



Environmental Assessment for Taxiway T Extension

Connecticut Airport Authority

Bradley International Airport, Windsor Locks, CT

DRAFT



August 2024

Environmental Assessment for Taxiway T Extension

Prepared for:



Connecticut Airport Authority
Bradley International Airport

Prepared by:



Draft — August 2024

This Environmental Assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

Responsible FAA Official

Date

Table of Contents

1	Introduction	1-1
1.1	Airport Facilities and Location	1-4
1.2	Description of the Proposed Project	1-4
2	Purpose and Need	2-1
2.1	Requested Federal Action	2-1
2.2	Timeframe of the Proposed Action	2-1
3	Alternatives	3-1
3.1	Alternatives	3-1
3.2	Evaluation	3-2
3.3	Preferred Alternative	3-3
4	Affected Environment	4-1
4.1	Agency Coordination and Public Involvement	4-1
4.2	Air Quality	4-1
4.3	Biological Resources	4-2
4.4	Climate	4-10
4.5	Coastal Resources	4-11
4.6	Historical, Architectural, Archeological, and Cultural Resources	4-12
4.7	Department of Transportation Act, Section 4(f) and Section 6(f)	4-13
4.8	Farmlands	4-13
4.9	Hazardous Materials, Solid Waste and Pollution Prevention	4-14
4.10	Land Use	4-19
4.11	Natural Resources and Energy Supply	4-22
4.12	Noise and Noise-Compatible Land Use	4-24
4.13	Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks	4-25
4.14	Visual Effects	4-29
4.15	Water Resources	4-31
5	Environmental Consequences	5-1
5.1	Air Quality	5-1
5.2	Biological Resources	5-4
5.3	Climate	5-7
5.4	Hazardous Materials, Solid Waste, and Pollution Prevention	5-10
5.5	Water Resources - Wetlands and Surface Waters	5-12
5.6	Water Resources – Groundwater	5-14
5.7	Cumulative Impact	5-15
5.8	List of Anticipated Permits, Licenses, Approvals, or Reviews	5-16
6	List of Preparers	6-1

Appendices

Appendix A – Agency Correspondence

Appendix B – Public Involvement

Appendix C – Threatened and Endangered Species Documentation

Appendix D – USDA Custom Soil Resources Report

Appendix E – EJSCREEN Report

Appendix F – Air Quality Assessment

Figures

Figure 1.1 – Airport Location.....	1-2
Figure 1.2 – Airport Diagram	1-3
Figure 1.3 – Proposed Project	1-5
Figure 2.1 – Excerpt of Airport Layout Plan	2-2
Figure 3.1 – Preferred Alternative.....	3-4
Figure 3.2 – Construction Haul Routes.....	3-5
Figure 4.1 – Ecological Communities	4-4
Figure 4.2 – Wetlands and Watercourses.....	4-6
Figure 4.3 – NDDB Areas	4-8
Figure 4.4 – Phase I ESA Sites of Significance.....	4-18
Figure 4.5 – Zoning.....	4-20
Figure 4.6 – Airport Development Zone.....	4-22
Figure 4.7 – Land Use.....	4-23
Figure 4.8 – Project Area Census Tracts.....	4-26
Figure 4.9 – Children’s Facilities	4-30

Tables

Table 3-1 – 2019 Airport Master Plan Full Parallel Taxiway Evaluation.....	3-1
Table 3-2 – Alternatives Evaluation Summary.....	3-2
Table 4-1 – Hartford County Nonattainment/Maintenance Status.....	4-2
Table 4-2 – Tribal Nations in Connecticut.....	4-12
Table 4-3 – Selected Population, Housing, Economic, and Social Characteristics.....	4-27
Table 5-1 – General Conformity EPA <i>De Minimis</i> Thresholds.....	5-2
Table 5-2 – Construction Emissions Compared to EPA <i>De Minimis</i> Thresholds.....	5-3
Table 5-3 – Existing and Proposed Ecological Community Areas	5-5
Table 5-4 – GHG Emissions Associated with Construction (metric tons)	5-8
Table 5-5 – Summary of Environmental Consequences.....	5-15
Table 6-1 – List of Preparers	6-1

1 Introduction

This Environmental Assessment (EA) documents the evaluation of potential environmental impacts associated with the proposed Taxiway T Extension Project (Proposed Project) at the Bradley International Airport (BDL or the Airport), which is owned and operated by the Connecticut Airport Authority (CAA or Authority). Based on the findings of the Airport Master Plan (2019 AMP) for BDL, completed in March 2019, a full parallel taxiway by extending Taxiway T was recommended to improve safety by alleviating congestion and runway crossings associated with Hotspot 1 and 2 (formerly referred to as Hotspot 2 and 3 in the 2019 AMP). Furthermore, the 2019 AMP noted that the lack of a full parallel taxiway on the northeast side of Runway 15-33 “results in some aircraft following circuitous routes, crossing active runways, and navigating around the commercial apron.”¹ It continued to state that developing a full taxiway to the northeast side of Runway 15-33 will increase efficiency, reduce the potential of airfield incursions, and encourage the maximized use of Airport property.

Section 22a-1c of the Connecticut General Statutes (CGS) states only “Actions ... proposed to be undertaken by state departments, institutions or agencies, or funded in whole or in part by the state” are subject to the CT Environmental Policy Act (CEPA). Subsection (a) of Connecticut Statutes § 15-120bb states that “the [CAA] shall not be construed to be a department, institution or agency of the state.” Therefore, there is no “state action” for the Proposed Project because the proposed actions are not being sought by a state department, institution or agency funded in whole or part by the state, as required by Section 22a-1c of the Connecticut General Statutes.

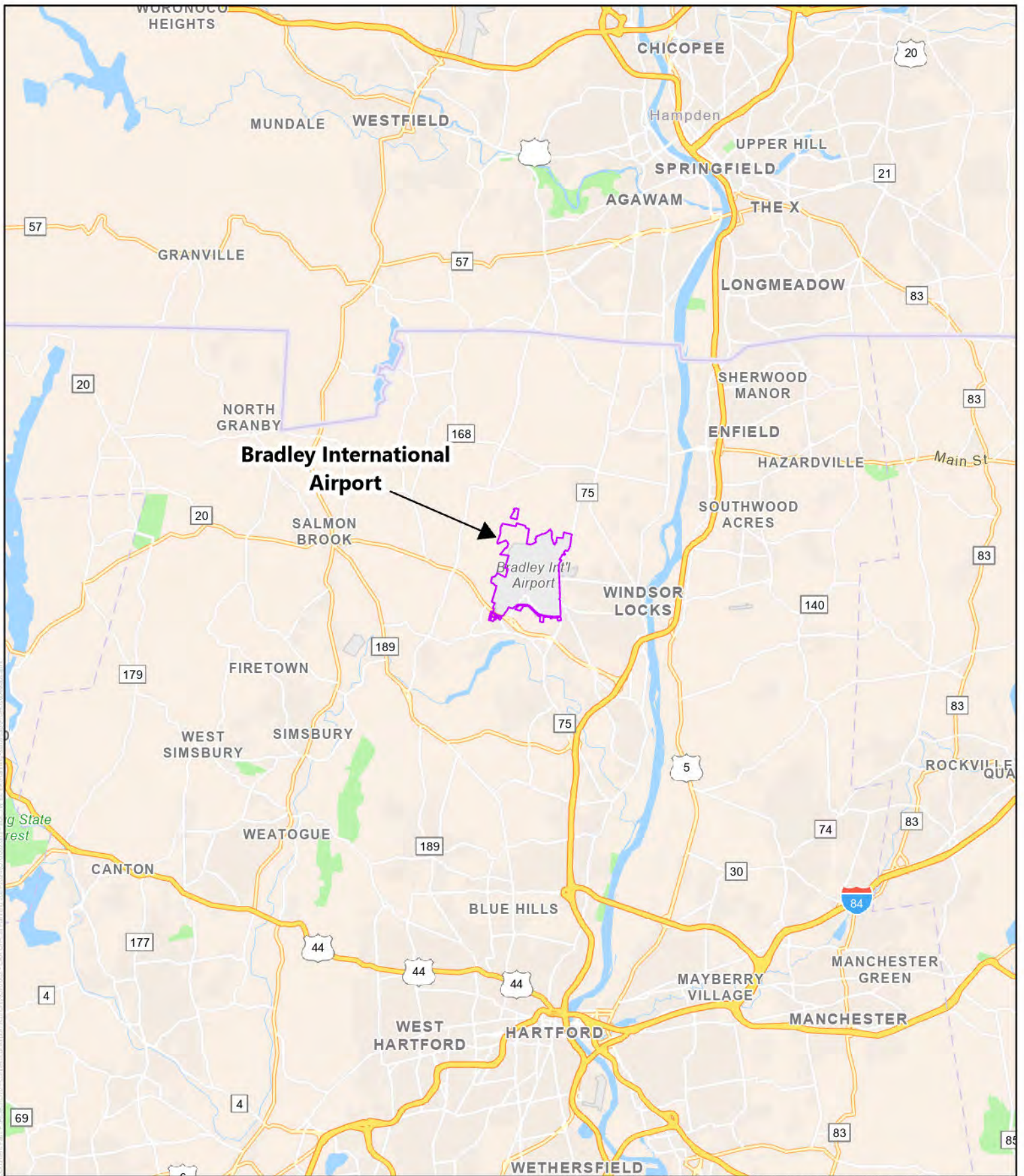
Since the Proposed Project would require federal approval and funding determinations by the FAA, the EA must comply with NEPA and other federal special purpose laws. This EA has been prepared to meet the requirements of the National Environmental Policy Act of 1969 (NEPA) in order to address potential impacts associated with the Proposed Project while providing the opportunity for public involvement and comments. This EA follows the guidelines and organizational structure recommended in the following documents:

- ◆ Council on Environmental Quality 87 FR 23453, *National Environmental Policy Act Implementing Regulations Revisions*
- ◆ Federal Aviation Administration (FAA) Order 1050.1F, *Environmental Policies and Procedures* (hereinafter referred to as FAA Order 1050.1F)
- ◆ FAA *1050.1F Desk Reference*
- ◆ FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (hereinafter referred to as FAA Order 5050.4B)

The EA includes the following sections:

- ◆ Introduction
- ◆ Purpose and Need
- ◆ Alternatives
- ◆ Affected Environment
- ◆ Environmental Consequences
- ◆ List of Preparers

¹ <https://bradleyairport.com/wp-content/uploads/2019/10/BDL-Final-Master-Plan-Full.pdf>, page 4-35.



Sources: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA. Created by C&S Engineers, Inc.



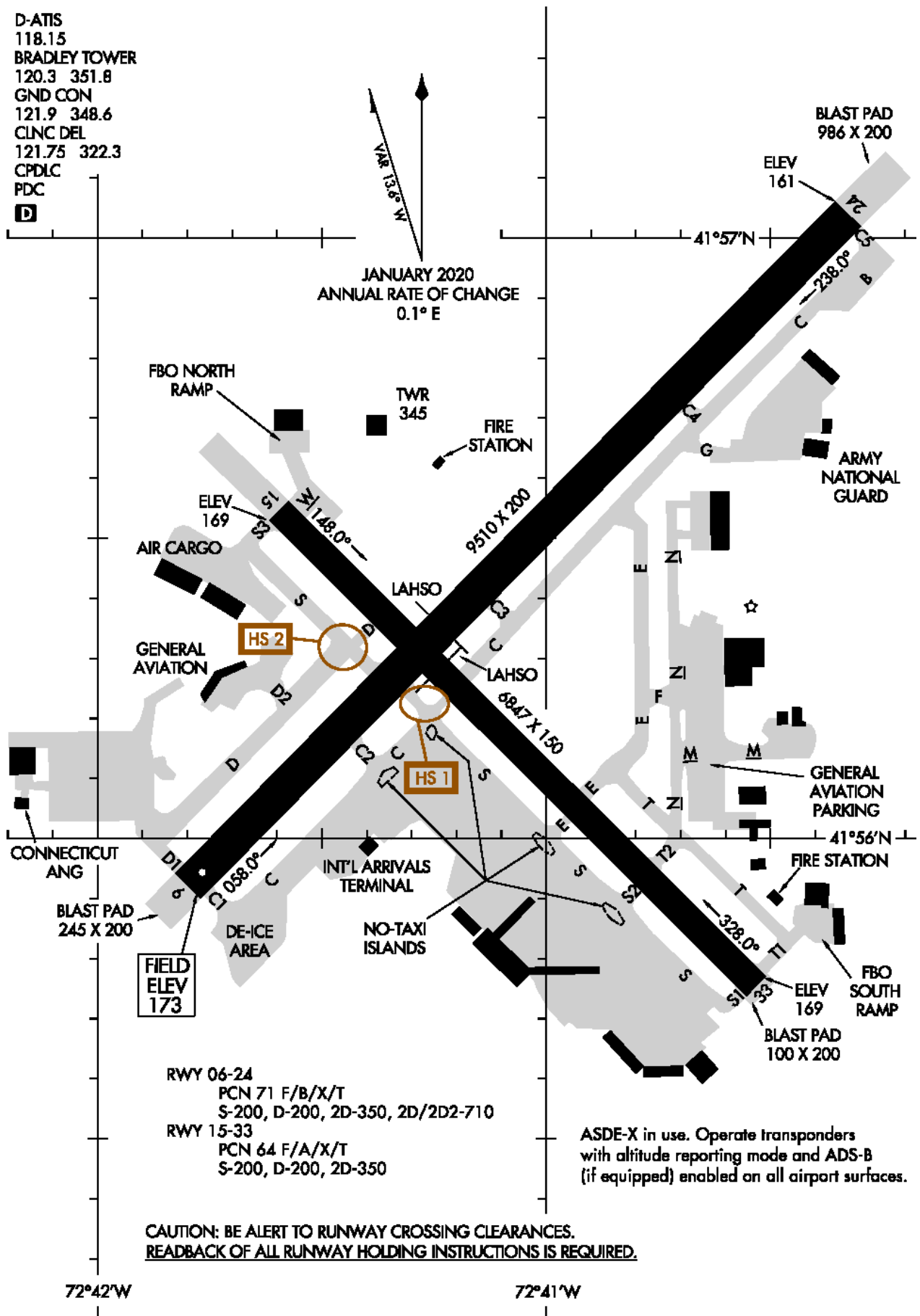
Figure 1.1 | Airport Location

EA for Taxiway T Extension



D-ATIS
118.15
BRADLEY TOWER
120.3 351.8
GND CON
121.9 348.6
CLNC DEL
121.75 322.3
CPDLC
PDC

D



ASDE-X in use. Operate transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces.

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES. READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.



Figure 1.2 | Airport Diagram

EA for Taxiway T Extension

Source: AirNav



1.1 Airport Facilities and Location

The Airport operates on approximately 2,400 acres located in the towns of Windsor Locks, Windsor, Suffield, and East Granby in Hartford County, Connecticut (**Figure 1.1**). The Airport serves commercial airlines, air cargo, general aviation, and military activity on two runways. Runway 6-24 is 9,510 feet long, 200 feet wide, and is served by full parallel Taxiway C to the southeast and partial Taxiway D on the northwest side of the Runway 6 end. Runway 15-33 is 6,847 feet long, 150 feet wide, and served by full parallel Taxiway S on the southwest side and partial Taxiway T on the northeast side of the Runway 33 end (**Figure 1.2**).

1.2 Description of the Proposed Project

The Proposed Project includes the following elements (**Figure 1.3**):

- ◆ Construction of a 75-foot-wide taxiway with two 30-foot shoulders (total width of 135 feet) from intersection of Taxiway T and Taxiway E to Taxiway W at the Runway 15 End (estimated total length of 4,200 feet).
- ◆ Site grading, estimated 25-30 feet from edge of pavement²
- ◆ Removal of vehicle service road, concrete pad, and Taxiway C3 pavement
- ◆ Construction of taxiway connector to Runway 15-33 at Taxiway D with appropriate fillets
- ◆ Installation of taxiway markings, lighting, and signage
- ◆ Drainage improvements
- ◆ Stockpile and spoils area and haul route





The stockpile and equipment/material staging area is an approximately 6.5-acre grass lot located on Light Lane Road. This area, along with the proposed haul route, was previously used for the Taxiway E construction project.

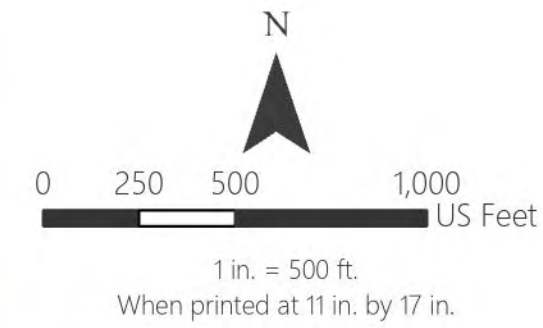
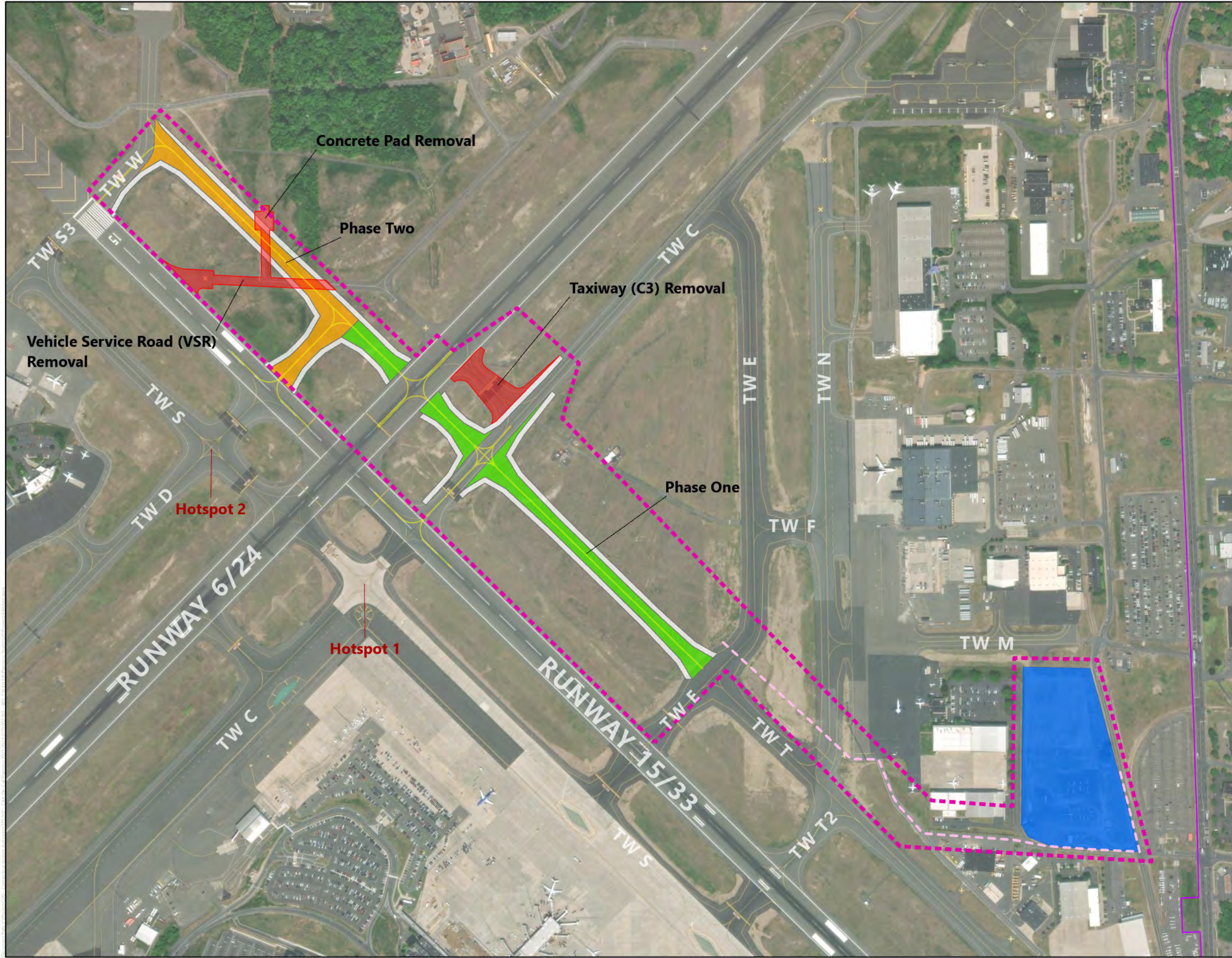
² Extents of grading may be narrower near Runway 15 end based on potential wetland disturbance.



Figure 1.3

Proposed Project

-  Project Area
-  Airport Property Line
-  Pavement Markings
-  Haul Route
-  Stockpile & Storage Area
-  Pavement Removal
- New Pavement**
 -  Phase 1
 -  Phase 2
 -  Shoulder



EA for Taxiway T Extension

Sources: Basemap from Maxar. Created by C&S Engineers, Inc.

2 Purpose and Need

The Purpose and Need statement explains why a project is needed with appropriate justification and establishes criteria for determining the reasonableness of any alternatives developed, i.e., any alternative that does not meet the Purpose and Need would be eliminated.

The purpose of the Proposed Project is to continue Taxiway T on the east side of Runway 13-33 to the Runway 15 end as documented and recommended in the 2019 Airport Master Plan.

The need for the Proposed Project is to

- 1) alleviate safety concerns associated with Hotspots 1 and 2 and active runway crossings, and
- 2) increase efficiency of airfield operations by providing direct access to and from runway ends and airfield development.

Hotspot 1 is located at the intersection of Taxiway C and Taxiway S due to the bottleneck caused by bidirectional traffic to multiple destinations on the Airport. Congestion is further increased by aircraft exiting Runway 6-24 to Taxiway C. The 2019 AMP indicates that extending Taxiway T to a full parallel taxiway would reduce traffic congestion and blockages on Taxiway S. Hotspot 2 is located at the intersection of Taxiway D and Taxiway S and faces the same blockage and traffic conflicts as Hotspot 1.

The current taxiway geometry encourages crossing active runways to allow access to and from the northeast side of Runway 15-33. Specifically, the existing full parallel taxiway to Runway 15-33, Taxiway S, is on the southwest side of the runway and is adjacent to the commercial apron. Aircraft going to or coming from the east quadrant of the airfield (general aviation, cargo, military, etc.) to the Runway 15 end need to cross both runways and navigate the commercial apron.

BDL has existing development on both sides of both runways, in all four quadrants of the Airport. While the existing taxiways provide access to all runway ends, they are on the south and west side of the airfield and result in some aircraft following circuitous routes, as shown in **Figure 2.1**. A full parallel taxiway would increase the ability of all aircraft to safely and efficiently navigate the airfield.

The Proposed Project would be constructed in two phases to allow for continued operation of one of the two runways. Phase 1 will include the alignment from new Taxiway E to outside the Runway Safety Area (RSA) north of Runway 6-24. Phase 2 will continue the extension to the Runway 15 end.

2.1 Requested Federal Action

The following federal actions and approvals from the FAA are subject to NEPA review. Where FAA approval authority exists, the Authority may not implement the Proposed Project absent prior FAA approval.

- ◆ Unconditional approval of the updated ALP depicting the proposed improvements pursuant to 47107(a)(16).
- ◆ Federal environmental approval of further processing of an application for federal assistance to implement those AIP eligible projects.

2.2 Timeframe of the Proposed Action

It is anticipated that the application for the grant for the work of Phase 1 will occur in 2025, with a construction period of Spring 2026 to Fall 2026. It is anticipated that the application for the grant for the work of Phase 2 will occur in 2027, with a construction period of Spring 2027 to Fall 2027.

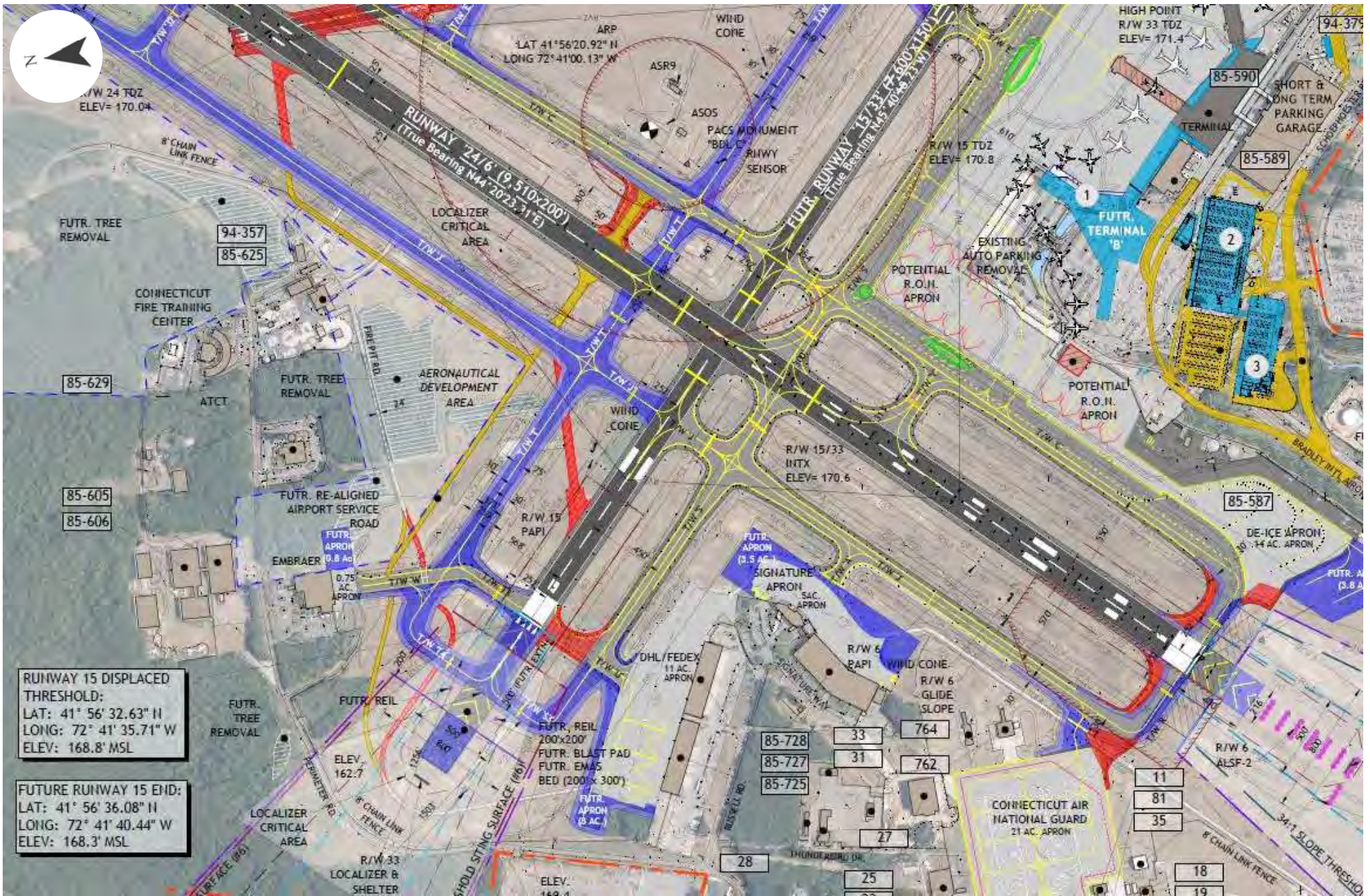


Figure 2.1 | Excerpt of Airport Layout Plan

EA for Taxiway T Extension

Source: Bradley International Airport-Airport Layout Plan Drawing Set, Excerpt of Sheet 4, Future Airport Layout Plan, Jan 2019.



3 Alternatives

FAA Order 1050.1F states that the identification and evaluation of alternatives is the heart of the environmental process.³ Regulations outlined in Title 40 of the code of Federal Regulations (CFR), Parts 1500 to 1508, and subsequently, FAA Orders 1050.1F and 5050.4B, require that the federal decision-makers (FAA) perform the following tasks:

- ◆ Rigorously explore and objectively evaluate reasonable alternatives (“reasonable” meaning alternatives that are practical or feasible from a technical, economical, and rational standpoint), including alternatives not within the jurisdiction of the federal agency. For alternatives that are eliminated from detailed study, briefly discuss the reasons for having been eliminated.
- ◆ Dedicate substantial treatment to each alternative considered in detail, including the No Action Alternative, so that reviewers may evaluate their comparative merit.
- ◆ Identify the Sponsor’s (Authority’s) preferred alternative.

The 2019 Airport Master Plan noted that “for some functional areas – such as the airfield – the logical recommendations were distinctly apparent as they are driven largely by FAA design standards”.⁴ The recommendation for full-parallel taxiways on both sides of the runways is based on the prioritization of safety first and operational efficiency second. The only alternatives considered were constructing full parallel taxiways and doing nothing. The Master Plan noted advantages and disadvantages of the construction of full parallel taxiways, as opposed to an evaluation against specific evaluation criteria, as shown below (**Table 3-1**):

Table 3-1 – 2019 Airport Master Plan Full Parallel Taxiway Evaluation

	Advantages	Disadvantages
Full Parallel Taxiway	<ul style="list-style-type: none"> Eliminates need for active runway crossings/improves safety (reduces potential of runway incursions) Reduces impacts associated with Hotspots 1 and 2* Reduced taxi times/increased efficiency Increased airfield capacity 	<ul style="list-style-type: none"> Cost and added maintenance requirements Potential grassland habitat impacts Additional impervious surface and stormwater drainage considerations Potential wetland impacts

*Hotspots 2 and 3 as noted on 2019 AMP

Source: 2019 Airport Master Plan, Bradley International Airport, Table 5-2, page 5-78

3.1 Alternatives

3.1.1 No Action Alternative

In accordance with the Council on Environmental Quality (CEQ) regulations (40 CFR §1502.14(C)), a No Action alternative is included in the evaluation. The No Action alternative would not provide a full parallel taxiway to the northeast side of Runway 15-33. The Airport would remain as it is today, with no improvements to reduce runway incursions, mitigate hot spots, reduce taxi times, or provide access to the

³ https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf, page 7-3.

⁴ 2019 Airport Master Plan, Bradley International Airport, page 5-1.

northern areas of Airport property. The No Action alternative does not meet the Purpose and Need statement but provides a basis of comparison for the assessment of future conditions and potential impacts.

3.1.2 Build Alternative

The build alternative, the Proposed Project, would provide a full parallel taxiway to the northeast side of Runway 15-33 from Taxiway E to Taxiway W at the Runway 15 end.

3.2 Evaluation

For the purposes of this EA, the evaluation of the Proposed Project (extension of Taxiway T to provide a full parallel taxiway on the northeast side of Runway 15-33) and the No Action alternative was based on the following (Table 3-2):

- ◆ Purpose and Need: Does the alternative meet the Purpose and Need statement?
- ◆ FAA Design Standards: Does the alternative comply with FAA design standards?
- ◆ Operational: Does the alternative provide for safe and efficient flow of aircraft traffic?
- ◆ Environmental: Does the alternative minimize impacts to wetlands and other environmental resource categories?
- ◆ Financial: What is the estimated construction cost of the alternative?

Table 3-2 – Alternatives Evaluation Summary

	No Action Alternative	Build (Proposed Project) Alternative
Purpose and Need: Does the alternative meet the Purpose and Need statement?	No	Yes
FAA Design Standards: Does the alternative comply with FAA design standards?	With no action, the existing Taxiway Connector C3 provides access to Runway 6-24 within the runway’s “high-energy area” (middle third of the runway.) It is a recommended practice per AC 150/5300-13B.4.8.1.2 to limit runway crossings to the outer thirds of the runway.	Yes, the taxiway extension would be constructed to meet the latest taxiway standards based on the existing critical aircraft for the Airport. Proposed Project relocates taxiway connectors to Runway 6-24 farther from the center of the “high-energy area” (middle third of the runway).
Operational: Does the alternative provide for safe and efficient flow of aircraft traffic?	No, hotspots HS 1 and HS 2 would remain as Taxiway S is the only taxiway providing access along Runway 15-33. Without an additional parallel taxiway, Taxiway S intersections with multiple nodes would maintain their existing hotspot condition.	Yes, the taxiway extension would improve safety and efficiency by reducing traffic through existing hotspots by providing bi-directional aircraft circulation around Runway 15-33. This would result in reduced runway incursions and taxi times.
Environmental: Does the alternative minimize impacts to wetlands and other environmental resource categories?	Yes, with no ground disturbance, no environmental impacts would be expected.	There will be an anticipated increase in impervious area, ground disturbance, and potential species, wetlands, and surface waters impacts that would be mitigated based on the findings of this assessment.
Financial: What is the estimated construction cost of the alternative?	There would be no costs since no action would be taken.	Approximately \$30M

Source: C&S Companies, Inc. 2023

3.3 Preferred Alternative

The build alternative (Proposed Project) is the preferred alternative as it fulfills the Purpose and Need statement, meets FAA design standards, and improves the safety and operational efficiency of the airfield. The 2019 AMP and associated Airport Layout Plan notes the following benefits of the Proposed Project:

- ◆ Reduces impacts associated with Hotspots 1 and 2, as noted in **Figure 1.2**
- ◆ Provides dedicated runway access for aircraft operations on the Runway 15 end, reducing runway crossings
- ◆ Improves operational efficiency (reduced delays and congestion)
- ◆ Provides additional airfield capacity⁵
- ◆ Provides access to future aeronautical development property in the north quadrant of the airfield, as shown in **Figure 2.1**.

After selection of the preferred alternative, discussions were held regarding construction limits of the Proposed Project. A wider project area boundary was developed to conservatively account for additional grading area that may be needed to meet grading standards adjacent to taxiways. Project Areas are identified on **Figure 3.2**. Work of Phase 1 will occur in all four project areas. Work of Phase 2 will occur in Project Area 4 and Project Area 1 (Stockpile Areas). In addition, haul routes were determined for the restriction of construction vehicle traffic to existing paved surfaces and avoid developing new haul routes. Haul Route 1 will be used for work east of Runway 6-24; Haul Route 2 will be used for work west of Runway 6-24. The revised areas of disturbance (Project Area) and haul routes are shown on **Figure 3.1** and **Figure 3.2**, respectively.

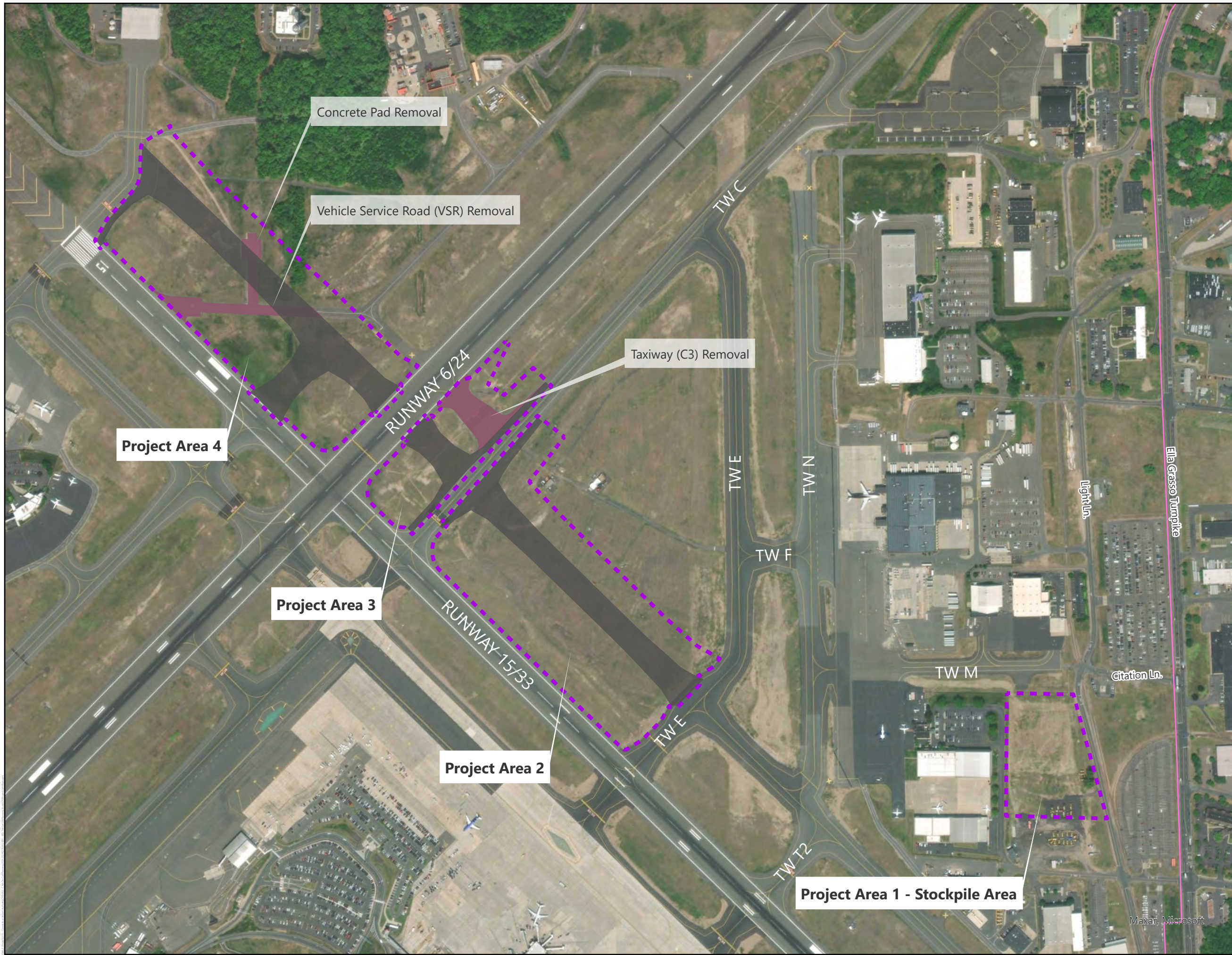
The preferred alternative (i.e., the Proposed Project, as shown on **Figure 3.1**) will be carried forward into **Section 5 – Environmental Consequences** to identify environmental resources that will be impacted, quantify the impacts, and recommend mitigation measures. The No Action alternative is also retained for detailed analysis for baseline comparison purposes to comply with CEQ regulations.

