Historical, Architectural, Archeological, and Cultural Resources

The Connecticut State Historic Preservation Office (CTSHPO) was contacted to determine the level of archaeological sensitivity of the airport property and surrounding parcels (see Appendix B). The CTSHPO indicates that the airport property and adjacent lands possess moderate to high sensitivity for prehistoric and historic archaeological resources. The CTSHPO strongly recommends that a professional reconnaissance survey be undertaken to identify and evaluate archaeological resources which may exist within airport-related property as a prerequisite to future site developments.

5.11 Light Emissions and Visual Impacts

Runway End Identifier Lights (REILs) are flashing lights that provide enhanced visibility of the runway end for aircraft during approach. The recommended plan includes the installation of REILs on the existing Runway 13 end As there are currently no homes within direct line-of-site of the existing Runway 13 end, it is anticipated that the installation of REILS would not cause any light emissions or visual impacts in that location.

5.12 Energy Supply and Natural Resources

Proposed developments at Danielson Airport, including taxiways, hangars, and lighting, as well as increased airport activity, would result in additional use of energy and resources. However, as all of the recommended developments would have low to moderate energy requirements, no significant impacts would be anticipated.

5.13 Noise

Annual operations are anticipated to increase by approximately 6,000 by the year 2025 (see Table 2-14). This increase in activity would subsequently result in an increase in aircraft noise. Thus, a noise analysis was performed to determine if noise may exceed significant levels by the end of the 20-year planning period, per FAA criteria.

The FAA's Integrated Noise Model (INM) Version 7.0 was used to conduct the analysis. As input, the INM requires an estimated number of takeoffs and landings by aircraft type, and operational flight tracks.

Federal regulations require the use of the Day-Night Average Noise Level (DNL) metric to determine if aircraft noise impacts are "significant." The DNL represents the total accumulation of aircraft noise spread out uniformly throughout the day. The FAA defines a DNL of 65 dB as the "threshold" of impact to noise sensitive areas. Noise sensitive areas experiencing a DNL over 65 dB are classified as significantly impacted.

The DNL is typically illustrated through the use of contour lines, which represent lines of equal loudness, with noisier levels centered on the runway and quieter levels expanding outward. The INM analysis indicated that Danielson Airport does not currently generate, nor is it anticipated to generate, average noise levels above DNL 60 dB. This is due to modest activity levels, small

aircraft use, and minimal nighttime activity. Thus, per federal criteria, no significant aircraft noise impacts would be anticipated as a result of the recommended developments at the Airport.

5.14 Secondary (Induced) Impacts

Secondary impacts occur when one project fosters, encourages, and/or enables another project to proceed with environmental impacts. Cumulative impacts consider past, present, and reasonably foreseeable actions, based on the fact that environmental impacts can accumulate over time. The recommended developments at Danielson Airport would not change the general character of the area. Although a NEPA/CEPA environmental study would typically be required to evaluate the secondary and cumulative impacts associated with the recommended modifications and recent or planned projects in the vicinity of Danielson Airport, due to the general small scale of projects and character of the area, secondary and cumulative impacts would not be anticipated.

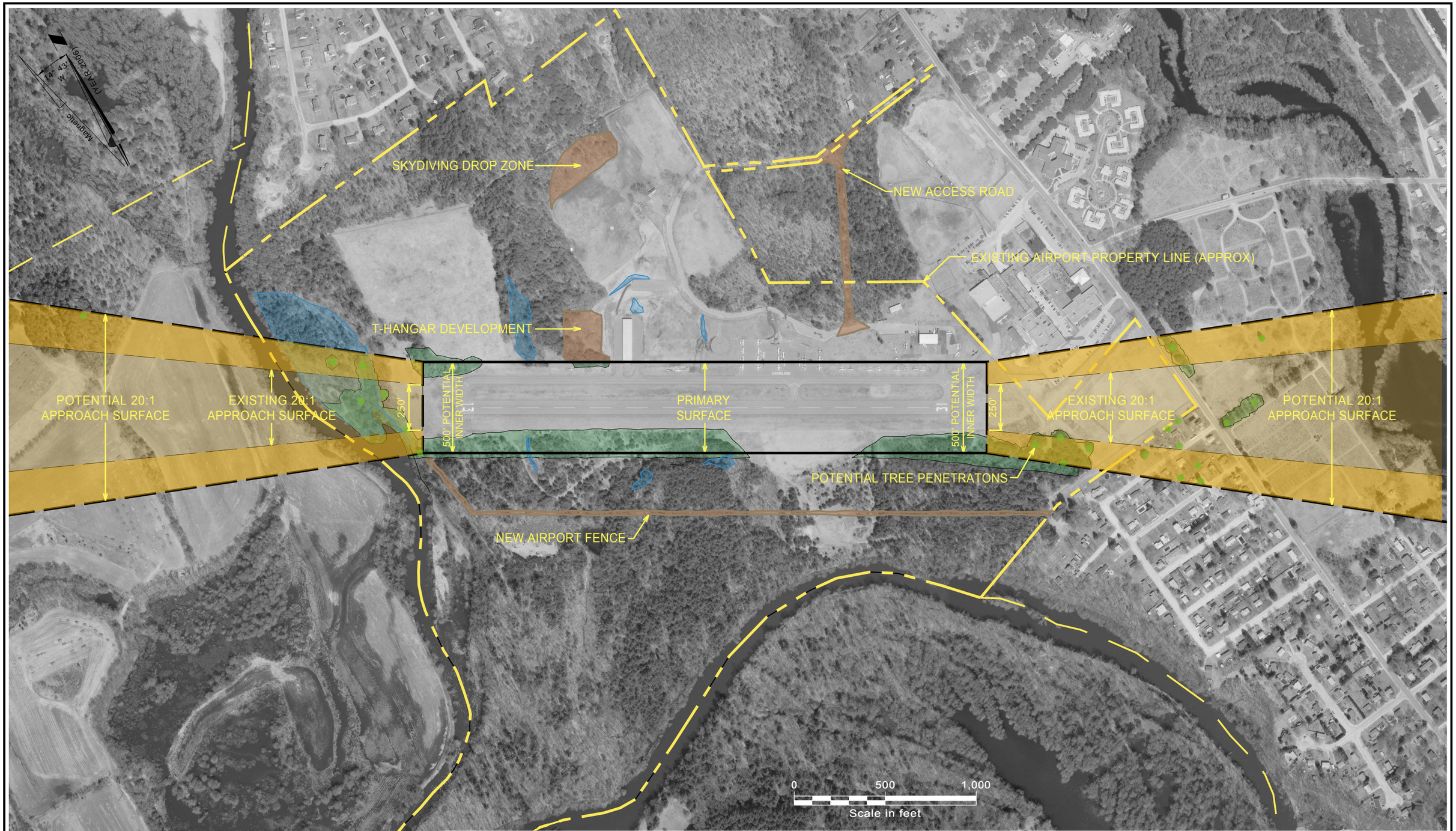
5.15 Socioeconomic and Environmental Justice Impacts

Socioeconomic impacts are typically defined by disruptions to surrounding communities, such as shifts in patterns of population movement and growth, changes in public service demands, loss of tax ratables, and changes in employment and economic activity stemming from airport development. These impacts may result from the closure of roads, increased traffic congestion, acquisition of business districts or neighborhoods, and/or by disproportionately affecting low income or minority populations. Environmental justice issues occur when a project impacts a low income or minority population at a higher level than other population segments. Children's environmental health and safety risks are associated with the pollution of air, food, water, recreational waters, soil, or products that a child is likely to be exposed to.

The recommended airport developments do not include projects that would have the potential for these types of broad impacts. Past FAA studies have identified that social and socioeconomic impacts are not normally significant unless substantial impacts are anticipated in other categories (e.g., noise or land use).

As part of the final recommendation for the RPZ area, voluntary acquisition of one home could be considered. However, as the acquisition would be entirely voluntary (i.e., at the discretion of the homeowner), and adequate compensation would be provided, social impacts would not be anticipated. If voluntary acquisition of the home is considered, the social impacts would be considered in an environmental study.

As described in Chapter 4, tree obstruction removal is recommended within the Federal Aviation Regulations (FAR) Part 77 Surfaces of Runway 13-31. ConnDOT is currently investigating this in a separate Vegetation Management Plan for all State owned airports. The recommendations of the Vegetation Management Plan for Danielson Airport will ultimately be incorporated into the Airport Master Plan. In general, tree obstruction removal is required both on and off the airport property, as illustrated on Figure 5-4. Avigation easements would be required for tree obstruction removal on non-airport properties. Any tree removal within wetland areas would be conducted during frozen ground conditions (typically during the months of January and February), with proper access and safeguards to prevent disturbance to the wetlands.



DELINEATED WETLANDS

TREE REMOVAL WITHIN FAR PART 77 IMAGINARY SURFACES

TREE REMOVAL FOR RECOMMENDED DEVELOPMENTS

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POTENTIAL TREE REMOVAL AREAS

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FIGURE 5-4

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5.16 Water Quality

Airport activities that can potentially impact surface and ground water include aircraft fueling, fuel storage, and aircraft maintenance. The addition of pavement (i.e. impervious surface) can also impact water quality at airports.

Surface water features in the vicinity of Danielson Airport include the Quinebaug River on the western and southern sides and the Five Mile River on the eastern side. The ConnDEP Aquifer Protection Program has determined that there are no State Identified Aquifer Protection Areas in the project area.

As described in Section 1.10 of the State of Connecticut Department of Transportation, *Standard Specifications for Roads, Bridges and Incidental Construction, Form 816*, the construction specifications for the recommended projects at Danielson Airport would incorporate the appropriate "Best Management Practices" for the control of erosion, sedimentation, and stormwater runoff. The recommended projects would also be developed in conformance with the 2004 Connecticut Stormwater Quality Manual, and would therefore include proper Erosion and Sediment Control plans.

During the design of various roadway, parking, and hangar projects, ConnDEP encourages the utilization of one, or a combination of, the following Low Impact Development (LID) measures to address stormwater quality issues:

- The use of pervious pavement (which is very compatible for parking lot applications), or impervious pavement without curbs, to promote sheet flow or stormwater runoff.
- The use of vegetated swales, tree box filters, and/or infiltration islands to infiltrate and treat stormwater runoff (from building roofs and parking lots).
- The minimization of access road widths and parking lot areas to the maximum extent possible to reduce the area of impervious surface.
- If soil conditions permit, the use of dry wells to manager runoff from building roofs.
- The installation of rainwater harvesting systems to capture stormwater from building roofs for the purpose of reuse for irrigation.

An environmental study would identify the total acreage of new pavement at Danielson Airport and the potential water quality impacts associated with the impervious surface. Subsequently, with the required permits and standard safeguards, the recommended development at Danielson Airport should not result in significant impacts to water quality.

5.17 Wetlands

A wetland delineation was conducted in June 2006 on portions of the airport property with the potential to be considered for future development; other wetlands may exist elsewhere on the airport property. The delineation was based on the U.S. Army Corps of Engineers' (ACOE) 1987 Wetland Delineation Manual and State of Connecticut wetlands (soils) definition. The functions and values assessment was conducted according to the methodology described in the U.S. Army Corps of Engineers (USACOE) New England Division publication entitled, "*The Highway Methodology Workbook Supplement: Wetland Functions and Values – A Descriptive Approach*" (November, 1995).

Wetland #4

Wetland #6

The wetland delineation identified eight (8) distinct wetlands and one (1) intermittent watercourse at Danielson Airport. As illustrated on Figure 5-3, the wetlands were identified primarily around the western half of the runway. Table 5-1 summarizes the size, type, and functions of the identified wetlands, as well as potential impacts from the recommended developments.