⁵ <https://bradleyairport.com/wp-content/uploads/2019/10/BDL-Final-Master-Plan-Full.pdf>, page 5-78.

Figure 3.1

Preferred Alternative

- Project Area
- New Pavement
- Pavement Removal
- Airport Property Line



0 270 540 Feet

1 in. = 500 ft.

When printed at 11 in. by 17 in.



EA for Taxiway T Extension

Sources: ESRI Basemap, Data from C&S Engineers, Inc. Created by C&S Engineers, Inc., 2024

Figure 3.2

Construction Haul Routes

- Project Area
- New Pavement
- Pavement Removal
- Airport Property Line
- Haul Route 1
- Haul Route 2



0 400 800 Feet

1 in. = 800 ft.

When printed at 11 in. by 17 in.



EA for Taxiway T Extension

Sources: ESRI BaseMap; Data from C&S Engineers, Inc.; Created by C&S Engineers, Inc.; 2024

4 Affected Environment

This section describes the environmental conditions of the Project Area. The characterization of the site is based on the information gathered from technical studies, on-site investigations, a review of available online regulatory information, agency correspondence, and discussions with Airport personnel and public officials. Information presented herein serves as a basis for the assessment of environmental, social, and economic consequences (refer to **Section 5**) associated with the Proposed Project.

4.1 Agency Coordination and Public Involvement

The CEQ gives Federal agencies instructions on NEPA's public involvement process at 40 CFR 1506.6. In addition, FAA Order 5050.4B requires notice and opportunity for public involvement under the NEPA process. Throughout the NEPA review process, BDL and the FAA seek input in writing from the public and federal, tribal, state, and local agencies.

4.1.1 Agency Coordination

During the preparation of the EA, BDL conducted coordination with federal and state regulatory agencies. Correspondence from regulatory agencies is included in **Appendix A**.

4.1.2 Draft EA Notifications and Distribution

To be included after the Draft EA is made available for public review and comment. **Appendix B** includes details regarding public involvement efforts.

4.1.3 Public Comments

(To be included upon completion of the public comment period.)

4.2 Air Quality

Defined in Chapter 1 of the FAA *1050.1F Desk Reference*, dated July 2015, air quality is the measure of the condition of the air expressed in terms of ambient pollutant concentrations and their temporal and spatial distribution. Air quality regulations in the United States are based on concerns that high concentrations of air pollutants can harm human health, especially for children, the elderly, and people with compromised health conditions; and can harm public welfare by damage to crops, vegetation, buildings, and other property.

4.2.1 Regulatory Background

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA, USEPA) designates areas with respect to the level of six criteria air pollutants within a specific area in the state. These criteria air pollutants are carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), sulfur dioxide (SO₂), and lead (Pb). Particulate matter is divided into two (2) particle size categories: coarse particles with a diameter less than 10 micrometers (PM₁₀) and fine particles with a diameter of less than 2.5 micrometers (PM_{2.5}). An area with measured pollutant concentrations that are below the National Ambient Air Quality Standards (NAAQS) is designated as "attainment", and an area with pollutant concentrations that exceed the NAAQS is designated as "nonattainment". After air pollutant concentrations in a nonattainment area are reduced to levels below the NAAQS, the EPA re-designates the area to be "maintenance"— a designation

that is maintained for a period of 20 years. Finally, an area is designated as unclassifiable when there is a lack of sufficient data to determine the status of a pollutant. **Table 4-1** provides the latest EPA designation of all criteria pollutants for Hartford County.

Table 4-1 – Hartford County Nonattainment/Maintenance Status⁶

Nonattainment / Maintenance Status	Pollutant
Nonattainment	8-Hour Ozone (2008) Serious 8-Hour Ozone (2015) Moderate
Attainment	Carbon Monoxide (CO) ⁷ Sulfur Dioxide (SO ₂) Particulate Matter (PM ₁₀ /PM _{2.5}) Nitrogen Dioxide (NO _x) Lead (Pb)

Source: HMMH, 2024

Connecticut Department of Energy and Environmental Protection (CT DEEP) prepares plans to attain and maintain compliance with these standards. These State Implementation Plans include regulations to prevent, reduce, and control air pollution.⁸ EPA has the authority to enforce the Connecticut air quality regulations incorporated into the State Implementation Plan. The CT DEEP also monitors air quality to protect public health and the environment under the Clean Air Act. The closest CT DEEP monitoring stations are to the south of BDL in the City of Hartford (Huntley Place) and the Town of East Hartford (McAuliffe Park).⁹

4.2.2 Summary

The Proposed Project has the potential to increase emissions due to construction activities. Therefore, an emissions inventory and a General Conformity applicability analysis is required. As a result, discussion related to air quality impacts will be discussed further in **Section 5 – Environmental Consequences**.

4.3 Biological Resources

4.3.1 Ecological Communities and Wildlife

Listed species surveys and ecological communities mapping have been conducted on the Airport property in recent years in support of various proposed and future projects and activities. In addition, BDL is in the process of preparing a comprehensive update of a Rare Species Management Plan (2023 Draft RSMP).¹⁰ **Appendix C** includes the 2023 Draft RSMP and its appendices, which contains the 2020 *Rare Species Habitat Assessment and Survey Findings* report, previous species surveys from 2003 to present, and previous coordination efforts with CT DEEP Natural Diversity Database (NDDB).¹¹ The surveys that were conducted as part of the 2023 Draft RSMP, along with recent aerial photographs and limited ground truthing, were utilized in assessing the ecological communities in the Project Area. The ecological communities that

⁶ Accessed November 2023 https://www3.epa.gov/airquality/greenbook/anayo_ct.html

⁷ It should be noted that state of Connecticut is attainment for carbon monoxide, with Hartford County redesignated to attainment in January of 1996 (<https://portal.ct.gov/DEEP/Air/Carbon-Monoxide>)

⁸ <https://portal.ct.gov/DEEP/Air/Planning/Air-Quality-Planning>

⁹ https://portal.ct.gov/-/media/DEEP/air_monitoring/CT2022NetworkPlanFinal_old.pdf

¹⁰ GZA GeoEnvironmental, Inc., Draft Bradley International Airport Rare Species Management Plan, February 16, 2023

¹¹ GZA GeoEnvironmental, Inc., Bradley International Airport Rare Species Management Plan, Rare Species Survey Results, December 2020

were mapped as part of the 2023 Draft RSMP were updated using recent aerial photography to account for changes that occurred in the Project Area from the time the original data was collected in 2019.

Ecological Communities

The ecological communities map for the Project Area is presented as **Figure 4.1**. Grassland communities dominate the Project Area as these areas are actively managed by the Airport to maintain low growing grassland vegetation. Grasses are generally categorized into warm season grasses and cool season grasses with most of the grasses found in the northeast consisting of non-native cool season grasses. Native warm season grasses are typically referred to as “prairie or bunch grasses.” Warm season grasses generally have greater ecological benefits than cool season grasslands. Ecological communities mapped within the Project Area include:

- ◆ Warm season grassland/open sand (4.99 acres)
- ◆ Warm season grassland (43.99 acres)
- ◆ Cool season grassland (15.60 acres)
- ◆ Wetlands (0.23 acres)
- ◆ Watercourses (0.31 acres)
- ◆ Paved surfaces (7.65 acres)

Warm Season Grassland – Open Sand: This community is comprised of mostly high-quality warm season grassland with up to 50% of these areas being open sand or sparsely vegetated sand and the remainder being predominately warm season grassland species. This community is a mixture of open ground (sand), sometimes covered with patchy lichen and sparse vegetation, to dense areas of warm season grasses and herbaceous flowering plants. Vegetation height varies from short cropped to mature grassland.

Warm Season Grassland: Warm season grassland is the most common community type in the Project Area. This community type is comprised of mostly warm season grasses and forbs with up to 20% of the area consisting of open sand and less than 10% of the community consisting of cool season grassland species. Open sand is less than 20% of the area with the remainder vegetated with mostly warm season grassland species. Warm season species that require open sand or highly disturbed habitats are generally absent in favor of more warm season species. Vegetation height varies from short cropped from routine airport maintenance (approximately 2” in height) to mature grassland (up to 24” in height). The dominant species in this community is little bluestem grass, making up > 50% of the vegetative matrix. Little bluestem is allowed to grow taller in the interior areas away from paved areas and is more routinely cut near the runway/taxiway edges. In the areas in and near the open sand, some small patches of higher quality sandplain grassland/sand barrens are present. A thin layer of topsoil is present underlain by sand. In some areas, the grassland is dense, and a thatch layer is forming. There is a small cool season/weedy component within the community as well, typically in areas proximal to pavement or in areas of past construction or disturbance, where cool season and weedy species such as clovers (*Trifolium* spp.), spotted knapweed (*Centaurea maculosa*), plantain (*Plantago* spp.), fescues (*Festuca* spp.), and sheep sorrel become more common, but overall, across these communities these make up less than 5% of the plant community.

Cool Season Grassland: This community is dominated almost entirely by cool season grasses. Some warm season components may be mixed in, mainly little bluestem; however, it is less than 10% of the vegetative matrix as the cool season species are outcompeting the warm season species. Soils in this community are richer with a thicker topsoil which supports more cool season plants. Open ground is mostly absent with a thick groundcover and thatch also present



Sources: GZA, FHI Studio, Maxar. Created by C&S Engineers, Inc.



Figure 4.1 | Ecological Communities

EA for Taxiway T Extension

- Project Area
- Warm Season Grassland / Open Sand
- Wet Meadow
- Warm Season Grassland
- Cool Season Grassland



Wetlands: A small portion of a larger, off-site wetland is located in the northwest portion of the Project Area (see **Figure 4.2**). This wetland is associated with the unnamed perennial watercourse discussed below. The northern portion of the wetland within the Project Area is a palustrine scrub-shrub (PSS) wetland with vegetation consisting of gray birch (*Betula populifolia*), red maple (*Acer rubrum*), and spicebush (*Lindera benzoin*) shrubs and saplings, skunk cabbage (*Symplocarpus foetidus*), and wild lily-of-the-valley (*Maianthemum canadense*) in the herbaceous stratum. The southern portion of the wetland is a palustrine emergent wetland (PEM). Vegetation in the lower portions of these channels is maintained by the Airport to discourage wildlife use. Vegetation includes common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*) and some skunk cabbage.

Watercourses: There are two short segments of a small, inland, perennial watercourse in the northwest portion of the Project Area (**Figure 4.2**). The watercourse areas are within maintained portions of the Airport and flow off site to the north. The watercourse is human-made, steep sided channels which contain wet vegetation in the lower portions near water levels, and cool season grassland vegetation near the upper levels of the banks.

Paved Surfaces: This community includes paved surfaces of the existing runways, taxiways, vehicle service road, and concrete pad.

Wildlife

Wildlife pose a risk to aircraft and are actively discouraged on the Airport property. The Airport perimeter fence is designed to provide safety and security by deterring wildlife from entering the active airfield and becoming a safety hazard to aircraft. Wildlife found in the Project Area consists of small mammals and birds.

4.3.2 Federal Threatened and Endangered Species

The potential occurrence of Federally-listed threatened and endangered species in the Project Area was evaluated using the United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online system on August 15, 2024. The IPaC official species list for the Project Area is included in **Appendix C**. Two species of mammals and one species of insect were identified as potentially occurring on or in the vicinity of the Project Area. No designated critical habitats were identified in the Project Area.

The Northern Long-eared Bat (NLEB) (*Myotis septentrionalis*, Federal and State endangered) was included in the IPaC official species list. The CT DEEP map of NLEB observations by town indicates there are known NLEB hibernacula in East Granby (CT DEEP, July 24, 2023). No NLEB hibernacula are known to occur in Windsor Locks. There are no caves or mines in the Project Area that could provide potential hibernacula for the NLEB. Additionally, there are no mature trees in the Project Area that could provide potential summer roosting habitat for this species, although some sapling and shrub size trees are present.

The Tricolored Bat (*Perimyotis subflavus*, federal Proposed Endangered) was recently proposed for listing under the Endangered Species Act (ESA) and is included in the IPaC official species list. Like the NLEB the Tricolored Bat hibernates in caves and mines. There are no caves or mines in the Project Area that could provide potential hibernacula for this species. The Tricolored Bat roosts primarily among leaf clusters of live or recently dead deciduous hardwood trees.¹² There are no mature trees in the Project Area that could provide potential summer roosting habitat for this species.

¹² Tricolored Bat Frequently Asked Questions, available at: <https://www.fws.gov/story/2022-09/tricolored-bat-frequently-asked-questions###3>



Sources: FHI Studio, Maxar imagery, Created by C&S Engineers, Inc.



Figure 4.2 | Wetlands & Watercourses

EA for Taxiway T Extension

- Project Area
- State & Federal Wetland
- Inland Perennial Watercourse

Note: wetlands and watercourses delineated by FHI Studio and TRC Companies



The candidate species Monarch Butterfly (*Danaus plexippus*) was also included in the IPaC official species list. Candidate species have no current protections under the ESA and do not need to be considered in an effects analysis. In addition, the mown grass and paved areas of the Airport do not provide Monarch Butterfly breeding and roosting habitat.

4.3.3 Essential Fish Habitat

There are no watercourses or waterbodies in the Project Area that could provide Essential Fish Habitat (EFH).

4.3.4 Migratory Birds

The IPaC query provided a list of 16 migratory bird species that may occur on, or in the vicinity of, the Project Area. The birds listed by the IPaC report in **Appendix C** are species of particular concern either because they occur on the USFWS Birds of Conservation Concern list or warrant special attention. These migratory bird species include:

- ◆ Bald Eagle (*Haliaeetus leucocephalus*)
- ◆ Black-billed Cuckoo (*Coccyzus erythrophthalmus*)
- ◆ Blue-winged Warbler (*Vermivora pinus*)
- ◆ Bobolink (*Dolichonyx oryzivorus*)
- ◆ Canada Warbler (*Cardellina canadensis*)
- ◆ Chimney Swift (*Chaetura pelagica*)
- ◆ Eastern Whip-poor-will (*Antrostomus vociferus*)
- ◆ Golden Eagle (*Aquila chrysaetos*)
- ◆ Grasshopper Sparrow (*Ammodramus savannarum*)
- ◆ Lesser Yellowlegs (*Tringa flavipes*)
- ◆ Prairie Warbler (*Dendroica discolor*)
- ◆ Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- ◆ Rusty Blackbird (*Euphagus carolinus*)
- ◆ Scarlet Tanager (*Piranga olivacea*)
- ◆ Semipalmated Sandpiper (*Calidris pusilla*)
- ◆ Wood Thrush (*Hylocichla mustelina*)

Potential habitat for the blue-winged warbler and prairie warbler occurs in the northwest portion of the Project Area where edge habitat exists along the wetland. The bobolink and grasshopper sparrow utilize grassland habitats which are present in the Project Area.

4.3.5 State Designated Threatened, Endangered, or Special Status Species

The 2023 Draft RSMP and its appendices provide the findings of rare species surveys for the entire Airport property and summarize the CT DEEP Natural Diversity Database (NDDB) correspondence for various other projects proposed at the Airport. The *Rare Species Habitat Assessment and Survey Findings* report (included as Appendix A of the 2023 Draft RSMP) was utilized in assessing the State-listed species that potentially occur in the Project Area. The most recent NDDB mapping (June 2024) indicates that most of the Project Area is within an NDDB polygon (**Figure 4.3**).



Sources: CT DEEP, FHI Studio, Maxar imagery. Created by C&S Engineers, Inc.



Figure 4.3 | NDDB Areas

EA for Taxiway T Extension

 Project Area

 Natural Diversity Database (NDDB) Area, December 2023



State-listed Plant and Invertebrate Species

The 2023 Draft RSMP indicates the following State-listed plants and invertebrates were identified as having the potential to occur in the Project Area:

Low Frostweed (*Crocanthemum propinquum*, State special concern): Low frostweed inhabits open, sandy soils of woodlands, roadsides, clearings, dry fields, and sandplains. Although this species was not documented in the Project Area, two areas of potential high-quality habitat for this species were identified in the Project Area.

Rare Tiger Beetles: Four species of tiger beetles have been documented at the Airport of which the only State-listed species is the big sand tiger beetle (*Cicindela Formosa*, State-listed special concern). The big sand tiger beetle inhabits open sandy habitats with small areas of vegetation nearby. Several areas of potential big sand tiger beetle habitat, including high quality habitat, were identified in the Project Area. The big sand tiger beetle was not documented as occurring in the potential habitat areas in the Project Area based on previous field surveys.

Rare Ground Beetles: Two species of rare ground beetles (*Brachinus cyanipennis* and *Harpalus erraticus*) were documented on the Airport property during studies conducted in 2003 but information on where they were documented was not available. Subsequent studies were completed in 2020, which did not identify individual species within the Project Area but noted several areas of potential higher quality ground beetle habitat in the Project Area.

Rare Lepidoptera: Six species of rare lepidoptera have been documented at the Airport, five of which are associated with open sandplain grasslands and barrens. Several areas of potential higher quality habitat for rare Lepidoptera were identified in the Project Area. The following three species were near, but not within, the Project Area:

- ◆ Phyllira Tiger Moth (*Grammia phyllira*, State endangered)
- ◆ Violet Dart Moth (*Euxoa violaris*, State special concern)
- ◆ Showy Flower (*Schinia spinosae*, State special concern)

Grassland Birds

The following eight species of State-listed grassland birds are noted as potentially occurring in the Project Area:

- ◆ Grasshopper Sparrow (State endangered)
- ◆ Vesper Sparrow (*Pooecetes gramineus*, State endangered)
- ◆ Savannah Sparrow (*Passerculus sandwichensis*, State special concern)
- ◆ Upland Sandpiper (*Bartramia longicauda*, State endangered)
- ◆ Eastern Meadowlark (*Sturnella magna*, State threatened)
- ◆ Bobolink (State endangered)
- ◆ Horned Lark (*Eremophila alpestris*, State endangered)
- ◆ American Kestrel (*Falco sparverius*, State special concern)

High quality warm season grassland nesting and foraging habitat for these grassland birds is present within the Project Area.

4.3.6 Summary

There are no Federally-listed species or essential fish habitat located within the Project Area. There is the potential habitat for migratory birds and State-listed species to occur within the Project Area. As a result, discussion related to species impacts will be discussed further in **Section 5 – Environmental Consequences**.

4.4 Climate

Climate change is a global phenomenon that can have local impacts.¹³ Scientific measurements show that Earth's climate is warming, with concurrent impacts including warmer air temperatures, increased sea level rise, increased storm activity, and an increased intensity in precipitation events. Increasing concentrations of GHG emissions in the atmosphere affect global climate.^{14, 15} GHG emissions result from anthropogenic sources, including the combustion of fossil fuels. GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and fluorinated gases.¹⁶ CO₂ is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years. Anthropogenic sources of GHG emissions include the combustion of fossil fuels.

Earth's global temperature has risen by 1.5°F over the past century and is projected to continue to rise.¹⁷ Small changes in the global temperature over time can translate into large and potentially dangerous shifts in climate and weather on a global scale and even at the local level. Many states have seen changes in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves.¹⁸

4.4.1 Regulatory Background

Research has shown that there is a direct link between fuel combustion and GHG emissions. Therefore, sources that require fuel or power at an airport are the primary sources that would generate GHGs including construction emissions.

Federal

Per FAA Order 1050.1F, the discussion of potential climate impacts should be documented in a separate section of the NEPA document, distinct from air quality.¹⁹ Where the proposed action or alternative(s) would result in an increase in GHG emissions, the emissions should be assessed either qualitatively or quantitatively. The CEQ issued the most recent interim *NEPA Guidance on Considerations of Greenhouse Gas Emissions and*

¹³ U.S. Environmental Protection Agency, Climate Change Division, Office of Atmospheric Programs, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3*, 2009, <https://www.epa.gov/ghgemissions/technical-support-document-endangerment-and-cause-or-contribute-findings-greenhouse>.

¹⁴ Global warming potentials are based on the latest Intergovernmental Panel on Climate Change (IPCC), Sixth Assessment Report (AR6), March 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_07_Supplementary_Material.pdf.

¹⁵ U.S. Global Change Research Program, *Global Climate Change Impacts in the United States*, 2009, <http://www.globalchange.gov/what-we-do/assessment/previous-assessments/global-climate-change-impacts-in-the-us-2009>.

¹⁶ U.S. Environmental Protection Agency, *Overview of Greenhouse Gases*, <http://www3.epa.gov/climatechange/ghgemissions/gases.html>.

¹⁷ <https://www.aqhelp.com/AQdocs.html>

¹⁸ <https://aqhelp.com/Documents/FINAL%20-%20AF%20AQ%20EIAP%20Guide%20Vol%201%20-%202019.pdf>

¹⁹ https://www.faa.gov/sites/faa.gov/files/about/office_org/headquarters_offices/apl/3-climate.pdf

Climate Change to assist agencies in analyzing GHG and climate change effects of their proposed actions. This guidance recommends consideration of: (1) the potential effects of a proposed action or its alternatives on climate change as indicated by its GHG emissions; (2) the implications of climate change for the environmental effects of a proposed action or alternatives²⁰. The overall reduction of aviation related GHG emissions impacts on climate is a goal, but it is not a regulatory mandate. This interim GHG guidance, effective upon publication, builds upon and updates CEQ's 2016 *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* ("2016 GHG Guidance"), highlighting best practices for analysis grounded in science and agency experience.²¹ CEQ issued this guidance to provide for greater clarity and more consistency in how agencies address climate change in NEPA reviews.

State

Through the State's Greenhouse Gas Emissions Inventory, first published in 2003, the CT DEEP provides a report card on 30 years of GHG emissions in the state, from 1990 to 2020, and tracks progress toward the state's statutory GHG emission-reduction targets.²² As of 2021, transportation remains the top emitter in the state and has not decreased significantly from 1990 level while residential heating has replaced the electric sector as the second-largest emitter in the state; and electric-sector emissions continue to decrease. Overall, Connecticut's GHG emissions peaked in 2004 at nearly 53 MMTCO_{2e} and since have been declining 0.9 MMTCO_{2e} a year on average.

4.4.2 Summary

The Proposed Project has the potential to increase emissions due to construction activities. As a result, discussion related to climate impacts will be discussed further in **Section 5 – Environmental Consequences**.

4.5 Coastal Resources

Based on a review of the USFWS Coastal Barrier Resources System (CBRS) Mapper, the Project Area is not located within, or in the vicinity of a CBRS Buffer Zone, a CBRS Prohibition, a CBRS system unit, or an otherwise protected area. In addition, based on review of CT DEEP GIS Open Data Website, the Airport is not located within a Coastal Zone boundary.²³

4.5.1 Summary

The Project Area is not located within a federal or state coastal zone. There will be no significant impact on coastal resources and no further discussion is included in this EA.

²⁰ <https://www.govinfo.gov/content/pkg/FR-2023-01-09/pdf/2023-00158.pdf>

²¹ CEQ, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 81 FR 51866 (Aug. 8, 2016), https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf.

²² Connecticut's greenhouse gas inventory relies heavily on data sets compiled by the U.S. EPA and released annually in its State Inventory Tool (SIT). The latest SIT was released in 2023 and contains data necessary to produce this inventory through 2020. Some data are available for 2021 and have been used with SIT calculators to produce a preliminary estimate of 2021 GHG emissions. Complete data for 2021 are expected by mid-2023.

²³ <https://deepmaps.ct.gov/datasets/CTDEEP::coastal-area/about>

4.6 Historical, Architectural, Archeological, and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the ACHP. Revised regulations, Protection of Historic Properties (36 CFR Part 800), became effective January 11, 2001.

Archeological & Cultural Resources: Coordination with the Connecticut State Historic Preservation Office (SHPO) indicated that there are no known archeological sites located in the Project Area, that the Project’s activities will occur within previously disturbed areas, and it is therefore unlikely that the Proposed Project’s activities will impact archeological deposits (see letter dated September 26, 2023, in **Appendix A**).

Historic Buildings and Sites: The Proposed Project does not contain nor is it located near any properties listed in the National Register of Historic Places. The closest listed National Register of Historic Places property to the Project Area is the East Granby Historic District, which is located off-airport approximately 0.7 miles west of the Proposed Project. Coordination with SHPO indicated that “no historic properties will be affected by the proposed undertaking” (see letter dated September 26, 2023, in **Appendix A**).

Tribal Resources: There are five Eastern Woodland Native American tribes recognized by the State of Connecticut but not federally – the Schaghticoke, Paucatuck Eastern Pequot, Mashantucket Pequot, Mohegan, and Golden Hill Paugussett. **Table 4-2** summarizes the location of these Tribal Nations and properties. None are located in the Project Area or its vicinity.

Table 4-2 – Tribal Nations in Connecticut

Tribal Nation	Properties/Location
Schaghticoke Tribal Nation (STN)	Tribal Nation located in Kent, CT ²⁴
Paucatuck Eastern Pequot/Eastern Pequot Tribal Nation (EPTN)	Tribal Nation located in North Stonington, CT ²⁵
Mashantucket (Western) Pequot Tribal Nation	Tribal Nation is located in Ledyard CT. Various Tribal Nation owned properties are located in Ledyard, North Stonington, Groton, and Norwich CT and include the Mashantucket Pequot museum and Research Center; Foxwoods Resort Casino; Lake of Isles Golf Course; Spa at Norwich Inn; Pequot Outpost; and the Pequot Health Care/Pharmaceutical Network. ²⁶
Golden Hill Paugussett Tribal Nation	Includes two Tribal Nations, one located in Trumbull, CT and the other in Colchester, CT. ²⁷
Mohegan Tribal Nation	Tribal Nation is located in Uncasville, CT.

Source: C&S Companies, Inc., 2024

²⁴ Schaghticoke Tribal Nation. Accessible at: <http://schaghticoke.com/> Accessed 2/2/2024.

²⁵ Native Northeast Portal. *Eastern Pequot Tribal Nation*. Accessible at: <https://nativenortheastportal.com/community/eastern-pequot-tribal-nation> Accessed 2/2/2024.

²⁶ The Mashantucket (Western) Pequot Tribal Nation. *Enterprises*. Accessible at: <https://www.mptn-nsn.gov/enterprises.aspx> Accessed 2/2/2024.

²⁷ CT Department of Education. *Golden Hill Paugussett Tribal Nation*. Accessible at: <https://portal.ct.gov/SDE/Publications/Teaching-Native-American-Studies/Golden-Hill-Paugussett-Tribal-Nation> Accessed 2/2/2024.

National Historic Landmarks: The National Historic Landmarks (NHL) Program sets to designate and preserve historic properties such as historic buildings, sites, structures, objects, and districts that illustrate the heritage of the United States. Of Connecticut's 65 designated NHLs, none are located in the Project Area or its vicinity. NHLs located within municipalities that the Airport occupies include the Oliver Ellsworth Homestead in Windsor Township (located approximately 4 miles southwest of BDL) and the Old Newgate Prison in Granby Township (located approximately 2.7 miles northwest of BDL).

4.6.1 Summary

The Proposed Project is anticipated to have no effect on historical, architectural, archeological, and cultural resources. No further discussion of these resources will be included in the EA.

4.7 Department of Transportation Act, Section 4(f) and Section 6(f)

According to Chapter 5 of the FAA *1050.1F Desk Reference*, Section 4(f) properties include significant:

- ◆ Parks and recreational areas of national, state, or local significance that are both publicly owned and open to the public.
- ◆ Publicly owned wildlife and waterfowl refuges of national, state, or local significance that are open to the public.
- ◆ Historic sites of national, state, or local significance in public or private ownership regardless of whether they are open to the public.

Public Parks, Recreation Areas, and Wildlife Refuges: No public parks, recreation areas, or wildlife refuges are located in the Project Area or its vicinity. Public parks in the Airport's vicinity are shown on **Figure 4.9** in **Section 4.13.3**.

Historic Sites: As discussed above in **Section 4.6**, that there are no historic sites in the Project Area. A Finding of No Effect letter from SHPO is included in **Appendix A**.

Section 6(f) Properties: Section 6(f) applies to recreational properties that have been federally-funded by the Land and Water Conservation Fund (LWCA) Act. The LWCA database indicates that there are no eligible Section 6(f) properties located in the Project Area or its vicinity. The closest Section 6(f) property to the Proposed Project is Welch Park, located in the Town of Windsor approximately 1.7 miles south of BDL.²⁸

4.7.1 Summary

Based on the information detailed above, no Section 4(f) or 6(f) resources are located in the Project Area or its vicinity. Therefore, there will be no significant impact to Section 4(f) or 6(f) resources and no further discussion is included in this EA.

4.8 Farmlands

Defined in Chapter 6 of the FAA *1050.1F Desk Reference*, farmlands are agricultural areas considered important and protected by federal, state, and local regulations. Important farmlands include all pasturelands, croplands, and forests considered to be prime, unique, or of statewide or local importance.

²⁸ LWCF Coalition. Map of LWCF. Accessible at: <https://lwcfcoalition.org/map> Accessed 2/2/2024.

The Farmland Protection Policy Act (FPPA) regulates federal actions with the potential to convert farmland to non-agricultural uses. Specifically, the Act regulates farmland identified as prime, unique, or of statewide or local importance. The Natural Resources Conservation Service (NRCS) has the final authority for designating important farmlands and keeps lists of important farmlands for each state.

According to the U.S. Department of Agriculture (USDA), *prime farmland* is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It has the soil quantity, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods.

Unique farmland, as defined by the USDA, is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when property managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration.

Farmland of Statewide Importance is land, in addition to prime and unique farmland, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land is determined by the appropriate state agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yield as prime farmlands if conditions are favorable.

Farmland of local importance is used for areas that are not identified as having national or statewide importance, but are still used for the production of food, feed, fiber, forage, and oilseed crops. This land is designated for agriculture by appropriate local agencies and ordinances.

Review of the USDA Natural Resources Conservation Survey (NRCS) Web Soil Survey Custom Soil Resources Report indicates that the Project Area includes soil types that are classified as prime farmland and farmland of statewide importance (**Appendix D**). However, the Project Area is located within an active airfield, where there are no soils being actively used for farmland and there are no farmlands in the vicinity of the Project Area. Therefore, no impacts to farmland are anticipated.

4.8.1 Summary

The Project Area is located within an active airfield. Although there are soil types in the Project Area that are suitable for farming, there are no existing farmland uses in the Project Area or its vicinity. There will be no significant impact to farmlands and no further discussion is included in this EA.

4.9 Hazardous Materials, Solid Waste and Pollution Prevention

4.9.1 Hazardous Materials

Hazardous materials are products or waste regulated by the EPA and CT DEEP. These include substances regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and regulations for solid waste management, above ground storage tanks (ASTs), and underground storage tanks (USTs).

FAA Order 1050.1F requires evaluation of waste streams generated by a project; potential hazardous materials that could be used during construction and operation of a project and applicable pollution

prevention procedures; potential to encounter existing hazardous materials at contaminated sites during construction, operation or decommissioning of a project; and the potential to interfere with any ongoing remediation of existing contaminated sites within or in the immediate vicinity of the Project Area.

The following resources were reviewed to determine the potential to encounter hazardous materials during construction:

- ◆ An environmental database report, which includes state (CT) and federal (EPA) databases.
- ◆ The CT DEEP Connecticut Environmental Land Use Restrictions online mapping tool ([Connecticut Environmental Land Use Restrictions \(arcgis.com\)](http://ConnecticutEnvironmentalLandUseRestrictions.arcgis.com)).
- ◆ The USEPA Envirofacts online search tool ([Envirofacts | US EPA](http://Envirofacts.US EPA)).
- ◆ United States Air Force (USAF) online Administrative Record Search (<https://ar.afcec-cloud.af.mil/Search>).
- ◆ *Phase I Environmental Site Assessment, Bradley International Airport, Windsor Locks, Connecticut*, prepared by TRC, September 2012 (referred to as 2012 Phase I ESA)
- ◆ Email correspondence with Airport staff.

The environmental database report (EDR) indicates that the Airport is listed in numerous databases. The 2012 Phase I ESA was also reviewed and listed several areas of interest (AOI). **Figure 4.4** shows the location of sites of significance from both the EDR and 2012 Phase I ESA. Descriptions of the items of significance are as follows:

- ◆ **Formerly Used Defense Site (FUDS).** The Airport was formerly Bradley Military Field, which consisted of 1,609.1 acres leased from the State of Connecticut beginning in April 1941. This constituted the runways and bulk of the installation area. During the period 1941 to 1943, the Government made further acquisitions totaling 376.105 acres fee by purchase and condemnation, an additional 95.7 acres lease for total of 1,704.8 acres leased, 54.54 acres easement, 2.47 acres permit, and license for 0.08 acre. At the end of WWII, Bradley Field was closed and accountability was assumed by the War Assets Administration in September 1947. The land was surrendered to the State of Connecticut in October 1948 for commercial airport purposes and as a training field for Air National Guard (ANG) units. The State of Connecticut is the current owner.
- ◆ **PFAS Contamination Site Tracker:** compiled by the Social Science Environmental Health Research Institute (PFAS SSEHRI). The report indicates that 700-800 gallons of PFAS was used at a crash site (location not indicated). According to Airport staff, the crash occurred near the glycol recycling facility located approximately 3,000 feet to the south of the center of the Project Area. It also mentions a June 2019 spill of “tens of thousands” of gallons of PFAS foam. According to an NBC news website, 50,000 gallons of foam was released from a hangar at the Airport and it reached the Farmington River.²⁹ According to Airport staff, the spill occurred at the Signature Aviation Hangar (Bldg #85-728) located at 100 Signature Way, which is approximately 1,700 feet west/ southwest of the Project Area.
- ◆ **PFAS IND Database:** The site is listed in the database because the Airport is involved in a line of business that utilized PFAS. The Connecticut Fire Academy is also listed in the PFAS IND database. Also, according to the 2012 Phase I ESA, a former burn pit is located approximately 0.5 miles to the north along the east side of an unnamed road that parallels Perimeter Road. Historical records indicate significant soil and groundwater contamination in the area, and that the extent of the impacts is not known. According to Airport staff, groundwater flow is generally to the southeast, and groundwater on the northern portion of the Airport has been documented to flow north. Surface water flow in the vicinity of the Project is to the north away from the Project Area. According to Airport staff, stormwater outfalls 9, 10, 11, 12, 13, and 13A are located north of Perimeter Road. As such, the fire academy and burn pit are not believed to be a concern to the Project.

²⁹ <https://www.nbcconnecticut.com/news/local/the-dangers-of-pfas-why-a-chemical-spill-into-farmington-river-is-still-a-concern-months-later/171330/>

- ◆ **Hazardous Materials Information Reporting System (HMIRS):** lists numerous spills associated with packaging issues of shipped products containing chemicals. The spills occurred within package handling facilities at the Airport. Although the locations are not clear it is suspected that the spills occurred within the UPS facility located approximately 0.25 miles east/northeast or at the USPS facility located approximately 0.5 miles south of the Project Area.
- ◆ **SPILLS:** The SPILLS database lists numerous spills for the Airport and Signature Flight Support. Each spill is listed as closed. Signature Flight Support is located approximately 0.25 miles south/southwest of the Project Area.
- ◆ **UST:** The underground storage tank (UST) database lists numerous former tank systems for the Airport. The tanks were generally closed between the late 1980s and the early 1990s, with a large number being closed in 1987. Some tanks were removed from the ground and some were closed in place. The tanks generally contained gasoline, diesel, and heating oil. The tanks were generally a few thousand gallons in capacity, although several tanks greater than 20,000 gallons were closed. The 2012 Phase I ESA provides a high level of detail regarding the locations and closures of the USTs. According to the 2012 Phase I ESA, the following tanks were located in proximity to the Project Area:
 - ◆ Former VORTAC facility located within the footprint of the northern portion of the Project Area. A small generator building was formerly present along with a 550-gallon diesel UST. Confirmatory soil samples collected during the tank closure demonstrated compliance with applicable cleanup criteria.
 - ◆ The midfield radar island, located approximately 300 feet north/northeast, currently and formerly is/was the location of USTs. A 1,000-gallon diesel AST is currently present. Three former USTs were present, two of unknown size and contents and one 1,000-gallon diesel. No closure documentation is available.
- ◆ **Leaky Underground Storage Tank (LUST)** includes listings for:
 - ◆ Lear Jet/Bombardier, for a November 2008 incident involving the overfill of a diesel UST. 175 gallons was spilled. The tank and some contaminated soil were removed and soil and groundwater were sampled. The LUST case is closed.
 - ◆ Canadian Air Terminal, for a 1993 incident involving the release of 20,000 gallons of jet fuel. The matter is listed in the “Investigation” phase.
 - ◆ General Aviation Fuel Farm, for a 1994 incident. 100 cubic yards of soil was removed. The case is in the “Cleanup Initiated” phase.
 - ◆ Camp Hartell for a 1991 incident involving the release of heating oil from an UST. The LUST case is closed.
- ◆ **State Hazardous Waste Site (SHWS).** No data is provided.
- ◆ **State Discovery and Assessment Database (SDAD)** lists sites where hazardous waste may have been disposed. Sites listed include AMR Combs Inc., Bradley Flight Limited, the Airport, Canadair Challenger, CT ANG, Army Aviation Support Facility, and Learjet. Very little information is provided, but the listings appear to be associated with other databases such as SPILLS and LUST.
- ◆ **CERCLIS and SEMS:** Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and Superfund Enterprise Management System (SEMS) for CT Air National Guard. CERCLIS discovery listed for 1991, Site Inspection and Preliminary Assessment in 1997, Site Reassessment and Cleanup Activity in 2001. Report indicates the site is not on the NPL.
- ◆ **USAF Administrative Record:** The USAF Air Force Civil Engineer Center (AFCEC) Administrative Record website contains 260 documents for the Airport. Many of the documents pertain to the ANG facility located directly south of Signature Flight Support, 0.6 miles south of the Project Area. Final closeout letters for many of the sites are available and according to mapping, the ANG facility is located cross-gradient of the Proposed

Project. There are also a significant number of documents regarding PFAS assessments/investigations, which also focus on the ANG area. According to the 2018 report *Final Report, FY16 Phase I Regional Site Inspections for Perfluorinated Compounds*, five areas within the ANG area, and the base boundary well were investigated for PFAS. No further action was recommended for four of the groundwater sampling locations, while soil and groundwater investigations to determine the nature and extent of PFAS impacts was recommended for two locations.

- ◆ The former and current transformers within the vicinity of the Project Area are listed below. There are no known leakages associated with the identified transformers.
 - ◆ At the former VORTAC facility, but Airport staff indicated it is no longer present.
 - ◆ Directly north of the former VORTAC facility, but Airport staff indicated it is no longer present.
 - ◆ ASR-9 in the midfield radar island.
 - ◆ ASR-3 in the midfield radar island.
- ◆ According to the 2012 Phase I ESA, an aircraft engine test stand was formerly located within the footprint of the northern portion of the Project Area. Although no documentation was identified that indicated a spill, this type of activity is likely to have resulted in releases of fuels or oils.
- ◆ The Fire Station and Fire Academy are listed as AOIs in the Phase I ESA. Chemical storage, generators, ASTs, USTs, transformers, and former ammunition buildings were listed for this area. However, no recognized environmental conditions (RECs) were listed. This area is located approximately 0.3 miles north of the Project Area. Surface water flow in the vicinity of the Proposed Project is to the north away from the Project Area. According to Airport staff, stormwater outfalls 9, 10, 11, 12, 13, and 13A are located north of Perimeter Road.

4.9.2 Solid Waste

USA Waste & Recycling is the current solid waste contractor. Increases in solid waste generation and disposal are anticipated as a result of the Proposed Project. Specifically, an increase in solid waste from construction activities (i.e., construction and demolish debris) at the Airport would occur. It is expected regional facilities (i.e., landfills, incinerators, recycling centers, waste-to-energy) have sufficient capacity to handle the anticipated volumes of waste generated by construction of the Proposed Project. Solid waste at the Airport, including solid waste associated with the Proposed Project, will continue to be handled, and disposed of consistent with local, state, and federal regulations. Construction and demolition debris (C&D) associated with the Proposed Project would be recycled to the greatest extent practicable. Excavated material would be disposed of in accordance with federal, state, and local regulations.



Figure 4.4

Phase I ESA Sites of Significance

- Project Area
- Airport Property Line



N



0 500 1,000 2,000 Feet

1 in. = 1,000 ft.
When printed at 11 in. by 17 in.



EA for Taxiway T Extension

Sources: Basemap from ESRI AERIAL. Created by C&S Engineers, Inc.

Maxar

4.9.3 Pollution Prevention

The Airport has a State Pollutant Discharge Elimination System (SPDES) Permit issued by the CT DEEP under the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of stormwater that might contain traces of harmful pollutants. In addition, the Airport is responsible for applying for a SPDES General Permit for Construction Activity that regulates potential pollution sources and harmful erosion.

4.9.4 Summary

The Proposed Project may involve the disturbance of contaminated materials. Therefore, further discussion regarding the potential impacts related to hazardous materials, solid waste, and pollution prevention is documented within **Section 5 – Environmental Consequences**.

4.10 Land Use

Defined in Chapter 9 of the FAA *1050.1F Desk Reference, Land Use* the compatibility of existing and planned land uses within an aviation or aerospace proposal. As described in Chapter 11 of the FAA *1050.1F Desk Reference, Noise and Noise-Compatible Land Use*, “land use” is usually associated with noise impacts. In addition to the impacts of noise, other potential impacts of FAA actions may also affect land use compatibility. This section includes identifying applicable state and/or local land use plans, land management plans, and/or zoning laws that might be relevant to land use in the Proposed Project.

For example, a change in runway configuration (e.g., runway extension) may require relocation of the runway protection zone (RPZ) into a residential area, resulting in the need to acquire houses to ensure land use compatibility. The compatibility of land uses near an airport may also need to be assessed to ensure those uses do not adversely affect safe aircraft operations. Examples of such land uses that may adversely affect those operations include municipal landfills (40 CFR § 258.10), wildlife refuges, wetland mitigation that may attract wildlife species hazardous to aviation, and unrestricted height zoning.

4.10.1 Zoning

The Airport is located within four municipalities, the Town of Suffield, the Town of Windsor Locks, the Town of East Granby, and the Town of Windsor. The Project Area is located entirely on-airport within the Towns of Windsor Locks and East Granby. **Figure 4.5** shows existing zoning designations in the Project Area and its vicinity. Zoning designations in which the Project Area is located are discussed as follows:

Town of Windsor Locks Zoning³⁰

- ◆ **Industrial Zone 1 (I-1):** According to Regulations for the Town of Windsor Locks, there are no expressly permitted uses in this zone. Allowable uses via Special Use Permit (SU) or Site Plan Design and Review (SP) include brew pubs, breweries, outdoor café seating, amusement enterprises (i.e., assembly hall, bowling center, billiard hall), business/professional offices, repair garages and shops, fire stations, multi-modal facilities, telephone exchange transformer stations, wholesale trade, newspaper and printing plants, bulk storage/warehouses, cold storage and distribution warehouses, fabrication/manufacturing/industrial research centers, banquet and catering facilities, indoor sports facilities, indoor valet parking, ad taxi/limousine/livery operations. There is no mention of Airport-specific uses for this district.

³⁰ Town of Windsor Locks. *Zoning Regulations Town of Windsor Locks, Connecticut, 2020 Printing*. Accessible at: <https://cdn.townweb.com/windsorlocksct.org/wp-content/uploads/2021/02/MASTER-ZR-FEBRUARY-2021-FINAL.pdf> Accessed 11/30/2023.

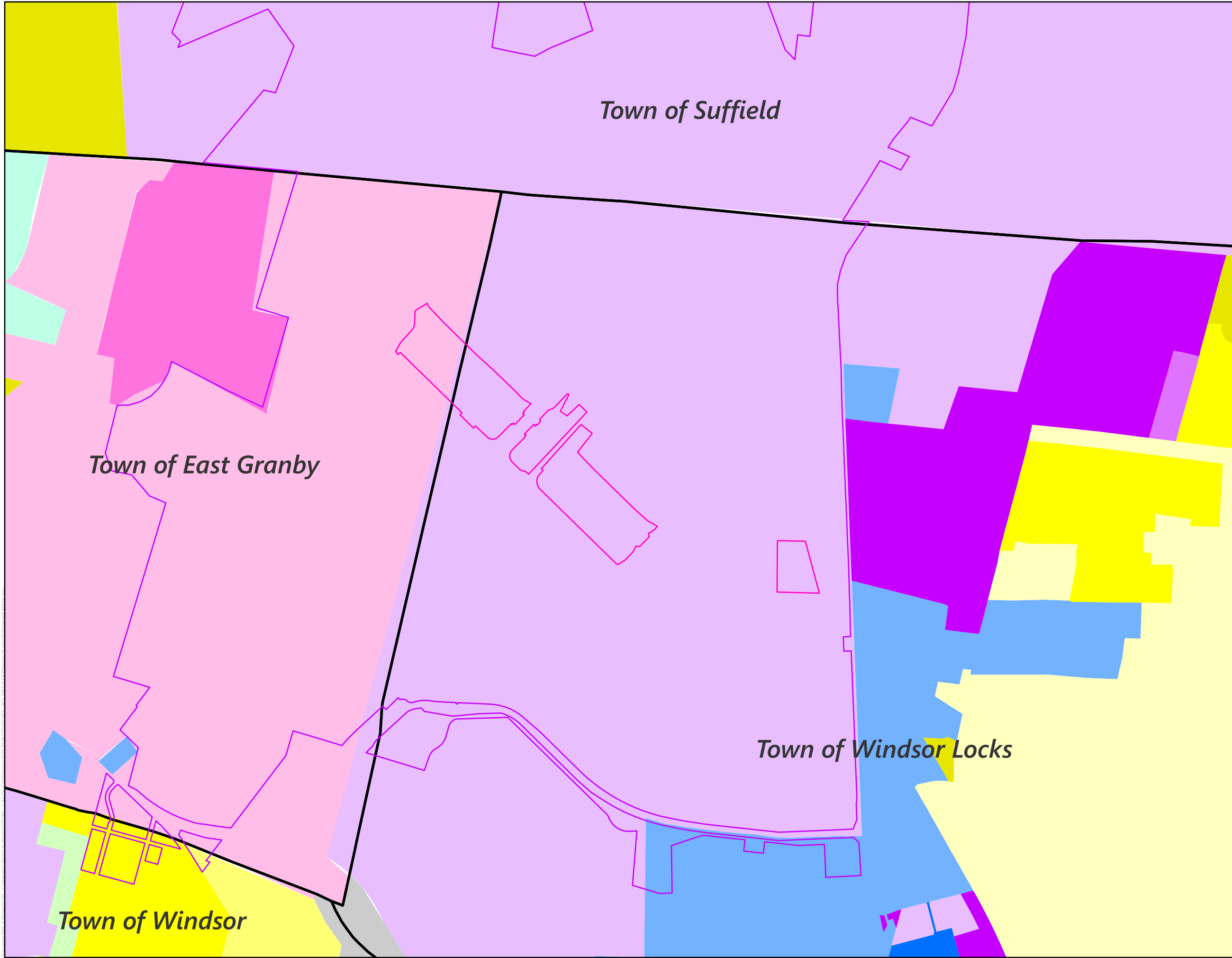
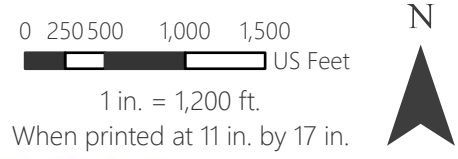


Figure 4.5

Zoning

- Project Area
- Airport Property Line
- Municipality
- Town of Windsor Zoning**
 - A - Residential
 - AA - Residential
 - AG - Agricultural
 - I - Industrial
 - Roadway
- Town of Suffield Zoning**
 - PDIP - Planned Development Industrial Park
 - R-25 - Residential 25,000 SF
- Town of East Granby Zoning**
 - A - Agriculture
 - B - Business
 - CP-A - Commerce Park A
 - CP-B - Commerce Park B
 - MFDR - Multi-Family Designed Residence
- Town of Windsor Locks Zoning**
 - A10Z - Airport Interchange Overlay Zone
 - B-1 - Business Zone 1
 - B-2 - Business Zone 2
 - B-DRD - Business Downtown Renewal District
 - I-1 - Industrial Zone 1
 - I-2 - Industrial Zone 2
 - I-3 - Industrial Zone 3
 - MFSD - Multiple Family Special Development Zone
 - R-A - Residence A Zone
 - R-AA - Residence AA Zone
 - R-B - Residence B Zone
 - R-DRD - Residence Downtown Renewal District



EA for Taxiway T Extension

Sources: Town of Windsor Locks Zoning Layer from Town of Windsor Locks.
Town of Windsor Zoning digitized from Town of Windsor Official Zoning Map September 2021.
Town of Suffield Zoning digitized from Town of Suffield Zoning Map 2022.
Town of East Granby Zoning Map digitized from Land Use Maps Zoning Map
Municipal boundaries from USCB TIGER 2022 County Subdivisions
Created by C&S Engineers, Inc., 2023

- ◆ **Airport Interchange Overlay Zone (AIOZ):** The purpose of this zone is to provide a legal framework for land use alternatives that provide for flexible development opportunities for land having high access to the Bradley Connector with Old County Road, Route 5, and South Center Street. Developers must apply for AIOZ designation with the Planning Commission and only limited areas throughout the Township (BDL areas within 2,500 feet of the aforementioned roads) are eligible. The AIOZ designation may waive and modify the underlying existing regulations to encourage a variety of uses, lot dimensions, and coverages which best promote development at the interface of the Airport corridor. Permitted uses generally include: multiple single family and multi-family dwelling; business/office/ financial institutions, hotels/motels, banquet and catering facilities, conference centers, full service restaurants, and retail.

Town of East Granby Zoning³¹

- ◆ **Commerce Park A (CP-A):** All uses in this district are required to undergo Site Plan approval. Permitted uses include businesses and professional offices, medical offices, research and development laboratories, light manufacturing/fabrication/processing and assembly of goods, warehouses, distribution centers, existing agricultural uses, and existing cemeteries. There is no mention of airport-specific uses for this district.

Airport Development Zone

Connecticut has three State-approved Airport Development Zones (ADZs) that provide economic incentives for compatible land use development within Airport proximity.³² Since 2015, administration of these zones has been under the Department of Economic and Community Development (DECD) after previously being under the jurisdiction of the CAA.³³

The BDL ADZ provides a tax abatement for companies that develop or acquire property in the zone and engage in manufacturing, manufacturing-related research and development, warehousing and distribution, and other-airport related businesses.³⁴ The extents of the BDL ADZ are shown in **Figure 4.6**. The Project Area is located on-airport property entirely within the BDL ADZ.

Correspondence with the CT DECD, and the Towns of Windsor Locks, Suffield, East Granby, and Windsor have not indicated that the Proposed Project will be incompatible with existing zoning designations (see **Appendix A**).

³¹ Town of East Granby. *East Granby Zoning Regulations*.

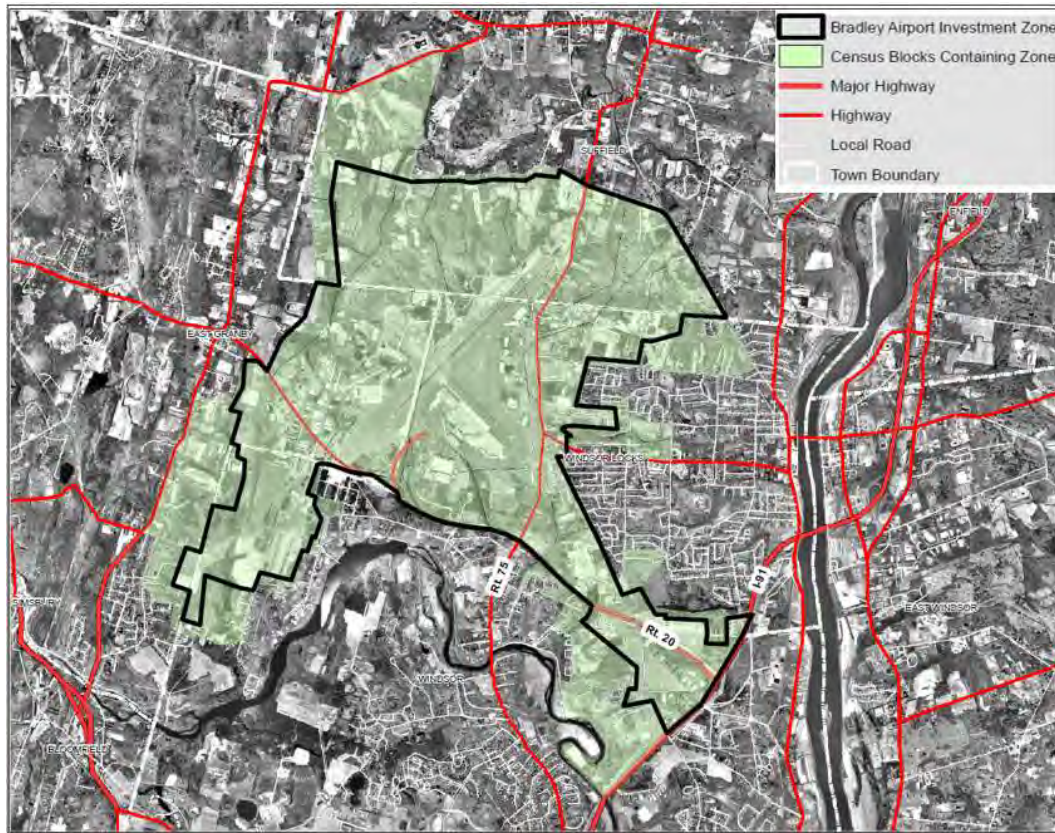
<https://eastgranbyct.org/docs/PDF%20Documents/Planning%20Zoning/LID/ZONEREGS-3-5-96%20with%20amendments%20to%206-18-16.pdf> Accessed 12/4/2023.

³² CT Official State Website. *Airport Development Zone*. Accessible at: https://portal.ct.gov/DECD/Content/Business-Development/06_Tax_Incentives/Enterprise-Zones/Airport-Development-Zone/Contact Accessed 11/30/2023.

³³ Connecticut Airport Authority. *Economic Development*. Accessible at: <https://ctairports.org/economic-development/development-zone-program/> Accessed 11/30/2023.

³⁴ Town of Windsor. *CT Department of Economic and Community development Bradley Airport Development Zone*. Accessible at: <https://townofwindsorct.com/app/uploads/sites/11/2017/09/Bradley-Development-Zone-PDF.pdf> Accessed 11/30/2023.

Figure 4.6 – Airport Development Zone



Source: The Capitol Region Council of Governments, April 9, 2009

4.10.2 Land Use

The Proposed Project is located entirely within Airport property. Land uses in the Project Area and its vicinity primarily consists of developed land (see **Figure 4.7**). The Project Area consists primarily of active airfield, including existing Taxiways W, C, C3, E, and N; a portion of Runway 6-24; and an existing vehicle service road (VSR). A haul route is proposed for the Proposed Project across or around the airfield (for Phase 1 and Phase 2, respectively) to an existing unused/vacant lot located on-airport east of Combs Gates Drive and west of Parking Lot 5B. The Proposed Project will not create long term land use changes in the Project Area or its immediate vicinity.

4.10.3 Summary

Given the above information, the Proposed Project will not cause a significant impact or change to existing land use designations on or surrounding Airport property. The Proposed Project does not include the type of development that would attract birds and wildlife (e.g., solid waste landfills, wastewater treatment facilities, spoil containment areas, etc.). No further discussion regarding land use or zoning is included in this EA.


4.11 Natural Resources and Energy Supply

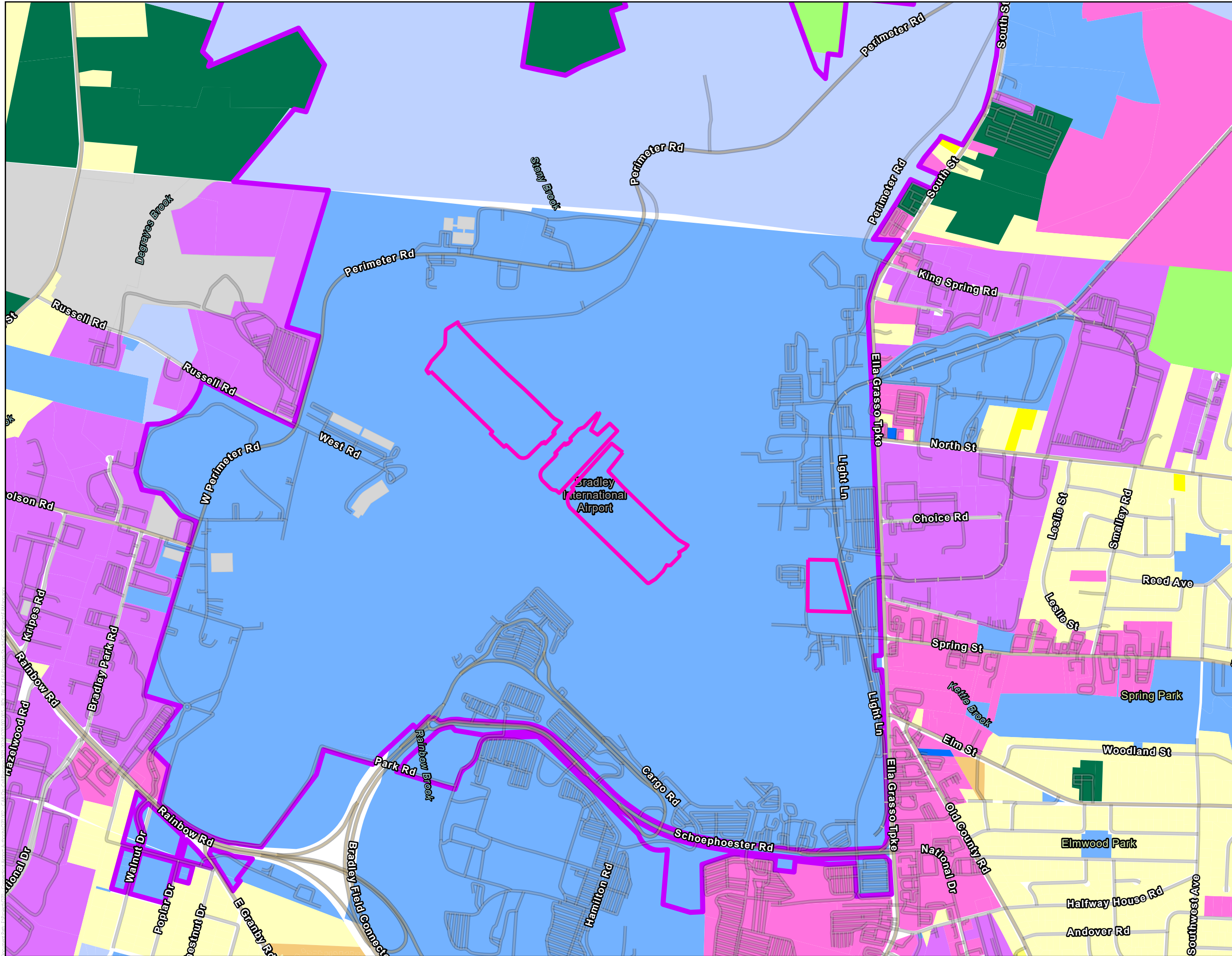
Defined in Chapter 9 of the FAA *1050.1F Desk Reference*, natural resources and energy supply provides an evaluation of a project's consumption of natural resources (such as water, aggregate, wood, etc.) and use of energy supplies (such as coal for electricity; natural gas for heating; and fuel for aircraft or ground vehicles).



Figure 4.7

Land Use

-  Airport Property Line
-  Project Area
- 2020 CRCOG Land Use
 -  Agriculture
 -  Commercial
 -  Condo
 -  Government / Non Profit
 -  Health / Medical
 -  Industrial
 -  Multi Family
 -  One Family
 -  Resource / Recreation
 -  Two Family
 -  Undeveloped
 -  Unknown



0 250 500 1,000 US Feet
1 in. = 1,200 ft.

When printed at 11 in. by 17 in.



EA for Taxiway T Extension

Land uses from 2020 DRCOG; Created by C&S Engineers, Inc., 2024

Potential impacts to energy requirements generally fall into two categories: those that relate to changed demands for stationary facilities and those that involve movement of air and ground vehicles. The Proposed Project has been reviewed to determine its potential impacts to utilities, consumable materials, and aircraft fuel consumption. The Proposed Project does not include:

- ◆ Major changes in stationary facilities that will increase large demands on local existing or planned utilities;
- ◆ The use of scarce or unusual materials to construct proposed facilities; or
- ◆ Significant changes to existing aircraft fuel use

As with any construction project, there will be short-term increases in electrical and gasoline usage to power construction equipment and for worker travel. Once operational, there will be a minor increase in consumption of electricity to power additional taxiway lighting. However, this increase in consumption is considered negligible. Given the information included above, there are no anticipated significant impacts to natural resources or energy supply demand at the Airport as a result of the Proposed Project.

Typical of asphalt paving projects, construction of the Proposed Project will utilize natural resources such as sand and aggregate. While not a natural resource, bituminous material will be used to generate the asphalt. Water consumption will increase for the periodic watering of dusty on-site travel routes and fuel consumption will increase during the operation of construction vehicles.

4.11.1 Summary

As with any construction project, there will be short-term increases in electrical and gasoline usage to power construction equipment and for worker travel. Once operational, consumption of natural resources will return to pre-construction levels. No further discussion regarding natural resources and energy supply is included in this EA.

4.12 Noise and Noise-Compatible Land Use

As described in Chapter 11 of the FAA *1050.1F Desk Reference*, noise is generally defined as unwanted sound. It may interfere with ordinary daily activities, such as communication, sleep or cause annoyance. A person's reaction to noise varies according to the duration, type, and characteristics of the source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. Noise may be intermittent or continuous, steady or impulsive, and it may be generated by stationary or mobile sources. Although aircraft are not the only source of noise in any area, they are readily identifiable to those affected by their noise emissions and are routinely singled out for special attention and criticism.

The Proposed Project will not:

- ◆ Increase the number of annual aircraft operations
- ◆ Change the current aircraft fleet mix by introducing new aircraft types or categories
- ◆ Change the current runway threshold locations or utilization

Therefore, a noise analysis is not required and there would be no permanent noise impacts.

Construction noise would temporarily increase sound levels in the immediate vicinity of construction and land grading. Pavement removal and grading operations are the noisiest, with such equipment generating noise levels as high as 75 to 95 dB within 50 feet of its operation. The Project Area is located near the center of the airfield along Runway 15-33. There are no residential areas near the Project Area. Due to the distances to the nearest noise-sensitive areas and noise levels associated with airfield operations, there would be a minimal-to-no temporary effect on off-airport noise-sensitive sites.

The compatibility of existing and planned uses near an airport is usually associated with the extent of the airport's noise impacts, as described in Chapter 11 of the FAA *1050.F Desk Reference*. Since the Proposed Project does not require a noise analysis to assess noise impacts, noise related land use compatibility impacts are not anticipated.

4.12.1 Summary

Noise and compatible land use impacts related to the Proposed Project are not anticipated and no further discussion will be included in this EA.

4.13 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

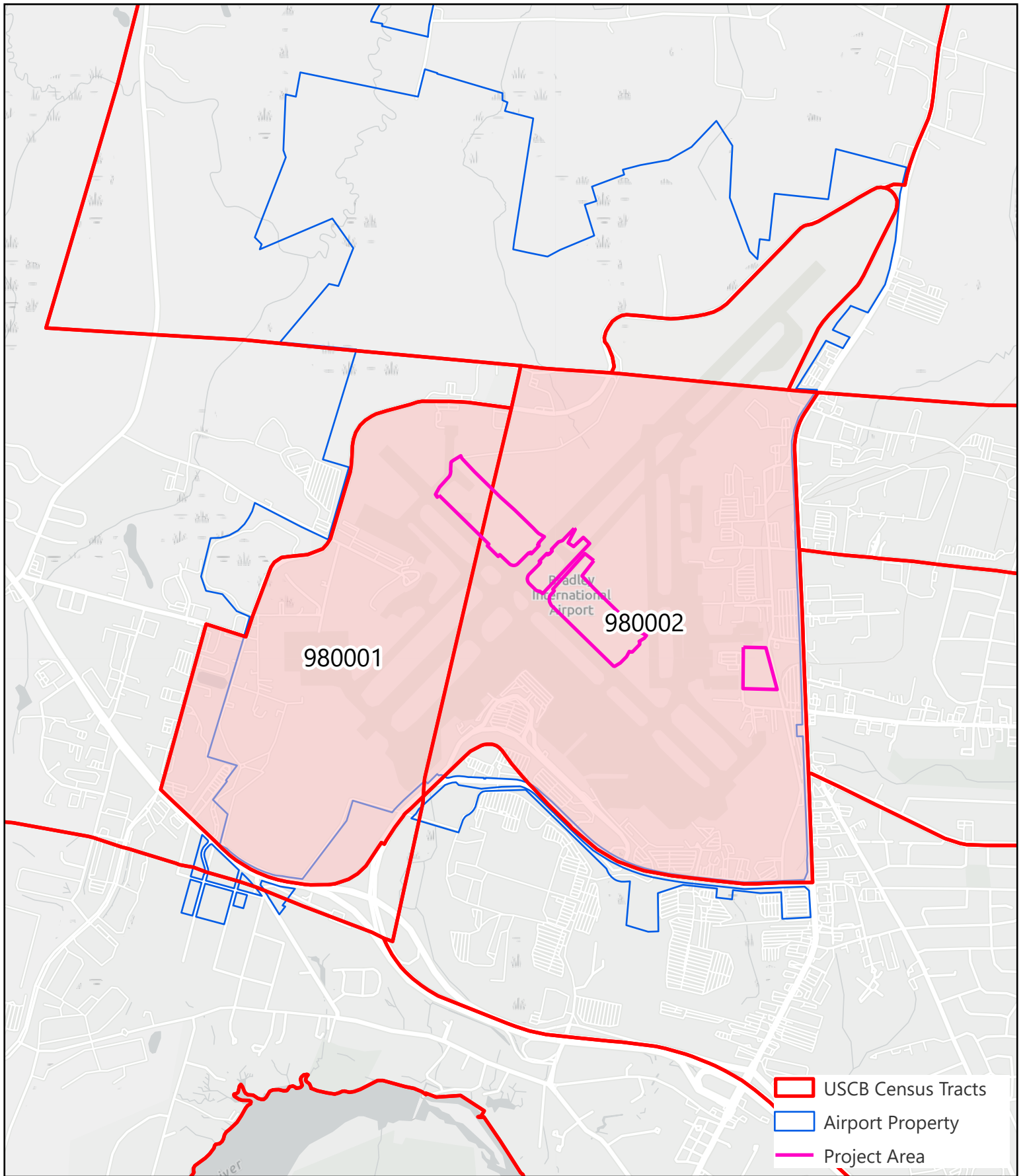
4.13.1 Socioeconomics

According to FAA Order 1050.1F, the FAA must evaluate proposed actions and their effect on the socioeconomics of the surrounding community. Socioeconomic resources include population, income, employment, and economics. Socioeconomic resources also include sensitive populations such as minorities, low-income communities, and children, as mandated by Executive Order (EO) 13045 *Protection of Children from Environmental Health Risks and Safety Risks* and EO 12898 *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. EO 13045 states that federal agencies shall identify and address environmental health and safety risks from their activities, policies, or programs that may disproportionately affect children and EO 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, authorized in 1994, serves to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations. Title VI was enacted as part of the Civil Rights Act of 1964 to protect against discrimination based on race, color, and national origin in programs and activities receiving federal financial assistance.

The EPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

The Project Area is located within both the Town of Windsor Locks and the Town of East Granby, both of which are contained within Hartford County. The Project Area is contained within the U.S. Census Bureau (USCB) Tracts 9800.01 and 9800.02 (shown on **Figure 4.8**). Selected socioeconomic characteristics from USCB American Community Survey (ACS) for these geographies are shown in **Table 4-3**. Note that the USCB indicates that there is no population living within these census tracts so they are excluded from **Table 4-3**. For this reason, analysis for the Proposed Project will compare the Town of Windsor Locks and East Granby to socioeconomic patterns of Hartford County and the State of Connecticut.

Populations and Race: According to the USCB 2021 ACS 5-Year Estimates data, the Town of Windsor Locks and the Town of East Granby generally follow the same patterns for racial diversity as seen in Hartford County and the State of Connecticut, where the majority of the population by race is white, followed by Black or African American. However, the Town of Windsor Locks and the Town of East Granby do have a smaller percentage of the population identifying as Latino or Hispanic when compared to



Sources: Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS. Created by C&S Engineers, Inc.



Figure 4.8 | Project Area Census Tracts

EA for Taxiway T Extension



Table 4-3 – Selected Population, Housing, Economic, and Social Characteristics

	Connecticut	Hartford County	Town of Windsor Locks	Town of East Granby
Population, total	3,605,330	898,636	12,559	5,148
Children (Under 18 years age)	20.6%	21.1%	18.9%	26.9%
Race Statistics				
White ¹	72.0%	66.7%	79.3%	79.0%
Black or African American ¹	10.8%	13.9%	7.8%	5.4%
Asian ¹	4.6%	5.7%	7.1%	3.2%
Native Hawaiian and Other Pacific Islanders ¹	0.0%	0.0%	0.0%	0.0%
American Indian and Alaska Native ¹	0.2%	0.3%	0.0%	0.05
Some Other Race ¹	6.0%	6.5%	2.3%	1.6%
Two or More Races ²	6.3%	6.9%	3.3%	10.9%
Latino or Hispanic ³	16.9%	18.8%	5.0%	6.9%
Non-Minority ⁴	64.9%	59.0%	76.9%	76.3%
Minority ⁵	35.1%	41.0%	23.1%	23.7%
Housing Statistics				
Housing Units ⁶	1,527,039	364,270	2,023	5,558
Economic & Employment Statistics				
Median household income	\$83,572	\$80,320	\$79,678	\$112,857
Per Capita Income	\$47,869	\$43,642	\$41,140	\$45,397
Families whose income is below the poverty level ⁶	6.8%	7.5%	6.4%	0.0%
Individuals whose income is below the poverty level ⁶	10.0%	10.9%	7.4%	3.6%
Unemployment Rate (of civilian labor force) ⁷	6.1%	5.8%	8.5%	3.4%

1 Includes persons identifying as only one race.

2 Includes persons identifying as more than one race of any races.

3 Persons identifying as Hispanic or Latino may be of any race and are also counted in applicable race categories.

4 Persons identifying as not Hispanic or Latino and white alone.

5 All individuals other than non-Hispanic or non-Latino whites.

7 Civilian population Age 16+ in Labor Force.

6 For incomes in the past 12 month. For the year 2021.

Note: There are no populations within USCB Tracts 9800.01 and 9800.02.

Source: USCB 2021 ACS 5-Year Estimates, Table DP03 (Selected Economic Characteristics), Table DP05 (Demographic and Housing Estimates), and Table S0101 (Age and Sex).

those of the County and State. Overall, the minority population in the Town of Windsor Locks and the Town of East Granby is smaller than that of the County and State.³⁵ These values are shown in **Table 4-3**.

Employment and Income: According to the USCB 2021 Census, primary employment occupations in Hartford County include management, business, science, and arts; service; sales and office; natural resources, construction, and maintenance; and production, transportation and material moving. In the Town of Windsor Locks, the median household income is \$79,678 per year, which is slightly lower than that of the County and State. In the Town of East Granby, the median household income is \$112,857 per year. This is significantly higher than both the County and State incomes. Additionally, the percentage of families and individuals whose income is below the poverty line is lower in the town of Windsor Locks and the Town of East Granby than for that of the County and State.

4.13.2 Environmental Justice

The first step in complying with EO 12898 is to identify if there is a minority or low-income EJ population occurring within or in close proximity to the Proposed Project such that they could be impacted by the action.

Presence of an EJ-Minority Community: To determine the presence of an EJ-minority community, the EPA recommends beginning with the *Fifty Percent Analysis* (as outlined in *EPA Promising Practices for EJ Methodologies in NEPA Review*) which designates an EJ-minority community if the minority population in a community is 50% or greater than that of a comparable reference community.³⁶ Review of the EPA's *EJScreen: Environmental Justice Screening and Mapping Tool* (results included in **Appendix E**) estimates that for the population within a one-mile radius of the Project Area (1,701 total population and shown on **Figure 4.8**), 15% are minority (indicated as People of Color).³⁷ This is lower than 50% and the State average of 34%. Therefore, this falls below the threshold of minority population that would necessitate an expanded EJ analysis. Additionally, this data is relatively consistent with that indicated in **Table 4-3**.

Presence of an EJ-Low-Income Community: To determine the presence of an EJ-low-income community, the EPA recommends using the *Low-Income Threshold Criteria Analysis*.³⁸ This method was used to compare the percentage of households and individuals in the Project Area whose income is below the poverty level to that of those in comparable reference communities. The EJScreen tool (**Appendix E**) indicates that for the population within a one-mile radius of the Project Area, 17% are low-income, which is less than that of the State average (23%). Therefore, this falls below the threshold of low-income population that would necessitate an expanded EJ analysis. Additionally, this data is relatively consistent with that indicated in **Table 4-3**.