TABLE 5-1 – SUMMARY OF WETLANDS

ID	Type	Functions and Values	Approx. Size (Acre)	Potential Impacts (Acre)	
				Filling	Tree Removal
1	Forested	wildlife use; sediment/toxicant retention	0.3	0	0
2	Emergent	groundwater discharge; wildlife use; sediment/toxicant retention	2.0	0	0
3	Emergent / Scrub Shrub	minimal wildlife use and shoreline stabilization	0.1	0.05	0
4	Forested	wildlife use; shoreline stabilization; fish & wildlife habitat	2.0	0	1.0
5	Forested	flood flow alteration; groundwater discharge; limited wildlife cover/use	2.0	0	0
6	Emergent	ground water recharge/ discharge, flood flow alteration, wildlife habitat	0.5	0	0
7	Emergent	flood flow alteration, wildlife habitat	0.1	0	0
8	Emergent	flood flow alteration, wildlife habitat	0.3	0	0
Total			**7.3**	**0.05**	**1.0**

The planning process included avoiding direct filling and impacts to wetland areas at Danielson Airport. For safety purposes, selective tree removal is recommended within Wetland # 4. To minimize disturbance to this wetland, the trees would be cut using non mechanized methods during frozen ground conditions. Prior to tree cutting activities, the crew would receive instructions regarding proper access to the tree removal site (via uplands) and directions that cut trees should not fall into the wetland area. Prior to any tree removal activities, the USACOE and IWRD should be contacted regarding permitting requirements.

Overall, for each of the recommended projects, wetland impacts and permitting requirements should be reviewed as part of a separate environmental study.

5.18 Wild and Scenic Rivers

The Quinebaug River is a part of the Quinebaug and Shetucket Rivers Valley National Heritage Corridor, and flows along the western and southern boundaries of Danielson Airport. The Nationwide Rivers Inventory (NRI) database of the National Park Service has an inventory of rivers that are eligible for the designation of Wild and Scenic River. Per the database, the Quinebaug River section from Aspinook Pond to Wauregan is eligible for the federal designation of Wild and Scenic River, but the section near the Airport is not eligible for this designation.

Since none of the recommended developments are proposed near or along the Quinebaug River, no significant impacts to Wild and Scenic Rivers would be anticipated.

6.0 RECOMMENDED PLAN

This chapter presents the Airport Capital Improvement Plan (ACIP) and Airport Layout Plan (ALP) that is associated with the recommended developments at Danielson Airport. The ACIP provides a financial plan for the recommended projects for the 20-year planning period. The ALP illustrates the recommended future airport layout, and serves as the official development plan for the Airport.

6.1 Summary of the Recommended Plan

Chapter 4 presented the overall recommended airport development plan for Danielson Airport. The plan contains recommendations for airfield and landside development, which have been organized into three implementation phases. The recommendations include the following:

Phase I (0 to 5 years)

1A - Tree obstruction removal from runway approach surfaces
1B - Airport perimeter fencing and emergency access gate through high school
1C - Paved airfield service road and reconfigured roadway to T-hangars
1D - Fuel farm/fuel truck parking pad
1E - Runway End Identifier Lights (beyond Runway 13) and Precision Approach Path Indicators (both runway ends)
1F - GPS instrument approach (for Runway 13) and non-precision runway markings
1G - Exit taxiway development near existing T-hangars
1H - Tree clearing/grubbing for skydiving drop zone
1I - T-hangar development east of existing T-hangars
1J - Rehabilitation of existing Airport Road and parking areas

Phase II (6 to 10 years)

2A - Rehabilitation of existing paved Tiedown Apron
2B - Paved tiedown apron development adjacent to existing paved Tiedown Apron
2C - Conventional hangar development west of the FBO hangar

Phase III (11 to 20 years)

3A - Rehabilitation of existing runway
3B - Rehabilitation of existing taxiway
3C - Airport Road reconfiguration
3D - T-hangar development west of existing T-hangars
3E - Conventional hangar development north of the FBO hangar

6.2 Airport Capital Improvement Plan

The ACIP lists the recommended projects and associated cost estimates for the 20-year planning period. Grant-eligible projects at Danielson Airport may receive 95 percent federal funding, with ConnDOT responsible for the remaining 5 percent share.[1] Grant-eligible capital projects include planning and environmental studies, runway and taxiway development and rehabilitation, airport lighting, security enhancements, aircraft parking aprons, access roads, obstruction removal, land acquisition, and navigational aids.

Projects that are ineligible for funding include those that generate revenue and do not directly benefit the general public, such as hangars, fuel farms, and office buildings. A private entity or developer, such as a fixed base operator (FBO) or other corporation, may fund and construct grant-ineligible projects under a lease agreement with ConnDOT. In some cases, ConnDOT may fund the total cost of an ineligible project, or an eligible project with a lower FAA priority (e.g., new airport access road).

In addition to the potential new airport developments, the Airport must also continually rehabilitate existing airfield facilities (e.g., pavement rehabilitation typically occurs every 20 years). As such, the ACIP includes these additional items. Although these items are not considered new capital developments, the associated costs can comprise the majority of an airport's annual capital investment.

Note that the ACIP does not constitute a commitment on behalf of the FAA or ConnDOT to fund any of the projects. In addition, the ACIP does not imply that the projects would receive environmental approvals. Thus, the ACIP serves as a planning document that must remain flexible. The ACIP should undergo regular updates as project priorities and demands indicate.

Table 6-1 provides the 20-year ACIP for Danielson Airport, organized into the following three phases:

- Phase I (0 to 5 years)
- Phase II (6 to 10 years)
- Phase III (11 to 20 years)

[1] FAA funding participation has ranged between 90 to 95% of the total project cost in recent years. The FAA's future funding participation is anticipated to be either 90 or 95%.

TABLE 6-1 – AIRPORT CAPITAL IMPROVEMENT PLAN				
Project	**Total Estimated Cost**	**Anticipated Funding Source**		
		FAA	**State**	**Private**
Phase I (0 to 5 years)				
1A - Tree obstruction removal	$250,000	$237,500	$12,500	
1B - Airport fencing and emergency gate	$300,000	$285,000	$15,000	
1C - Paved airfield service road	$125,000	$118,750	$6,250	
1D - Fuel farm/fuel truck parking pad	Undetermined	Undetermined		
1E - REILs and PAPIs	$150,000	$142,500	$7,500	
1F - GPS approach, upgrade runway markings	$75,000	$71,250	$3,750	
1G - Exit taxiway development	$100,000	$95,000	$5,000	
1H - Tree clearing for skydiving drop zone	$50,000			$50,000
1J - T-hangar development (east)	$1,100,000			$1,100,000
1K - Rehab Airport Road and parking areas	$150,000	$142,500	$7,500	
Phase I Subtotal	**$2,300,000**	**$1,092,500**	**$57,500**	**$1,150,000**
Phase II (6 to 10 years)				
2A - Rehab existing Paved Tiedown Apron	$250,000	$237,500	$12,500	
2B - Paved tiedown apron development	$1,400,000	$1,330,000	$70,000	
2C - Conventional hangar development (west)	$750,000			$750,000
Phase II Subtotal	**$2,400,000**	**$1,567,500**	**$82,500**	**$750,000**
Phase III (11 to 20 years)				
3A - Rehabilitation of existing runway	$1,000,000	$950,000	$50,000	
3B - Rehabilitation of existing taxiway	$500,000	$475,000	$25,000	
3C - Airport Road reconfiguration	$275,000	$475,000	$25,000	
3D - T-hangar development (west)	$2,200,000			$2,200,000
3E - Conventional hangar development (north)	$800,000			$800,000
Phase II Subtotal	**$4,775,000**	**$1,686,250**	**$88,750**	**$3,000,000**
GRAND TOTAL	**$9,475,000**	**$4,346,250**	**$228,750**	**$4,900,000**

6.3 Airport Layout Plan

The ALP drawings illustrate all development projects identified for Danielson Airport throughout the 20-year planning horizon. Upon approval by ConnDOT and the FAA, the ALP becomes the official development document for the Airport. The FAA requires that all new airport facilities be consistent with the ALP. As such, keeping the drawings accurate and up to date is a high priority. FAA policy now requires that the ALP be updated at least every five years.

Although the ALP is the only drawing that is signed by the FAA, it is part of a larger drawing set that includes the sheets listed below. These ALP drawings can be found in Appendix D.

DRAWING INDEX		
Sheet No.	**Sheet Title**	**Drawing No.**
	Cover Sheet & Drawing Index	---
1	Existing Airport Layout	ALP-1
2	Airport Layout Plan	ALP-2
3	Inner Approach Surface Drawing - Runway 18-36	ALP-3
4	Airport Airspace Plan	ALP-4
5	Land Use Plan	ALP-5
6	Property Plan	ALP-6

6.3.1 Existing and Proposed Airport Layout Plan

The first sheet of the drawing set (ALP-1) illustrates the existing airport layout. This sheet depicts the Airport as it exists today. The drawing identifies key FAA airfield design standards (e.g., Runway Safety Areas, Object Free Areas, Runway Protection Zones) and illustrates existing landside facilities. Key information, such as runway end elevations and runway-taxiway offsets, is also illustrated on ALP-1.

The proposed ALP (ALP-2) includes all features of ALP-1, and illustrates each recommended facility for Danielson Airport. Several offices within the FAA review this drawing for consistency with airport design standards, flight procedures, surrounding airspace, and environmental requirements. Approval of ALP-2 represents the acceptance of the general location of future facilities. However, prior to the development phase of each project, ConnDOT is required to submit the final locations, heights, and exterior finish of each proposed structure for approval. ALP approval does not represent environmental clearance under the National Environmental Policy Act (NEPA) or Connecticut Environmental Policy Act (CEPA), or compliance with permit requirements. Such approvals must be obtained prior to development, and are not part of the ALP process.

It is also noted that ALP approval does not represent a commitment on behalf of ConnDOT, the FAA, or others to fund or pursue the projects depicted. Rather, the Master Plan and associated ALP represent the first products of the planning and development process, and are intended to depict a broad and long-range view of the potential improvements to the Airport.

The ALP drawings were prepared in accordance with FAA design standards for Airport Reference Code (ARC) B-I. Aircraft within ARC B-I include the Piper Saratoga and Cessna Skyhawk.

The following publications were used during the drawing preparation:

- FAA Advisory Circular 150/5300-13, *Airport Design*
- FAA Advisory Circular 150/5070-6B, *Airport Master Plans*
- Federal Aviation Regulations, Part 77, *Objects Affecting Navigable Airspace*

The major proposed facilities on the ALP include tree obstruction removal, a service road, fencing improvements, lighting and instrumentation upgrades, and apron and hangar development. Rehabilitation and maintenance of existing paved areas is also incorporated into the ACIP. No extension of the paved runway is included on the ALP.

Runway End Identifier Lights (REILs) are currently installed on the Runway 31 end. REILs are recommended for Runway 13 to provide enhanced visibility of the runway end. Danielson Airport does not currently provide vertical guidance equipment for either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) conditions. Precision Approach Path Indicators (PAPIs) are recommended for each runway end to provide vertical approach guidance during VFR conditions. For improved approach capability during IFR conditions, a GPS non-precision instrument approach (IAP) is recommended for Runway end 13.[2] This would require an upgrade of the runway markings from visual to non-precision, as illustrated on ALP-2. Overall, with the implementation of the recommendations above, the approach capabilities of Danielson Airport would be substantially improved.

The Runway Protection Zone (RPZ) is a ground area that provides land use protections beneath the inner portion of each runway approach, thereby enhancing the protection of people and property on the ground. Since the design aircraft is forecast to remain under 12,500 pounds, the dimensions and locations of the RPZs at Danielson Airport will not change during the 20 year planning period, as listed in Table 6-2.

[2] According to weather data from Windham Airport, Runway 13 at Danielson Airport provides the best wind coverage for approaches during IFR conditions.

TABLE 6-2 – RUNWAY PROTECTION ZONE DIMENSIONS				
Runway End – Current	**Visibility Minimum**	**Inner Width**	**Outer Width**	**Length**
Runway 13 (Visual)	1-mile	250’	450’	1,000’
Runway 31 (Visual)	1-mile	250’	450’	1,000’
Runway End – Proposed	**Visibility Minimum**	**Inner Width**	**Outer Width**	**Length**
Runway 13 (GPS IAP)	1-mile	250’	450’	1,000’
Runway 31 (Visual)	1-mile	250’	450’	1,000’

6.3.2 Airport Airspace Plan

The next two sheets of the ALP Drawing Set (ALP-3 and 4) illustrate the airspace requirements associated with Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*. Part 77.23 identifies a series of geometric planes (i.e., imaginary surfaces) that extend outward and upward from an airport’s runways to define obstruction clearing requirements. These surfaces identify the maximum acceptable height of objects by defining three dimensional surfaces surrounding all sides of the airfield. When an object penetrates an imaginary surface, it is considered an airspace obstruction and may present a hazard to air navigation.