The EPA EJScreen tool and the data presented in **Table 4-3**, reflect that the Proposed Project is not located within or proximate to potential EJ areas. There will be no impact to EJ communities.

³⁵ A minority population is any readily identifiable group of minority persons who live in geographic proximity or geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FAA Program, policy, or activity.

³⁶ EPA Promising Practices for EJ Methodologies in NEPA Reviews. Accessible at: https://www.epa.gov/sites/production/files/2016-08/documents/nepa_promising_practices_document_2016.pdf (Accessed 12/22/2023)

³⁷ EPA EJScreen: Environmental Justice Screening and Mapping Tool. Accessible at: <https://www.epa.gov/ejscreen>. (Accessible 12/22/2023).

³⁸ EPA Promising Practices for EJ Methodologies in NEPA Reviews. Accessible at: https://www.epa.gov/sites/production/files/2016-08/documents/nepa_promising_practices_document_2016.pdf (Accessed 12/22/2023)

4.13.3 Children's Health and Safety Risks

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, defines the risks to children's safety that are attributable to products or substances that the child is likely to touch or ingest including the air we breathe, the food we eat, the water we drink or use for recreation, and the soil we use to grow food.

As indicated in **Table 4-3**, 18.9% of the population in the Town of Windsor Locks and 26.9% the Town of East Granby are children (under the age of 18). Children under five are considered the most vulnerable to environmental hazards and per the EJScreen report included in **Appendix E**, make up about 4% of the population living within one-mile of the Project Area.

Locations of nearby children's facilities are shown on **Figure 4.9**. There are no schools, daycare centers, parks, and/or children's health clinics in the Project Area. The closest facility of this type is the East Granby KinderCare located approximately 0.5 miles west of the Airport in the Town of East Granby and the New England Preschool located approximately 0.5 miles east of the Airport in the Town of Windsor Locks. Therefore, there will be no impacts to children's health and safety.

4.13.4 Traffic

No permanent impacts or disruptions to local traffic patterns are expected with the implementation of the Proposed Project. There is the potential for increased traffic on local roadways serving the Airport during construction. However, these impacts are temporary and expected to be minor in scale.

4.13.5 Summary

Overall, the two communities bordering the Proposed Project, the Town of Windsor Locks and the Town of East Granby have a smaller percentage of minority population and percentage of families living below the poverty line when compared to the state of Connecticut. The Proposed Project is not located within or proximate to potential EJ areas and as a result, there will be no impact to EJ communities. There will be no impacts to children's health and safety or disruptions to traffic patterns. No further discussion regarding socioeconomics, environmental justice, or children's health and safety is included in this EA.

4.14 Visual Effects

According to Chapter 13 of the FAA *1050.1F Desk Reference*, visual effects deal broadly with the extent to which the proposed action or alternative(s) would either: 1) produce light emissions that create annoyance or interfere with activities; or 2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. The FAA *1050.1F Desk Reference* defines the following visual effects:

- ◆ *Light emissions* include any light that emanates from a light source into the surrounding environment. Examples of sources of light emissions include airfield and apron flood lighting, navigational aids, terminal lighting, parking facility lighting, and roadway lighting.
- ◆ *Visual resources* include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features.
- ◆ *Visual character* refers to the overall visual makeup of the existing environment where the proposed action and alternative(s) would be located. For example, areas close to densely populated areas generally have a visual character that could be defined as urban, whereas less-developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc.

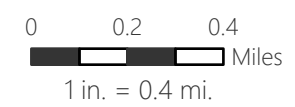
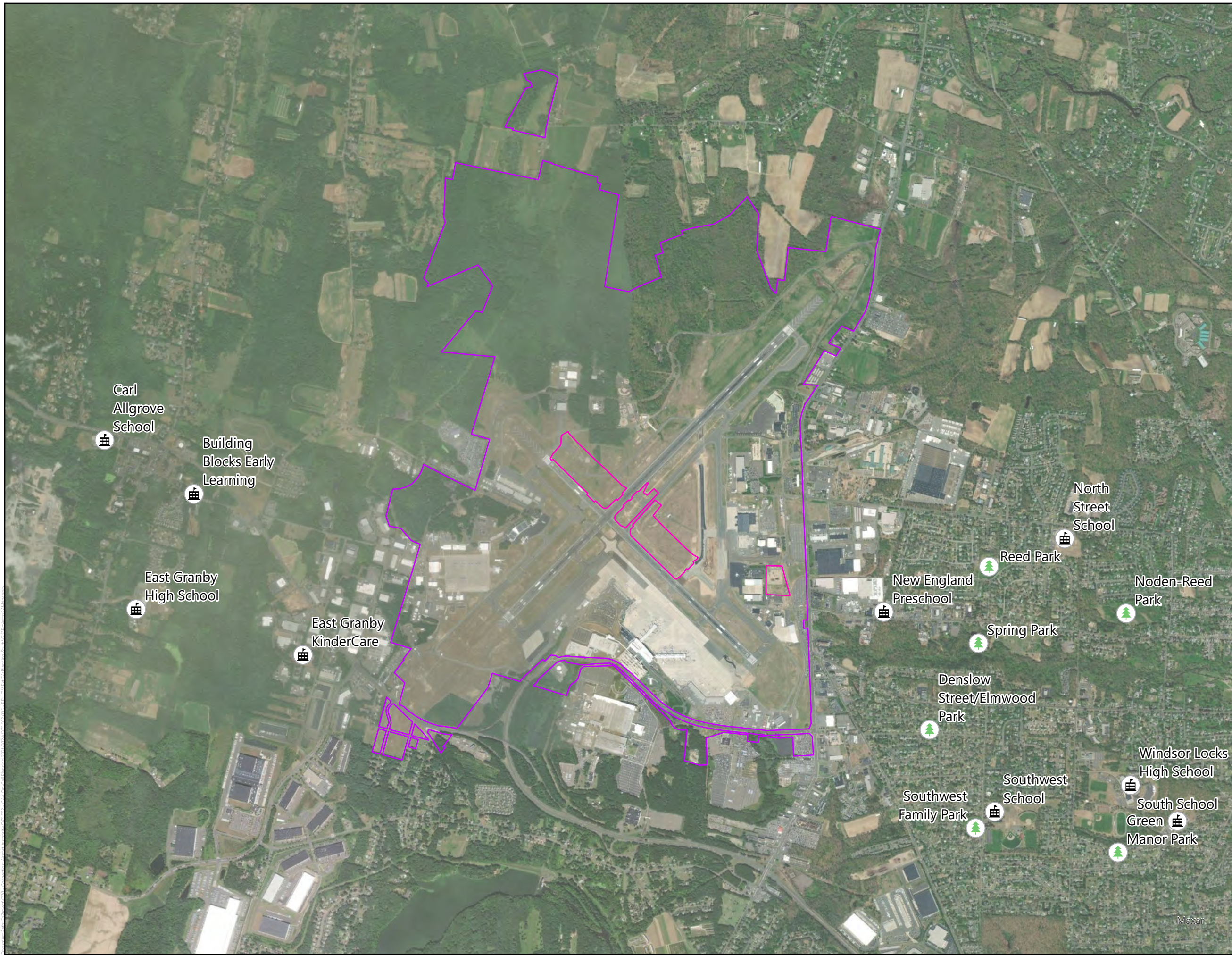
Figure 4.9

Children's Facilities

- Project Area
- Airport Property Line

Children's Facilities

- 🌳 Park
- 🏫 School



When printed at 11 in. by 17 in.



EA for Taxiway T Extension

Sources: Places digitized from Google Maps 12/5/2023
Created by C&S Engineers, Inc., 2023

4.14.1 Light Emissions

Existing sources of light within the Project Area include airfield lighting, navigational aids, obstruction lighting, building and parking facility lighting, and roadway lighting. No light sensitive areas are located near the proposed project area. Light emissions implemented with the Proposed Project will be consistent with that of existing conditions. Lighting installed as part of the Proposed Project will not create an annoyance for people in the vicinity or interfere with normal activities, including work and recreation. Therefore, light emissions are not anticipated.

4.14.2 Visual Resources and Character

Airside viewsheds in the Project Area consist of mowed/maintained grass areas and taxiway and runway pavement. Landside views consist of roadways, vacant/empty lots, and Airport buildings. The Proposed Project will not impact the visual resources and character of existing viewsheds within its vicinity since the type of development proposed is consistent with that of existing conditions.

4.14.3 Summary

The Proposed Project will not result in a change to both on and off airport light emissions and viewsheds. No further discussion regarding visual impacts is included in this EA.

4.15 Water Resources

Water Resources include wetlands, surface waters, groundwater, floodplains, and wild and scenic rivers.

4.15.1 Wetlands and Surface Waters

Field investigations to delineate wetlands and watercourses were conducted in the northwest portion of the Project Area for two different projects in 2020.³⁹ The results of these field investigations indicated that one wetland and two segments of an inland, unnamed perennial watercourse were identified in the Project Area (**Figure 4.2**). The wetland and watercourses are Federally-regulated and State-regulated. The wetland is adjacent to both the eastern and western sides of the unnamed watercourse in the northern portion of the Project Area. A further description of the wetland is presented in **Section 4.3.1**. The primary functions and values of this wetland are nutrient removal and sediment/toxicant retention.

The Ordinary High Water (OHW) boundaries of two segments of perennial watercourse, separated by a culvert, were delineated in the north portion of the Project Area. These watercourse segments have been channelized, contain open water, and drain north off the Project Area via an unnamed watercourse to a larger wetland system. These two watercourse segments contain open water and likely receive hydrology from surface runoff and groundwater recharge. This watercourse conveys groundwater and surface water drainage from the Airport to wetlands north of the Project Area. The unnamed perennial watercourse has a surface water quality classification of “A”. Class “A” surface waters are designated for: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture.

4.15.2 Groundwater

The Project Area is located within an area mapped as Groundwater Classification “GA-Impaired”. The designated uses for Class GA groundwater is: “existing private and potential public or private supplies of

³⁹ Wetland and Waterbody Delineation Report, Perimeter Road, TRC, July 2020
Wetlands and Ordinary High Water Observation Memorandum, Fitzgerald and Halliday, Inc., May 26, 2020

water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies”. “Impaired” indicates that the actual quality of groundwater does not meet the assigned classifications criteria for GA.

4.15.3 Floodplains

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) under the National Flood Insurance Act of 1968, as well as overseeing the federal floodplain management programs and flood hazard mapping. Federal flood hazard areas are identified on community specific Flood Insurance Rate Maps (FIRM). According to the FIRM, Panels 09003C0204F, 09003C0208F, 09003C0212F and 09003C0216F, the Project Area is not located in a mapped 100-year floodplain or 500-year floodplain.

4.15.4 Wild and Scenic Rivers

There are no designated wild and scenic rivers in the Project Area. According to the U.S. National Wild and Scenic Rivers System, no designated rivers are present in the immediate vicinity of the Project Area. Areas designated as national or state forest, wilderness areas, or wild and scenic rivers are not present on the Airport property or immediately adjacent. The nearest designated river is the Farmington River that is located approximately 1.5 miles southwest of the Project Area.

4.15.5 Summary

The Proposed Project is not located within or adjacent to a mapped 100-year floodplain, 500-year floodplain, or wild and scenic river. No further discussion regarding floodplains or wild and scenic rivers is included in this EA.

The Proposed Project has the potential to impact wetlands, surface waters, and is located within an area mapped as Groundwater Classification “GA-Impaired”. Therefore, discussion related to wetlands, surface waters, and groundwater impacts will be discussed further in **Section 5 – Environmental Consequences**.

5 Environmental Consequences

This section describes the foreseeable environmental, social, and economic consequences of the Proposed Project. Information pertaining to the environmental consequences was obtained through an alternatives analysis, review of published information, agency correspondence, and discussions with the Airport personnel and public officials.

The Proposed Project (Project Action) would provide a full parallel taxiway to the northeast side of Runway 15-33 from Taxiway E to Taxiway W at the Runway 15 end alleviating safety concerns and increasing efficiency of airfield operations (**Figure 3.1**). The No Action alternative does not meet nor address the needs of the Airport. The No Action alternative assumes that the Proposed Project is not implemented, the Airport would remain as it is today, with no improvements to reduce runway incursions, mitigate hot spots, reduce taxi times, or provide access to the northern areas of Airport property. The Proposed Action is compared to the No Action throughout this section as per FAA Order 1050.1F, Section 6-2.1.f.

Using the data collected as part of the environmental planning process and comparing the Proposed Action analysis results to the No Action alternative, limited environmental impacts were revealed (below the Significance Impact Thresholds established in FAA Order 1050.1F), due to the nature and location of the Project. Necessary measures and BMPs would be established to further minimize and mitigate foreseeable environmental impacts the Proposed Action may have. The potential impacts from the Proposed Action are discussed in the following sections and quantified to the maximum extent possible. In areas where quantitative measures cannot be provided, qualitative assessments are provided. The following resources are not present within the Project Area or will not be discussed as they were determined to have no impact in **Section 4**; therefore, these resources are not evaluated further:

- ◆ Coastal Resources
- ◆ Historical, Architectural, Archeological, and Cultural Resources
- ◆ Department of Transportation Act, Section 4(f) and Section 6(f)
- ◆ Farmlands
- ◆ Land Use
- ◆ Natural Resources and Energy Supply
- ◆ Noise and Noise-Compatible Land Use
- ◆ Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks
- ◆ Traffic
- ◆ Visual Effects
- ◆ Water Resources (Floodplains, Wild and Scenic Rivers)

5.1 Air Quality

5.1.1 Significance Thresholds

As provided in FAA Order 1050.1F, an action would cause a significant air quality impact if pollutant concentrations would exceed one or more of the NAAQS established by the EPA under the Clean Air Act, for any of the time periods analyzed, or would increase the frequency or severity of any such existing violations. Additionally, the Clean Air Act requires federal agencies such as the FAA to ensure that any actions not occurring in an area in attainment with Clean Air Act standards “conform” to the appropriate State Implementation Plan. The Clean Air Act General Conformity Rule requires that a project or action adheres to the State Implementation Plan’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.

If General Conformity applies, an applicability analysis is performed to determine if a General Conformity Determination is required to demonstrate that the Proposed Action conforms to the approved State Implementation Plan(s). A conformity determination is required if the total direct and indirect pollutant emissions resulting from a project are above the *de minimis* emissions threshold levels specified in the conformity regulations.⁸⁰ The *de minimis* thresholds represent emission quantities of a NAAQS-regulated pollutant, or its applicable precursors, over which a Proposed Action in a nonattainment or maintenance area may cause or contribute to a new or continued violation of the NAAQS. A conformity determination is not required if the differences in emissions between the Proposed Action and the No Action alternatives are below the applicable *de minimis* thresholds, or if the Proposed Action is exempt or included in the FAA list of “presumed to conform activities.”

As stated in **Section 4.2**, BDL is located in Hartford County, which the EPA has designated as follows for the six criteria NAAQS pollutants:

- ◆ “attainment” for nitrogen oxides, sulfur dioxide, and coarse particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), and carbon monoxide, and
- ◆ “nonattainment” for the 2008 and 2015 8-hour ozone standard.

As a result, the General Conformity Rule applies to the Proposed Action for the 2008 and 2015 8-hour ozone standard.

The current Federal EPA *de minimis* thresholds for nonattainment areas relative to Hartford County are listed in **Table 5-1**. As noted in the table, pollutants designated as attainment do not have EPA *de minimis* thresholds, however, the maintenance *de minimis* thresholds were used to determine significant impacts under NEPA for attainment pollutants.

Table 5-1 – General Conformity EPA De Minimis Thresholds

Pollutants	Attainment Status (Severity)	Pollutants	Threshold (tons per year)
Carbon Monoxide (CO)	Attainment ²	CO	100
Nitrogen Dioxide (NO ₂)	Attainment ²	NO ₂	100
Ozone (O ₃) ¹	Nonattainment, 2008 Standard (Serious) ³ Nonattainment, 2015 Standard (Moderate) ³	NO _x / VOC	50 / 50
Particulate Matter (PM ₁₀ /PM _{2.5})	Attainment ²	PM ₁₀ /PM _{2.5}	100
Sulfur Dioxide (SO ₂)	Attainment ²	SO ₂	100
Lead (Pb)	Attainment ²	Pb	25

Source: HMMH 2023.

5.1.2 Methodology

The Proposed Action would not induce changes in aircraft operations and/or additional vehicle trips or stationary sources compared to the No Action alternative after construction. Therefore, an air quality analysis for the construction emissions was performed for the Proposed Action in accordance with FAA guidelines. Air emissions associated with aircraft, general access vehicles, or stationary sources were not inventoried and evaluated as part of this analysis. Potential air quality impacts associated with construction and demolition under the Proposed Action are discussed in this section. The complete air quality analysis is included in the Air Quality

Technical Report found in **Appendix F**. Construction activities associated with the Proposed Action are anticipated to begin in 2026 and to be completed in 2027.

Construction emissions were inventoried and compared to appropriate EPA *de minimis* thresholds in accordance with the nonattainment or maintenance designation of the Project Area for determining significant impacts and whether a Conformity Determination is required for this Project.⁴⁰ Hartford County is designated as attainment for CO, SO₂, PM₁₀, PM_{2.5}, and Pb; since these pollutants are designated attainment by EPA, no *de minimis* thresholds exist. The maintenance area designation *de minimis* thresholds were used to determine significance under NEPA.

5.1.3 No Action

The No Action alternative assumes that the Proposed Action is not implemented, and air quality would remain unchanged for 2026 and 2027. Therefore, no additional air quality impacts would occur as a result of choosing the No Action alternative.

5.1.4 Proposed Action

Table 5-2 presents the total emissions associated with the construction of the Proposed Action for each year of the construction period (2026 and 2027) with a comparison to the appropriate EPA *de minimis* thresholds. The Proposed Action would not exceed any of the Conformity Rule *de minimis* thresholds for 2026 or 2027, therefore, a General Conformity Determination is not required. Additionally for pollutants not subject to General Conformity, in accordance with the FAA *1050.1F Desk Reference*, the Proposed Action can be determined to “not cause a significant air quality impact, since it is unlikely the pollutant concentration analyzed would exceed *de minimis* thresholds or the NAAQS.”

Table 5-2 – Construction Emissions Compared to EPA *De Minimis* Thresholds

Year of Construction	CO (short tons)	VOC (short tons)	NO _x (short tons)	SO ₂ (short tons)	PM ₁₀ (short tons)	PM _{2.5} (short tons)
<i>De Minimis</i>	100	50	50	100	100	100
2026	5.05	0.78	2.98	0.02	0.76	0.08
2027	4.24	0.59	2.20	0.02	0.60	0.06

Source: HMMH 2023, EPA General Conformity *De Minimis* Tables

In summary, no significant adverse air quality impacts or violation of the NAAQS would be expected to result from the construction of the Proposed Action.

5.1.5 Best Management Practices and Minimization

As necessary and applicable, the following best management practices and reasonably available control measures would be implemented:

- ◆ Construction sequencing or phasing
- ◆ Promote the use of equipment that meets Tier 4 emission standards⁴¹
- ◆ Minimization of exposed soils at any given time during construction activities
- ◆ Water spray for dust suppression and preventing fugitive dust from becoming airborne from construction vehicles

⁴⁰ USEPA General Conformity *De Minimis* Table, <https://www.epa.gov/general-conformity/de-minimis-tables>.

⁴¹ 40 CFR Part 1039, <https://www.ecfr.gov/current/title-40/part-1039>

- ◆ Suspending or adjusting intensity of earthwork during periods of sustained high wind speeds (e.g., 30 mph and over), as defined by the Occupational Safety and Health Administration (OSHA)
- ◆ Maintaining construction vehicles in good working condition
- ◆ Limiting construction vehicle engine idling by turning off engines after three (3) to five (5) minutes of inactivity
- ◆ Decreasing vehicle speed limits while onsite to reduce fugitive dust generation and obeying posted vehicle speed limits while off-site
- ◆ Requiring construction contractors to use properly maintained and operated construction equipment
- ◆ Not overloading construction trucks beyond their maximum hauling capacity with fill borrow material or construction debris
- ◆ Using tarp covers on construction trucks transporting construction materials and construction debris to and from the site
- ◆ Re-vegetating exposed soils following completion of construction activities in designated areas.

5.1.6 Summary of Impact

Per the FAA 1050.1F Desk Reference, if a project's net emissions are less than the *de minimis* thresholds, then the federal action is considered to be too small to adversely affect the air quality status of the area and is considered to conform with the applicable State Implementation Plan, therefore the General Conformity requirements have been complied with and the process is complete. In that case, a General Conformity determination is not required for the construction activities associated with the Proposed Action or for the net change in operational emissions from the Proposed Action compared to the No Action.

The Proposed Action would not exceed any of the Conformity Rule *de minimis* thresholds for 2026 or 2027, therefore, a General Conformity Determination is not required. Therefore, no significant adverse air quality impacts or violation of the NAAQS would be expected to result from the construction of the Proposed Action.

5.2 Biological Resources

5.2.1 Significance Thresholds

FAA 1050.1F indicates that “*a significant impact to biological resources would occur when: The U.S. Fish and Wildlife Service or the National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a Federally-listed threatened or endangered species, or would result in the destruction or adverse modification of federally-designated critical habitat. The FAA has not established a significance threshold for non-listed species*”.

While not a significance threshold, FAA 10150.1F provides additional factors to consider in evaluating potential environmental impacts. The following factors were considered when evaluating potential impacts resulting from the No Action and Proposed Action alternatives:

- ◆ Long-term or permanent loss of unlisted plant or wildlife species from a large project area
- ◆ Adverse impacts to special status species, such as state species of concern, species proposed for listing, migratory birds, bald and golden eagles, or their habitats
- ◆ Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations
- ◆ Adverse impacts on a species' reproductive success rates, natural mortality rates, non-natural mortality rates (e.g., road kills and hunting), or ability to sustain the minimum population levels required for population maintenance

5.2.2 No Action

Under the No Action alternative, Taxiway T would not be extended, and the Airport would continue operating within the same footprint. There would be no additional impacts beyond those that currently occur from Airport operations. The Airport would continue implementing their Wildlife Management Plan in compliance with FAA guidelines, including deterring wildlife usage and regularly mowing grass areas within the airfield.

5.2.3 Proposed Action

The Project Area is primarily comprised of grassland and grassland/sand barren ecological communities that are adjacent to existing paved runways and taxiways. These communities are managed to deter hazardous wildlife usage but still have the potential to support some State-listed plants, insects, grassland birds and three species of migratory birds. Two of these migratory bird species prefer edge habitat, of which a small area is located in the northern portion of the Project Area. Construction of the taxiway extension and associated improvements would impact all of the ecological communities in the Project Area. No State-listed plants were documented in the Project Area during previous studies, however, potential habitat for low frostweed does exist in the Project Area. Although no State-listed tiger beetles, ground beetles, or moths were found within the Project Area by previous studies, they could potentially occur in the grassland/open sand habitats that would be impacted by the Proposed Action during construction. During construction, impacts could occur to grassland birds and migratory birds with potential habitat in the Project Area through vegetation removal and disturbance of active nests if work is undertaken during the nesting season (May 1st through July 31st).

The existing and proposed post-construction extent of the ecological communities in the Project Area are summarized in **Table 5-3**. There will be a net increase in paved surfaces of 10.88 acres and corresponding net decrease of 10.34 acres of grassland communities and 0.54 acres of wetlands and watercourses habitat in the Project Area.

Table 5-3 – Existing and Proposed Ecological Community Areas

Ecological Community	Existing Area (acres)	Post-construction Area (acres)	Change (acres)
Warm Season Grassland/Open Sand	4.99	4.08	-0.91
Warm Season Grassland	43.99	37.01	-6.98
Cool Season Grassland	15.60	13.15	-2.45
Wetlands	0.23	0	-0.23
Watercourses	0.31	0	-0.31
Paved Areas	7.65	18.53	+10.88

Source: GZA Draft Bradley International Airport RSMP (2023), C&S Companies (2024), FHI Studio (2024)

After construction of the Proposed Action, Airport operations would continue with the periodic mowing of grassland habitats. Mowing would be conducted in accordance with the recommendations in the Airport's Draft RSMP included in **Appendix C**.

5.2.4 Best Management Practices and Minimization

The effects on biological resources would be minimized through the implementation of best management practices (BMPs) in the Airport's Draft RSMP that has been prepared in coordination with the CT DEEP. The Proposed Action would primarily occur within grassland and grassland/open sand ecological communities. Proposed mitigation for wetland and watercourse impacts are discussed in **Section 5.5.4**.

BMPs and restoration procedures for State-listed species associated with grassland and grassland/open sand communities during construction include:

- ◆ Limiting the area of grassland disturbance to the minimum necessary.
- ◆ Maintaining construction activities within authorized project boundaries, construction staging areas, and clearing limits.
- ◆ Conducting surveys within the Project Area for low frostweed prior to construction through coordination with CT DEEP.
- ◆ If found in the Project Area, transplanting low frostweed to a mitigation site following the protocol in the Draft RSMP.
- ◆ Conducting additional coordination with the CT DEEP NDDDB during the design and permitting phase of the Proposed Project to prepare a detailed mitigation plan to address loss of grassland bird habitat, with the potential mitigation areas outlined in the Draft RSMP as a baseline.
- ◆ Minimizing impacts to rare moths, plants, and beetles by mitigating for lost habitat according to the Draft RSMP.
- ◆ For temporary impacts to grassland habitats existing topsoil would be scraped off prior to grading and stockpiled to be re-used after grading has occurred.
- ◆ New or disturbed grassland areas would be restored with an approved grassland seed mix with little bluestem (*Schizachyrium scoparium*) as the dominant species.
- ◆ To avoid and minimize conflicts with grassland and migratory birds, vegetation removal and disturbance would take place outside the nesting season (May 1st through July 31st) for species which could occur in the Project Area.
- ◆ The top layer of sand barren soils will be scraped from the work area, stored separately to preserve the existing seed bank, and reused in appropriate habitat within the project area.

Post construction long-term habitat management includes:

- ◆ Mowing as needed to maintain vegetation height of 6" to 12"
- ◆ Monitoring the restored grassland habitats and mitigation area in accordance with the schedule outlined in the Draft RSMP

5.2.5 Summary of Impact

No federally-listed species are anticipated to occur in the Project Area and there are no critical habitats in the Project Area. Because the Proposed Action would not alter any habitats, and because of the unlikelihood of federally-listed species in the Project Area, pursuant to Section 7 of the ESA, the proposed project would have **no effect** on the NLEB and Tricolored Bat or critical habitats.

The Proposed Action would result in temporary construction related impacts to grassland and grassland/open sand habitats along with State-listed plant and insect species that potentially occur in these habitats. The Proposed Action would result in the conversion of approximately 10.88 acres of grassland habitat to paved surfaces. The Draft RSMP proposes mitigation ratios for impacts to upland habitats based on habitat type and quality. The mitigation ratios proposed are:

- ◆ Low Quality Sandplain Grassland - 1.5:1
- ◆ Moderate Quality Sandplain Grassland – 2:1
- ◆ High Quality Sandplain Grassland – 3:1
- ◆ Pitch Pine – 2:1
- ◆ Open Sand – 1.5:1

By implementing BMPs during construction and mitigation measures at the Airport in accordance with the Draft RSMP, potential impacts on grassland habitats and species that may utilize them would be mitigated. CAA will undertake additional coordination with the CT DEEP NDDB during the design and permitting phase of the Proposed Project to prepare a detailed mitigation plan to address loss of grassland bird habitat, with the potential mitigation areas outlined in the Draft RSMP as a baseline. The Draft RSMP identified approximately 30.7 acres of potential warm season grassland habitat and 52.5 acres of sandplain grassland/open sand habitat on the Airport. By implementing BMPs during construction and mitigation measures after construction the Proposed Action would not exceed the significant impact thresholds as per FAA Order 1050.1F.

5.3 Climate

5.3.1 Significance Thresholds

There are no defined significance thresholds for aviation GHG emissions, nor has FAA identified any factors to consider in making a significance determination for GHG emissions. Any increases in GHG emissions from construction associated with the Proposed Action would be temporary and essential for implementation of the Proposed Action. The potential climate impacts at BDL could include increasing temperature and changing precipitation patterns, ecosystems and agriculture, and human health.

It should be noted that for this EA, the best available science, data, and rationale for the GHG analysis is based on the interim guidance. As ongoing scientific research works to improve the understanding of construction and aviation's relationship to climate change, FAA guidance will evolve if new federal requirements are established.

5.3.2 Methodology

Impacts related to climate are assessed by disclosing:

- ◆ Reasonably foreseeable direct and indirect greenhouse gas emissions of a proposed action and the no action alternative;
- ◆ Context for the GHG emissions including monetizing climate damages using estimates of the social cost of greenhouse gas emissions (SC-GHG); and
- ◆ Identified mitigation measures to avoid, minimize, and compensate for climate effects.

GHG emissions associated with the Proposed Action were prepared for carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) and presented as carbon dioxide equivalent (CO₂e) in metric tons per year relevant to their global warming potential. The carbon dioxide equivalent is estimated by taking the mass equivalent of each pollutant (TPY), multiplying by the GWP equivalent of each pollutant, and then adding them together. For example, CO₂ is 1 GWP, CH₄ is 29.8 GWP, and N₂O is 273 GWP, according to the IPCC Sixth Assessment Report.⁴²

⁴² <https://erce.energy/erceipccsixthassessment/>

The methodology and assumptions for the GHG analysis are described in **Appendix F**. GHG emissions associated with the construction and demolition activities were qualitatively evaluated.

5.3.3 No Action

The No Action alternative assumes that the Proposed Action is not implemented, and climate-related impacts would remain unchanged for 2026 and 2027. Therefore, no additional air quality impacts would occur as a result of choosing the No Action alternative.

5.3.4 Proposed Action

Emissions Inventory

Table 5-4 presents the annual greenhouse gas emissions for demolition and construction activities associated with the Proposed Action for 2026 and 2027.

Table 5-4 – GHG Emissions Associated with Construction (metric tons)

Year of Construction	CO ₂	CH ₄	N ₂ O	CO ₂ e
2026	3,314	0.017	0.118	3,347
2027	2,717	0.014	0.095	2,744

Source: HMMH 2023, **Appendix F**.

Details regarding the calculation of GHG emissions are provided in **Appendix F**.

Increases in construction emissions compared to the No Action will be temporary but necessary for the proposed improvements at the Airport. The increases would comprise a small portion of the state of Connecticut's 2021 GHG emissions 34.7.7 million metric tons of carbon dioxide equivalent (MMT_{CO₂e}), the U.S.-based emissions of 6,472 million metric tons CO₂e, and even less than the 49 gigatons of carbon dioxide equivalent global GHG emissions.^{43, 44, 45, 46} Based on all this information, no significant impact on GHGs or climate is expected as a result of the Proposed Action.

Social Cost of Carbon

The CEQ's Interim *Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* provides direction to better assess and disclose climate impacts. The interim guidance recommends contextualizing GHG emissions by developing the social cost of carbon dioxide equivalents (SC-CO₂e) for proposed actions.

SC-CO₂e is an estimate of the economic costs of emitting one additional ton of carbon dioxide into the atmosphere, and thus the benefits of reducing emissions. It provides a monetary measure (in U.S. dollars) of the future damages (e.g., changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services) associated with specified quantities of GHG resulting from the Proposed Action. For transparency and disclosure, to provide a contextualized monetary measure of the three main greenhouse gases, the social cost of GHG (SC-GHG) was calculated for the CO₂ equivalents (CO₂e) of CO₂, CH₄, and N₂O emissions for the Proposed Action, summarized in **Appendix F**. These costs were calculated

⁴³ https://portal.ct.gov/-/media/DEEP/climatechange/1990-2021-GHG-Inventory/DEEP_GHG_Report_90-21_Final.pdf

⁴⁴ <https://www.dallasclimateaction.com/ghg-inventory>

⁴⁵ <https://www.epa.gov/sites/production/files/2019-02/documents/us-ghg-inventory-2019-main-text.pdf>

⁴⁶ http://ipcc.ch/publications_and_data/ar4/syr/en/contents.html

using the IWG 2021 Technical Support Document (TSD): Social Cost of Carbon, Methane, and Nitrous Oxide developed under EO 13990.⁴⁷

The SC-CO_{2e} is estimated to range from \$58,502 to \$578,577 in 2026, when the Proposed Action begins to \$49,060 and \$484,175 at the completion of construction in 2027. The results show there is a slight reduction in the social costs from 2026 to 2027 due to a slight reduction in expected construction GHG emissions during 2027 compared to 2026. This range in costs represents the potential social costs associated with adding GHGs to the atmosphere in a given year.

The foregoing social costs are estimates only and are subject to change depending on a variety of factors. They are provided for disclosure and context, but such estimated costs may not actually result.

Local Impacts

Based on the USEPA's factsheet for Connecticut, the state has the following to experience the following impacts from climate change:

- ◆ Increasing temperature and changing precipitable patterns
- ◆ Sea level rise, wetland loss, and coastal flooding
- ◆ Ecosystems and agriculture
- ◆ Human Health

The potential impacts of climate change to the Airport as denoted by US EPA for Connecticut⁴⁸ may be narrowed down based on the location of the airport away from the coast, as such these coastal impacts can be discarded when evaluating potential impacts at the airport environs. Therefore, the potential climate impacts at BDL could include increasing temperature and changing precipitation patterns, ecosystems and agriculture, and human health. Based on the temporary and minor nature of construction emissions, no significant impact on GHGs or climate is expected as a result of the Proposed Action.

5.3.5 Best Management Practices and Minimization

In the absence of potentially significant impacts, no mitigation measures are proposed. The FAA is developing policies for the aviation industry to reduce GHG and climate impacts including the Aviation Action Plan and the Net Zero Sustainable Aviation System including the Aviation Action Plan, Net Zero Sustainable Aviation System as well as a commitment to a sustainable transportation system which includes:

- ◆ Increase the production of sustainable aviation fuels
- ◆ Eliminate aviation gasoline lead emissions by the end of 2030
- ◆ Develop new aircraft and engine technologies
- ◆ Increase operations efficiency; and
- ◆ Reduce airport emissions and improve fuel efficiency.

Any reduction in the volume of fuel combusted will reduce GHG emissions and would be consistent with the State and Federal goals for reduced emissions. When practicable, it is recommended that the contractor use construction equipment that can operate on alternative fuels or electricity wherever possible to minimize emissions associated with diesel and gasoline powered equipment.

⁴⁷ [Technical Support Document: Social Cost of Carbon, Methane, \(whitehouse.gov\)](#)

⁴⁸ https://aqhelp.com/Documents/CCFactSheets/climate-change-CT_AUG2016.pdf

5.3.6 Summary of Impact

Any increases in GHG emissions from construction associated with the Proposed Action would be temporary and essential for implementation of the Proposed Action. Based on all this information provided in this section and in **Appendix F**, no significant impact on GHGs or climate is expected as a result of the Proposed Action.

5.4 Hazardous Materials, Solid Waste, and Pollution Prevention

5.4.1 Significance Thresholds

The FAA has not established a significance threshold for hazardous materials, solid waste, or pollution prevention. However, it has identified factors to consider in evaluating the context and intensity of the potential environmental impacts. These factors include situations in which the Proposed Project would have the potential to:

- ◆ Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and solid waste management.
- ◆ Involve a contaminated site (e.g., a site listed on the National Priorities List).
- ◆ Produce an appreciably different quantity or type of hazardous waste.
- ◆ Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity.
- ◆ Adversely affect human health and the environment.

5.4.2 No Action

Under the No Action Alternative, no construction activities occur, so no potential to encounter hazardous materials exists. Therefore, no impacts to hazardous materials, solid waste, or pollution prevention are expected.

5.4.3 Proposed Action

Hazardous Materials: Based on the documentation reviewed, with respect to the scope of the Proposed Project, the potential to encounter hazardous materials exists in the following area:

- ◆ Former Aircraft Engine Test Stand, located in the northern extent of the Project Area. Although no documentation was identified that indicated a spill, this type of activity is likely to have resulted in releases of fuels or oils.

Solid Waste: The Proposed Project will generate solid waste in the form of construction debris, which may include soil, concrete slabs and asphalt, and vegetation. Soil with no evidence of impacts will be reused for the Proposed Project or stockpiled onsite for future reuse. If contaminated soil is encountered, it will be tested and disposed of at a CT DEEP permitted solid waste landfill. Transformers will be tested for PCB content so that the enclosures and contents can be properly recycled /disposed of consistent with state and federal regulation. Solid waste will be recycled by the contractor where practicable and the remainder will be disposed of off-site by the contractor consistent with federal, state, and local regulations. Solid waste disposal is not expected to significantly impact the capacity of disposal facilities.

Pollution Prevention: No significant changes to existing pollution prevention practices are anticipated as a result of the Proposed Project. In addition, the Airport is responsible for applying for a SPDES General Permit for Construction Activity that regulates potential pollution sources (i.e., spills, leaks, and other releases) and harmful erosion.⁴⁹

5.4.4 Best Management Practices and Minimization

While no specific mitigation is required, if hazardous substances, contaminated soils, or other regulated materials are encountered during construction, they will be handled using best management practices and complying with FAA Order 1050.10D, Environmental Pollution Control and Abatement at FAA facilities (FAA, 2015). Recommended BMP's and measures include the following:

- ◆ **Hazardous Materials Handling:** Consistent with requirements of the Stormwater Pollution Prevention Plan, (SWPPP) the construction contractor would be required to implement BMPs for handling hazardous materials onsite. The use of construction BMPs would minimize negative effects on groundwater and soils, and would include the following:
 - ◆ All hazardous materials would be stored, labeled, and disposed of in accordance with state and local regulations. The contractors would also be held responsible for reporting any discharges of hazardous materials or other similar substances during construction.
 - ◆ Spill control and countermeasures, including employee spill prevention/response training would be implemented.
 - ◆ Overtopping of construction equipment fuel gas tanks would be prohibited.
 - ◆ During routine maintenance of construction equipment, grease and oils would be properly contained and removed.
 - ◆ Discarded containers of fuels and other chemicals would be properly disposed of.
- ◆ **Recycling and Disposal of Oil and Other Solvents:** Oil and other solvents used during maintenance of construction equipment would be recycled or disposed of in accordance with applicable regulatory requirements. All hazardous materials would be transported, handled and disposed of in accordance with applicable regulatory requirements.
- ◆ **Potential Accidental Release of Hazardous Materials:** In the event of an accidental release of hazardous materials during construction, containment and clean up would occur in accordance with applicable regulatory requirements.
- ◆ Contract specifications will require that a contingency plan be prepared in the event that evidence of potential soil or groundwater contamination (e.g., discoloration, sheen, and odors), debris, or buried storage containers are encountered during design or construction of the Proposed Project.

5.4.5 Summary of Impact

The Proposed Project may involve the disturbance of contaminated materials. However, the measures listed in the mitigation section will address this work. In addition, the work is not expected to produce hazardous waste, will have limited solid waste generation, and will not adversely affect human health and the environment. All necessary federal, state, and local permits will be obtained prior to construction activities. Therefore, no significant effect on hazardous materials, solid waste, or pollution prevention resources are expected.

⁴⁹ <https://portal.ct.gov/DEEP/Water-Regulating-and-Discharges/Stormwater/Construction-Stormwater-GP>

5.5 Water Resources - Wetlands and Surface Waters

Water resources in the Project Area include wetlands, surface waters, and groundwater.

5.5.1 Significance Thresholds – Wetlands and Surface Waters

As described in FAA Order 1050.1F, a significant impact to wetlands and surface waters would occur if the Proposed Project would:

- ◆ Adversely affect a wetland’s function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers.
- ◆ Substantially alter the hydrology needed to sustain the affected wetland system’s values and functions or those of a wetland to which it is connected.
- ◆ Substantially reduce the affected wetland’s ability to retain floodwaters or storm runoff, thereby threatening public health, safety, or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public).
- ◆ Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands.
- ◆ Promote development of secondary activities or services that would cause the circumstances listed above to occur.
- ◆ Be inconsistent with applicable state wetland strategies.
- ◆ Exceed water quality standards established by federal, state, local, and tribal regulatory agencies.
- ◆ Contaminate public drinking water supply such that public health may be adversely affected.

5.5.2 No Action

Under the No Action alternative, Taxiway T would not be extended, and the Airport would continue operating within the same footprint. Therefore, there would be no additional impacts to wetlands and surface waters.

5.5.3 Proposed Action Wetlands and Surface Waters

As identified in **Table 5-3**, the Proposed Project will cause a net increase in paved surfaces of 10.88 acres; a corresponding net decrease of 10.34 acres of grassland communities; disturbance of 0.23 acres of State- and Federally-regulated wetlands; and disturbance of approximately 0.31 acres of State- and Federally-regulated watercourses.

Stormwater Management: If practicable, the Proposed Project would include opportunities to incorporate stormwater detention and infiltration, and to offset the increase in impervious surfaces with removal of existing pavement. The 2024 Connecticut Stormwater Quality Manual and 2024 Guidelines for Soil Erosion & Sediment Control would guide the design of the Proposed Project and the design of the stormwater management system would be further developed during the permitting phase of the project. Stormwater best management practices, controls, and management systems would be approved through the CT DEEP Construction Stormwater General Permit, including a Stormwater Pollution Control Plan (SWPCP), that would be obtained for the Proposed Project.

Watercourses: The watercourses are located within managed portions of the Airport and the vegetation in, and around, them is mowed to deter wildlife usage. These watercourses convey groundwater and surface water drainage from the Airport to wetlands north of the Project Area. The watercourse’s flow will be maintained during and after the project is constructed.

Wetlands: The wetlands are located within managed portions of the Airport and the vegetation in and around them is mowed to deter wildlife usage. The primary functions and values of this wetland that are impacted are nutrient removal and sediment/toxicant retention. These functions and values would be mitigated for as described in **Section 5.5.4** below.

5.5.4 Best Management Practices and Minimization – Wetlands and Surface Waters

Due to their location in relation to the proposed taxiway extension, it is not feasible to avoid direct impacts to wetlands or surface waters. Because FAA design parameters must be adhered to, work must occur in the project areas where the wetlands and watercourses are located, causing unavoidable impacts. The potential for indirect off-site water quality impacts during construction would be minimized by implementation of a SWPCP that would be prepared in accordance with CT DEEP regulations in the future permitting stage. The Proposed Action was designed to minimize potential impacts to regulated wetlands and surface waters to the extent practicable.

Compensatory mitigation would be implemented for all wetland and watercourse impacts to achieve the overall policy goal of “no net loss” according to their ecological functions and values. The compensatory wetland mitigation framework would involve off-site permittee responsible mitigation in addition to payment into the National Audubon Society-Connecticut In-Lieu Fee Program. The wetland impacts can be appropriately mitigated to ensure “no-net-loss” of regulated wetlands. Proper permitting would be obtained in accordance with applicable regulations. The CAA has identified a large parcel (769.3 acres) of their property to the north of Perimeter Road which will be further investigated during the design and permitting phase of the Proposed Project for suitable wetland and watercourse mitigation sites. This parcel contains existing wetlands, watercourses, and uplands which provide good potential wetland and watercourse mitigation opportunities. The CAA has undertaken successful wetland mitigation on this parcel for a past project. Based on an analysis of this parcel, it was determined that approximately 108 acres of upland are available for potential permittee-responsible wetland mitigation, 84 acres of forested uplands, and 24 acres of non-forested uplands, respectively. These findings were presented during a coordination meeting with the regulatory agencies on June 26, 2024, to present a mitigation framework and provide information on potential areas available to permittee-responsible mitigation (see Record of Meeting in **Appendix A**).

Advisory Circular AC-150/5200-33C requires that FAA and regulatory agencies evaluate proposed new land uses according to specific separation criteria to prevent the creation of land uses that attract or sustain hazardous wildlife at airports. Included in these land use practices are potential wetland mitigation sites for compensation of wetland impacts resulting from airport projects. The FAA must comply with AC-150/5200-33C for any project which involves potential applicant-responsible wetland mitigation to compensate for impacts to wetland and/or watercourse impacts. There is a provision in AC-150/5200-33C for review of proposed mitigation sites that do not meet the separation criteria to be reviewed on a site-by-site basis by a qualified wildlife biologist to determine if they are safe from a wildlife hazard perspective.

An FAA Wildlife Biologist specialist has reviewed the proposed wetland mitigation framework for the project and determined that this compensatory mitigation is compatible with safe airport operations and grant assurance compliance in terms of potential wildlife hazards (see Record of Meeting in **Appendix A**). The proposed mitigation site would be relatively small and would be constructed as a forested wetland, rather than an emergent or scrub-shrub wetland, to minimize potential attraction of hazardous wildlife.

During the design and permitting phase of the project, coordination with the CT DEEP and U.S. Army Corps of Engineers (USACE) would be undertaken for the preparation of a detailed Compensatory Wetland

Mitigation Plan that may include a combination of creation, enhancement, restoration, and/or contributing to a Preservation/Conservation Benefit Project within this parcel.

5.5.5 Summary of Impact

The Proposed Action would result in direct impacts to approximately 0.23 acres of State- and Federally-regulated wetlands and 0.31 acres of State- and Federally-regulated watercourses. During the design and permitting phase of the project, coordination with the CT DEEP and USACE would be undertaken for the preparation of a detailed Compensatory Wetland Mitigation Plan that may include a combination of creation, enhancement, restoration, and/or contributing to a Preservation/Conservation Benefit Project within this parcel. Therefore, it is not anticipated that the Proposed Action would exceed the significance thresholds for these resources.

5.6 Water Resources – Groundwater

5.6.1 Significance Thresholds – Groundwater

As detailed in FAA Order 1050.1F, a significant impact to groundwater would occur if the Proposed Project would:

- ◆ Exceed groundwater quality standards established by Federal, State, local, and tribal regulatory agencies.
- ◆ Contaminate an aquifer used for public water supply such that public health may be adversely affected.
- ◆ Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values.

5.6.2 No Action

Under the No Action alternative, Taxiway T would not be extended, and the Airport would continue operating within the same footprint. Therefore, there would be no additional impacts to groundwater.

5.6.3 Proposed Action - Groundwater

The Project Area is located within an area mapped as Groundwater Classification “GA-Impaired”. The groundwater quality goal and designated use for Class GA groundwater is suitable for drinking however there may be a known or potential impairment source. The Project Area is not within an aquifer protection area. The Proposed Action does not include installation of wells that could potentially impact groundwater. The Proposed Action would not result in the production of wastewater or effluent that could impact groundwater. The Proposed Action is not anticipated to result in direct or indirect impacts to groundwater.

5.6.4 Best Management Practices and Minimization – Groundwater

The potential for impacts to groundwater during construction would be minimized by implementation of a SWPCP that will be prepared in accordance with CT DEEP regulations.

5.6.5 Summary of Impact

It is not anticipated that the Proposed Action would result in any direct or indirect impacts to groundwater. It is not anticipated that the Proposed Action would exceed the significance thresholds for these resources.

5.7 Cumulative Impact

Cumulative impacts are impacts on the environment which result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. The analysis of cumulative impacts recognizes that while the impacts of individual actions may be small, when combined with the impacts of past, present, and reasonably foreseeable future actions on populations or resources in and around BDL, the impacts could be potentially significant.

The cumulative impacts assessment only considers the environmental categories with impacts resulting from the Proposed Project. **Table 5-5** includes a summary of those environmental categories that had impacts and, applicable recommended mitigation measures. The environmental resource categories included in **Table 5-5** are the categories that were evaluated as part of the cumulative impact analysis.

Table 5-5 – Summary of Environmental Consequences

Environmental Resource Category	Alternative 1: No Action	Alternative 2: Proposed Action
Meets Purpose And Need?	No	Yes
Air Quality	No change.	Does not exceed significance thresholds.
Biological Resources	No change.	Best management practices and seasonal restrictions will avoid impacts to migratory birds and State-listed species. Does not exceed significance thresholds.
Climate	No change.	Does not exceed significance thresholds.
Hazardous Materials, Solid Waste, and Pollution Prevention	No change.	With inclusion of best management practices, does not exceed significance thresholds.
Water Resources – Wetlands and Surface Waters	No change.	A Compensatory Wetland Mitigation Plan will be developed during design in coordination with CT DEEP and USACE. May include a combination of creation, enhancement, restoration, and/or contributing to a Preservation / Conservation Benefit Project within this parcel. May also include payment into the Connecticut In-Lieu Fee Program. Does not exceed significance thresholds.
Water Resources – Groundwater	No change.	Does not exceed significance thresholds.

Source: C&S Companies, Inc. 2024

5.7.1 Cumulative Impact Analysis

Past projects include pavement reconstruction projects (Taxiway C, Taxiway S, and Taxiway E), as well as an obstruction removal project. An environmental assessment was completed for the obstruction removal

project, which concluded that the project was not anticipated to result in any permanent impacts or environmental concerns.

Current projects at the Airport include interior improvements to the baggage and vertical circulation components of the terminal, routine maintenance and repair of paved areas (reconstruction of Firehouse Lane and mill and overlay of Viaduct Road), and improvements to airfield signage. These projects will result in temporary construction-related increases in air quality but are not anticipated to result in significant cumulative impacts.

An ongoing project that will occur simultaneously along with the Proposed Project is the Proposed Cargo Development and Perimeter Road Relocation. The CAA has developed preliminary plans to relocate a portion of Perimeter Road to allow for the construction of a cargo facility near Runway 24. An Environmental Assessment for the Proposed Cargo Development and Perimeter Road Relocation is underway to evaluate the potential impacts from the increase in airport operations associated with the project. The cargo development is in an area that currently contains water resources and has the potential to include habitat for protected species. The Proposed Project is not anticipated to exceed significance thresholds for biological resources and water resources with inclusion of best management practices and the development of a Compensatory Mitigation Plan during design. Therefore, cumulative impacts resulting from the Proposed Action and the Proposed Cargo Development and Perimeter Road Relocation are not anticipated.

Detailed project information is not available for the reasonably foreseeable future projects. In order to provide a quantitative analysis and magnitude of impact, preliminary information was used. This included the currently approved ALP drawing and similar projects at other commercial service airports. Reasonably foreseeable projects include routine maintenance and repair of paved areas (reconstruction of Runway 6-24 and the Old Rental Car Parking Lot). Reasonably foreseeable projects at the airport are intended to maintain existing infrastructure and increase safety and efficiency, but do not support or promote increased operations. These projects will result in temporary construction-related increases in air quality but are not anticipated to result in significant cumulative impacts.

5.7.2 Summary of Cumulative Impacts Assessment

The discussion of cumulative impacts addressed impacts of reasonably foreseeable future projects proposed in combination with past and present actions near the Project Area. For the past, present, and reasonably foreseeable future projects near BDL, no significant cumulative impacts are anticipated with the Proposed Project.

5.8 List of Anticipated Permits, Licenses, Approvals, or Reviews

Permits, licenses, approvals, or reviews that may be required for the proposed action are listed below:

- ◆ FAA Form 7460 Notice of Proposed Construction.
- ◆ USACE Pre-Construction Notification (PCN).
- ◆ CT DEEP General Permit for Water Resources Construction Activities.
- ◆ PCN – USACE General Permits for CT (for Section 401 Water Quality Certification).
- ◆ CT DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.
- ◆ Conduct surveys within the Project Area for low frostweed prior to construction through coordination with CT DEEP.

- ◆ Conduct additional coordination with the CT DEEP NDDB during the design and permitting phase of the Proposed Project to prepare a detailed mitigation plan to address loss of species habitat, with the potential mitigation areas outlined in the Draft RSMP as a baseline.
- ◆ Compensatory Wetland Mitigation Plan will be developed during design in coordination with CT DEEP and USACE. May include a combination of creation, enhancement, restoration, and/or contributing to a Preservation / Conservation Benefit Project within this parcel.
- ◆ Implementation of a Stormwater Pollution Control Plan (SWPCP) that would be prepared in accordance with CT DEEP.

6 List of Preparers

This Draft EA was prepared by C&S Companies, Inc., with support from FHI Studio and HMMH, and integrating information provided by BDL. The Draft EA was prepared in collaboration with the FAA. The following personnel participated in preparation of the document:

Table 6-1 – List of Preparers

Name / Affiliation	Contribution	Education Certifications/Licenses Professional Organizations	Years of Experience
Kara Young C&S Companies, Inc.	Project Manager EA Author Purpose and Need Alternatives Cumulative Impacts	B.S. Environmental Engineering	16
Christen Craig C&S Companies, Inc.	Quality Assurance, Quality Control	B.S. Chemistry ACC	29
Mia Held C&S Companies, Inc.	Coastal Resources Farmlands	Masters, Community & Regional Planning (MCRP) University of New Mexico BFA, Niagara University	3
Shannon Eibert C&S Companies, Inc.	GIS Graphics Creation Historic, Architectural, Archeological, and Cultural Resources DOT Section 4(f) Land Use & Zoning Natural Resources Socioeconomic, Environmental Justice, and Children’s Environmental Health and Safety Risks	MCRP, City & Regional Planning B.S., Environmental Science & Ecosystems B.A., Geography & Urban Planning American Institute of Certified Planners Envision Sustainability Professional	9
Matt Walker C&S Companies, Inc.	Hazardous Materials, Solid Waste, and Pollution Prevention	B.S., Environmental Resource Management	20
Phil DeVita, CCM HMMH	Air Quality and Climate Technical Lead	M.S. Environmental Studies B.S. Meteorology	35
Shawn Callaghan FHI Studio	EA Author, Biological and Water Resources	B.S. Natural Resources, M.A. Landscape Design Professional Soil Scientist	25
Daniel Hageman FHI Studio	EA Author, Biological and Water Resources	B.S. Natural Resource Management & Engineering / Professional Soil Scientist	32
Ronald Gautreau FHI Studio	EA Author, Biological and Water Resources	B.A. Biology/Ecology, M.S. Environmental Science	36

Source: C&S Companies, Inc. 2024

Appendix A – Agency Correspondence

Environmental Distribution List

Airport Sponsor

Connecticut Airport Authority
Bradley International Airport
334 Ella Grasso Turnpike, Suite 160
Windsor Locks, CT 06096

Lead Agency

Cheryl Quaine
Environmental Protection Specialist
Federal Aviation Administration
New England Region
12 New England Executive Park
Burlington, MA 01803
Cheryl.j.quaine@faa.gov

Federal Agencies

David Simmons
Supervisory Biologist, Endangered Species
United States Department of the Interior
U.S. Fish & Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
David_Simmons@fws.gov
newengland@fws.gov

State Agencies

Robin Blum
Supervising Wildlife Biologist
Wildlife Division Ecological Services
Bureau of Natural Resources
Connecticut Department of Energy and
Environmental Protection
209 Hebron Road
Marlborough, CT 06447
robin.blum@ct.gov

Senior Environmental Analyst
Connecticut Department of Energy &
Environmental Protection
Office of Environmental Review
79 Elm Street
Hartford, CT 06106
Deep.webmaster@ct.gov

Jonathan Kinney
State Historic Preservation Officer
Connecticut Department of Economic &
Community Development
State Historic Preservation Office
450 Columbus Boulevard, Suite 5
Hartford, CT 06103
Jonathan.kinney@ct.gov

Town of Windsor Locks

First Selectman: Paul Harrington
Planner: Jennifer Valentino
50 Church Street
Windsor Locks, CT 06096
pharrington@wlocks.com
jvalentino@wlocks.com

Town of Suffield

First Selectman: Colin Moll
Planner: Bill Hawkins
83 Mountain Road
Suffield, CT 06078
cmoll@suffieldct.gov
Bhawkins@SuffieldCT.gov

Town of East Granby

First Selectwoman: Eden Wimpfheimer
Planner: Robin Newton
9 Center Street
East Granby, CT 06026
edenw@egtownhall.com
robinn@egtownhall.com

Town of Windsor

Mayor: Donald Trinks
Manager: Peter Souza
Planner: Eric Barz
275 Broad Street
Windsor, CT 06095
TownCouncil@townofwindsorct.com
souza@townofwindsorct.com
barz@townofwindsorct.com

August 14, 2023

Cheryl Quaine
Environmental Protection Specialist
Federal Aviation Administration
New England Region
12 New England Executive Park
Burlington, MA 01803

SAMPLE SCOPING LETTER PACKAGE

Re: Bradley International Airport, Windsor Locks, Connecticut
NEPA Environmental Assessment – Taxiway T Extension Project
Preliminary Environmental Scoping/Request for Information

File: O70.002.005

Dear Ms. Quaine:

On behalf of the Connecticut Airport Authority (CAA) and Bradley International Airport (BDL), C&S Engineers, Inc., is preparing an Environmental Assessment (EA) for a taxiway extension project at BDL in Windsor Locks, Hartford County, Connecticut (see attached **Figure 1**). The EA will evaluate the environmental impacts associated with the Taxiway T Extension Project in order to comply with Federal Aviation Administration (FAA) requirements to assess impacts associated with airport development projects. Since the project will involve approvals from federal agencies, National Environmental Policy Act (NEPA) review is necessary. The FAA is the NEPA lead agency for the project. This letter has been submitted to elicit comments and request pertinent information from your agency.

Background Information/Project Description

Bradley International Airport (Airport or BDL), owned and operated by the Connecticut Airport Authority, operates on approximately 2,400 acres located in the towns of Windsor Locks, Windsor, Suffield, and East Granby, in Hartford County. Airport operations include both public/commercial and military use.

The extension of Taxiway T was recommended as an effective way to reduce runway incursions and increase safety, efficiency, and economic development benefits. While the taxiway may be constructed in phases (Phase 1: from Taxiway E to just northwest of Runway 6-24 and Phase 2: from north of Runway 6-24 to Taxiway W), this EA will evaluate the full-build scenario.

Proposed major development items in this project will include the following (see attached **Figure 2**):

- Site grading
- Construction of a 75 foot wide taxiway
- Construction of a taxiway connection from Runway 15-33 to Taxiway T at Taxiway D
- Connect to the newly realigned Taxiway E
- Removal of Taxiway C3, partial removal of a vehicle service road, and removal of concrete pad associated with a decommissioned VOR

- Drainage/stormwater impacts and necessary improvements east of the Runway 15 end
- Connect to existing Taxiway W
- Installation of taxiway markings, lighting, and signage


As part of the preliminary scoping process, we are requesting that your agency provide relevant information or comments regarding the following Environmental Impact Categories, taken from the FAA Order 1050.1F *Environmental Impacts: Policies and Procedures* as they may relate to your interest in the proposed projects. The categories are listed in the table below:

Air Quality/Climate	Socioeconomics
Biological Resources (including Fish, Wildlife, and Plants)	Environmental Justice
Coastal Resources	Children’s Environmental Health and Safety Risks
Department of Transportation Act, Sec 4(f)	Light Emissions & Visual Resources
Farmlands	Wild and Scenic Rivers
Hazardous Materials, Solid Waste, and Pollution Prevention	Wetlands
Historic, Architectural, Archeological, and Cultural Resources	Floodplains
Land Use	Surface Waters
Natural Resources and Energy Supply	Groundwater
Noise and Noise-Compatible Land Use	Construction Impacts

In order to maintain the schedule for environmental planning for this project, we would appreciate a response to this inquiry by **September 14, 2023**. If we do not hear from you by that date, we will assume that you have no comments. If you have any questions regarding the project, please contact Kara Young at 315-455-2000, or by e-mail at kyoung@cscos.com. Thank you for your assistance.

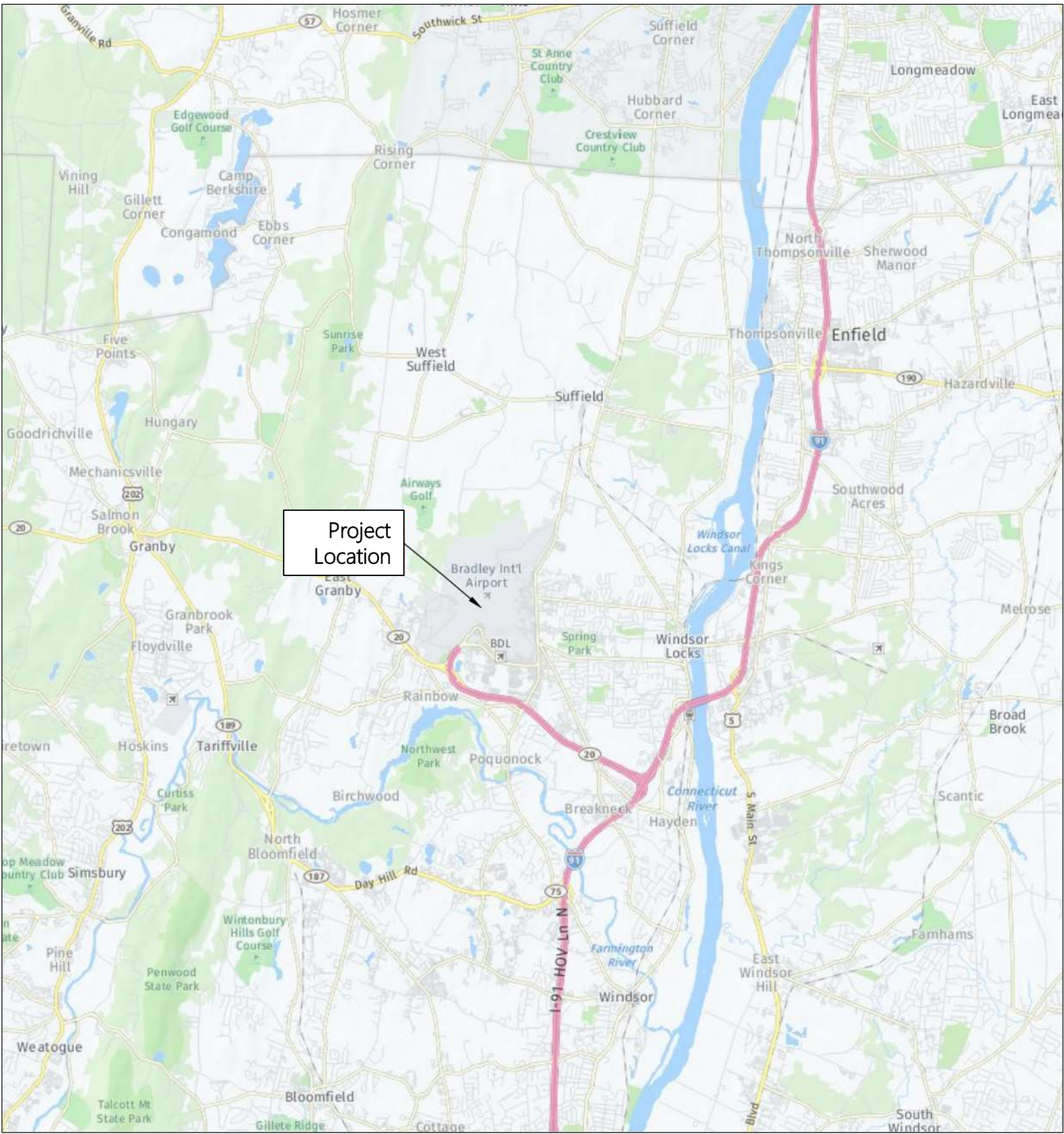
Sincerely,

C&S ENGINEERS, INC.



Kara Young, ENV SP
Principal Consultant, Aviation Planning

enc.



Not to Scale



Figure 1 | Project Location

Taxiway T Extension Project Environmental Assessment
Bradley International Airport



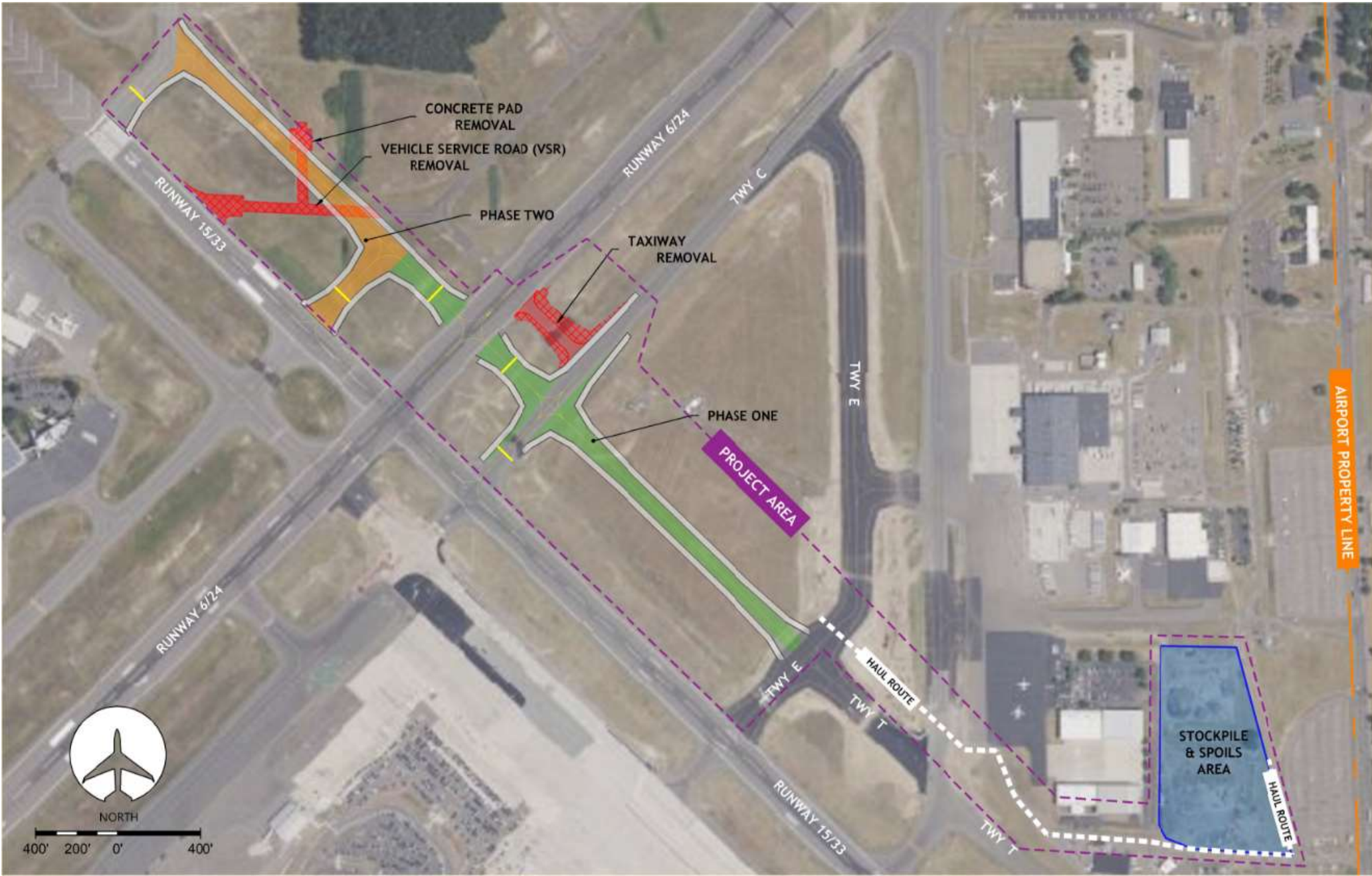


Figure 2 | Project Area

Taxiway T Extension Project Environmental Assessment
Bradley International Airport



From: Simmons, David <david_simmons@fws.gov>
Sent: Monday, August 28, 2023 1:13 PM
To: Kim Fabend
Cc: Colin Goegel; Molly Guyer; Robert Bruno; Kara Young
Subject: RE: [EXTERNAL] Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Hi Kim,

The US Fish and Wildlife Service's [Information for Planning and Consultation website](#) is the best place to start. This service will indicate federally listed species, migratory birds of conservation concern, wetlands, and other sensitive resources that may occur in a given project area. Please contact me if you have any additional questions. Regards,
David

~~~~~  
David Simmons  
Supervisor, Endangered Species & FERC/Hydro Programs  
U.S. Fish and Wildlife Service, New England Field Office  
70 Commercial Street, Suite 300, Concord, New Hampshire 03301  
Cell: 603-333-5440  
~~~~~

From: Kim Fabend <kfabend@cscos.com>
Sent: Monday, August 14, 2023 4:27 PM
To: Simmons, David <david_simmons@fws.gov>; New England FO, FW5 <newengland@fws.gov>
Cc: Colin Goegel <cgoegel@ctairports.org>; Molly Guyer <mgyuer@ctairports.org>; Robert Bruno <rbruno@ctairports.org>; Kara Young <kyoung@cscos.com>
Subject: [EXTERNAL] Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon...

On behalf of the Connecticut Airport Authority, C&S Engineers, Inc. is preparing an Environmental Assessment for the Bradley International Airport (BDL) Taxiway T Extension project. A letter requesting information on any environmental categories under your jurisdiction that may be affected within the project limits has been sent in the mail and is attached to this message. If you could provide a response by September 14, 2023, that would be greatly appreciated. Please contact me or Kara Young (kyoung@cscos.com) if you have any questions. Thank you for your time and consideration.



[Build your career at C&S!](#)

Kimberly Fabend, PE*, PTOE, ENV SP (she/her/hers)
Managing Director, Aviation Planning

office: (315) 455-2000

direct: (315) 703-4405

cell: (315) 708-7356

kfabend@cscos.com

*NY, PA, MI, KY

CONFIDENTIALITY NOTICE: This e-mail, including any attachment(s) to it, is intended for the exclusive use of the addressee(s) and may contain proprietary, confidential, or privileged information. If you are not the intended recipient, you are hereby notified that any use, disclosure, copying, distribution, or taking of any action in reliance on this information is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately by e-mail and delete the message.

Kim Fabend

From: Kara Young
Sent: Tuesday, August 29, 2023 9:44 AM
To: Brunza, Linda; Goegel, Colin; Molly Guyer
Cc: Hammerling, Eric; Riese, Frederick; Kim Fabend
Subject: RE: EA notice for Bradley International Airport Taxiway Extension Assessment

Hello Linda,

Thank you for your reply. The responses to your questions are listed below.

The extension of Taxiway T was identified during the 2019 Airport Master Plan to reduce the amount of runway crossings and provide efficient airside access. The master plan evaluated the construction of the full parallel taxiways, or leaving the airfield pavement as-is, and noted the advantages and disadvantages of both alternatives. The EA Alternatives Chapter will reference the alternative discussion identified within the Master Plan.

The EA text will reference previous studies completed (wetlands delineation report and the draft rare species management plan), as well as online data (i.e. online mappers). At this time, we are soliciting general comments that would supplement existing information. The Draft EA will be available for review and comment at a later time.

Please let me know if you have any further comments at this time.

Thank you,



[Build your career at C&S!](#)

Kara Young, ENV SP (she/her/hers)
Principal Consultant

office: (315) 455-2000
direct: (315) 703-4194
cell: (774) 313-0309
kyoung@cscos.com
499 Col. Eileen Collins Blvd. | Syracuse, NY 13212

CONFIDENTIALITY NOTICE: This e-mail, including any attachment(s) to it, is intended for the exclusive use of the addressee(s) and may contain proprietary, confidential, or privileged information. If you are not the intended recipient, you are hereby notified that any use, disclosure, copying, distribution, or taking of any action in reliance on this information is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately by e-mail and delete the message.

From: Brunza, Linda <Linda.Brunza@ct.gov>
Sent: Thursday, August 24, 2023 8:30 AM
To: Kara Young <kyoung@cscos.com>; Goegel, Colin <cgoegel@ctairports.org>; Molly Guyer <mguyer@ctairports.org>
Cc: Hammerling, Eric <Eric.Hammerling@ct.gov>; Riese, Frederick <Frederick.Riese@ct.gov>
Subject: EA notice for Bradley International Airport Taxiway Extension Assessment

Good morning,

We received the letter informing our agency that an EA is being prepared for this project. Before I solicit staff comments, I am anticipating being asked questions and heading them off at the start.

During what process was the extension of Taxiway T recommended as the way to reduce runway incursions and increase safety? What were the other options considered?
Do you have anything for staff to review, such as any known wetlands in the area, or what is currently present where the extension is planned?

I can solicit general comments, but wondering if you have any more detailed plans to review or can offer some background on how this came about.

Thank you,

Linda Brunza

Linda Brunza

Senior Environmental Analyst (3)
Environmental Review & Strategic Initiatives Office
Office of the Commissioner
Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
p: 860-424-3739 | Linda.Brunza@ct.gov



**Connecticut
Department of Energy &
Environmental Protection**

*Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.*

     | portal.ct.gov/DEEP



To: Kara Young, Principal Consultant, Aviation Planning
From: Linda Brunza, Environmental Analyst
Telephone: 860-424-3739
Email: Linda.Brunza@ct.gov

Date: 9/13/2023

Subject: Bradley International Airport, NEPA Environmental Assessment Preliminary Scoping

The Department of Energy and Environmental Protection (DEEP) has received scoping letter dated August 14, 2023 regarding the preparation for an Environmental Assessment (EA) for the Taxiway T Extension Project Request for Information. The EA will evaluate environmental impacts associated with the Taxiway T Extension Project to comply with the Federal Aviation Administration requirements under NEPA. This extension project was recommended to reduce runway incursions and increase safety and efficiency.

The following comments are submitted for your consideration.

Remediation

Contact: Ryan Mowrey, Analyst, Remediation Division, Ryan.Mowrey@ct.gov

All soil should be properly characterized before excavation of the site. Due to the it being an airport, there is a high likelihood that contaminated soil will be encountered. The nature and extent of any potential contamination should be known prior to removal and stockpiling of soil. The soil should be sampled for volatile organic compounds, petroleum products, and metals to address any potential fuel impacts as well as emerging contaminants. This includes sampling for PFAS due to fire foam use and known PFAS contamination at other areas of the airport. Also, 1-4 dioxane needs to be sampled for due to antifreeze/ deicing fluids being used at the airport. Any runway asphalt or concrete that is removed during the work should be properly characterized, especially for PFAS. PFAS can be absorbed into the pore spaces of the asphalt/concrete and serve as ongoing sources of contamination. This will impact where the material can be sent for disposal and the cost associated with disposal.