The height and dimensions of the imaginary surfaces are determined by the airfield elevation, design aircraft, and the type of approach to each runway end. The specific surfaces for OXC are described below.

Primary Surface: A surface longitudinally centered at the runway elevation extending 200 feet beyond each runway end. The width of the primary surface is 250 feet for the existing visual Runway 13-31 at Danielson Airport. The recommended non-precision GPS IAP to Runway 13 would increase the entire width of the primary surface to 500 feet. This is because the primary surface is defined as the largest width required by either runway end.

Horizontal Surface: A horizontal plane 150 feet above the airport elevation. As the elevation of Danielson Airport is 238 feet above mean sea level (AMSL), the horizontal surface is situated at 388 feet AMSL. The shape of the surface is created using radial arcs of 5,000 feet, from the ends of the primary surface, connected by lines tangent to the arcs.

Conical Surface: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1, for a horizontal distance of 4,000 feet. The elevation of the outer edge of the conical surface at Danielson Airport is 588 feet AMSL.

Approach Surface: Surfaces longitudinally centered on the extended runway centerlines, extending outward and upward from the ends of the primary surface. For Danielson Airport, the dimensions and slopes of the approach surfaces are listed in Table 6-3.

TABLE 6-3 – APPROACH SURFACE DIMENSIONS				
Runway End – Current	**Inner Width**	**Outer Width**	**Length**	**Slope**
Runway 13 (Visual)	250’	1,250’	5,000’	20:1
Runway 31 (Visual)	250’	1,250’	5,000’	20:1
Runway End – Proposed	**Inner Width**	**Outer Width**	**Length**	**Slope**
Runway 13 (GPS IAP)	500’	2,000’	5,000’	20:1
Runway 31 (Visual)	500’	2,000’	5,000’	20:1

Transitional Surface: Surfaces extending outward and upward at right angles from the sides of the primary and approach surfaces at a slope of 7 to 1. The transitional surfaces terminate at the overlying horizontal surface.

Objects that penetrate the runway imaginary surfaces are depicted on ALP-3 and ALP-4.

ALP-3, the Inner Approach Surface Plan and Profile Drawing, provides greater detail regarding the close-in airspace obstructions, particularly to the inner portions of each approach surface (also see Figure 5-4). For each obstruction, the height, penetration, ownership, and proposed action/disposition are indicated in the associated tables.

Several close-in trees penetrate the primary and transitional surfaces to the south of the runway. Removal of these trees, which are located on airport property, is recommended, as illustrated on ALP-3. Several trees also penetrate the recommended non-precision approach surface to Runway 13, most of which are located in a wetland area on the airport property. Sporadic groups of trees also penetrate the recommended approach surface to Runway 31. Removal of all tree obstructions is recommended. Any tree removal located off the airport property, such as those in the residential area along Maryland Street and in the adjacent cemetery, would require ConnDOT to obtain avigation easements from the property owner.

In addition to tree penetrations, there are also building and light pole penetrations in the recommended approach surface to Runway 31. To improve the safety of the approach, the buildings should be equipped with obstruction lighting and the light poles should be lowered or redesigned. Overall, all of the obstruction issues above should be addressed before a non-precision GPS instrument approach is pursued. As illustrated on ALP-3, the existing approaches to Runway 13-31 contain obstructions, and on and off airport tree removal is necessary.

ALP-4, Airport Airspace Plan, illustrates the overall dimensions of the Part 77 surfaces, and highlights penetrations to the outer surfaces. As shown, there are some limited penetrations to the outer portions of the imaginary surfaces.

6.3.3 Land Use Plan

Danielson Airport is located in the Town of Killingly, Windham County, Connecticut. As depicted on ALP-5, the Land Use Plan, the area surrounding Danielson Airport primarily

consists of open, wooded, residential, and institutional areas. A summary of nearby features is provided below.

- The Quinebaug River creates the western and southern borders of the airport property.
- Residential development is located immediately northwest and southeast of the airport property.
- The Harvard H. Ellis Technical High School is located immediately east of the airport property.
- Cemeteries, light industrial, and senior housing developments are located along Maple Road to the east.
- Large open and wooded areas provide a buffer between the airport property and surrounding areas (except to the east).

Danielson Airport is located on the eastern side of the Town of Killingly, along the border of the Town of Brooklyn. ALP-5 depicts the zoning districts in the adjacent towns, as well as the general land uses. ALP-5 also illustrates all of the property owned by ConnDOT.

As described in Chapter 4, the FAA recommends controlling the land immediately beyond the runway ends, within the RPZs, through easement or acquisition of the property. The existing RPZ beyond Runway 31 contains one home. Voluntary acquisition of the home should be considered for land use compatibility purposes. There are no homes located in the existing RPZ beyond Runway 13.

Land use compatibility is also related to airport noise exposure. The FAA uses a Day-Night Average Noise Level (DNL) of 65 dB as a threshold to determine if incompatible activities exist in the vicinity of an airport. DNL levels for existing and future conditions indicate a maximum noise level of DNL 60 dB at Danielson Airport. Thus, no incompatible land use impacts would be anticipated as a result of aircraft noise in the Town of Killingly. Since the existing and future airport noise levels are less than DNL 65 dB, the noise contours are not illustrated on ALP-5.

ALP-6 provides a more detailed Airport Property Map, including acquisition history. The primary purpose of this sheet is to provide information indicating how various tracts of airport property were acquired (i.e., federal programs, local funds only, etc.). The map identifies for the FAA the aeronautical use of properties acquired with federal funds.

Appendix A

AIRPORT USER & TRANSIENT PILOT QUESTIONNAIRES

Airport User Questionnaire

At the beginning of the study process, a questionnaire was mailed to approximately 145 Danielson Airport users, including based aircraft owners, airport businesses, and student pilots. The mailing list was provided to the study team by New England Flight Services (the Airport's fixed base operator). The primary purpose of the questionnaire was to provide Danielson Airport users with the opportunity to comment on desired facility improvements, as well as to collect information regarding the Airport's service area, based aircraft, operations, services, and sales. The questionnaire responses will be incorporated and referenced throughout the study process.

A questionnaire response rate of approximately 30 percent was achieved. The purpose of each question and general observations from the questionnaire responses are provided below.

1. What town and state do you reside in? Miles from 5B3 by car? (Note: 5B3 has since been changed to LZD)

Town, State_____
Miles from 5B3?_____

This question was intended to reflect service area characteristics. In general, the majority of Danielson Airport users reside in the state of Connecticut (81%), followed by Rhode Island (11%) and Massachusetts (8%). Some Danielson Airport users live as close as one mile away, while others live as far as 70 miles away. According to the questionnaire responses, Danielson Airport users live an average of 15 miles away (this is typical of a general aviation facility).

2. ***Please ✓ the type of aircraft you have based at 5B3 and how it is stored (if applicable):***

Aircraft Type	**Ownership**	**Storage Method**
___Single-engine piston	___Personally own	___Grass tiedown
___Twin-engine piston	___Rent/lease	___Paved tiedown
___Other (indicate below)	___Company owned/leased	___T-hangar
_____	$_____Estimated value	___Conventional hangar

This question was intended to reflect based aircraft characteristics. For based aircraft type, all of the questionnaire responses indicated single-engine piston, most of which were personally owned and stored on grass or paved tiedowns, with values ranging between $7,000 and $300,000. Very few questionnaire responses indicated T-hangar or conventional hangar as the based aircraft storage method (which typically store higher value aircraft than tiedowns), likely because of their limited availability at Danielson Airport.

3. Is your aircraft capable of GPS-based instrument approaches (✓ if applicable)?

___Yes ___No

This question was intended to determine the need for instrument approach capability. Danielson Airport does not currently provide an instrument approach on either runway end. Thirty-one percent (31%) of the questionnaire responses indicated yes to this question. As such, providing an instrument approach at Danielson Airport would be beneficial to current users.

4. Please indicate your approximate number of <u>annual</u> landings:

_____Landings at **5B3** on an annual basis
_____Landings at **other airports** on an annual basis

This question was intended to reflect how actively Danielson Airport users fly. The questionnaire responses indicated a total of approximately 3,000 annual landings (average of 95 per response) at Danielson Airport (including 1,000 annual landings by an airport business), and approximately 2,000 annual landings (average of 72 per response) at other airports (this is not indicative of total airport operations).

5. What airports do you most frequently fly to or from 5B3 (in rank order if applicable)?

1. **Windham (IJD)**
2. **Groton-New London (GON)**
3. **Block Island (BID)**
4. **Martha's Vineyard (MVY)**

This question was intended to identify common user destinations. The top four airports (destinations) are indicated above. These airports are all less than 65 nautical miles from Danielson Airport. Of all of the questionnaire responses, the furthest airport indicated is approximately 360 nautical miles from Danielson Airport.

6. Please indicate the following operational characteristics regarding your flying at 5B3 (approximate):

A.	Runway End	**75%** Runway 31	+	**25%** Runway 13	=	100%
B.	Time of Day	**98%** 7 AM to 10 PM	+	**2%** After 10 PM	=	100%
C.	Time of Week	**50%** Mon. to Fri.	+	**50%** Sat./Sun.	=	100%
D.	Local Operations	**74%** Local	+	**26%** Itinerant	=	100%
E.	Touch & Go Operations	**24%** Touch & Go	+	**76%** All Other	=	100%
F.	Instrument Operations	**4%** IFR*	+	**96%** VFR	=	100%

*During <u>actual</u> instrument conditions

This question was intended to reflect airport operational characteristics. The average percentages from the questionnaire responses are indicated above.

7. In the next 5 years, do you expect your use of 5B3 to increase (%), decrease (%), or stay the same (✓)?

___% Increase ___% Decrease ___Stay the same

This question was intended to provide information to use in the airport activity forecasts. None of the questionnaire responses indicated anticipated activity decrease at Danielson Airport. Most of the questionnaire responses (56%) indicated anticipated activity increase, with slightly

less (44%) indicating stay the same. The percent of activity increase indicated ranged from 10% to 200%.

8. Please indicate the amount of time (%) you fly for the following purposes (should total 100%):

23% Training	**13%** Personal transportation
11% Business	___% Other (indicate below)
53% Recreational	_____

This question was intended to reflect personal flying characteristics. The average percentages from the questionnaire responses are indicated above.

9. Please indicate the reasons you base your aircraft at 5B3 (in rank order of those that apply):

1 Proximity to home/office/passenger base	**2** FBO services
___Fuel price	___Runway length
___Availability of hangar space	___Runway pavement strength
___Hangar rental fee or ground lease rate	**4** Other (indicate below)
3 Availability of tiedown space	**Aircraft Maintenance**

This question was intended to reflect user attractions to Danielson Airport. The top four user attractions to Danielson Airport from the questionnaire responses are indicated above.

10. Please indicate the estimated annual value of services you purchase at 5B3:

$50,000 Fuel	**$23,000** Flight training
$35,000 Aircraft maintenance	**$1,600** Pilot supplies
$13,000 Hangar/tiedown	$_____Other:_____
$44,000 Aircraft rental	**$166,600 TOTAL (approximately $4,500 per response)**

This question was intended to reflect the estimated annual value of purchases. The total values from the questionnaire responses are indicated above (this is not indicative of total annual purchases).

11. What do you believe to be the most needed facility improvements at 5B3 (in rank order)?

This question was intended to identify needed facility improvements. The top 10 questionnaire responses are indicated below (in rank order).

1. *Improve/expand FBO facilities (pilot's lounge, restrooms, additional services)*
2. *Additional hangars (T-hangars and conventional hangars) and tiedowns*
3. *Extend runway to 3,200 feet*
4. *Restaurant/cafe/coffee*
5. *VASI or PAPI for Runway 31*
6. *Self-service fuel*
7. *GPS precision instrument approach*
8. *Tree clearing*
9. *Weather reporting system (AWOS/ASOS)*

10. Turf runway

12. Please list any positive or negative factors/issues associated with operation at 5B3, or any other comments:

_____
_____
_____

This question was intended to generate user feedback. Nearly all of the questionnaire responses indicated excellent FBO services and location (as positive factors). A few questionnaire responses indicated expensive fuel price (as a negative factor).

13. Respondent information (optional):

Name_____ Telephone_____
Address _____ Email_____

___ ✓if you would like to be added to the study email list

This question was intended to provide respondents with the opportunity to join the study email list. Forty-six percent (46%) of the respondents joined. Periodic emails will be sent throughout the study process (typically to announce meetings). Individuals can also join the study email list and submit comments through www.DanielsonAirportPlan.com.

Transient Pilot Questionnaire

Transient operations are those conducted by non-based aircraft or pilots. The transient pilot questionnaire was administered by New England Flight Services (the Airport's fixed base operator), and was intended to provide general observations about Danielson Airport's transient operations. Transient pilots were requested to complete and submit the questionnaire while visiting the Airport in early-2006. The questions were similar to those of the Airport User Questionnaire (see above), as were the responses. Differences worth noting include:

1. For aircraft type, two of the questionnaire responses indicated twin-engine piston aircraft
2. Flying for recreational purposes was the most common questionnaire response indicated, followed by business purposes
3. Several of the questionnaire responses indicated Remote Communications Outlet (RCO) as a needed facility improvement. At non-towered airports, a RCO provides a radio link to regional air traffic personnel. It would allow aircraft on the ground at 5B3 to communicate with regional air traffic personnel in Providence without interference.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

March 10, 2006

Reference:	Project	Location
	Antenna co-location	Providence, RI, CHA # 10585.2008.1106
	Airport improvements	Killingly, CT, CHA # 14002

John Greaves
Michael Kotlow
Clough Harbour & Associates LLP
111 Winners Circle
P.O. Box 5269
Albany, NY 12205-0269

Dear Messrs. Greaves and Kotlow:

This responds to your recent correspondence requesting information on the presence of federally-listed and/or proposed endangered or threatened species in relation to the proposed activity(ies) referenced above.

Based on information currently available to us, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes our review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

Connecticut Commission on Culture & Tourism

Historic Preservation & Museum Division

59 South Prospect Street
Hartford, Connecticut
06106

(v) 860.566.3005
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October 25, 2007

CORRESPONDENCE
Project # 14002

Ms. Asmita Tiwari
Clough Harbour & Associates
111 Winners Circle
PO Box 5629
Albany, NY 12205-0269

Subject: Danielson Airport Master Plan
Killingly, CT
CHA #14002

Dear Ms Tiwari:

The State Historic Preservation Office has reviewed the above-named project. This office notes that the project area possesses moderate to high sensitivity for prehistoric and historic archaeological resources. Therefore, we recommend that a professional reconnaissance survey be undertaken to identify and evaluate archaeological resources which may exist within proposed project limits, including, equipment storage and associated work areas. All archaeological studies must be undertaken in accordance with our *Environmental Review Primer for Connecticut's Archaeological Resources.* A list of archaeological consultants is enclosed for your information.

No ground disturbance or construction-related activities should be initiated until this office has had an opportunity to review and comment upon the recommended archaeological survey report.

We anticipate working with all interested parties in the expeditious furtherance of the proposed undertaking as well as in the professional management of Connecticut's archaeological heritage.

For further information please contact Dr. David A. Poirier, Staff Archaeologist.

Sincerely,

Karen Senich
Deputy State Historic Preservation Officer

cc: Dr. Nicholas Bellantoni/OSA
Ms. Cynthia Holden/ConnDOT

RECEIVED
NOV 1 5 2007
Clough, Harbour & Associates

Appendix C

AIRPORT ECONOMIC IMPACT

Introduction

Airports, by their nature, can be viewed as an economic asset to the community they serve. They offer employment to area residents and enhance business opportunities for entities engaged in aviation-oriented activities, such as maintenance and repair of aircraft, fuel sales, flight training, and air charter services. A community's airport serves as a portal for access to the national air transportation system, providing support for personal and business travel, both to local residents and visitors. Airport businesses can also serve the community by providing a convenient location to receive and send shipments of goods. In sum, airports serve as gateways for economic activity, providing a stimulus for business enterprises and generating employment opportunities for area residents.

By documenting the economic benefit and contributions of an airport, the local community can better understand the airport's importance, role, and need for continued operation. For some, an airport is viewed as a recreational facility that is used by relatively few persons. However, a broader perspective is more appropriate since airports provide services that affect all citizens of a community, either directly or indirectly. Airports serve as a public transportation facility, as well as attract commerce. In summary, an airport enables such activities as:

- Logistic support for equipment, supplies, and personnel
- Emergency disaster response support and critical medical transportation
- Shipment of time-sensitive items
- Pilot training and aircraft rentals
- Aircraft maintenance and storage
- Access to the national air transportation system

The importance of air transportation and small general aviation airports, particularly in rural communities, should be considered a vital asset and a positive feature for economic development initiatives. Although limited in volume, the ability to make just-in-time deliveries and to dispatch sales and customer service staff to locations not served by commercial air service transportation makes the smaller general aviation airports even more important to the community and are increasingly viewed as a critical business advantage. Danielson Airport provides support for all of the above purposes, and additionally generates a positive economic impact in terms of employment and purchases of goods and services from local businesses. In general, the local community served by Danielson Airport includes Windham County (along the Interstate 395 corridor), as reflected by the geographic distribution of the based aircraft owners and airport users.

Methodology

The generally accepted methodology for determining the economic impact of an airport includes the measurement of three types of activity: direct, indirect, and induced. The combination of the three measures equates into the airport's total economic impact or "benefit."

Direct economic impacts are defined as the employment and revenues generated by businesses located at an airport (i.e., those which are dependent on access to the facility). The expenditures by these businesses for local goods, services, and capital improvements are also included considered direct economic impacts.

Indirect economic impacts include the jobs and revenues generated by off-airport businesses located in the community, attributable to their relationship, support, or use of the airport. This includes any sector of the local economy that serves users of the airport, or that uses the airport to transport goods, supplies, or personnel in order to enhance business opportunities and activities. Like on-airport businesses, these enterprises employ staff, purchase locally produced goods and services, and invest in capital projects. Businesses in this category have activity associated with the airport or aviation, and can include hotels, restaurants, manufacturers, shippers, and retail stores. When assessing economic impact values, distinction is made between those generated as a result of the airport (direct) and those serving other segments of the local economy (indirect).

Induced economic impacts are those generated in a community caused by the recycling of spending from both the direct and indirect economic impacts. Airport businesses, users, employees, and the airport itself are, in essence, consumers whose expenditures support other businesses and employment in the community. Studies have indicated that a dollar spent in a region will create at least another dollar of income in that region. This activity is commonly referred to as the "multiplier effect." Thus, the induced economic impact of any activity is at least equal to the sum of the direct and indirect impacts, in terms of dollars.

Finally, the total economic impact is defined as the sum of the direct, indirect and induced impacts. For example, if an airport generates $60 in direct impact, $40 in indirect impact, and has a 2.0 multiplier to account for the induced impact, then the total economic impact would be $200 (i.e., ($60 + $40) * 2.0 = $200).

As an airport's business activity level changes over time, the total economic impact will similarly change. Continued improvement of an airport may serve to attract more activity and result in an increased economic impact value to the communities served.

Airport User Survey

As previously discussed in Appendix A, *Airport User & Transient Pilot Questionnaires*, a questionnaire was distributed to approximately 145 Danielson Airport users, including based aircraft owners, the airport businesses, and area pilots. The survey included questions regarding

the estimated annual value of goods and services purchased at the Airport. There were 37 responses to the survey (25% response rate). The aggregated results from specific questions related to economic activity are presented in Table C-1.

TABLE C-1 – DANIELSON AIRPORT USER SURVEY		
Item	**Aggregate Total**	**Average (37)**
Fuel	$49,800	$1,346
Maintenance	$34,600	$935
Hangar/Tiedown	$12,900	$349
Aircraft Rental	$44,200	$1,195
Flight Training	$23,200	$627
Pilot Supplies	$1,600	$43
Total	**$166,300**	**$4,495**
Source: Danielson Airport User Survey, 2006		

The results of the airport user survey indicate that on average, respondents annually spent about $4,500 on airport services. Fuel sales and aircraft rentals were the top two items specified by the users. Assuming that 80 percent of the 145 users spend $4,500 annually, it can be estimated that Danielson Airport generates over $522,000 in annual purchases of goods and services. Considering the busy flight instruction and skydiving businesses at the Airport, this provides a reasonable estimation for an airport of this size and character.

Airport Business Tenant Survey

A detailed economic survey of the three business-oriented tenants at Danielson Airport was also conducted. This survey requested information concerning expenditures for full and part-time employment, salaries and wages, purchases of local (off-airport) goods and services, and capital investments to support their operations in calendar year 2006. While the individual survey results are to be kept confidential, aggregate totals were identified to assess the direct economic impact of these entities, as described below.

Employment

The respondents indicated that there are 13 full-time and 10 part-time employees at Danielson Airport with a total annual payroll of $144,000. Assuming that 2.5 part-time employees equal one full-time employee, a total of 17 jobs are generated by the Airport. Using the survey results, this assumption leads to approximately $8,500 per full-time employee and $3,400 per part-time employee. Applying a figure of $20,000 (based roughly on the 2004 per capita income) to the 17

equivalent full-time employees yields a total estimated income of $340,000.[1] This factor is also assumed to include payments by the Connecticut Department of Transportation (owner of Danielson Airport) for annual maintenance services by local contractors, as well as other payroll costs that were unaccounted for by the survey.

Local Goods & Services

Airport businesses reported that a total of $338,000 was spent on local good and services in 2006 and that they expect $357,500 in expenses in 2007. These consist of business purchases by the airport tenants.

Economic Impact Analysis

Direct Impacts

Direct impacts are the sum of economic activity by airport users, the salaries and wages paid to full-time and part-time employees by the airport tenants, and their expenditures for local goods and services along with capital investments. Using the data from the surveys of airport users and business tenants, the calculated direct economic impact totaled $1.2 million in 2006.

Indirect Impacts

Indirect impacts were derived from the estimated number of itinerant aircraft arrivals made by visiting (i.e., transient) aircraft. Using one-half of the interpolated 6,340 itinerant operations for 2006 (from the activity forecasts in Chapter 2), there were 3,170 annual itinerant arrivals. Assuming that only 25 percent of those operations were conducted by visitors (as opposed to based tenants), there would have been approximately 800 visiting itinerant arrivals. Light single and twin-engine propeller-driven aircraft account for almost all of the itinerant operations and carry an average of two persons, including the pilot. Using the assumption that each visitor, including the pilot, spent $25 daily off-airport while in the local area (for two consecutive days), the associated total indirect expenditure was limited, amounting to only $80,000 annual indirect impact in 2006.

It should be noted that additional indirect economic impacts are generated from off-airport businesses that occasionally use the Airport for the shipment of goods and transportation of personnel. However, this portion of the indirect benefit was not quantified.

Induced Impacts

The multiplier effect or the induced economic impact for Danielson Airport was assumed to equal the sum of the direct and indirect impacts. Using this assumption, the induced economic impact of the Airport is $1,280,000 in 2006.

[1] The per capita income was $19,779 and the median household income was $41,087 (US Census Data, 2004),

Total Economic Impact

For year 2006, the total annual estimated economic impact of the Danielson Airport based on the survey responses and aforementioned assumptions is presented in Table C-2.

TABLE C-2 – DANIELSON AIRPORT ECONOMIC IMPACT	
Item	**Aggregate Total**
Direct Impact	$1,200,000
Indirect Impact	$80,000
Induced Impact	$1,280,000
Total	**$2,560,000**
Source: Danielson Airport User Survey, 2006	

Other Direct Community Benefits

The Town of Killingly directly collects a small amount of revenue from the Danielson Airport in the form of property taxes and aircraft registration fees. Table C-3 presents the direct revenues the Town collected from the presence of the Airport within its jurisdictional boundaries for 2004, 2005, and 2006.