Water Planning and Management Division

Contact: Marlene Krajewski, Water Planning and Management Division, Marlene.Krajewski@ct.gov

Wild and Scenic Rivers

The Project Site is just north of the start of the federally designated Lower Farmington River Wild and Scenic River, which begins 0.5 miles below the Rainbow dam and Ends with the confluence of the Connecticut River in Windsor, CT. The Lower Farmington River & Salmon Brook Wild and Scenic River is designated for recreation, and has Outstanding Remarkable Values for Biodiversity, Culture, Geology, and Recreation. This system was designated in 2019. This Segment may be within the Study Area for the project, depending on what the FAA determines the Study Area to be for this project.

The Project should take into consideration impacts to the nearby resource, including construction and cumulative impacts. These impacts may include: any alternation of its free-flowing nature, impacts on the Outstanding Remarkable Values, or deterioration to the river's water quality. There should be communication with the National Park Service and the Farmington River and Salmon Brook Wild and Scenic Committee if there is a possibility of impacts to the segment of the Farmington River.

<https://www.rivers.gov/river/farmington#close>

Watershed

Three subregional watersheds intersect on the property of Bradley International Airport. The Project Area is within the Stony Brook Subregional Watershed, while the stockpiles and stores area is in the Connecticut River Subregional Watershed, and the terminals are in the Farmington River Subregional Watershed. As such, the applicant may need to consider any significant transfer of water between these subregional watersheds.

The letter submitted to DEEP states that as part of the Project, drainage/stormwater impacts and necessary improvements east of Runway 15 would be made. DEEP supports these improvements as they relate to water quality. Additionally, proper stormwater management measures should be followed to mitigate the impact of construction activities to receiving waters surrounding these areas.

Total Maximum Daily Load (TMDL)

There is a Total Maximum Daily Load for Rainbow Brook and Seymour Hollow Brook (1999) which identifies Aircraft Facilities at Bradley International Airport as a source of pollutant or stressor to the waterbody. Deicing at the airport was identified as a major cause of the impairments in Rainbow Brook and Seymour Hollow Brook. Rainbow Brook and Seymour Hollow Brook are both south of the project area and are both impaired waterbodies as of the 2022 CT Integrated Water Quality Report. There is an upcoming update to this TMDL.

<https://portal.ct.gov/-/media/DEEP/water/tmdl/CTFinalTMDL/rainbowSeymourHollowBrook>

The proposed taxiway improvements could impact Discharge Serial Number (DSN) 10, DSN 11, DSN 13, and proposed construction could impact DSN 10. This discharge point is currently meeting the Water Quality Criteria for chlorides, copper and zinc. Propylene glycol and ethylene glycol have not been detected at this discharge point. DSN 13 does have propylene glycol present and will be included in the TMDL, chloride and copper are also a concern for this area.

Discharge BIA 2 discharges into Seymour Hollow which is in the current TMDL for propylene glycol and ethylene glycol; it will also be listed for chlorides, copper, and zinc. Seymour Hollow Brook does not meet water quality criteria for chlorides copper and zinc.

The EA should look at whether these activities will increase the concentration of these parameters via increased stormwater or groundwater and consider ways to reduce or mitigate the impact.

Natural Diversity Database

Contact: Robin Blum, Supervising Wildlife Biologist, Wildlife Division, Robin.Blum@ct.gov

The airport is noted to contain Connecticut state listed species, and airport projects have been the subject of multiple NDDB reviews over the years. NDDB required the Connecticut Airport Authority (CAA) to prepare and submit a Rare Species Management Plan in order to provide a framework for managing rare species and habitats at the Airport, due to the piecemeal nature of project review submissions. NDDB last met with CAA and their consultants in June, 2023, and are awaiting the most recent draft version of this plan to be submitted for review. In the interim, NDDB expects that the draft plan can be used for guidance in determining expected impacts to listed species and acceptable protection and/or mitigation measures should be proposed by the applicant. NDDB has not yet received a review request for this project. Please follow the instructions for submitting an [NDDB filing at DEEP's NDDB Environmental Review](#) webpage.

Fisheries Division

Contact: Shalyn Zappulla, Biologist, Fisheries Division. Shaylyn.Zappulla@ct.gov

Impervious coverage of just 10% and sometimes much less can have significant effects on aquatic ecosystems and their functions. Effects of impervious area to aquatic ecosystems can include changes to water chemistry, species assemblages and diversity, increased runoff causing erosion, increased stream width, deeper channels, increased turbidity, and introduction of pollutants, decreased flows, increased flashiness, sedimentation and loss of instream pools, loss of woody debris, loss of riparian

vegetation, and loss of natural floodplain and groundwater recharge. Thermal consequences of these impervious surfaces have caused temperatures in Rainbow Brook to exceed 100°F on occasion.

Pollutants introduced into streams include but are not limited to oil, gas, and PFAS from fire foam. The presence of deicing and anti-icing agents used by the airport required the establishment of a Total Maximum Daily Load for Rainbow Brook and Seymour Hollow Brook.

Fisheries data is summarized below. All estimates of impervious area were obtained through StreamStats, which has an 80% accuracy. Bradley International Airport is not the sole contributor of impervious surfaces.

- The Spencer Brook watershed contains an estimated 17.3% impervious area. Only Redfin Pickerel and Tessellated Darter have been found here in Fisheries Division sampling efforts. Redfin Pickerel are often found in areas with relatively high amounts of impervious cover according to State of New Hampshire Fish and Game. Tessellated Darters are tolerant of poor water quality.
- The Rainbow Brook watershed contains an estimated 43.1% impervious area. No fish were found upstream near Park Rd. (adjacent to airport). American Eel were present downstream near Rainbow Rd. and the Farmington River.
- The Seymour Hollow Brook watershed contains an estimated 53.7% impervious area. No fish were found by Fisheries Division sampling.
- The Kettle Brook watershed contains an estimated 33.7% impervious area. Fisheries Division sampling indicated the presence of American Eel, Brook Lamprey, both wild and stocked Brown Trout, Blacknose Dace, Bluegill, and Redfin Pickerel.
- The DeGraves Brook watershed contains an estimated 25.9% impervious area. The Fisheries Division does not have data for DeGraves Brook.
- The Little Brook watershed contains an estimated 20.1% impervious area. Fisheries Division sampling indicated the presence of American Eel, Common Shiner, Redfin Pickerel, and Tessellated Darter.
- The watershed of an unnamed tributary to Stony Brook contains an estimated 26.2% impervious area and the project lies entirely within this area. It is important to note that more impervious surfaces will be created with this project than will be removed. The Fisheries Division does not have data for this tributary. It is contained within the larger Stony Brook watershed which has a 44.6 sq mi drainage area, a diverse fish community, and an estimated 7.4 % impervious area. Trout are stocked annually into Stony Brook. Federally listed dwarf wedge mussels are also present in this watershed. NDDDB needs to be consulted if they haven't already as there would likely be significant concerns for this species as well as the state-listed species in the project area. Lastly, Stony Brook is a diadromous fish restoration priority and includes the potential removal of the only significant dam in the watershed, thus opening up all upstream habitat to river herring and other diadromous species.

There should be no direct discharges into streams. Stringent stormwater BMPs should be implemented. Installation of retention ponds and other measures to offset thermal and chemical pollution risks to watercourses is essential.

Aquifer Protection

Staff from DEEP reviewed the location of this project and found that it is not in an aquifer protection area and has no comments on the proposed project.

Stormwater Management during Construction

Contact: Bureau of Materials Management and Compliance Assurance, Permitting and Enforcement Division: DEEP.stormwaterstaff@ct.gov

The General Permit for [Stormwater and Dewatering Wastewaters from Construction Activities](#) may be applicable depending on the size of the disturbance regardless of phasing. The construction stormwater general permit dictates separate compliance procedures for Locally Exempt projects (projects primarily conducted by government authorities) and Locally Approvable projects (projects primarily by private developers). This general permit applies to discharges of stormwater and dewatering wastewater from construction activities where the activity disturbs more than an acre. The requirements of the current general permit include registration to obtain permit coverage and development and implementation of a Stormwater Pollution Control Plan (SWPCP). The SWPCP contains requirements for the permittee to describe and manage their construction activity, including implementing erosion and sediment control measures as well as other control measures to reduce or eliminate the potential for the discharge of stormwater runoff pollutants (suspended solids and floatables such as oil and grease, trash, etc.) both during and after construction. A goal of 80 percent removal of the annual sediment load from the stormwater discharge shall be used in designing and installing post-construction stormwater management measures. Stormwater treatment systems must be designed to comply with the post-construction stormwater management performance requirements of the permit. These include post-construction performance standards requiring retention and/or infiltration of the runoff from the first inch of rain (the water quality volume or WQV) and incorporating control measures for runoff reduction and low impact development practices. Projects that are exempt from local permitting that disturb over one acre must submit a registration form and Stormwater Pollution Control Plan (SWPCP) to the Department at least 60 or 90 days, as identified in the permit, prior to the initiation of construction. Locally Approvable construction projects with a total disturbed area of one to five acres are not required to register with the Department provided the development plan has been approved by a municipal land use agency and adheres to local erosion and sediment control land use regulations and the CT Guidelines for Soil Erosion and Sediment Control. In addition to measures such as erosion and sediment controls and post-construction stormwater management, the SWPCP must include a schedule for plan implementation and routine inspections. For further information, contact the division at 860-424-3025 or DEEP.StormwaterStaff@ct.gov. The construction stormwater general permit registrations must be filed electronically through DEEP's [ezFile Portal](#). Additional information can be found on-line at: [Construction Stormwater GP](#).

Solid Waste Disposal

Demolition waste that is not contaminated with asbestos, PCBs, or other materials that require special handling is subject to Connecticut's [solid waste statutes and regulations](#), and must be reused, recycled, or disposed of accordingly. Construction and demolition debris should be segregated on-site and reused or recycled to the greatest extent possible. Waste management plans for construction, renovation or demolition projects are encouraged to help meet the State's reuse and recycling goals. Connecticut's [Comprehensive Materials Management Strategy](#) outlines a goal of 60% recovery rate for municipal solid waste by the year 2024. Part of this effort includes increasing the amount of construction and demolition materials recovered for reuse and recycling in Connecticut. It is recommended that contracts be awarded only to those companies who present a sufficiently detailed construction/demolition waste management plan for reuse/recycling. Additional information concerning construction and demolition material management and waste management plans can be found on the DEEP's [C&D Material Management](#) and [C&D Waste Management Plan](#) web pages.

One way that certain types of construction and demolition waste can be reused is as clean fill. Clean fill is defined in section 22a-209-1 of the Regulations of Connecticut State Agencies (RCSA) and includes only natural soil, rock, brick, ceramics, concrete, and asphalt paving fragments. Clean fill can be used on site or at appropriate off-site locations. Clean fill does not include uncured asphalt, demolition waste containing other than brick or rubble, contaminated demolition wastes (e.g., contaminated with oil or lead paint), tree stumps, or any kind of contaminated soils. Land-clearing debris and waste other than clean fill resulting from demolition activities is considered bulky waste, also defined in section 22a-209-1 of the RCSA. Bulky waste is classified as special waste and must

be disposed of at a permitted landfill or other solid waste processing facility pursuant to section 22a-208c of the Connecticut General Statutes and section 22a-209-2 of the RCSA. A fact sheet regarding disposal of special wastes and the authorization application form may be obtained at: [Special Waste Fact Sheet](#).

Special Waste

If abatement is required for asbestos containing materials (ACM), these materials are regulated as a “special waste” in Connecticut and may not be disposed of with regular construction and demolition waste. Instead, these materials may only be disposed of at facilities that are specifically authorized to accept ACM. Although the disposal of asbestos-containing material is typically arranged for by the licensed asbestos abatement contractor, project proponents should ensure that the contractor disposes of all such materials at properly licensed facilities. For further information, contact the Waste Engineering & Enforcement Division at 860-424-3023. A fact sheet regarding disposal of special wastes and the authorization application form may be obtained at: [Special Waste Fact Sheet](#).

Demolition debris may also include materials that contain polychlorinated biphenyls (PCBs). Such materials can include transformers, capacitors, fluorescent light ballast and other oil-containing equipment, and in certain building materials (i.e., paint, roofing, flooring, insulation, etc.). EPA has learned that caulk containing potentially harmful polychlorinated biphenyls (PCBs) was used around windows, door frames, masonry columns and other masonry building materials in many buildings starting in 1929 with increased popularity in the 1950s through the 1970s, including schools, large scale apartment complexes and public buildings. In general, these types of buildings built after 1978 do not contain PCBs in caulk. In 2009, EPA announced new guidance about managing PCBs in caulk and tools to help minimize possible exposure. The guidance can be found at: [PCBs in Caulk](#). Where schools or other buildings were constructed or renovated prior to 1978, EPA and DEEP recommend that PCB-containing caulk removal be scheduled during planned renovations, repairs (when replacing windows, doors, roofs, ventilation, etc.) and demolition projects, whenever possible. However, the continued use of such PCB materials is prohibited and, where it is identified, it must be addressed. EPA recommends testing caulk that is going to be removed as the first step to determine what protections are needed during removal. Where testing confirms the presence of PCBs, it is critically important to ensure that they are not released to air during replacement or repair of caulk in affected buildings. Many such PCB removal projects will need to include sampling of the substrate and soil, as well as require plans to be approved by EPA in coordination with DEEP. Further information concerning the DEEP PCB Program can be found on-line at: [DEEP PCB Program](#).

Air Management

DEEP Bureau of Air Management typically recommends the use of newer off-road construction equipment that meets the latest EPA or California Air Resources Board (CARB) standards. If newer equipment cannot be used, equipment with the best available controls on diesel emissions including retrofitting with diesel oxidation catalysts or particulate filters in addition to the use of ultra-low sulfur fuel would be the second choice that can be effective in reducing exhaust emissions. The use of newer equipment that meets EPA standards would obviate the need for retrofits.

DEEP also recommends the use of newer on-road vehicles that meet either the latest EPA or California Air Resources Board (CARB) standards for construction projects. These on-road vehicles include dump trucks, fuel delivery trucks and other vehicles typically found at construction sites. On-road vehicles older than the 2007-model year typically should be retrofitted with diesel oxidation catalysts or diesel particulate filters for projects. Again, the use of newer vehicles that meet EPA standards would eliminate the need for retrofits.

Additionally, Section 22a-174-18(b)(3)(C) of the Regulations of Connecticut State Agencies (RCSA) limits the idling of mobile sources to 3 minutes. This regulation applies to most vehicles such as trucks and other diesel engine-powered vehicles commonly used on construction sites. Adhering to the regulation will reduce unnecessary idling at truck staging zones, delivery or truck dumping areas and further reduce on-road and construction equipment emissions. Use of posted signs indicating the three-minute idling limit is recommended. It should be noted that only DEEP can enforce Section 22a-

174-18(b)(3)(C) of the RCSA. Therefore, it is recommended that the project sponsor include language similar to the anti-idling regulations in the contract specifications for construction to allow them to enforce idling restrictions at the project site without the involvement of DEEP.

Thank you for the opportunity to review this project. These comments are based on the reviews provided by relevant staff and offices within DEEP during the designated comment period. They may not represent all applicable programs within DEEP. Feel free to contact me if you have any questions concerning these comments.

cc: Eric Hammerling

Kim Fabend

From: Kim Fabend
Sent: Wednesday, August 16, 2023 11:28 AM
To: Jen Valentino; Paul Harrington
Cc: Colin Goegel; Molly Guyer; Robert Bruno; Kara Young
Subject: RE: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Jen...

Thank you so much for your quick response and questions to our scoping letter. For clarification, we are early in the planning/environmental process and are collecting information from various relevant agencies at this point. Any anticipated impacts and necessary mitigation measures will be identified as we progress through the Environmental Assessment and further into the design process. Based on the EA, coordination will occur with any regulatory agencies having jurisdiction over applicable environmental resources categories (e.g., species impacts coordinated with US Fish and Wildlife and CT CEEP). Individual responses to your comments are shown below in red. If you have additional questions or any information to share, please don't hesitate to contact me.

~ Kim

Direct Office: 315-703-4405
Cell: 315-708-7356

From: Jen Valentino <jvalentino@wlocks.com>
Sent: Monday, August 14, 2023 6:23 PM
To: Kim Fabend <kfabend@cscos.com>; Paul Harrington <pharrington@WLOCKS.com>
Cc: Colin Goegel <cgoegel@ctairports.org>; Molly Guyer <mguyer@ctairports.org>; Robert Bruno <rbruno@ctairports.org>; Kara Young <kyoung@cscos.com>
Subject: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Greetings and thank you for the referral,

I do have a few questions and comments and I do realize that this area is in close proximity to the airway/runway so some of the inquiries may not be relevant or possible:

1. Despite the appearance of lawn and surrounding road/runways, the NDDB map indicates State and Federal Listed Species and Critical Habitat. May we have a copy of what is prepared for DEEP for their review and their comments and can you share what's being done to protect habitat? Realizing trees are not ideal at an airport, is there anything being added in the 30 or so acre triangle near this new road that would enhance habitat? Or if habitat growth is not encouraged here due to the proximity of the runway, is there mitigation elsewhere on the property or town to support such habitat?
<https://www.depdata.ct.gov/naturalresources/endangeredspeciesmaps/nd165.pdf> Biological resources is one of the categories evaluated in the EA. Impacts and potential mitigation measures will be identified and coordinated with USFWS and CT DEEP. Generally speaking, the airfield, especially adjacent to a runway and taxiway, is meant to be clear and graded appropriately with habitat growth prohibited.
2. Will any new lighting be proposed and if so will the light pollution be minimized utilizing fewer / full cut off fixtures? Lighting will be limited to directional/guiding lights adjacent to the taxiway. The visual impacts category evaluated in the EA will identify if this lighting is an annoyance or adverse impact.

3. Regarding air and water pollution and energy consumption, which airport operations contribute to, can the adjacent 30 or so acres be utilized to do the following somehow? **As noted previously, what can be installed in the airfield adjacent to runways and taxiways is limited, but the EA will evaluate air, water, and natural resources and energy supply impacts and potential mitigation. Plantings, alternative energy equipment, etc. would not be included in this project.**
 - a. reduce impacts of current operations and the new pavement
 - b. contribute to production of green energy – creative low-to-the-ground wind energy structures perhaps
 - c. clean and cool air – plantings that are low and non-intrusive
 - d. clean and cool water – disconnecting gray infrastructure, garden swales and depressed stormwater gardens
 - e. pollinator gardens or apiaries (just read that Pittsburgh and Orlando have them, how wonderful!)
4. From a cultural perspective, gardens and professional, beautiful, low-to-the-ground art projects here could have both cultural and tourist/economic significance if allowed **Same comment as above regarding what can be installed in an airfield.**

So true that everything that happens at the airport and the adjacent towns are somehow connected and I really do appreciate our relationship and this opportunity to comment. Good luck on the project, the roadway improvements certainly make sense.

Best,
Jen

Jennifer Valentino (Rodriguez), AICP
Town Planner
Director of Planning and Development
Town of Windsor Locks
50 Church Street, Town Hall
Windsor Locks CT 06096
Office: 860.627.1447
Cell: 860.999.0817
jvalentino@wlocks.com

From: Kim Fabend <kfabend@cscos.com>
Sent: Monday, August 14, 2023 4:35 PM
To: Paul Harrington <pharrington@wlocks.com>; Jen Valentino <jvalentino@wlocks.com>
Cc: Colin Goegel <cgoegel@ctairports.org>; Molly Guyer <mgyuer@ctairports.org>; Robert Bruno <rbruno@ctairports.org>; Kara Young <kyoung@cscos.com>
Subject: RE: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Forgot the attached letters...

~ Kim

Direct Office: 315-703-4405
Cell: 315-708-7356

From: Kim Fabend
Sent: Monday, August 14, 2023 4:34 PM

To: 'pharrington@wlocks.com' <pharrington@wlocks.com>; 'jvalentino@wlocks.com' <jvalentino@wlocks.com>
Cc: 'Colin Goegel' <cgoegel@ctairports.org>; 'Molly Guyer' <mguyer@ctairports.org>; 'Robert Bruno' <rbruno@ctairports.org>; Kara Young <kyoung@cscos.com>
Subject: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Good afternoon...

On behalf of the Connecticut Airport Authority, C&S Engineers, Inc. is preparing an Environmental Assessment for the Bradley International Airport (BDL) Taxiway T Extension project. A letter requesting information on any environmental categories under your jurisdiction that may be affected within the project limits has been sent to each of you in the mail and is attached to this message. If you could provide a response by September 14, 2023, that would be greatly appreciated. Please contact me or Kara Young (kyoung@cscos.com) if you have any questions. Thank you both for your time and consideration.



[Build your career at C&S!](#)

Kimberly Fabend, PE*, PTOE, ENV SP (she/her/hers)
Managing Director, Aviation Planning

office: (315) 455-2000
direct: (315) 703-4405
cell: (315) 708-7356
kfabend@cscos.com

*NY, PA, MI, KY

CONFIDENTIALITY NOTICE: This e-mail, including any attachment(s) to it, is intended for the exclusive use of the addressee(s) and may contain proprietary, confidential, or privileged information. If you are not the intended recipient, you are hereby notified that any use, disclosure, copying, distribution, or taking of any action in reliance on this information is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately by e-mail and delete the message.

Disclaimer

The information contained in this communication from the sender is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, distribution or taking action in relation of the contents of this information is strictly prohibited and may be unlawful.

This email has been scanned for viruses and malware, and may have been automatically archived by **Mimecast Ltd**, an innovator in Software as a Service (SaaS) for business. Providing a **safer** and **more useful** place for your human generated data. Specializing in; Security, archiving and compliance. To find out more [Click Here](#).

Kim Fabend

From: Robin Newton <robinn@egtownhall.com>
Sent: Wednesday, August 16, 2023 11:31 AM
To: Kim Fabend; Eden Wimpfheimer
Cc: Colin Goegel; Molly Guyer; Robert Bruno; Kara Young
Subject: RE: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Good Morning All,

Eden and I looked at the proposal and there is no issues that we believe will fall under our jurisdic. on. Thank you.

Robin Newton, AICP, CZEO
Director of Planning & Economic Development

From: Kim Fabend <kfabend@cscos.com>
Sent: Monday, August 14, 2023 4:38 PM
To: Eden Wimpfheimer <edenw@egtownhall.com>; Robin Newton <robinn@egtownhall.com>
Cc: Colin Goegel <cgoegel@ctairports.org>; Molly Guyer <mguyer@ctairports.org>; Robert Bruno <rbruno@ctairports.org>; Kara Young <kyoung@cscos.com>
Subject: Bradley International Airport (BDL) Taxiway T Extension Environmental Assessment

Good afternoon...

On behalf of the Connecticut Airport Authority, C&S Engineers, Inc. is preparing an Environmental Assessment for the Bradley International Airport (BDL) Taxiway T Extension project. A letter requesting information on any environmental categories under your jurisdiction that may be affected within the project limits has been sent to each of you in the mail and is attached to this message. If you could provide a response by September 14, 2023, that would be greatly appreciated. Please contact me or Kara Young (kyoung@cscos.com) if you have any questions. Thank you both for your time and consideration.



[Build your career at C&S!](#)

Kimberly Fabend, PE*, PTOE, ENV SP (she/her/hers)
Managing Director, Aviation Planning

office: (315) 455-2000
direct: (315) 703-4405
cell: (315) 708-7356
kfabend@cscos.com

*NY, PA, MI, KY

CONFIDENTIALITY NOTICE: This e-mail, including any attachment(s) to it, is intended for the exclusive use of the addressee(s) and may contain proprietary, confidential, or privileged information. If you are not the intended recipient, you are hereby notified that any use, disclosure, copying, distribution, or taking of any action in reliance on this information is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately by e-mail and delete the message.

September 26, 2023

Ms. Kara Young
C&S Companies
41 State Street, Suite 600
Albany, NY 12207
(via email only to kyoung@cscos.com)

Subject: Bradley International Airport: Taxiway T Extension Project
Windsor Locks, Connecticut

Dear Ms. Young,

The State Historic Preservation Office (SHPO) has reviewed your request for our comments regarding the referenced project. SHPO understands that the proposed undertaking consists of extending Taxiway T to reduce runway incursions and increase safety. The proposed activities include site grading, taxiway construction, removal of a taxiway, drainage improvements, and other construction related access and staging. All activities will be constructed within the footprint of previously disturbed contexts and will utilize existing infrastructure. The proposed undertaking is receiving assistance from the Federal Aviation Administration and, therefore, is subject to review by this office.

There are no archeological sites or properties listed in the National Register of Historic Places recorded within or in the immediate vicinity of the proposed project area. As noted above, all activities will occur within previously disturbed areas. Therefore, it is unlikely that the proposed activities will impact archaeological deposits. Based on the information provided to our office, it is SHPO's opinion that no historic properties will be affected by the proposed undertaking.

SHPO appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act, as amended. For additional information, please contact Catherine Labadia, Staff Archeologist and Deputy State Historic Preservation Officer, at (860) 256-2764 or catherine.labadia@ct.gov.

Sincerely,



Jonathan Kinney
State Historic Preservation Officer



Meeting Notes

Connecticut Airport Authority

Bradley International Airport
Taxiway T Extension Environmental Assessment

Project Coordination

06/26/2024

09:00 AM EST

Via Teams

Name	Affiliation	Name	Affiliation
Molly Guyer	CAA	Jeff Caiola	CT DEEP
Colin Goegel	CAA	Dawn McKay	CT DEEP NDDB
Rahul Abraham	CAA	Kara Young	C&S
Robert Bruno	CAA	Shawn Callaghan	FHI
Taylor Bell	USACE	Dan Hageman	FHI
Laura Robbins	CT DEEP	David Winslow	FHI

Reference link: [CAA - BDL Taxiway T Extension](#)

DISCUSSION ITEMS

1. Project Background

- a. Discussed project’s Purpose and Need, alternatives, and schedule.

2. Agency Wetland/Watercourse Mitigation Summary

- a. USACE:
 - i. Has FAA confirmed approval of use of In-Lieu-Fee?
 - ii. Has Airport/FAA provided disclosure that the airport takes full responsibility and accountability for any damages occurred from a bird strike?
 - 1. C&S to coordinate with FAA regarding the AC as it relates to the proposed mitigation approach
 - 2. Stream/watercourse mitigation measures may require higher ratios (example – 3 x LF of stream).
- b. State:
 - i. CT DEEP does not recognize the state-led in-lieu-fee (ILF) program. Therefore, permittee-responsible mitigation (PRM) is required.

1. Depending on coordination with federal and state, PRM can sometimes fit the needs of both state and federal mitigation.
- ii. Appears to be sufficient space for mitigation of impacts on the airport parcel presented.
- iii. 2:1 mitigation ratio to be used as a minimum but may change based on mapping of existing conditions. Enhancement would require a higher ratio.
- iv. Considerations for permitting stage:
 1. Disturbance quantities should be sure to include access roads to wetland mitigation areas and any other areas of disturbance.
 2. CT DEEP requested that the project not dispose of sand barren soils as there is a seed bank to preserve. CT DEEP asked that the project separate sand barren soil scrapings and store separately from other demolition materials. CAA committed to this on the call. Include language about this in the EA.
 3. Complete on-site delineation to verify impacts and available areas; should include access roads and any other disturbance areas used during wetland mitigation.
 4. Prioritize expansion of existing wetland mitigation areas and historical areas of wetlands that may be restored instead of creation of new.
 5. Coordination to occur between CT DEEP and USACE to see if Permittee Responsible Mitigation (PRM) could suit the needs of state and federal mitigation requirements.
 6. Endangered species consultation with NDDB and IPaC to be completed for mitigation area (habitat for mussels and northern long eared bat have potential to occur).
 7. Future coordination should include Bill Sigmund (William.sigmund@ct.gov) and Kevin Kotelly (USACE) (kevin.r.kotelly@usace.army.mil).

ACTION ITEMS

1. CAA

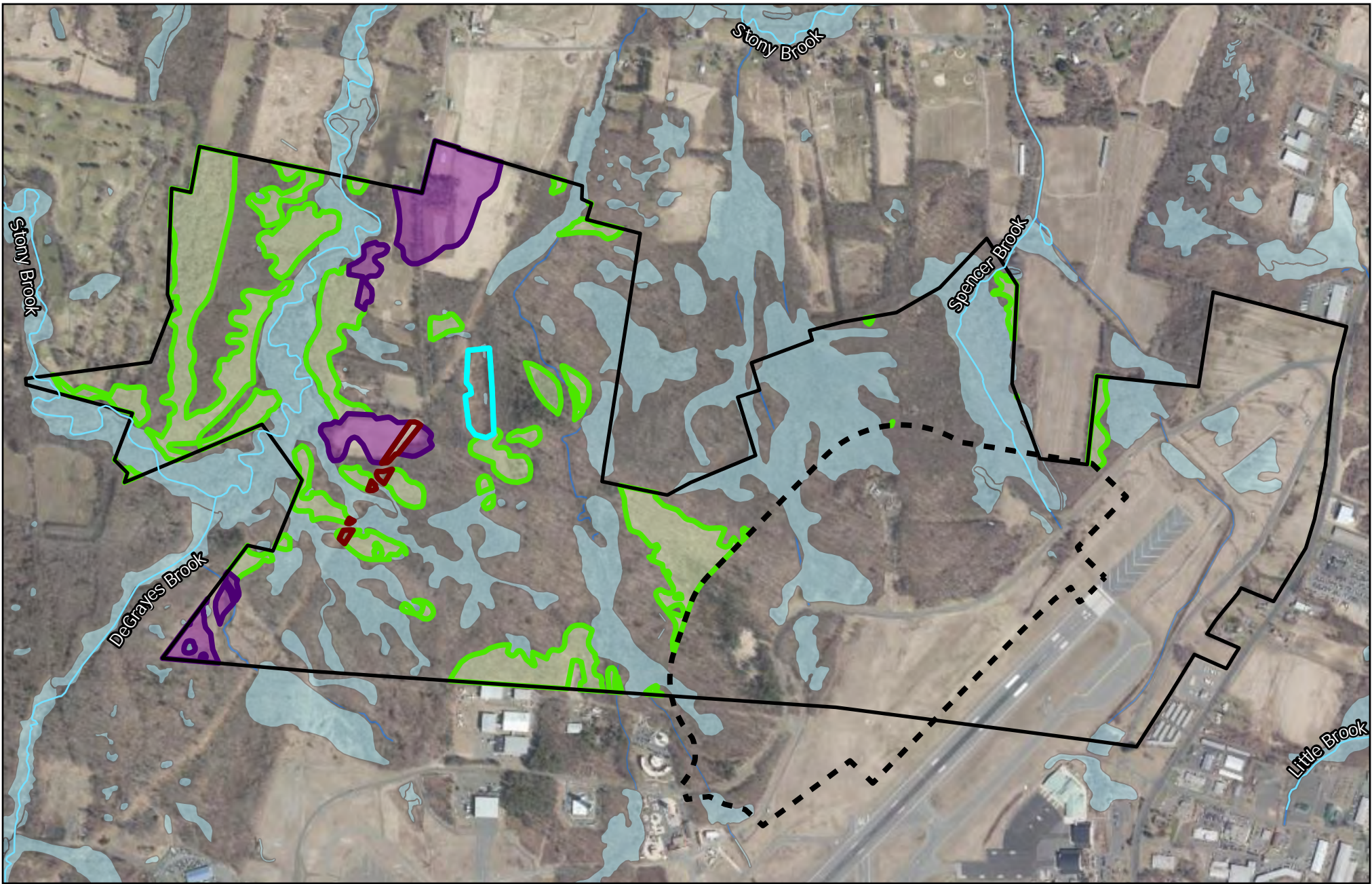
- a. None.

2. C&S/FHI

- a. C&S to follow up with FAA regarding approval of in-lieu-fee and bird strike AC. Meeting will be held to get concurrence on the current mitigation approach proposed in this meeting.

ATTACHMENTS

Areas Available for Wetland Mitigation map



Sources: NWI (2024), NRCS SSURGO hydric soils (2023), Limited FHI Delineation (2023, 2024), Limited C&S Delineation (2023), CT DEEP (2024), CT ECO (2019)

**Bradley International Airport
Taxiway T Extension
Areas Available for Wetland Mitigation**

Base Layers

- Parcel Boundary (769 acres)
- Wetland (NWI)
- Riverine (NWI)
- Named Watercourse (DEEP)

Potential Mitigation Area

- Forest (84 acres)
- Open (24 acres)

Unavailable Areas

- Utility Corridor (1 acre)
- Potential Future Development
- Previous Mitigation Site





Meeting Notes

Connecticut Airport Authority

Bradley International Airport
Taxiway T Extension Environmental Assessment

Project Coordination
07/14/2024
2:30 PM EST
Via Teams

Name	Affiliation	Name	Affiliation
Molly Guyer	CAA	Kim Fabend	C&S
Colin Goegel	CAA	Kara Young	C&S
Cheryl Quaine	FAA	Shawn Callaghan	FHI
Amy Anderson	FAA	Dan Hageman	FHI

Reference link: [CAA - BDL Taxiway T Extension](#)

DISCUSSION ITEMS

1. Proposed Project

- a. Purpose
 - i. Alleviate safety concerns associated with Hotspots 1 and 2 and active runway crossings, and
 1. Hotspot 1 is located at the intersection of Taxiway C and Taxiway S due to the bottleneck caused by bidirectional traffic to multiple destinations on the Airport. Congestion is further increased by aircraft exiting Runway 6/24 to Taxiway C. The 2019 AMP indicates that extending Taxiway T to a full parallel taxiway would reduce traffic congestion and blockages on Taxiway S.
 2. Hotspot 2 is located at the intersection of Taxiway D and Taxiway S and faces the same blockage and traffic conflicts as Hotspot 1.
 - ii. Increase efficiency of airfield operations by providing direct access to and from runway ends and airfield development.
- b. Project details
 - i. Construction of a 75-foot-wide taxiway with two 30-foot shoulders (total width of 135 feet) from intersection of Taxiway T and Taxiway E to Taxiway W at the Runway 15 End (estimated total length of 4,200 feet).
 - ii. Site grading, estimated 25-30 feet from edge of pavement

- iii. Removal of vehicle service road, concrete pad, and Taxiway C3 pavement
- iv. Construction of taxiway connector to Runway 15-33 at Taxiway D with appropriate fillets
- v. Installation of taxiway markings, lighting, and signage
- vi. Drainage improvements
- vii. Stockpile and spoils area and haul route
- viii. 0.23 acres of State and Federally- regulated wetlands; 0.31 acres of state and federally regulated watercourses

2. Coordination with FAA Wildlife Biologist (Amy Anderson):

- a. What is the ratio of mitigation: impact the state / feds would require for the 0.25-acre wetland impact?
 - i. USACE: ILF fund; CT DEEP approximately 2:1 ratio
- b. Is wetland creation the only type of mitigation they will accept? As far as wetland creation areas being attractive to wildlife-it depends on the size and shape as much as whether it is forested or not.
 - i. Wetland creation or restoration is currently proposed as it has the smallest ratio requirement. Forested wetlands are proposed so as not to attract hazardous wildlife species; conversion of farmland to forested wetland would be optimal.
- c. The map that has the "Potential Mitigation Areas" on it-is the idea for the areas marked "forested" to create forested wetlands and "open" to create herbaceous wetlands with an open water component?
 - i. The intent is to create forested wetlands and not emergent or shrub wetlands to ensure minimal wildlife attraction. The potential area was determined after screening the site for soils, NWI mapped wetlands, and land type (open field, forest, etc.).
- d. What are the details on the existing wetland mitigation site previously constructed by CAA? What type of wetland? When was it done?
 - i. CAA believes it's a combination of open and forested; completed about 20 years ago.
 - 1. FAA: The surrounding area appears to be a good mix of wetland/wet pasture/etc. Also, the mitigation proposed for this project would only require development of a small area. Therefore, she is not worried about the wetland mitigation proposed. This does not appear to be a concerning wildlife attractant.
 - 2. Should consider:
 - a. If previous mitigation site should be expanded to create a larger forested area for use in future for more wetland impacts with future projects.
 - b. Keeping mitigation as far away from movement areas as possible.

3. Regarding the previous mitigation site, what are the forested areas? First generation pine? CAA: It's a mixture; some upland areas are tall mature oak forests and others are previously used for farming or pasture. Large areas dominated by red maples that are uniform and pole size – 4-6" trees. Meadows/pasturelands are either active or dominated by invasives. There could be a benefit to taking old pasture areas and creating into forested which would also reduce the risk for wildlife attractants.
 4. FAA: Biggest concern is areas that are attractive to waterfowl; riskiest species for airfields. CAA: Geese/etc. typically do not frequent forested wetlands.
- e. EA text to reference the following:
 - i. FAA AC background
 - ii. Proposed approach
 - iii. Reference that forested wetlands of this size and type are not likely to be a wildlife attractant

ACTION ITEMS

1. CAA

- a. None at this time.