TABLE C-3 – AIRPORT TAX & REGISTRATION REVENUES			
Item	**2004**	**2005**	**2006**
Property Tax	$242	$270	$112
Aircraft Registration Fees	$4,980	$5,000	$3,920
Total	**$5,222**	**$5,270**	**$4,032**
Source: Town of Killingly, CT			

Non-Economic Benefits

It should be noted that Danielson Airport also provides many non-economic benefits, such as emergency transportation access for medical and emergency response personnel and equipment, pilot training, and the community's access to the national air transportation system. Users of the Airport can include recreational flyers, corporate flyers, charters, and military, public safety, and government operators.

In fact, Danielson Airport provides a base and command center for the Danielson Squadron of the Civil Air Patrol (CAP), an all volunteer organization with approximately 30 active members.

The CAP's function is to provide emergency services to State and Federal agencies and other private organizations. The CAP also provides aerospace education and cadet programs.

Danielson Airport also provides invaluable recreational opportunities for both the flying and non-flying public. The Airport is home to a glider club, skydiving business, and flight instruction school, as well as several locally-owned recreational aircraft. One of the large fields (away from the airfield) is used by a local soccer club as an occasional practice facility. These types of recreational opportunities, and the Danielson Squadron of the CAP, should be viewed equally, if not greater to, the quantitative analysis of the Airport's economic impact.

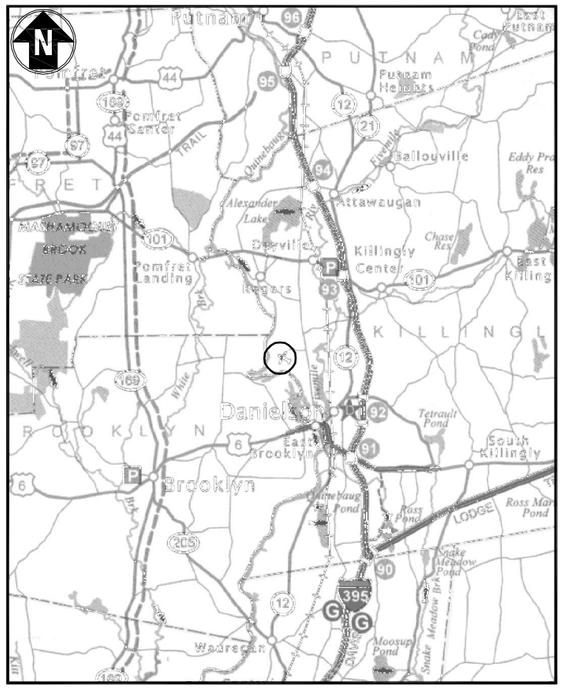
Summary

Airports the size and character of Danielson do not generally provide the substantial economic impact generated by the larger general aviation and commercial services airports. However, as the community's link to the national air transportation system and a source of invaluable recreational opportunities, the Airport should continue to be viewed as a valuable asset for providing an aviation gateway for both local residents and visitors to the region. As a base for two successful businesses with several full-time and part-time employees, Danielson Airport not only sustains businesses, it is also an attractor of economic activity, generating an annual economic impact of approximately $2.5 million. These are among the many intangible benefits of supporting an airport facility to serve the air transportation needs, in addition to the existing and potential economic vitality, of the community.

FINAL AIRPORT LAYOUT PLAN

for the

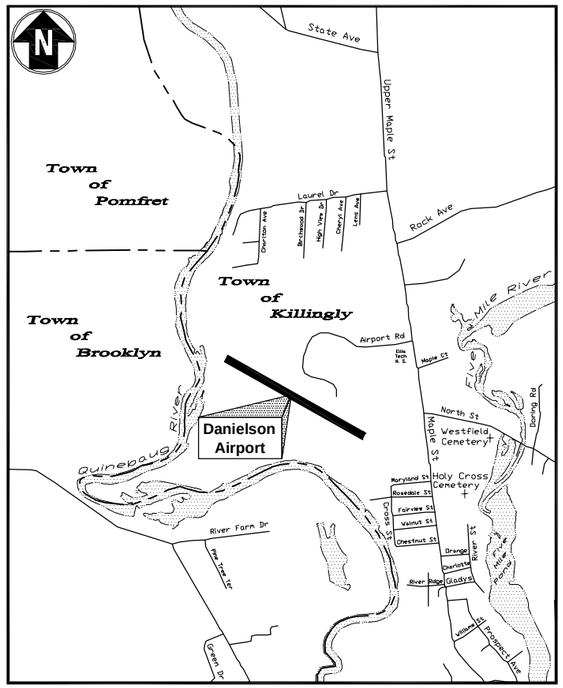
DANIELSON AIRPORT (LZD)



Vicinity Map

F.A.A. Project No. 3-09-0007-06-2005
STATE Project No. 68-204

Drawing Index		
Sheet No	Drawing	Title
–	T-1	TITLE SHEET
1	ALP-1	EXISTING AIRPORT LAYOYT PLAN
2	ALP-2	AIRPORT LAYOUT PLAN
3	ALP-3	INNER APPROACH SURFACE DRAWING
4	ALP-4	AIRSPACE DRAWING
5	ALP-5	LAND USE PLAN
6	ALP-6	PROPERTY PLAN



Project Location Map

Windham County
Town of Killingly, Connecticut

No.	Submittal / Revision	App'd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

CHA
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Designed: P.O.M. | Drawn: P.M. | Checked: M.K.

DANIELSON AIRPORT
AIRPORT LAYOUT PLAN

TITLE SHEET

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

T-1

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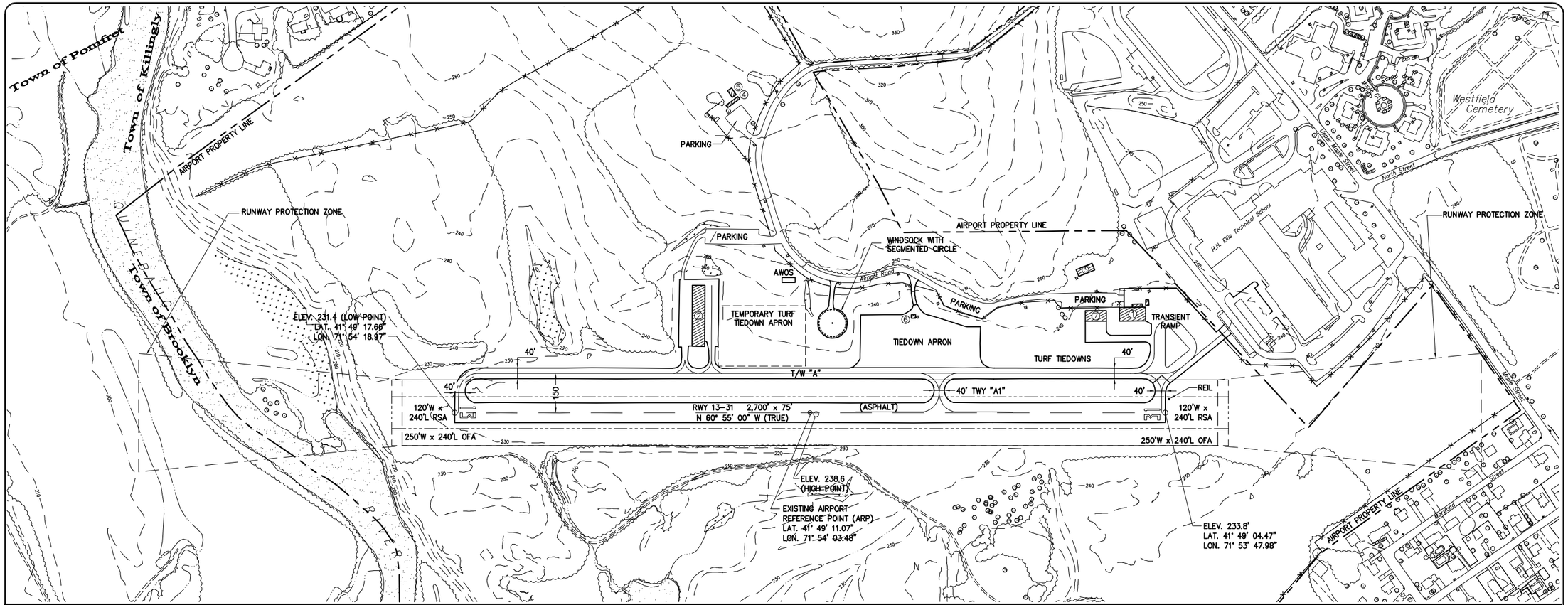


NOTES:

1. All positional data references North American Datum of 1983 (NAD 83).
2. Ground contour interval: 10 feet.

RUNWAY DATA TABLE

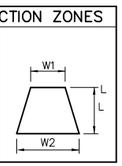
RUNWAY DATA	Runway 13/31 Existing
Effective Gradient (%)	0.3%
Wind Coverage (%)	94.3%
Max. Elevation (MSL)	238.6'
Runway Length	2,700'
Runway Width	75'
Displaced Threshold	N/A
Usable Runway Length	2,700'
Surface Type	Asphalt
Pavement Strength	(Single Wheel) 29,000 lbs
Approach Surface Slope	Rwy 13: 20:1 Rwy 31: 20:1
Approach Minimums	1–Mile
Visual Approach Aids	REIL
Instrument Approach Aids	VOR–A
Runway Lighting	MIRL
Runway Marking	Basic
Airport Reference Code (ARC)	B–I
Design Aircraft	Piper Navajo
Runway Object Free Area (ROFA)	Length Beyond Runway: 240' Width: 250'
Runway Safety Area (RSA)	Length Beyond Runway: 240' Width: 120'
FAR Part 77 Category	Visual
Runway End Coordinates (NAD 83)	Rwy 13: Lat. 41° 49' 17.66" Lon. 71° 54' 18.97" Rwy 31: Lat. 41° 49' 04.47" Lon. 71° 53' 47.98"
Runway End Elevations (MSL)	Rwy 13: 231.4' Rwy 31: 233.8'

RUNWAY PROTECTION ZONES

Existing RPZ

Runway 13/31

W1	L	W2
250'	1,000'	450'
250'	1,000'	450'



LEGEND

Existing	Description
	Runway Centerline
	Runway Safety Area (RSA)
	Runway Object Free Area (ROFA)
	Runway Protection Zone (RPZ)
	Building Restriction Line (BRL)
	Airport Pavement
⊕	Airport Reference Point
①	Airport Buildings/Building No.
	Other Buildings
	Airport Property Line
	Other Property Lines
	Fence
	Roads/Pavement
	Tree line
	Wetlands
	Stream/River/Body of Water
100	Ground Elevation Contours

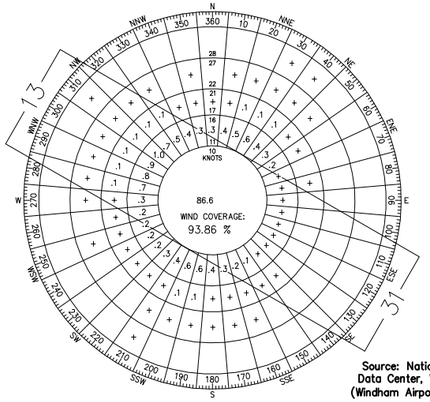
Note: Some Features In The Legend May Not Have Been Used

NAVAIDS AND VISUAL AIDS

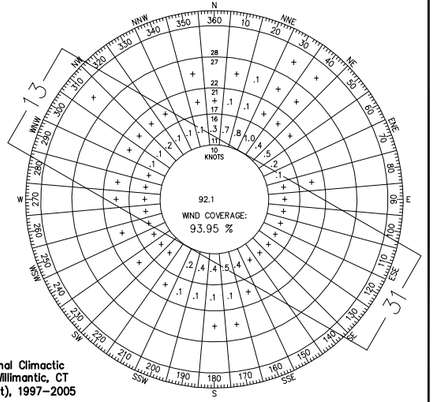
Runway	Existing
13	N/A
31	REIL

AIRPORT DATA TABLE

Airport Data	Existing
Airport Elevation (MSL)	238.6'
Airport Reference Point (NAD 83)	
Lattitude	41° 49' 11.07"
Longitude	71° 54' 03.48"
Mean Max Temperature of Hotest Month	86°
Airport Terminal Area NAVAIDS	VOR–A
Magnetic Variation	14° 43' W
Date of Magnetic Variation	2006
NPIAS Service Level	General Aviation
State Service Level	General Aviation
Wind Coverage Crosswind Component	
VFR	94.1%
IFR	94.6%
All Weather	94.3%
Airport Reference Code	B–I
Design Aircraft	Piper Navajo
Taxiway Lighting	MITL
Taxiway Marking	YES



All–Weather Windrose
Total Coverage = 94.3%



IFR Crosswind Windrose
Total Coverage = 94.6%

Source: National Climactic Data Center, Willimantic, CT (Windham Airport), 1997–2005

FACILITIES TABLE

#	FACILITY NAME	TOP ELEVATION
1	FBO/Maintenance Hangar	254.7
2	T–Hangar	255.0
3	Civil Air Patrol	255.3
4	Skydiving Trailer 1	307.4
5	Skydiving Trailer 2	302.5
6	Electrical Vault	242.9
7	Storage Hangar	–

Note: Elevations Are Rooftop Elevations

NONCONFORMING CONDITIONS

Description	Existing/ Planned	Standard	Remarks	Date Approved

Certification: CONDOT certifies that all airport elements shown on this ALP are in accordance with criteria contained in the current edition of FAA Circular 150/5300–13, except as noted in table entitled "Nonconforming Conditions".

Name _____ Date _____

No.	Submittal / Revision	App'd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Designed: P.O.M. Drawn: P.M. Checked: M.K.

DANIELSON AIRPORT
AIRPORT LAYOUT PLAN

EXISTING AIRPORT LAYOUT

Issue Date: 9-2008 Project No.: 14002 Scale: AS NOTED

ALP-1

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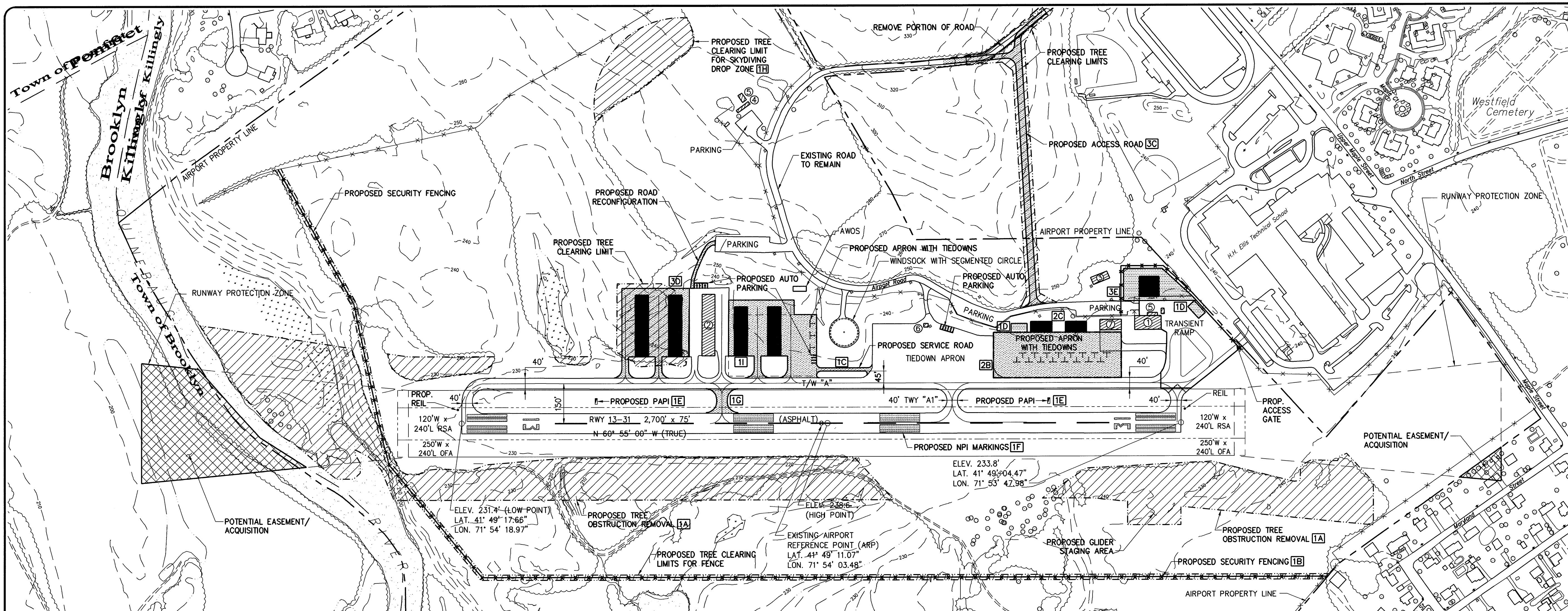


0 200 400
Scale in feet

Notes:

1. FAA's approval of this Airport Layout Plan (ALP) represents acceptance of the general location of future facilities depicted. During the preliminary design phase, the airport owner is required to resubmit for approval the final locations, heights and exterior finish of structures. FAA's concern is obstructions, impact on electronic aids or adverse effects on controller view of aircraft approach and ground movement areas which could adversely affect the safety, efficiency or utility of the airport.
2. All positional data references North American Datum of 1983 (NAD 83).
3. Ground contour interval: 10 feet.
4. See ALP-1 for Windrose.

NAVAIDS AND VISUAL AIDS		
Runway	Existing	Proposed
13	N/A	REIL, PAPI, RNAV
31	REIL	REIL, PAPI

RUNWAY DATA TABLE

RUNWAY DATA	Runway 13/31 Existing	Runway 13/31 Ultimate
Effective Gradient (%)	0.3%	0.3%
Wind Coverage (%)	94.3%	94.3%
Max. Elevation (MSL)	238.6'	238.6'
Runway Length	2,700'	2,700'
Runway Width	75'	75'
Displaced Threshold	N/A	N/A
Usable Runway Length	2,700'	2,700'
Surface Type	Asphalt	Asphalt
Pavement Strength	(Single Wheel) 29,000 lbs	(Single Wheel) 12,500 lbs
Approach Surface Slope	Rwy 13: 20:1 Rwy 31: 20:1	Rwy 13: 20:1 Rwy 31: 20:1
Approach Minimums	1-Mile	1-Mile
Visual Approach Aids	REIL	REIL, PAPI
Instrument Approach Aids	VOR-A	VOR-A, RNAV
Runway Lighting	MIRL	MIRL
Runway Marking	Basicl	NPI
Airport Reference Code (ARC)	B-I	B-I
Design Aircraft	Piper Navajo	Piper Navajo
Runway Object Free Area (ROFA)	Length Beyond Runway: 240'	Length Beyond Runway: 240'
	Width: 250'	Width: 250'
Runway Safety Area (RSA)	Length Beyond Runway: 240'	Length Beyond Runway: 240'
	Width: 120'	Width: 120'
FAR Part 77 Category	Visual	NPI
Runway End Coordinates (NAD 83)	Rwy 13: Lat. 41° 49' 17.66" Lon. 71° 54' 18.97"	Rwy 13: Lat. 41° 49' 17.66" Lon. 71° 54' 18.97"
	Rwy 31: Lat. 41° 49' 04.47" Lon. 71° 53' 47.98"	Rwy 31: Lat. 41° 49' 04.47" Lon. 71° 53' 47.98"
Runway End Elevations (MSL)	Rwy 13: 231.4' Rwy 31: 233.8'	Rwy 13: 231.4' Rwy 31: 233.8'

LEGEND

Existing	Description	Proposed
	Runway Centerline	
	Runway Safety Area (RSA)	
	Runway Object Free Area (ROFA)	
	Runway Protection Zone (RPZ)	
	Building Restriction Line (BRL)	
	Airport Pavement	
⊕	Airport Reference Point	
①	Airport Buildings/Building No.	A
	Other Buildings	
	Airport Property Line	N/A
	Other Property Lines	
	Fence	
	Roads/Pavement	
	Tree line	
	Wetlands	N/A
	Stream/River/Body of Water	
100	Ground Elevation Contours	100
N/A	Pavement to be Removed	LABELED ON PLAN
N/A	Proposed Easement/Acquisition	
N/A	Proposed Tree Clearing	
N/A	To be Removed (Other)	

Note: Some Features In The Legend May Not Have Been Used

RUNWAY PROTECTION ZONES

Existing RPZ			Ultimate RPZ		
Runway 13/31			Runway 13/31		
W1	L	W2	W1	L	W2
250'	1,000'	450'	250'	1,000'	450'
250'	1,000'	450'	250'	1,000'	450'

AIRPORT DATA TABLE

Airport Data	Existing	Proposed
Airport Elevation (MSL)	238.6'	238.6'
Airport Reference Point (NAD 83)		
Latitude	41° 49' 11.07"	41° 49' 11.07"
Longitude	71° 54' 03.48"	71° 54' 03.48"
Mean Max Temperature of Hotest Month	86°	86°
Airport Terminal Area NAVAIDS	VOR-A	VOR-A, RNAV
Magnetic Variation	14° 43' W	14° 43' W
Date of Magnetic Variation	2006	2006
NPIAS Service Level	General Aviation	General Aviation
State Service Level	General Aviation	General Aviation
Wind Coverage Crosswind Component		
VFR	94.1%	94.1%
IFR	94.6%	94.6%
All Weather	94.3%	94.3%
Airport Reference Code	B-I	B-I
Design Aircraft	Piper Navajo	Piper Navajo
Taxiway Lighting	MITL	MITL
Taxiway Marking	YES	YES

NONCONFORMING CONDITIONS

Description	Existing/ Planned	Standard	Remarks	Date Approved

Certification: CONDOT certifies that all airport elements shown on this ALP are in accordance with criteria contained in the current edition of FAA Circular 150/5300-13, except as noted in table entitled "Nonconforming Conditions".

Name _______________ Date _______________

CONNECTICUT DEPARTMENT OF TRANSPORTATION	FEDERAL AVIATION ADMINISTRATION
[signature]	[signature]
DATE 1-30-09	DATE 1/14/09 see letter dated 11-03-08 (previously signed 11-03-08)

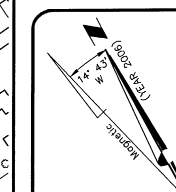
FACILITIES TABLE

#	Existing Facility Name	Top Elevation	#	Proposed Facility Name	Top Elevation
1	FBO/Maintenance Hangar	254.7'	1A	Tree Obstruction Removal	N/A
2	T-Hangar	255.0'	1B	Security Fence	N/A
3	Civil Air Patrol	255.3'	1C	Service Road	N/A
4	Skydiving Trailer 1	307.4'	1D	Fuel Farm	N/A
5	Skydiving Trailer 2	302.5'	1E	PAPI	N/A
6	Electrical Vault	242.9'	1F	NPI Runway Markings	N/A
7	Storage Hangar	–	1G	Exit Taxiway	N/A
			1H	Skydiving Drop Zone	N/A
			1I	T-Hangar Development	255.0'
			2B	Paved Tiedown Apron	N/A
			2C	Hangar Development	–
			3C	New Airport Road	N/A
			3D	T-Hangar Development	255.0'
			3E	Hangar Development	–

Note: Elevations Are Rooftop Elevations

No.	Submittal / Revision	App'd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION



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Designed: P.O.M. | Drawn: P.M. | Checked: M.K.