2. C&S/FHI

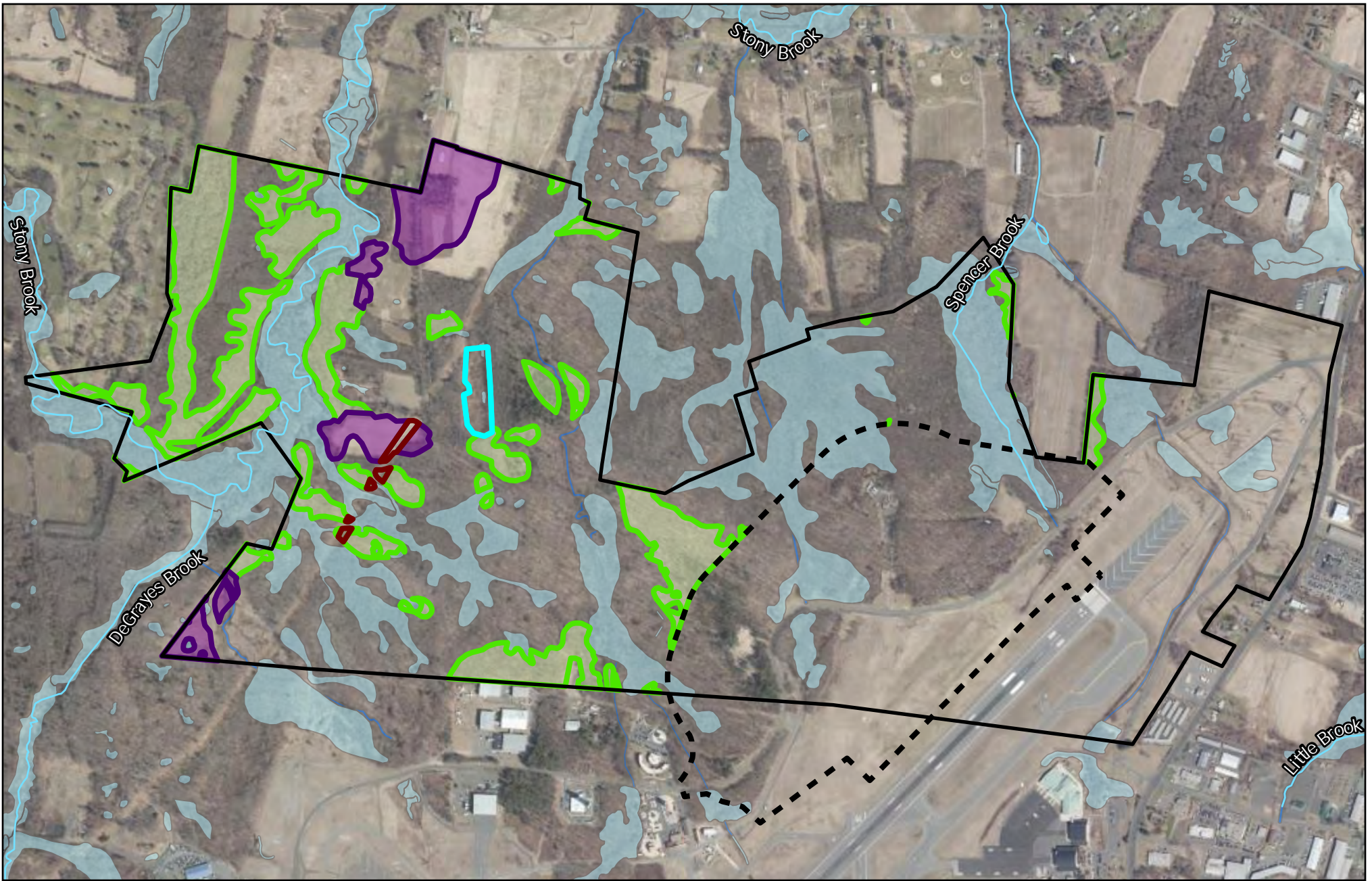
- a. Revise EA text to summarize high-level points of discussion and document FAA concurrence with the proposed wetland mitigation approach.

3. FAA

- a. Provide concurrence with approach if further comments are received from CT DEEP or USACE.

ATTACHMENTS

Areas Available for Wetland Mitigation map



Sources: NWI (2024), NRCS SSURGO hydric soils (2023), Limited FHI Delineation (2023, 2024), Limited C&S Delineation (2023), CT DEEP (2024), CT ECO (2019)

**Bradley International Airport
Taxiway T Extension
Areas Available for Wetland Mitigation**

Base Layers

- Parcel Boundary (769 acres)
- Wetland (NWI)
- Riverine (NWI)
- Named Watercourse (DEEP)

Potential Mitigation Area

- Forest (84 acres)
- Open (24 acres)

Unavailable Areas

- Utility Corridor (1 acre)
- Potential Future Development
- Previous Mitigation Site



Appendix B – Public Involvement

To be included after the Draft EA is made available for public review and comment

Appendix C – Threatened and Endangered Species Documentation



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:

08/15/2024 14:29:08 UTC

Project Code: 2024-0030539

Project Name: Taxiway T Extension Project at the Bradley International Airport

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see [Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service \(fws.gov\)](#).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

PROJECT SUMMARY

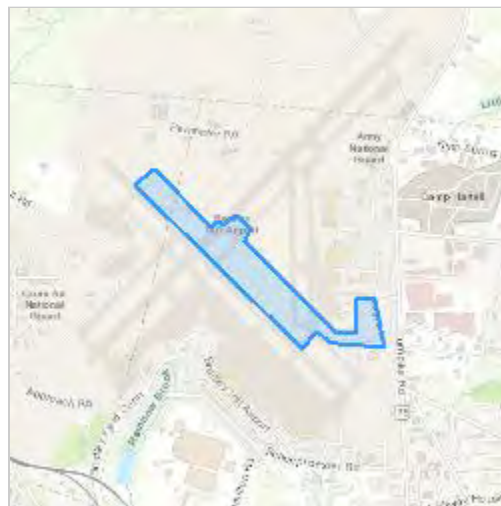
Project Code: 2024-0030539
Project Name: Taxiway T Extension Project at the Bradley International Airport
Project Type: Airport - Maintenance/Modification
Project Description: Bradley International Airport (BDL), owned and operated by the Connecticut Airport Authority (CAA), operates on approximately 2,400 acres located in the towns of Windsor Locks, Windsor, Suffield, and East Granby, in Hartford County. BDL operations include both public/commercial and military use. The extension of Taxiway T is proposed to reduce runway incursions and increase safety, efficiency, and economic development benefits.

Proposed major development items in this project will include the following:

- Construction of a 75-foot-wide taxiway with two 30-foot shoulders (total width of 135 feet) from intersection of Taxiway T and Taxiway E to Taxiway W at the Runway 15 End (estimated total length of 4,200 feet).
- Site grading, estimated 25-30 feet from edge of pavement
- Removal of vehicle service road, concrete pad, and Taxiway C3 pavement
- Construction of taxiway connector to Runway 15-33 at Taxiway D with appropriate fillets
- Installation of taxiway markings, lighting, and signage
- Drainage improvements
- Stockpile and spoils area and haul route

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.9373588,-72.68362082449836,14z>



Counties: Hartford County, Connecticut

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Federal Aviation Administration

Name: Ron Gautreau

Address: 416 Asylum Street

City: Hartford

State: CT

Zip: 06103

Email: rgautreau@fhiplan.com

Phone: 2039889939

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Aviation Administration

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

Taxiway T Extension Project at the Bradley International Airport

LOCATION

Hartford County, Connecticut



DESCRIPTION

Some(Bradley International Airport (BDL), owned and operated by the Connecticut Airport Authority (CAA), operates on approximately 2,400 acres located in the towns of Windsor Locks, Windsor, Suffield, and East Granby, in Hartford County. BDL operations include


both public/commercial and military use. The extension of Taxiway T is proposed to reduce runway incursions and increase safety, efficiency, and economic development benefits.


Proposed major development items in this project will include the following:

- Construction of a 75-foot-wide taxiway with two 30-foot shoulders (total width of 135 feet) from intersection of Taxiway T and Taxiway E to Taxiway W at the Runway 15 End (estimated total length of 4,200 feet).
- Site grading, estimated 25-30 feet from edge of pavement
- Removal of vehicle service road, concrete pad, and Taxiway C3 pavement
- Construction of taxiway connector to Runway 15-33 at Taxiway D with appropriate fillets
- Installation of taxiway markings, lighting, and signage
- Drainage improvements
- Stockpile and spoils area and haul route)

Local office

New England Ecological Services Field Office

 (603) 223-2541

 (603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of

Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC
<https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
<p>Bald Eagle <i>Haliaeetus leucocephalus</i></p> <p>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.</p>	Breeds Oct 15 to Aug 31
<p>Golden Eagle <i>Aquila chrysaetos</i></p> <p>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.</p> <p>https://ecos.fws.gov/ecp/species/1680</p>	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

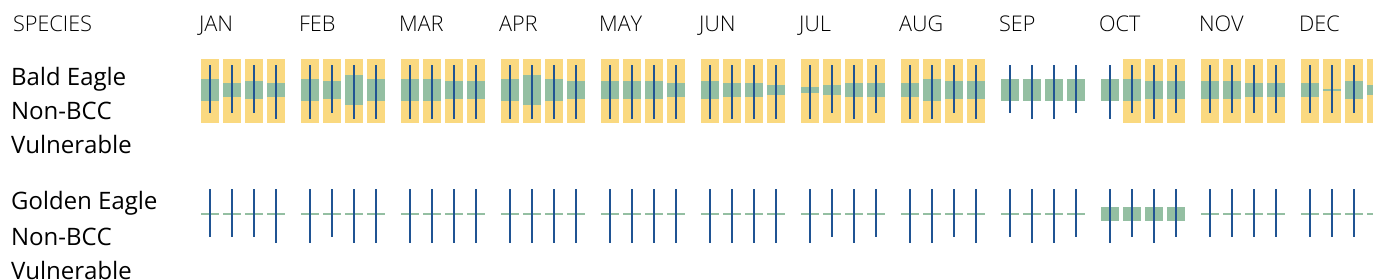
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "[Supplemental Information on Migratory Birds and Eagles](#)".

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
<p>Bald Eagle <i>Haliaeetus leucocephalus</i></p> <p>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.</p>	Breeds Oct 15 to Aug 31

<p>Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399</p>	Breeds May 15 to Oct 10
<p>Blue-winged Warbler <i>Vermivora pinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds May 1 to Jun 30
<p>Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 20 to Jul 31
<p>Canada Warbler <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 20 to Aug 10
<p>Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Mar 15 to Aug 25
<p>Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680</p>	Breeds elsewhere
<p>Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679</p>	Breeds elsewhere
<p>Prairie Warbler <i>Dendroica discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 1 to Jul 31
<p>Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 10 to Sep 10

Rusty Blackbird *Euphagus carolinus*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Wood Thrush *Hyllocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

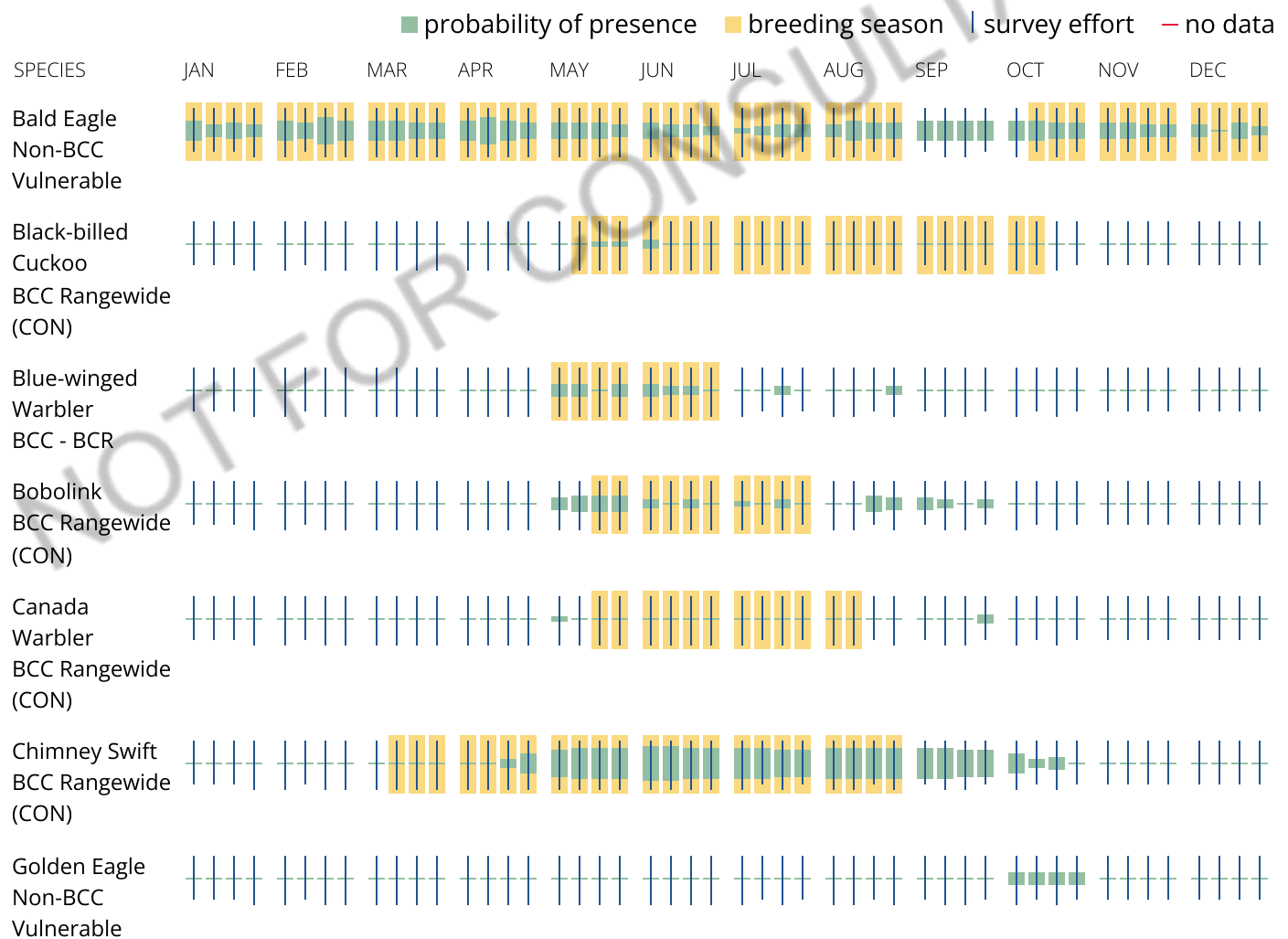
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

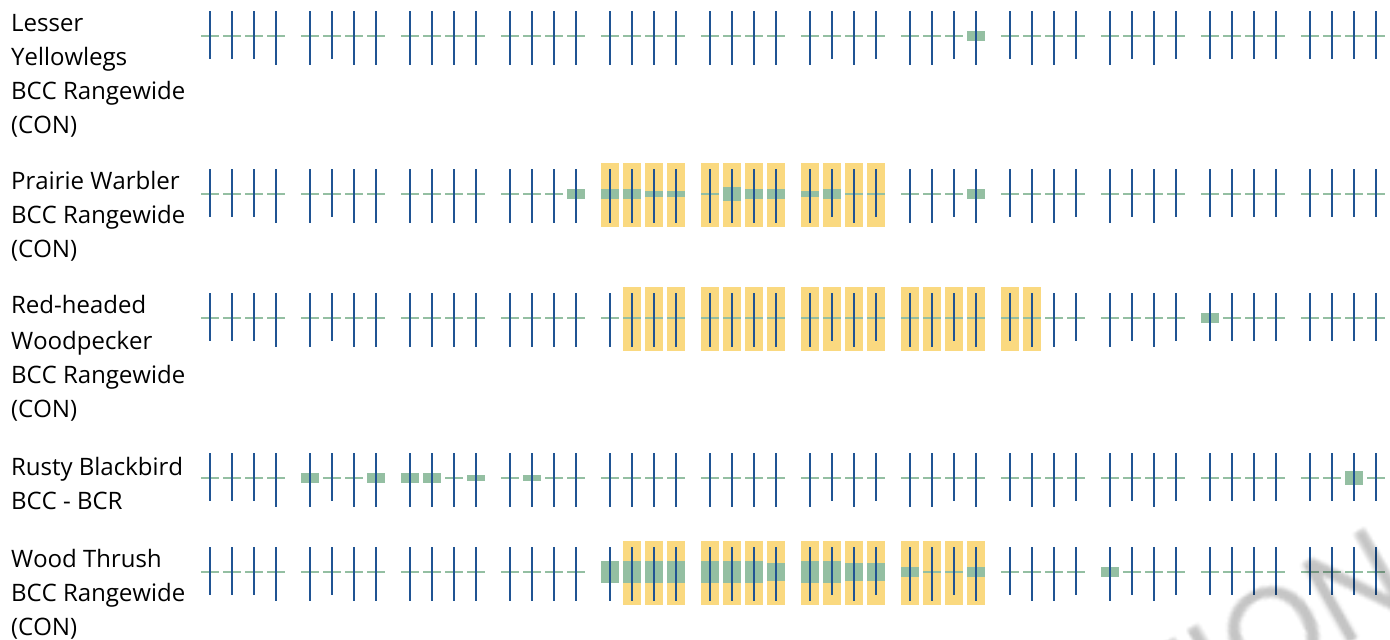
No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

[PEM1E](#)

FRESHWATER POND

[PUBHx](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION



Known for excellence.
Built on trust.



Note: This is an annotated outline/draft progress document and is not intended for implementation at this time.

DRAFT

Bradley International Airport (BDL) RARE SPECIES MANAGEMENT PLAN Windsor Locks, Connecticut

February 16, 2023

File No. 15.0166708.01



Schinia spinosae – BDL August 2020

PREPARED FOR:

Connecticut Airport Authority (CAA)
Terminal A, 3rd Floor
Bradley International Airport
Windsor Locks, CT 06096



GZA GeoEnvironmental, Inc.

1350 Main Street, Suite 1400 | Springfield, MA 01103
413-726-2100

McFarland Johnson, Inc.
53 Regional Drive
Concord, NH 03301

Copyright© 2023 GZA GeoEnvironmental, Inc.



Known for excellence.
Built on trust.



Via Email

February 13, 2023
File No. 15.0166708.01

Dawn McKay/Robin Blum
Bureau of Natural Resources
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Re: Rare Species Management Plan
Bradley International Airport
Windsor Locks, CT 06096

Dear Dawn/Robin

GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the enclosed Draft Rare Species Management Plan (RSMP) for Bradley International Airport (BDL or the Airport) in Windsor Locks, CT. The Airport has developed this RSMP in response to a request by the Connecticut Department of Energy and Environmental Protection (CT DEEP) based on several recent projects at the airport. The intent of the Rare Species Management Plan is to provide a framework for managing rare species habitats at the Airport with the following specific goals:

- To provide long-term net benefit to the rare species in concert with the previously created avian mitigation area;
- To facilitate the Airport's development of future individual projects, in coordination with CT DEEP, to avoid a net loss of the sustainable level of habitat determined by the RSMP to be appropriate for the Airport or harm to the species sustained by the habitats at the Airport while protecting Airport safety and management needs;
- To provide a comprehensive mitigation strategy that will allow the Airport to plan for the mitigation of future impacts and, at the same time, demonstrate to CT DEEP that the Airport has the capacity to adequately mitigate those impacts; and
- To provide a management process to adapt to changes in FAA regulations and requirements as well as Airport needs, and changes in the listing status of rare species.



If you have any questions or comments on this draft, please feel free to contact Erin Haugh at 413-244-0696 or erin.haugh@gza.com.

Very truly yours,
GZA GeoEnvironmental, Inc.

A handwritten signature in blue ink that reads "Erin Haugh".

Erin Haugh
Ecologist

A handwritten signature in black ink that reads "Daniel M. Nitzsche".

Daniel M. Nitzsche, CPESC, CESSWI, SE
Consultant/Reviewer

A handwritten signature in black ink that reads "Stephen Lecco".

Stephen Lecco, AICP, CEP, PWS
Principal-in-Charge



TABLE OF CONTENTS

1.0 INTRODUCTION1

2.0 AIRPORT DEVELOPMENT OVERVIEW – RECENT AND PROPOSED PLANS1

3.0 EXISTING RARE SPECIES DATA3

4.0 EXISTING CT DEEP (DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION) ACTIONS.....5

5.0 POTENTIAL DEVELOPMENT AND IMPACTS10

6.0 MITIGATION OF PAST AND FUTURE DEVELOPMENT IMPACTS12

6.1 EXISTING MITIGATION AND PROPOSED MITIGATION APPROACH 13

6.2 IDENTIFY POTENTIAL NEW MITIGATION AREAS ON-AIRPORT 17

6.3 PROPOSED MITIGATION FRAMEWORK 18

6.4 PROJECT COORDINATION WITH CT DEEP 19

7.0 HABITAT MANAGEMENT AND ESTABLISHMENT20

7.1 LONG-TERM HABITAT MANAGEMENT 20

7.1.1 Grasslands/ Grassland/Sand Barren 21

7.1.2 Shrubland/ pitch pine areas..... 21

7.2 CONSTRUCTION PROCEDURES FOR GRASSLAND IMPACTS AND GRASSLAND RESTORATION 21

7.2.1 Grasslands/ Grassland/Sand Barren 22

7.2.1.1 *Transplantation Protocols for Low Frostweed*..... 22

7.2.2 Shrubland/ pitch pine areas..... 23

7.3 MONITORING SCHEDULE 23



TABLES

TABLE 2.1	AIRPORT PROJECTS
TABLE 3.1	RARE SPECIES AT BDL BY HABITAT TYPE
TABLE 5.1	PROJECTS WITH POTENTIAL RARE SPECIES IMPACTS/MITIGATION POTENTIAL
TABLE 5.2	SUMMARY OF RARE SPECIES IMPACTS
TABLE 6.1	MITIGATION RATIOS BY HABITAT QUALITY
TABLE 6.2	PROJECT IMPACTS AND REQUIRED MITIGATION
TABLE 6.3	SUMMARY OF IMPACTS AND MITIGATION BY DEVELOPMENT LIKELIHOOD
TABLE 6.4	PROPOSED MITIGATION TYPES, MANAGEMENT ACTIVITIES, AND MONITORING
TABLE 6.5	CT DEEP COORDINATION FOR PROJECTS
TABLE 7.1	HABITAT MANAGEMENT
TABLE 7.2	MONITORING SCHEDULE

FIGURES

FIGURE 1	LOCUS
FIGURE 2	AMPU SHORT TERM PROJECTS (AMPU FIGURE 5-33)
FIGURE 3	AMPU RECOMMENDED PROJECTS (AMPU FIGURE 5-34)
FIGURE 4	RARE SPECIES HABITATS/NATURAL COMMUNITIES
FIGURE 5	NATURAL COMMUNITIES AND PROPOSED PROJECTS
FIGURE 6	POTENTIAL MITIGATION AREAS
FIGURE 7	HABITAT MANAGEMENT PLAN



APPENDICES

APPENDIX A GZA RARE SPECIES FINDINGS REPORT 2020

APPENDIX B PREVIOUS CT DEEP/NDDDB CORRESPONDENCE

- Memorandum of Understanding for Grassland Birds
- Taxiway C and Taxiway R Realignment (NDDB Determination No. 201802821)
- Runway 1-19/Construct Taxiway E and Taxiway P Extension (NDDB Determination No. 202079007)
- Airport Signage Replacement Project (NDDB Determination No. 202004125)
- CAA Response to NDDB Determination 202004125
- Taxiway S Rehabilitation and Reconstruction (NDDB Determination No. 202009135)
- CAA Response to NDDB Determination 202009135
- Correspondence between Stantec and NDDB for RW 6-15 Airspace Obstruction Removal (Previous NDDB Determination No. 201607290 and new NDDB Determination No. 202207363)



1.0 INTRODUCTION

Bradley International Airport (BDL) (“Airport”) has developed this Rare Species Management Plan (RSMP) in response to a request by the Connecticut Department of Energy and Environmental Protection (CT DEEP) based on several recent projects at the airport. The intent of the Rare Species Management Plan is to provide a framework for managing rare species habitats at the Airport with the following specific goals:

- To provide long-term net benefit to the rare species in concert with the previously created avian mitigation area;
- To facilitate the Airport’s development of future individual projects, in coordination with CT DEEP, to avoid a net loss of the sustainable level of habitat determined by the RSMP to be appropriate for the Airport or harm to the species sustained by the habitats at the Airport while protecting Airport safety and management needs;
- To provide a comprehensive mitigation strategy that will allow the Airport to plan for the mitigation of future impacts and, at the same time, demonstrate to CT DEEP that the Airport has the capacity to adequately mitigate those impacts; and
- To provide a management process to adapt to changes in FAA regulations and requirements as well as Airport needs, and changes in the listing status of rare species.

Species that are listed as State or Federal Special Concern, Endangered, or Threatened comprise the term “rare species” used in this report; however, there are no Federally-listed species known at the Airport.

2.0 AIRPORT DEVELOPMENT OVERVIEW – RECENT AND PROPOSED PLANS

Bradley International Airport contains approximately 2,000 acres of property in north central Connecticut. While primarily located in the Town of Windsor Locks (Hartford County), portions of the Airport extend into the Towns of East Granby, Windsor, and Suffield. BDL is the second busiest airport in New England (after Boston-Logan), the service area extends beyond the Hartford area, into Springfield and western Massachusetts and much of the remaining State of Connecticut. The general location and vicinity of the Airport are depicted in Figure 1. It should also be noted that BDL holds long-term leases of some of its property (Figure 1). Entities who lease from BDL are responsible for their own permitting through NDDB. However, BDL is considered a whole property and this document sets out a framework and procedures for permitting and protection that will be followed by the lessees through their permitting process. Therefore, this RSMP will be provided to the lessees so that they are aware of the rare species concerns and any permitting and mitigation framework agreed to herein.

In 2019, BDL completed an Airport Master Plan Update (AMPU) to evaluate the Airports needs and systems and to plan for both long-term and short-term development strategies over the next 20 years for the non-leased portions of the property. This section includes some information about those projects – both upcoming and currently under construction. Figures 2 and 3 (Figures 5-33 and 5-34 from AMPU) show the recommended projects in the short term and long according to the AMPU. The list of recommended projects in the AMPU are included in Table 2.1. Although the AMPU provides most of the information for this section, from a rare species perspective, changes in vegetation management on the airport also constitute a “project”, therefore, vegetation management (cutting, spraying other activities) changes, stormwater management changes that affect sandplain communities and any other activities that can alter the rare species habitat are also included in Table 2.1. More detailed information by project including potential impacts is included in Section 5.



Table 2.1: Airport Projects

PROJECT NO.	PROJECT NAME	ANTICIPATED PROJECT SCHEDULE	PRIORITY (LOW, MEDIUM, HIGH)
1	Taxiway C and R Realignment	0 Years	CONSTRUCTED
2	Stop Mowing Restrictions on Airport	0 Years	CONSTRUCTED
3	Construct Taxiway E	0-1 Year	CONSTRUCTED
4	Rehabilitate Taxiway S	0-1 Year	CONSTRUCTED
5	Airfield Signage and Replacement	0-1 Year	CONSTRUCTED
5A	ARFF Road Project	0-3 Years	HIGH
6	Extension of Taxiway T	1-3 Years	HIGH
7	Tree Removal and Maintenance Area for ATCT Line of Sight	3-5 Years	MEDIUM
8	Taxiway H Reconfiguration	5-10+ Years	LOW
9	RON Apron Expansion	5-10+ Years	LOW
10	Light Lane Realignment	5-10+ Years	LOW
11	Airport Maintenance/Repair Facility	5-10+ Years	LOW
12	Runway 33 Extension/Taxiway S & T Extension and Service Road Relocation	5-10+ Years	LOW
13	Runway 33 RAILS (MALSR)*	5-10+ Years	LOW
14	EMAS Installation - Stop End of Runway 15	5-10+ Years	LOW
15	Runway 15 Extension/Parallel Taxiway S Extension and Service Road Relocation	5-10+ Years	LOW
16	Runway 24 Glideslope	5-10+ Years	LOW
17	Taxiway J Extension	5-10+ Years	LOW
18	Taxiway G Reconfiguration	5-10+ Years	LOW
19	New Taxiway E1 Connector	5-10+ Years	LOW
20	CT ANG Taxiway Relocation	5-10+ Years	LOW
21	Apron Expansion – various locations	5-10+ Years	LOW
22	Remote Parking Lot Expansion (Lot 3), Building Demolition	5-10+ Years	LOW
23	Terminal Expansion (ticketing, Bag Claim, Concourse)	3-5 Years	LOW
24	International Gates -Phase 2- Gate & Sterile Corridor	5-10+ Years	LOW
25	Elevated/Enclosed Walkway from Lot 3 to Terminal	5-10+ Years	LOW
26	Schoephoester Road Improvements	5-10+ Years	LOW
27	Terminal B - Phase 1 - Processor & Central Gates	5-10+ Years	LOW
28	Terminal A Renovations - Phase 2 - Bag Claim	5-10+ Years	LOW
29	Terminal B - Phase 2 - North Gates	5-10+ Years	LOW
30	Terminal B - Phase 3 - West Gates	5-10+ Years	LOW
31	ANG Fitness Track (permitted by lessee)	0-3 Years	HIGH – in permitting
32	Sapling Removal/Pitch Pine Enhancement	0-1 Years	COMPLETED
33	New England Air Museum Parking Lot	0-1 Years	HIGH



3.0 EXISTING RARE SPECIES DATA

This section provides a summary of the known rare species onsite and existing habitat based primarily on the 2020 GZA Rare Species Findings Report. It includes the figure of rare species habitats and known locations from the GZA Rare Species Findings Report 2020 to codify known resources for future projects. The GZA Rare Species Findings Report 2020 in its entirety is in Appendix A; therefore, this section is simply a summary of the species known to occur onsite. It also includes a table summarizing description of the rare species and their preferred habitats. The rare species listed herein are accepted to be the known rare species that may occur onsite as of the date of this Plan. Since this RSMP is a living document and Airport projects may change, it is understood that rare species potentially present onsite may change as well. If NDDB determines additional rare species are present onsite (or previously occurring species are no longer present), NDDB should communicate this with the Airport, so that this document can be adapted to incorporate them. NDDB could send the Airport an updated rare species list annually or wait until CAA sends a request associated with an upcoming project.

Overall, the airport is mostly grassland and in part due to the maintenance of this large area of grassland it is occupied by several rare species. GZA reviewed previous rare species surveys and conducted surveys in 2020 to document the habitat and presence of rare species known to be potentially present at the Airport. The report of findings of those surveys is in Appendix A and a summary of the species present is in Table 3.1. The airfield has generally higher-quality grassland, while the off-airfield airport-owned habitats have more general upland/wetland forest, with low likelihood of supporting rare species. The quality of the habitats within the airfield also vary, due to a variety of factors that range from frequency of mowing, soil condition, and past disturbances. In general, the warm season grasslands which have developed on the outwash parent material on the southern half of the airfield are the highest quality habitat for the rarest species listed as being potentially present. Based on the 2003 Insect Fauna of Bradley International Airport (Lowrey and Wagner¹) study and GZA's 2020 observations, these areas could support six rare moth species, the rare tiger beetle species, both ground beetle species, all the listed rare avifauna and low frostweed (Table 3.1). While eastern box turtle and eastern hognose snake are listed as being potentially present, the habitat patch within the airport is too small and isolated (by the airport fence) from any other habitats outside of the airfield to support a viable population of box turtle. Hognose snake habitat (transitional habitat with loose sandy soils) is present; however, larger high-quality habitats are not and therefore this species is not likely to be present. The highest quality habitats within the sandy, xeric, southern half of the airfield are the sandplain grassland/barrens and open sand patches within these grasslands. The northern end and central portion of the airfield have cool season and cool season – warm season transition areas that have more thatch, denser vegetation and are less supportive of the rare moths, birds, beetles and low frostweed; however, the open habitats they provide are important for the overall avifauna community. Although the open grasslands remain habitat for the rare birds, mitigation for these species (purchase of a 133-ac site) was completed under the previous MOU therefore this document does not address these species. Rare avifauna are included in the table below only as a summary of the known state listed species present but are not considered addresses by this document. The overall quality of the grasslands on the airfield is depicted in Figures 4. Figure 4 also depicts which of the warm season grasslands and open sand areas qualify as Sand Barren habitat, a unique natural community regulated by CT DEEP.

¹ Lowrey & Wagner. 2003. Insect Fauna of Bradley International Airport.



Table 3.1: Rare Species at BDL by Habitat Type

Rare Species by Habitat				
Warm Season Grassland Species				
Scientific Name ¹	Common Name	CT Status	Habitat	Special Hab. Attributes
Birds - Included as site information but not addressed in this plan since CAA already provided mitigation for these species.				
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	CT-E	Warm season grassland	
<i>Bartramia longicauda</i>	Upland Sandpiper	CT-E	Warm season grassland	
<i>Dolichonyx oryzivorus</i>	Bobolink	CT-SC	Warm season grassland	
<i>Eremophila alpestris</i>	Horned Lark	CT-E	Warm season grassland	
<i>Falco sparverius</i>	American Kestrel	CT-SC	Warm season grassland	
<i>Passerculus sandwichensis</i>	Savannah sparrow	CT-SC	Warm season grassland	
<i>Sturnella magna</i>	Eastern Meadowlark	CT-T	Warm season grassland	
<i>Poocetes gramineus</i>	Vesper Sparrow	CT-E	Warm season grassland	
Moths				
<i>Euxoa violaris</i>	Violet Dart	CT-E	Dry Coastal Grasslands	Grasses
<i>Apantesis (Grammia) phyllira</i>	Phyllira Tiger Moth	CT-E	Sandy Grasslands	Lupines ² Larvae noted to be believed to feed on forbs in grasslands
<i>Schinia spinosae</i>	Spinulose Flower Moth	CT-SC	sandy pine barrens openings sometimes coastal (Wagner); Pitch Pine - Scrub Oak Woodlands (CTDEP 2005)	Unpublished data from Wagner ³ indicates <i>Polygonella spp.</i> is the host plant in CT (and that is where GZA observed the adults onsite) Woodland edges containing asters and goldenrods. Larvae recorded on <i>Pityopsis falcata</i> in New York ⁴ (Host plant likely a composite.
<i>Dargida rubripennis</i>	Pine Streak	CT-T	Sandy grasslands, old fields, roadsides, and other native grass areas also dune and prairie habitat (NatureServe ⁵)	Switch grass and other grasses ⁶

² Lowrey & Wagner. 2003. Insect Fauna of Bradley International Airport.

³ Wagner, David L. Unpublished data – referenced in Lowrey & Wagner. 2003. Insect Fauna of Bradley International Airport.

⁴ Hardwick, D. F. 1996. A monograph to the North American Heliotheninae. Centre for Land and Biological Resources Research. Agriculture Canada. Ottawa, Canada. 281 pp

⁵ NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: September 2002).

⁶ Wagner, D. L., D.F. Schweitzer, J.B. Sullivan, and R.C. Reardon. 2011. *Owlet Caterpillars of Eastern North American*. Princeton: Princeton University Press.



Rare Species by Habitat				
Warm Season Grassland Species				
Scientific Name ¹	Common Name	CT Status	Habitat	Special Hab. Attributes
<i>Euchlaena madusaria</i>	Scrub Euchlaena	CT-T	Grasslands, heathlands, Pitch pine-scrub oak barrens	Lowbush blueberry
Plants				
<i>Crocianthemum propinquum</i>	Low Frostweed	CT-SC	Sparsely vegetated sandplain grassland	
Beetles				
<i>Brachinus cyanipennis</i>	Bombardier beetle	CT-SC	Sandy substrate areas	
<i>Harpalus erraticus</i>	Ground Beetle	CT-SC	Sandy substrate areas	
Open Sandy Habitat Species				
Scientific Name ¹	Common Name	CT Status	Habitat	Special Hab. Attributes
Beetles				
<i>Cicindela formosa generosa</i>	Big Sand Tiger Beetle	CT-SC	Open sandy areas lacking vegetation	
Heathland/Shrubland Species				
Scientific Name ¹	Common Name	CT Status	Habitat	Special Hab. Attributes
Birds				
<i>Toxostoma rufum</i>	Brown Thrasher	CT-SC	shrubland	
Moths				
<i>Euchlaena madusaria</i> (listed twice in the table because it fits 2 habitat types)	Scrub Euchlaena	CT-T	Pitch Pine Scrub-Oak Barrens, heathlands, grasslands	Lowbush blueberry
<i>Eumacaria madopata (latiferrugata)</i>	Brown Bordered Geometer	CT-T	Dunes and sandy grasslands or open heathland with <i>Prunus</i> species	<i>Prunus</i> spp. (and potentially other trees in <i>Rosaceae</i>) which serve as larval hosts. Requires open canopy.
<i>Zanclognantha martha</i>	Pine Barrens Zanclognantha	CT-T	Pitch Pine Scrub Oak Barrens	Pitch pine, sandy

4.0 EXISTING CT DEEP (DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION) ACTIONS

This section lists the recent CT DEEP/NDDDB correspondence regarding rare species resources for recent projects at the Airport. Each document is listed in Appendix B of this report. This section also includes a short summary of each in terms of projects that have been built and any impacts or mitigation that have occurred. The relevant and recent projects include the Memorandum of Understanding (MOU) for the grassland mitigation area that was purchased to mitigate for future projects for grassland birds and the recent/current Taxiway E project.