DANIELSON AIRPORT
AIRPORT LAYOUT PLAN

AIRPORT LAYOUT PLAN

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

ALP-2

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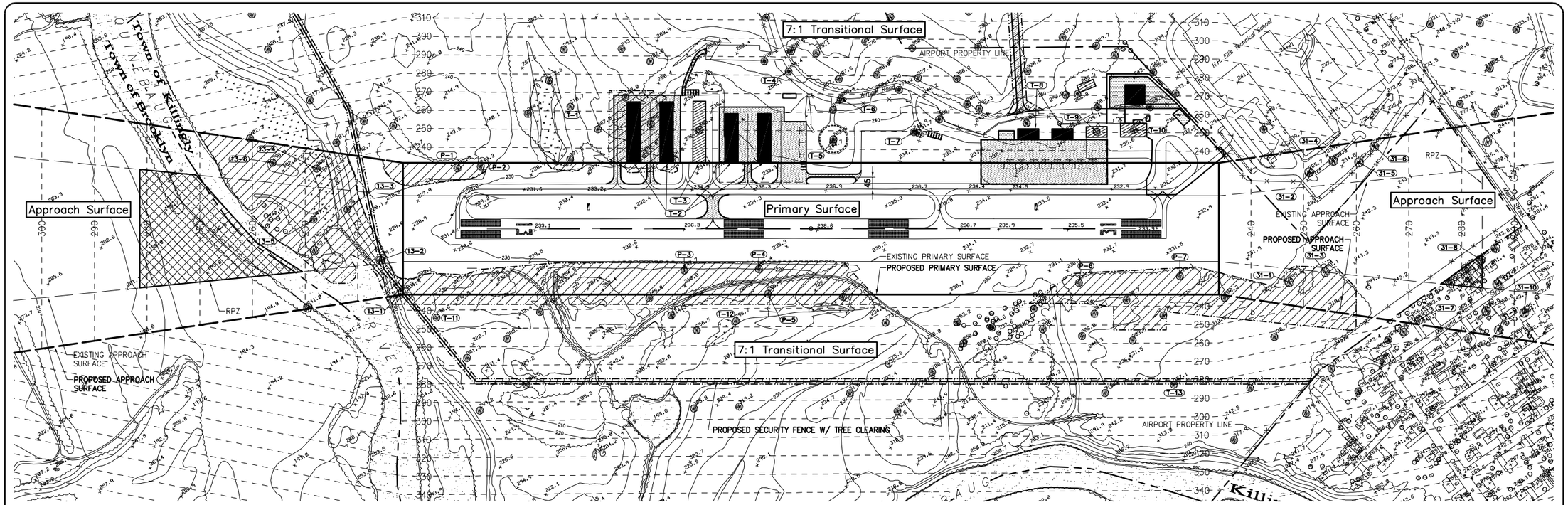

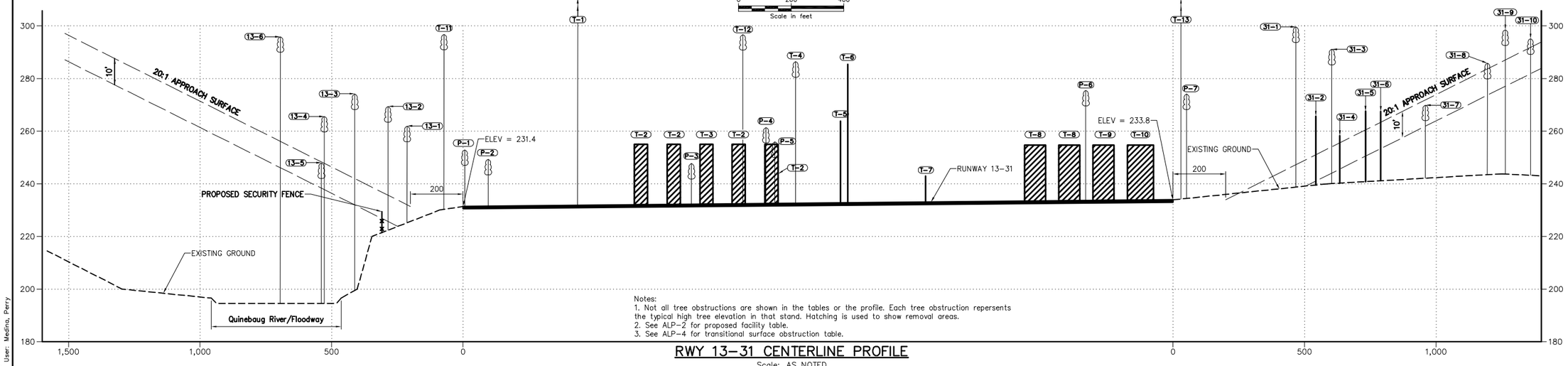

Notes:
1. Not all tree obstructions are shown in the tables or the profile. Each tree obstruction repersents the typical high tree elevation in that stand. Hatching is used to show removal areas.
2. See ALP-2 for proposed facility table.
3. See ALP-4 for transitional surface obstruction table.

RWY 13–31 CENTERLINE PROFILE

Scale: AS NOTED

RUNWAY 13 APPROACH OBSTRUCTIONS

No.	Description	Top Elevation	Elevation of Surface	Penetration	Ownership	Proposed Action
13–1	TREES	262.3'	232.0'	30.3'	CONDOT	REMOVE
13–2	TREES	269.3'	235.7'	33.6'	CONDOT	REMOVE
13–3	TREES	274.1'	242.0	32.1'	CONDOT	REMOVE
13–4	TREES	265.6'	247.8'	17.8'	CONDOT	TBD
13–5	TREES	247.9'	248.4'	*	CONDOT	REMOVE
13–6	TREES	296.3'	256.1'	40.2'	CONDOT	TBD

Easement Or Acquisition Required — *Within 10' of approach surface

PRIMARY SURFACE OBSTRUCTIONS

No.	Description	Top Elevation	Elevation of Surface	Penetration	Ownership	Proposed Action
P–1	TREES	252.9	231.6'			REMOVE
P–2	TREES	249.3'	231.6'			REMOVE
P–3	TREES	247.7'	232.7'			REMOVE
P–4	TREES	261.4'	232.4'			REMOVE
P–5	TREES	255.9'	232.5'			REMOVE
P–6	TREES	275.5'	233.4'			REMOVE
P–7	TREES	274.1'	233.7'			REMOVE

Easement Or Acquisition Required

HATCH LEGEND

- Property Acquisition
- Avigation Easement
- Obstruction

PROFILE LEGEND

- Obstruction Light
- Existing Approach Surface
- Proposed Approach Surface
- Existing Threshold Siting Surface
- Property Line
- Runway Protection Zone (RPZ)

Note: Some Features In The Legend May Not Have Been Used

RUNWAY 31 APPROACH OBSTRUCTIONS

No.	Description	Top Elevation	Elevation of Surface	Penetration	Ownership	Proposed Action
31–1	TREES	299.6'	247.2'	52.4'	CONDOT	REMOVE
31–2	POLE	265.7'	251.0'	14.7'	CBOE	LIGHT
31–3	TREES	291.1'	254.0'	37.1'	CONDOT	REMOVE
31–4	POLE	258.3'	255.6'	2.7'	CBOE	LIGHT
31–5	POLE	267.6'	260.4'	7.2'	CBOE	LIGHT
31–6	POLE	267.5'	263.3'	4.2'	CBOE	LIGHT
31–7#	TREE	269.9'	271.8'	*	PRIVATE	N/A
31–8#	TREES	285.8'	283.6'	2.2'	PRIVATE	REMOVE
31–9#	TREE	289.5'	287.0'	2.5'	PRIVATE	REMOVE
31–10#	TREE	295.1'	291.8'	3.3'	PRIVATE	REMOVE

Easement Or Acquisition Required — *Within 10' of approach surface

No.	Submittal / Revision	Appr'd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Designed: P.O.M. | Drawn: P.M. | Checked: M.K.

DANIELSON AIRPORT
AIRPORT LAYOUT PLAN
INNER APPROACH SURFACE DRAWING

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

ALP-3

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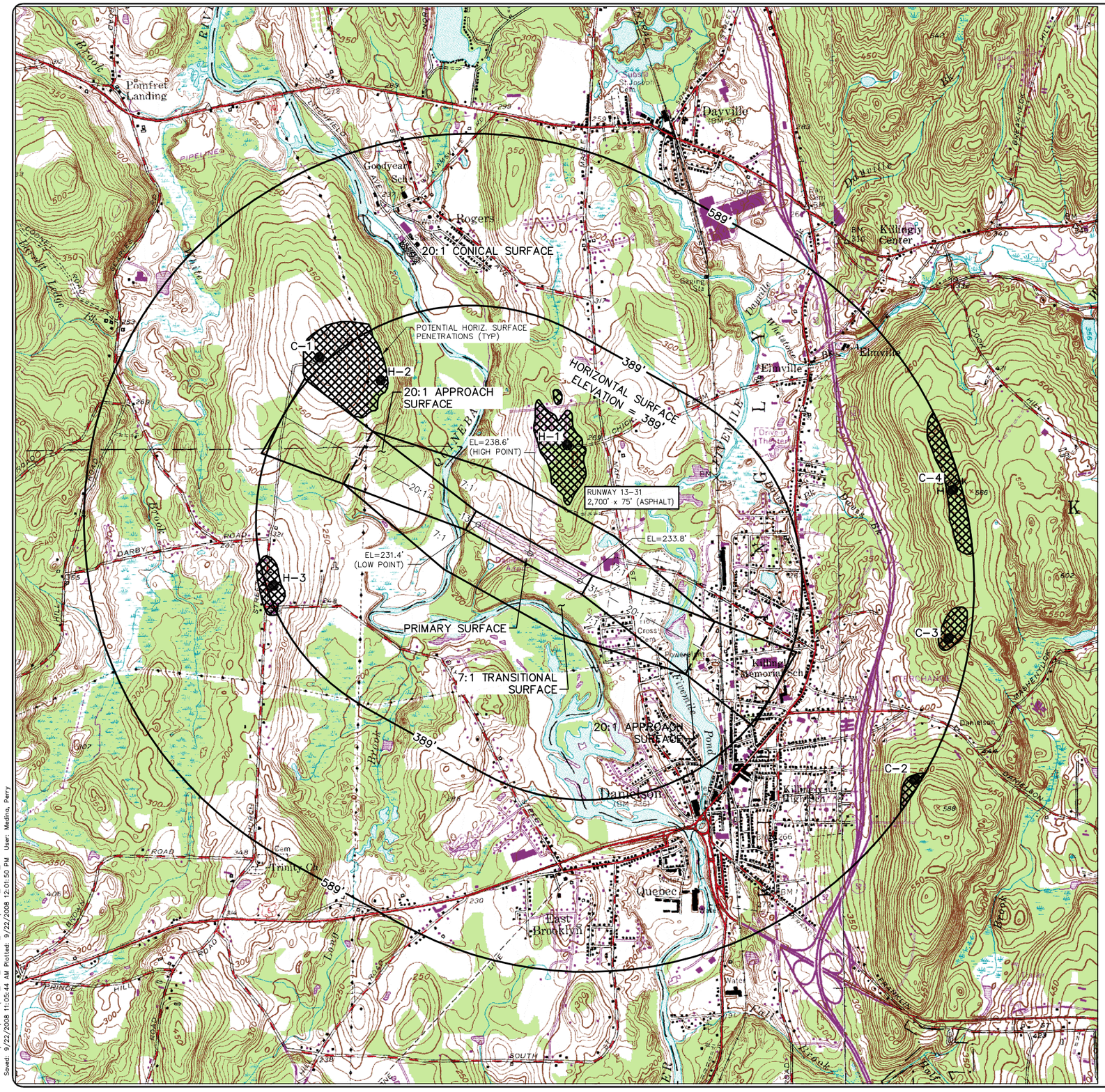

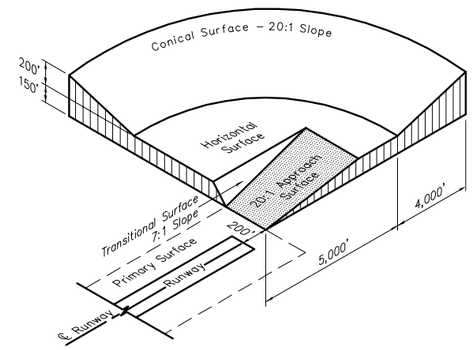

IMAGINARY SURFACES – ISOMETRIC VIEW

NO SCALE

PUTNAM	THOMPSON
DANIELSON AIRPORT	EAST KILLINGLY

USGS QUADRANGLES

TRANSITIONAL SURFACE OBSTRUCTIONS

Number	Description	Top Elevation	Elevation of Surface	Penetration	Ownership	Proposed Action
T-1	Trees	310.7'	262.3'	48.4'	CONDOT	Remove
T-2	Proposed T-hangars	255.0'	250.3'	4.7'	CONDOT	Light
T-3	T-hangar	255.0'	250.3'	4.7'	CONDOT	Light
T-4	Pole	286.4'	282.2'	4.2'	CONDOT	Light
T-5	Wind Sock	263.8'	245.4'	18.4'	CONDOT	N/A
T-6	Pole	285.4'	267.2'	18.2'	CONDOT	Light
T-7	Elec. Vault	242.9'	249.5'	6.6'	CONDOT	Remove
T-8	Proposed Hangars	254.0'	251.3'	2.7'	CONDOT	Light
T-9	Hangar	254.0'	251.3'	2.7'	CONDOT	Light
T-10	Office/hangar	254.7'	251.3'	3.4'	CONDOT	Light
T-11	Tree	296.8'	244.1'	52.7'	CONDOT	Remove
T-12	Tree	296.7'	246.7'	50.0'	CONDOT	Remove
T-13	Tree	327.1'	282.6'	44.5'	CONDOT	TBD

See ALP-3 for location. # Easement Or Acquisition Required

HORIZONTAL & CONICAL SURFACE OBSTRUCTIONS

Number	Description	Top Elevation	Elevation of Surface	Penetration	Ownership	Proposed Action
H-1	Trees	±400'	389'	11'	T.B.D.	Remove#
H-2	Trees	±430'	389'	41'	T.B.D.	Remove#
H-3	Trees	±380'	389'	Within 10"	T.B.D.	Remove#
C-1	Trees	±440'	±398'	42'	T.B.D.	Remove#
C-2	Trees	±590'	±583'	7'	T.B.D.	Remove#
C-3	Trees	±560'	±566'	Within 10"	T.B.D.	Remove#
C-4	Trees	±600'	±578'	22'	T.B.D.	Remove#
# Easement Or Acquisition Required						

NOTE: PRIMARY, INNER APPROACH & TRANSITIONAL SURFACE OBSTRUCTIONS ARE ILLUSTRATED ON RUNWAY PLAN AND PROFILE DWG., ALP-3

0 1,200 2,400
Scale in feet

TREE OBSTRUCTION AREAS

No.	Submittal / Revision	Appd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Magnetic (YEAR 2006) 14° 45' W

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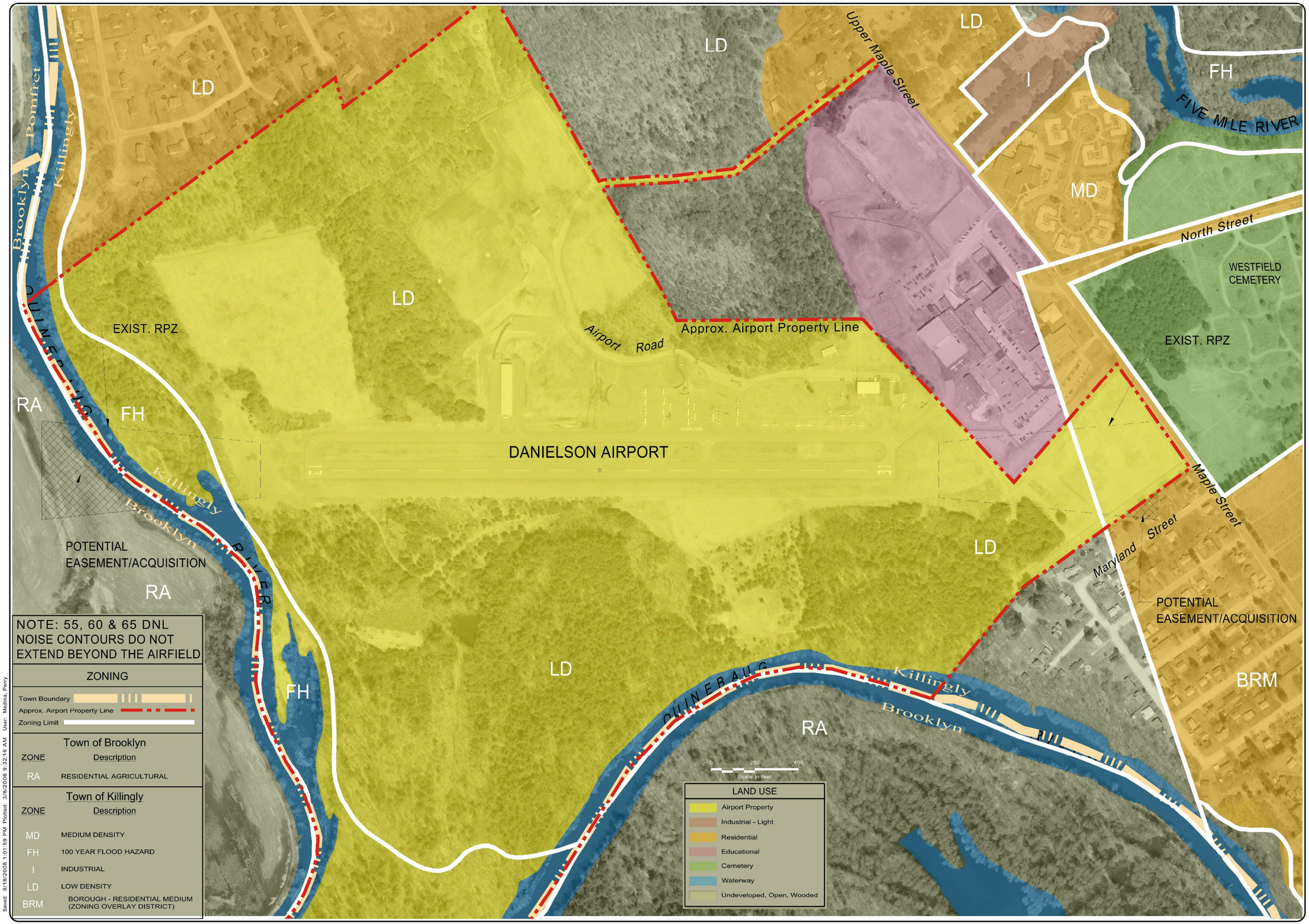
DANIELSON AIRPORT
AIRPORT LAYOUT PLAN

AIRSPACE DRAWING

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

ALP-4

File: U:\14002\vacad\ALP_SET_9-22-08_FINAL\ALP-4_14002_9-22-08.DWG
Saved: 9/22/2008 11:05:44 AM Plotted: 9/22/2008 12:01:50 PM User: Medina, Perry



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No	Submittal / Revision	App'd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Magnetic (YEAR 2009) 14° 43' W

UNAUTHORIZED ALTERATION OR ADDITION TO THIS PLAN IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

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DANIELSON AIRPORT
AIRPORT LAYOUT PLAN

LAND USE PLAN

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

ALP-5

DANIELSON AIRPORT

MAP KEY	GRANTOR	GRANTEE	INSTRUMENT	BOOK	PAGE	DATE	TOWN	REMARKS	ACRES
1	SUMNER B. WARREN	STATE OF CONN.	W.D.	141	34	9/30/60	KILLINGLY	ACQUIRED UNDER FAA PROJECT 9-06-013-6101	202±
1A	STATE OF CONN. BOARD OF EDUCATION	STATE OF CONN. AERONAUTIC	W.D.	151	619	10/10/63	KILLINGLY	ACQUIRED UNDER FAA PROJECT 9-06-013-6101	39 ±
2	STATE OF CONN. BOARD OF EDUCATION	STATE OF CONN. AERONAUTIC	CUSTODY & CONTROL	126	356	5/4/61	KILLINGLY	ACQUIRED UNDER FAA PROJECT 9-06-013-6101	21 ±
2A	STATE OF CONN. BOARD OF EDUCATION	CONN. AERONAUTIC COMM.	AVIGATION EASEMENT	151	619	9/10/63	KILLINGLY	ACQUIRED UNDER FAA PROJECT 9-06-013-6101	
3	FLORA E. HUTCHINS	STATE OF CONN.	ADMINISTRATOR DEED	143	410	5/13/61	KILLINGLY		3±
4	AMERICAN TELEPHONE & TELEGRAPH	STATE OF CONN.	Q.C. RELEASE	144	131	6/15/61	KILLINGLY	30' UTILITY R.O.W.	

AIRPORT PROPERTY IS DESIGNATED FOR AERONAUTICAL OR RELATED USES

TOTAL AIRPORT PROPERTY 265 ± ACRES

LEGEND	
AIRPORT PROPERTY LINE	
PARCEL LINE	
EASEMENT	
RUNWAY	
BUILDING RESTRICTION LINE	
RUNWAY PROTECTION ZONE	

Source:
Danielson Airport Property Map, Connecticut Department of Transportation, May 1991.

0 200 400
Scale in feet

File: U:\14002\ACAD\ALP_SET_9-22-08_FINAL\ALP-6_14002_9-22-08.DWG
Saved: 9/22/2008 11:05:48 AM Plotted: 9/22/2008 12:06:02 PM User: Medina, Perry

No.	Submittal / Revision	Appd	By	Date

CONNECTICUT DEPARTMENT OF TRANSPORTATION

14° 43' W (YEAR 2006)
Magnetic

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Designed: P.O.M. | Drawn: P.M. | Checked: M.K.

DANIELSON AIRPORT
AIRPORT LAYOUT PLAN
PROPERTY PLAN

Issue Date: 9-2008 | Project No.: 14002 | Scale: AS NOTED

ALP-6

LIST OF ACRONYMS

AAGR	Average Annual Growth Rate
AC	Advisory Circular
ACIP	Airport Capital Improvement Plan
AIP	Airport Improvement Program
ALP	Airport Layout Plan
AMSL	Above Mean Sea Level
ARC	Airport Reference Code
ARP	Airport Reference Point
ASOS	Airport Surface Observing System
ASV	Annual Service Volume
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
AWOS	Automated Weather Observing System
BOS	Boston Logan International Airport
CAP	Civil Air Patrol
CEPA	Connecticut Environmental Policy Acts
CERC	Connecticut Economic Resource Center
ConnDEP	Connecticut Department of Environmental Protection
ConnDOT	Connecticut Department of Transportation
CSASP	Connecticut Statewide Airport System Plan
CTAF	Common Traffic Advisory Frequency (Radio Frequency)
DNL	Day-Night Average Noise Level
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FMV	Fair Market Value
FPPA	Farmland Protection Policy Act
GA	General Aviation
GON	Groton-New London Airport
GPS	Global Positioning System
HFD	Hartford-Brainard Airport
IAP	Instrument Approach Procedure
IFR	Instrument Flight Rules
IJD	Windham Airport
INM	Integrated Noise Model
LL	Low-Lead
LZD	FAA 3-Letter Identifier for Danielson Airport

ME	Multi Engine Aircraft
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
Navaids	Navigational Aids
NCDC	National Climactic Data Center
NDDB	National Diversity Data Base
NEFS	New England Flight Services
NEPA	National Environmental Policy Acts
NFPA	National Fire Protection Association
NFPO	National Flight Procedures Office
NPI	Non Precision Instrument
NPIAS	National Plan of Integrated Airport Systems
NRCS	National Resource Conservation Services
OFA	Object Free Area
ORH	Worchester Airport
PAPI	Precision Approach Path Indicator (Visual Approach Aid)
PVD	T.F. Green State Airport
REIL	Runway End Identifier Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
SE	Single Engine Aircraft
SF	Square Feet
SPCC	Spill Prevention, Control, and Countermeasure Plan
SY	Square Yards
TAF	FAA Terminal Area Forecast
US	United States
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VASI	Visual Approach Slope Indicator (Visual Approach Aid)
VFR	Visual Flight Rules
VGSI	Visual Glide Slope Indicator (Visual Approach Aid)
VOR	VHF Omnidirectional Range (Navigational Aid)