MOU: In 2011, a Memorandum of Understanding was developed between the CT DEEP and the CT Department of Transportation (DOT) concerning habitat mitigation for rare grassland birds. The MOU addressed mitigation for “all future



development and loss of habitat for State Listed grassland birds” at the Airport. To provide for this mitigation, the CAA (formerly a division of CT DOT) funded and paid for the acquisition of a 133-acre parcel in Windsor and agreed to provide funding for habitat maintenance that parcel for a specific time frame. The MOU also stated that DOT (CAA) and DEP agreed that mowing will be prohibited between May 1 and August 1 annually in “No Mowing Areas” as depicted on a map in the MOU (see Appendix B) until either “(i) State-Listed grassland birds discontinue use of the “No Mowing Areas” as habitat, or (ii) DOT in its discretion converts to other use(s) or commences development upon, the “No Mowing Areas”, whichever occurs earlier.” The Airport, at its discretion, has discontinued the limited mowing in these areas as of 2020 due to wildlife safety concerns. These areas are now managed between 6 and 12 inches in accordance with the Airport’s Wildlife Hazard Management Plan (2019).

Runway 6-15 Airspace Obstruction Removal (NDDB Determination No. 201607290 and 202207363): In 2016, the Airport proposed cutting some areas of the Airport that contained airspace obstructions. The work was in two areas and each of which had different rare species habitat. The RW 15 approach included wetland habitat with potential to impact rare mussels in Stony Brook downgradient of the work, while in the RW 6 approach, the tree clearing included sand/pine barren habitat with potential impacts to *Zanclognatha martha* moth and big sand tiger beetle. The October 2, 2016, NDDB letter regarding this is included in Appendix B, and lists mitigation measures to protect the species in both habitats.

For the wetland habitat in the RW 15 approach, the concern was that the work was within the Stony Brook watershed and as such had the potential to negatively impact Federal and State Endangered dwarf wedgemussel (*Alasmidonta heterodon*), State Endangered brook floater (*Alasmidonta varicosa*), and State Species of Special Concern eastern pondmussel (*Ligumia nasuta*) if the cutting resulted in erosion that was detrimental to water quality. To avoid impacts the following was recommended by NDDB:

- no vegetation removal within 100-feet of Stony Brook;
- no use of fertilizers or lime in areas adjacent to wetland soils;
- silt fences should be removed as soon as the project is completed and soils are stabilized to limit impediments to amphibian and reptile migration;
- your DEEP Permit Analyst should include the most stringent water quality protection measures that can be imposed for this site and project to ensure that the water quality in the Stony Brook is not negatively impacted.

NDDB also recommended minimization of rare bird impacts by cutting between September 1 and May 1 to avoid the breeding season.

Within the Sand/Pine Barrens habitat, NDDB had concerns about impacts to *Zanclognatha martha* habitat, which feeds on pitch pine and scrub oak and overwinters in the duff in the cutting area and big sand tiger beetle in the vicinity. NDDB states that the complete removal of woody vegetation, including stump grinding would impact the moth; and addition of topsoil, woodchips, lime or fertilizer, or seeding with turf grasses would negatively affect both the *Zanclognatha martha* moth and the big sand tiger beetle. To protect these species, NDDB recommended:

- mature trees can be removed but young (short) pitch pines and scrub oaks be spared to provide habitat;
- cut trees should be removed from site and not chipped on-site since chips left on sandy soils change the microclimate of the soils (introducing slow decaying organics and moisture);
- a plan that includes a schedule and methods for maintaining the areas at the end of Runway 6 in an early successional state, should be crafted and implemented to ensure that sand/pitch pine barren habitat is not destroyed on airport property. Please forward a copy of this plan to the Wildlife Division (laura.saucier@ct.gov) for review and comment.

Further correspondence about these vegetation management areas on April 19, 2022, from Stantec to NDDB indicated that obstruction removal efforts were conducted in 2016 and 2018 in accordance with the NDDB conditions and that additional cutting is again needed in three areas: 1) mostly white pines in residential areas where the Airport has obtained easements; 2) deciduous regrowth of 2016 cutting areas in the RW 15 area; and 3) further maintenance of the 13.27-acre sand barren area that NDDB required be maintained in an early successional state (potentially through controlled burns).



Based on a meeting with NDDB and the Airport on April 27, 2022, in accordance with the third bullet above a management plan was developed for the pitch pine area with the Wildlife Division and approved. However, that plan involved controlled burns, and the Airport had safety concerns about conducting burns and the burns did not occur. The April 19, 2022, letter proposed alternative management for this area.

On June 27, 2022, Stantec updated its April 19, 2022, letter regarding the proposed 2022 vegetation management. For the RW 15 approach, the Airport proposed a 25-foot setback from wetlands maintained with a silt fence barrier, followed by seeding in May/June 2023. The areas that were cut in 2016 have regrown with a mix of the preferred pitch pine/scrub oak but also saplings of poplar, red oak, white pine, black cherry and grey birch. The Airport is proposing to conduct phased management to remove the undesirable saplings. First, the non-pitch pine/scrub oak saplings will be controlled using the hack and squirt method of herbicide treatment during the late fall. This method will allow the species to be targeted specifically and allows for a visual success indicator in the next growing season. Hack and squirt will leave them standing so no removal methods or large quantities of wood debris will disturb the duff and soil where the *Zanclagnatha martha* lives. Additionally, by timing the treatment during the dormant season, less herbicide can be used, and it is highly protective of non-target plant species. Treated species will fall slowly over time and the staggered timing as well as degradation prior to deposition will not create a mulching effect on the lower vegetation.

Secondly, the Airport proposed to collect up to 200 viable pitch pine cones at the site and use heat offsite to collect seeds and create seed ball in a silt/loam medium. Approximately 200 seed balls will then be established at the Airport in 20 established plots in spring 2023. Each 5' diameter plot will receive 10 evenly spaced seed balls. The plot centers will be marked with numbered wire flags and the locations recorded on the project site plan. Data recording during installation shall include a counting of pitch pine in the groundcover layer (those under 3' high), and photo documentation. These plots will be monitored in 2024 and 2025 to determine if this is an effective method of generating young pitch pine growth at the site. This method was chosen to try to enhance the pitch pine habitat without using controlled burns, which the Airport considers a safety concern.

On August 10, 2022, NDDB responded with a new determination number (202207363) to allow the project to proceed with the following conditions:

- work shall be only the areas submitted on June 28, 2022.
- Project will occur between October 1 and February 1 (fall and winter as planned) to reduce ground disturbance and impacts to grassland birds.
- Erosion controls must be used adjacent to wetlands (as proposed).
- Vegetation Management Areas 1-7 (the RW 15 approach and easement areas) will be restored with a warm season native grassland mix including little bluestem, big bluestem, Indiangrass, switchgrass, and others that provide resources for pollinators some of which could be nonnative, such as white clover).
- In the RW 15 Approach, a 15' no disturbance buffer must be maintained from the wetland boundary (25' was proposed).
- Target-specific herbicide controls in Vegetation Management Area 8 (VMA 8 – the pitch pine area) will be implemented to eradicate deciduous tree regrowth. This will negate the need to use heavy machinery within the limits of the sensitive pitch-pine savannah Target-specific herbicide methods include:
 - Basal treatment method - to be utilized in areas where stem diameters are small and crowded.
 - Hack/squirt method - to be utilized in areas where stem diameters are larger and scattered (proposed).

NDDB also specified post-construction monitoring and reporting for VMA 8 (the pitch pine area) to include:

- Treatment Report: A report of the treatment submitted to NDDB by December 31, 2022 that will include the timeline of treatment, photos and maps of the treatment areas, the chemicals used and a narrative summarizing field conditions.
- Three Annual Post Treatment Reports: Reports will be submitted to NDDB annually for 3 years following treatment and the 2022 report. These will include site maps and photos, narrative of current field conditions, discussion of successes and failures of the restoration project, a description of proposed follow-up management to maintain VMA 8 in an early



successional state, and discussion of need or opportunity to provide additional seeding of the area as discussed during a July 14, 2022 TEAMS meeting. The reports should be submitted by December 31 in the years 2023, 2024, and 2025.

- The project manager must contact NDDDB to coordinate a field visit with the program botanist/ecologist after the treatment has taken place within the 3 year time frame of post-project monitoring.

This sapling removal/pitch pine enhancement was completed with herbicide applied as planned in December 2022.

Taxiway C and Taxiway R Realignment (NDDB Determination No. 201802821): As part of this project, Taxiways C and R were reconfigured to better align with the end of RW 6. The NDDB letter regarding this project is in Appendix B. That letter lists mitigation measures which are primarily concerned with development of this RSMP and implementation of BMPs during the construction process that include:

1. Locating project staging, stockpile areas and access roads to the staging areas only on pavement. No equipment or access routes should occur in any sandplain grassland or sand barren habitat.
2. Restoring temporarily impacted project areas back to ecologically functioning sandplain grassland or sand barren habitat. Use native seed mixes only or allow the natural vegetation to re-establish itself through the naturally occurring seed bank in the soil.
3. Reducing the amount of sand barren habitat permanent impact from almost one acre to 0.38 acres and also reducing permanent reduction of the sandplain grassland habitat.
4. CT Airport Authority shall retain an ornithologist (qualified bird expert) to be on airport grounds during this project. The ornithologist must inspect all work areas for State Endangered Upland Sandpiper (*Bartramia Longicauda*) and State Threatened Horned Lark (*Eremophila Alpestris*) if work will occur on this project between March 1st and August 15th. Both of these birds nest in very short grassland and are often found in the very center of the airport and along the taxiways and runways. If the ornithologist finds nesting birds in the work area, all work must cease until after August 15th. A report of the ornithologist's findings will be sent to the CT NDDDB before any work can begin.

This project was completed according to the proposed plans.

Runway 1-19/Construct Taxiway E and Taxiway P Extension (NDDB Determination No. 202079007): As part of this project, Runway 1-19 has been permanently closed and is being converted to a new alignment for Taxiway E (TW E), while former Taxiway E is being converted to a taxi lane. The NDDB letter regarding this project is in Appendix B. New intersection points will also be constructed at each end of the proposed TW E. The overall project will result in a net reduction of approximately 1.42 acres of pavement surfaces (5.65 acres of "new" pavement in existing grassland areas and 7.07 acres of removal of existing pavement). The areas of existing pavement removal will be restored as warm season grassland habitat. The proposed project will also result in an additional 10.64 acres of temporary disturbance to the grassland areas located adjacent to edges of existing pavement for associated grading and construction of the proposed project. Disturbed areas will be restored following the completion of the taxiway construction. The project proposes to use removed and imported topsoil in areas of removed pavement, followed by planting a warm season grass mix. A laboratory evaluation of the existing soils will be conducted and where saved topsoil cannot be reused, this analysis will be used to create new topsoil for the restored areas.

In order to address the adverse impacts to these moth species and the loss of their high quality habitat, post-construction surveys and enhanced plantings of known larval food plants are required, and long-term monitoring of the "radar" island for these species must be conducted for five years post construction. The post-construction monitoring will examine the status and progress of the restored grassland areas two times per growing season (June and September) following construction. At each observation, information on plant cover and plant species will be documented. A year-end report with site photos, as well as GIS maps of the grassland restoration area showing total plant cover, species and habitat distribution, will be provided with an assessment of the current condition and any recommendations on improvements. Additional monitoring of the rare moth species will also be conducted within the "radar island" for 5 years. At the end of Year five (5) post-construction monitoring, a final map showing the actual grassland habitat created will be produced to document if any or all of the restoration areas provide effective grassland habitat for the state listed species identified by



NDDB and if not, what corrective actions could be employed to improve habitat. This project is currently approaching construction and some of the initial mitigation requirements have already been met.

Airfield Signage Project (NDDB Determination No. 202004125 and CAA Response): This project involves replacement and relocation of airfield signs at select locations adjacent to runways and taxiways at the Airport. Proposed rare species protection during construction and mitigation include:

- Traveling between sign locations (work areas) from the closest point of paved surfaces rather than over grassland and maintaining low speeds during travel,
- Contractor education of rare species potentially onsite for species protection;
- A qualified biologist onsite to relocate any rare species (turtles and snakes) observed within the work area prior to construction or during the work;
- In order to preserve the sandy soils, the areas will be revegetated without the use of leguminous plant (i.e. clover, bird's foot trefoil, crown vetch, sweet pea, etc.) which can alter the soil fertility and influence long-term plant species composition;
- Hire an ornithologist to conduct on-site monitoring for nesting birds within the proposed project areas and cease work at that work area if nesting is occurring within a work area;
- Vehicles should only be parked on gravel surfaces to avoid impacting hognose snake, spotted turtles or eastern box turtles;
- Temporary fencing to protect rare reptiles, down gradient wetlands, low frostweed and sandy soils; and
- Any rare turtles or other rare species should be reported and documented to NDDB; and no equipment within 50 feet of streams and brooks.

CAA composed a response letter to explain that some of the above items were not possible due to airfield safety constraints. The letter explained that any fencing (including silt fencing, and haybales) is a hazard to aircraft and could not be used within Runway Safety or Object Free Areas. CAA also responded to the need for a qualified biologist onsite all day during construction explaining that once the area is cleared of rare species they are unlikely to return due to the construction noise and work disturbance. They also noted that since 2018, the Airport and USDA have recorded only four turtles onsite and all were snapping turtles, and no snakes have been observed, which indicates that there may be a low likelihood of occurrence of these species. NDDB had also said that working outside the bird breeding season as well as the turtle nesting season could reduce potential for impact otherwise the specialists mentioned in the bullet list above would be needed. CAA responded that the work would occur during breeding/nesting, but that they would hire the appropriate biologists and focus on the remaining conservation measures.

Rehabilitation of Taxiway S (NDDB Determination No. 202009135 and CAA Response): This project involves the rehabilitation and reconstruction of Taxiway S. Proposed rare species protections during the work include:

- Contractors are required to access work areas from the closest point of pavement (i.e. non habitat areas);
- Contractors should drive slowly to avoid any basking rare species;
- Contractor education as to how to identify rare turtles and snakes that may be in the work area;
- Erosion and sedimentation control barriers erected prior to work will also serve as exclusionary barriers and must not include netting;
- A qualified biologist must conduct a pre-work survey to look for any rare species within potential disturbance areas, and should any be found, the biologist with a collector's permit must relocate the species to a safe location;
- Work areas should revegetate naturally without addition of fertilizer, topsoil, straw mulch or other amendments. Seed mixes should only be used where required for stabilization, and must not include leguminous plants which alter soil fertility;
- If working within the bird breeding season, an ornithologist must survey for nesting within the project area, and if it is found, the work must cease and CAA should contact NDDB for further evaluation;
- A biologist with a collection permit should move any hognose snakes, eastern box turtles or spotted turtles unharmed from the work area should any be encountered.
- Vehicles should be parked and materials staged on gravel surfaces only;
- The contractor and herpetologist must search the work area each morning prior to work occurring;



- Avoid equipment within 50 feet of streams and brooks; and
- Report any confirmed rare species sightings to NDDDB.

CAA composed a response letter to explain that some of the above items were not possible due to airfield safety constraints and to respond to the need for full time biologist onsite and construction timing similar to the Airport Signage Project. The letter explained that any fencing (including silt fencing, and haybales) is a hazard to aircraft and could not be used within Runway Safety or Object Free Areas. Additionally, it should be noted that there are no wetlands within the project area nor any streams or brooks within 1500 linear feet. CAA stated that they would hire expert biologists to clear the work areas and temporary storage areas before work begins and qualified biologist will be on-call for identification and removal of any rare species. However, CAA did not anticipate keeping the biologists onsite all day every day since the work disturbances is likely to keep the animals from entering the area during construction. And contractors will not be asked to identify any species, but to immediately report any turtle or snake for the biologist to identify. They also noted that since 2018, the Airport and USDA have recorded only four turtles onsite and all were snapping turtles, and no snakes have been observed, which indicates that there may be a low likelihood of occurrence of these species.

CAA also noted that work would occur during breeding and nesting season for the rare birds and reptiles, but requested that biologists not be required since the areas will be mowed every 2-3 weeks to make the area unsuitable for bird nesting according to the Massachusetts Audubon Society *Best Management Practices for Nesting Grassland Birds* in accordance with their usual mowing for areas near pavement. CAA also noted that large areas of grassland would not be impacted by the project and 2.8 acres of pavement would be removed and restored to be used by birds and reptiles in the future.

5.0 POTENTIAL DEVELOPMENT AND IMPACTS

This section overlays the potential development of the Airport as envisioned in the 2019 Airport Master Plan (Master Plan) and Airport Layout Plan (ALP) on the rare species resources as defined in Section 3 and quantifies the probable impacts to rare species resources from the proposed projects. Table 5.1 summaries the potential impacts to rare species by project, and Figure 5.1 shows the projects with the habitat impacted. Within this table, some of the projects are listed as occurring within developed area – that signifies that the project is completely within previously built-out surfaces including pavement or buildings. These projects are noted here, but are not considered to have any impact to rare species resources, therefore are not described further in this document.

Table 5.1: Projects with Potential Rare Species Impacts/Mitigation Potential

Project No.	Project Name	Existing Habitat/Developed Characteristics	Priority (Low, Medium, High)
1	Taxiway C and R Realignment	Pavement and medium and low quality sandplain grassland	CONSTRUCTED
2	CT ANG Entrance/Gate House	Medium quality sandplain grassland, cold season grassland and developed area	CONSTRUCTED
3	Construct Taxiway E	Pavement, high and medium quality sandplain grassland	CONSTRUCTED
4	Rehabilitate Taxiway S	Pavement only although temporary impact on grassland edges is possible	CONSTRUCTED
5	Airfield Signage and Replacement	Airfield near taxiways and runways	CONSTRUCTED
5A	ARFF Road Project	Existing pavement and high and moderate grassland and open sand/grassland habitat	HIGH



6	Extension of Taxiway T	High and low quality grassland and pavement	HIGH (EA to begin early 2023)
7	Potential Tree Removal and Maintenance Area for ATCT Line of Sight	Forest/or woody swale	MEDIUM
8	Taxiway H Reconfiguration	Pavement removal in cold season grassland	LOW
9	RON Apron Expansion	Developed area	LOW
10	Light Lane Realignment	Developed area	LOW
11	Airport Maintenance/Repair Facility	Developed area	LOW
12	Runway 33 Extension/Taxiway S & T Extension and Service Road Relocation	Low quality grassland	LOW
13	Runway 33 RAILS (MALSR)*	Low quality grassland	LOW
14	EMAS Installation: Stop End of Runway 15	Pavement	LOW
15	Runway 15 Extension/Parallel Taxiway S Extension and Service Road Relocation	Pavement and high quality grassland	LOW
16	Runway 24 Glideslope	Cold season grassland	LOW
17	Taxiway J Extension	Mix of grassland habitat – high, medium and low quality warm season and some cold season	LOW
18	Taxiway G Reconfiguration	Cold season grassland	LOW
19	New Taxiway E1 Connector	Low quality sandplain grassland	LOW
20	CT ANG Taxiway Relocation	Medium quality sandplain grassland	LOW
21	Apron Expansions various locations	Northeast quadrant - Low quality grassland/developed, Southwest quadrant - high to moderate quality grassland	LOW
22	Remote Parking Lot Expansion (Lot 3), Building Demolition	Developed area	LOW
23	Terminal Expansion (ticketing, Bag Claim, Concourse)	Developed area	LOW
24	International Gates -Phase 2- Gate & Sterile Corridor	Developed area	LOW
25	Elevated/Enclosed Walkway from Lot 3 to Terminal	Developed area	LOW
26	Schoephoester Road Improvements	Developed area	LOW
27	Terminal B - Phase 1 - Processor & Central Gates	Developed area	LOW
28	Terminal A Renovations - Phase 2 - Bag Claim	Developed area	LOW
29	Terminal B - Phase 2 - North Gates	Developed area	LOW
30	Terminal B - Phase 3 - West Gates	Developed area	LOW
31	ANG Fitness Track (permitted by lessee)	Upland Forest – potentially Pitch pine	HIGH – in permitting
32	Sapling Removal/Pitch Pine Enhancement	Pitch pine/sapling area	COMPLETED
33	New England Air Museum	Upland forest, managed lawn/developed area with some sandy areas	HIGH

Most of these projects that have not already occurred are not high priority; therefore, a description of the projects is not included. The project areas and impacts are included on the tables and figures instead. As the projects move forward and more is known, the project areas and impacts will be refined. This document is intended to provide the framework for



how to handle these potential projects as they move forward rather than to provide specific details about the projects themselves. Some projects on the list have no potential impact to rare species (Projects 22-30); therefore, they are not included in the tables. In addition to projects, areas that can be used for mitigation can be included here.

Table 5.2: Summary of Rare Species Impacts

Area or Project	Timing and Potential for Project	Resources Impacted (ac) ¹					Potential Maximum Disturbed
		Grassland Habitat (moths, ground beetles and plants)			Pitch Pine Habitat (Moths)	Open Sand Habitat (Tiger Beetle)	
		Low quality	Moderate quality	High Quality			
1	Constructed		0.88	0.12		0.7	1.00
3	Constructed		3.07	0.66		1.18	3.74
4	Constructed	0.02					0.02
5A	High		0.18	0.32		0.32	0.50
6	High	0.56	3.37	8.20		4.68	12.13
11	Low	1.04					1.04
12	Low	4.54					4.54
15	Low	1.62		6.12		2.07	7.74
17	Low	3.44	1.51	1.42		0.88	6.38
19	Low	0.97					0.97
20	Low		0.58				0.58
21a	Low		0.78	0.42		1.20	1.20
21b	Low	6.59					6.59
21c	Low	0.69					0.69
21d	Low		0.78	0.44		0.44	1.22
21e	Low	0.38					0.38
21f	Low	2.28					2.28
21g	Low	1.66					1.66
21i	Low			0.49			0.49
21j	Low			0.08			0.08
21k	Low	2.31					2.31
22	Low	0.05					0.05
31	In permitting				1.53 ³		1.53 ³
32	Complete				13.91 ²		13.91
33	High					0.10	0.10
Total Impacts		26.15	10.97	17.95	1.53 ³	11.15	71.03

¹ GIS level impact and mitigation assessment – projects that have occurred may not be completely accurate, and those yet to occur will likely alter slightly in final design.

² Habitat management not loss.

³ Upland forest but potentially pitch pine.

6.0 MITIGATION OF PAST AND FUTURE DEVELOPMENT IMPACTS

This section discusses past mitigation areas on and off Airport and also identifies future areas that can be used for mitigation through the management of existing habitat or habitat creation. These future mitigations are organized by



natural community type and the species they will benefit. This section also describes the process for projects (as defined in this RSMP or others as yet unknown) including the process for mitigation of new impacts under the RSMP, level of correspondence with CT DEEP, and the projects that require no mitigation or notice to CT DEEP.

We will include a table of areas and mitigation relative to new grassland for moths or beetles created by previous permitted activities and total grassland under management which creates a running total of impacts and mitigation.

- Section 6.1 – Provide a summary of mitigation under the existing agreements with CT DEEP and proposed mitigation methods under the RSMP as applicable;
- Section 6.2 – Identify potential new mitigation areas on-Airport;
- Section 6.3 – Identify and describe the types of mitigation areas to be provided (i.e., grasslands, heathland, open sand barrens etc.), how to determine mitigation for projects and proposed management methods (referencing habitat management plan in Section 7); and
- Section 6.4 – Describe the process for projects (RSMP-defined or other) including the approach for mitigation of new impacts under the new RSMP, the interaction with NDDB, and the projects that require no mitigation and/or notice to NDDB.

6.1 EXISTING MITIGATION AND PROPOSED MITIGATION APPROACH

Previously at the Airport, mitigation has been solely for grassland birds as those were the primary species known to occur. Mitigation was established through the MOU to provide habitat for the grassland birds into the future off site, so the Airport’s projects could move forward without providing new habitat for each individual project. More recently, rare invertebrates and low frostweed have become known at the Airport or were known and are now State-listed. The Airport will continue to provide habitat for these species which prefer open area due to their maintenance of safe airspace, which requires open habitats that are less common throughout the State. The MOU will continue to provide all the mitigation for future grassland bird impacts. Projects within habitat for the rare invertebrates (moths and beetles) and low frostweed also necessitate mitigation. This section presents, through the mitigation ratios, a way to determine the mitigation needs for future projects for changes to the management under the MOU or for impacts to plants, moths or beetles that use this habitat. Taxiways C and R and more recently TW E projects have allowed for restoration of pavement removal areas as well as post construction monitoring as mitigation for lost habitat. Future projects are likely to include a combination of habitat restoration and monitoring as well as preserving land for the long term in areas adjacent to the airfield. In order to determine how much mitigation is needed, the Airport will consider the quality of habitat that will be lost for the project. Table 6.1 provides proposed mitigation ratios based on the mapped habitat quality in Figure 4.

Table 6.1 – Mitigation Ratios by Habitat Type

Impacted Habitat	Mitigation Ratio
Low Quality Sandplain Grassland	1.5:1
Moderate Quality Sandplain Grassland	2:1
High Quality Sandplain Grassland	3:1
Pitch Pine	2:1
Open Sand	1.5:1

Many airfield projects include new pavement and pavement removal. As those projects occur, pavement removal results in grassland restoration. When grassland restoration occurs as part of individual projects, sometimes grassland habitat is created in excess of the mitigation required by the impacts of that project. NDDB does not approve of banking mitigation areas; therefore, these areas would not act as a mitigation bank for future projects. However, as future projects occur and mitigation needs are considered, if these areas need enhancement, they may be considered as potential grassland



enhancement mitigation in conjunction with the potential to preserve and manage land in other areas further from the airfield.

Based on the mitigation ratios presented in Table 6.1, Table 6.2 provides information on the proposed impacts and mitigation needed by projects, and also includes the amount of habitat created through pavement removal or other means. Table 6.3 gives a summary of the impacts and mitigation needs grouped by the likelihood that the project will occur. Projects can include construction projects on the airport, or changes to the management plan as presented in the MOU.



Table 6.2: Projects Impacts and Required Mitigation

Area or Project ¹	Timing and Potential for Project	Resources Impacted (ac) ²					Mitigation Needs by Ratio (ac) ²							Restoration Area (pavement removed)
		Grassland Habitat (moths, beetles and plants)				Pitch Pine Habitat (Moths)	Grassland Habitat (moths, ground beetles and plants)				Total Grassland Mitigation ³	Pitch Pine Habitat (Moths)	Total Mitigation Needs	
		Low quality	Moderate quality	High Quality	Open Sand		Low quality	Mod. quality	High Quality	Open Sand Habitat				
1	Constructed	0	0.88	0.12	0.7	0	0	1.76	0.36	1.05	2.12	0	2.12	1.68
3	Constructed	0	3.07	0.66	1.18	0	0	6.14	1.98	1.77	8.12	0	8.12	5.97
4	Constructed	0.02	0	0	0	0	0.03	0	0	0	0.03	0	0.03	0
5A	High	0	0.18	0.32	0.32	0	0	0.36	0.96	0.48	1.32	0	1.32	0.96
6	High	0.56	3.37	8.2	4.68	0	0.84	6.74	24.6	7.02	32.18	0	32.18	0.92
8	Low	0	0	0	0	0	0	0	0	0	0	0	0	1.38
9	Low	0	0	0	0	0	0	0	0	0	0	0	0	0.19
11	Low	1.04	0	0	0	0	1.56	0	0	0	1.56	0	1.56	0
12	Low	4.54	0	0	0	0	6.81	0	0	0	6.81	0	6.81	2.29
15	Low	1.62	0	6.12	2.07	0	2.43	0	18.36	3.11	20.79	0	20.79	1.71
17	Low	3.44	1.51	1.42	0.88	0	5.16	3.02	4.26	1.32	12.44	0	12.44	0.80
18	Low	0	0	0	0	0	0	0	0	0	0	0	0	1.14
19	Low	0.97	0	0	0	0	1.46	0	0	0	1.46	0	1.46	0
20	Low	0	0.58	0	0	0	0	1.16	0	0	1.16	0	1.16	0.91
21a	Low	0	0.78	0.42	1.2	0	0	1.56	1.26	1.8	2.82	0	2.82	0
21b	Low	6.59	0	0	0	0	9.89	0	0	0	9.89	0	9.89	0
21c	Low	0.69	0	0	0	0	1.04	0	0	0	1.04	0	1.04	0
21d	Low	0	0.78	0.44	0.44	0	0	1.56	1.32	0.66	2.88	0	2.88	0
21e	Low	0.38	0	0	0	0	0.57	0	0	0	0.57	0	0.57	0
21f	Low	2.28	0	0	0	0	3.42	0	0	0	3.42	0	3.42	0



Area or Project ¹	Timing and Potential for Project	Resources Impacted (ac) ²					Mitigation Needs by Ratio (ac) ²							Restoration Area (pavement removed)
		Grassland Habitat (moths, beetles and plants)				Pitch Pine Habitat (Moths)	Grassland Habitat (moths, ground beetles and plants)				Total Grassland Mitigation ³	Pitch Pine Habitat (Moths)	Total Mitigation Needs	
		Low quality	Moderate quality	High Quality	Open Sand		Low quality	Mod. quality	High Quality	Open Sand Habitat				
21g	Low	1.66	0	0	0	0	2.49	0	0	0	2.49	0	2.49	0
21i	Low	0	0	0.49	0	0	0	0	1.47	0	1.47	0	1.47	0
21j	Low	0	0	0.08	0	0	0	0	0.24	0	0.24	0	0.24	0
21k	Low	2.31	0	0	0	0	3.47	0	0	0	3.47	0	3.47	0
22	Low	0.05	0	0	0	0	0.08	0	0	0	0.08	0	0.08	0
31	In permitting	0	0	0	0	1.53 ⁵	0	0	0	0	0	3.06 ⁵	0	3.06 ⁵
32	Constructed	0	0	0	0	13.91 ⁴	0	0	0	0	0	0	0	0
33	High	0	0	0	0.10	0	0	0	0	0.15	0.15	0	0.15	0
Totals		26.15	11.15	18.27	11.57	1.53 ⁵	39.25	22.3	54.81	17.36	116.51	3.06 ⁵	116.51	17.95

¹ Only includes projects with impacts.

² GIS level impact and mitigation assessment – projects that have occurred may not be completely accurate, and those yet to occur will likely alter slightly in final design.

³ Mitigation total assumes the open sand habitat mitigation can be within/part of the grassland mitigation.

⁴ Habitat management not loss.

⁵ Upland forest but potentially pitch pine.



Table 6.3: Summary of Impacts and Mitigation Likelihood

Resource		Total Habitat Disturbance ¹	Disturbance by Project Likelihood		Total Mitigation ¹	Mitigation By Project Likelihood	
			Low Potential	High Potential		Low Potential	High Potential
Grassland	Low Quality	26.15	25.57	0.58	39.23	38.36	0.87
	Moderate Quality	11.15	3.65	7.50	22.30	7.30	15.00
	High Quality	18.27	8.97	9.30	54.81	26.91	27.90
	Open Sand	11.57	4.59	6.98	17.36	6.89	10.47
Grassland/Open Sand Totals²		55.57²	38.19²	17.38²	116.51²	72.57²	43.92²
Pitch Pine		1.53³	0	1.53³	0	0	3.06³

¹ GIS level impact and mitigation assessment – projects that have occurred may not be completely accurate, and those yet to occur will likely alter slightly in final design.
² Impacts and mitigation totals assume the open sand habitat mitigation is within/part of the grassland impacts and mitigation.
³ This project is within upland forest some of which is potential pitch pine habitat .

6.2 IDENTIFY POTENTIAL NEW MITIGATION AREAS ON-AIRPORT

The land purchased for the MOU and managed by CT DEEP has already provided a bank for grassland bird habitat and no further mitigation for grassland birds is needed; however, additional areas exist on the Airport that may be preserved or improved if needed as mitigation for non-avian species such as moths, tiger and ground beetles or low frostweed. Depending on the species needing mitigation, this could include the parcels acquired for noise mitigation across Route 20, or habitat improvement of cool season grassland onsite, especially in the approach to Runway 6. There are different benefits to both areas – while the on-Airport restoration reduces fragmentation, it is subject to the Airport’s mowing and cannot be permanently preserved. On the other hand, the Route 20 parcel can have long-term preservation, but is less contiguous with some of the current moth and beetle populations. As the RW 6 end and the Route 20 parcels are restored, the area will provide more contiguous habitat. Combined, the airfield restoration and Route 20 parcels have the potential to provide up to 30.7 acres of higher quality sandplain grassland and 86.7 acres of higher/improved quality grassland/open sand barrens for rare moths, tiger and ground beetles and low frostweed.

On-Airport Restoration: There are areas of grassland on the Airport, particularly in the Runway 6 approach where lower quality grassland habitat for moth and beetles exists surrounded by higher quality habitat. These areas of potential restoration are shown in Figure 6. The areas have been separated into two categories – warm season grassland restoration or warm season grassland/sand barrens restoration. These areas can be interchanged if needed for project mitigation but based on surrounding habitat but as currently shown could provide roughly 30.7 acres of warm season grassland and 52.5 acres of sandplain grassland/sand barrens habitat. These acreages include areas of pavement removal for projects located adjacent to existing grassland, but not areas that would be isolated small islands of grass (these isolated islands are shown as pavement removal without the hatching that implies mitigation/restoration potential in Figure 6). Both areas would have similar native warm season grassland vegetation and would provide habitat for most of the rare moths and ground beetles. The grassland/sand barrens areas would also incorporate areas of open sandy soils preferred by big sand tiger beetles and low frostweed. The *Polygonella* species that act as host plants to the spinulose flower moth are also more often observed in openings like these. Should the Airport need to provide mitigation for projects within moth, plant or beetle habitat, these areas can be restored to higher quality sandplain grassland or sandplain grassland/sand barrens. The total potential area of restoration at the RW 6 end is 15.7 acres. There are other areas of potential restoration to warm season grassland in the approaches to both ends of Runway 15-33 as well as west portions of Runway 24. Although the



area west of RW 24 would make a good area to try to expand tiger beetle habitat, this area is also partially within a potential project area in the future, so the limits of potential habitat expansion would need to be considered. The on-airport restoration projects would provide larger areas of contiguous habitat, but as airport needs and FAA and USDA safety requirements change in the future, there is potential for these areas to be impacted by projects.

Parcels across Route 20: This area is 34.2 acres in size and formerly contained houses that were purchased for noise abatement. The houses have been removed and the area is currently a mix of high, medium and low quality sandplain grassland. Should additional projects occur in grassland that is used by moths, beetles, or has low frostweed, this area can be used for mitigation. Some areas are already high quality grassland and would only need to be set aside as mitigation, while other portions would need some restoration. The lower quality grassland can be restored with addition of sand as needed to restore the soil, followed by planting with a warm season grass mix. This area could also be used for transplant of low frostweed should any be found within a project area in the future. Since this area is adjacent to the Runway 6 approach it is relatively close to high quality sandplain on the airport, which should allow for moths to find the new habitat. Although the higher quality habitat is currently fragmented from the main airfield, these areas can be restored leaving only Route 20 to fragment it from the Airport’s habitat. This area can also be set aside for long term preservation for periods of 10-years with threat of future project disturbance.

6.3 PROPOSED MITIGATION FRAMEWORK

The mitigation area needed by the projects will be determined by the impacts of the projects implemented. This will be dependent on the habitat impacted and where it is located – grassland impact mitigation is likely to be from the parcels across Route 20 or from restoration of areas with good potential that are already managed (Section 6.2 discusses mitigation area locations). Table 6.4 discusses the habitat that will need to be managed for each impact type and the type of future management commitments for each area. These future mitigations will be organized by natural community type and species they will benefit. These mitigation areas will be managed according to Section 7. Consideration of habitat fragmentation will be given in developing mitigation areas and where practicable preservation and long-term management will be included. This is also why not all areas of grassland creation after pavement removal for proposed projects are considered potential mitigation.

Table 6.4: Proposed Mitigation Types, Management Activities, and Monitoring

Resource Impacted	Species Affected	Proposed Mitigation Management	Proposed Monitoring Schedule
Grassland	Moths, ground beetles	Establishing grasslands if they are not already managed, then mowing as needed (Section 7).	Conduct 2 years of follow-up monitoring after habitat creation Every 5 years, assess habitat and make habitat recommendations as needed based on observations.
	Low frostweed	Transplant plants out of work areas if/when needed. Mow established areas according to management plan.	Conduct 2 years of follow-up monitoring after transplants
	Big Sand Tiger Beetle	Establish open sandy areas within the grassland matrix if needed and mow as needed to stop shrubs from moving in according to plan.	Conduct 2 years of follow-up monitoring after habitat creation
Pitch Pine	Pine Barrens Zanclognatha	Habitat enhancement through removal of undesirable species and propagation of additional pitch pine by heating cones to release seeds and planting seed balls. May	Conduct 2 years of follow-up monitoring after habitat creation



		require periodic management through selective removal of pitch pine every 5 years to keep growth low.	
Heathland/ Shrubland	Shrubland moths	Mitigation could include planting or transplanting of additional host plants and/or periodic management of parts of the mitigation area every 5 years to keep growth low	Conduct 2 years of follow-up monitoring after habitat creation

6.4 PROJECT COORDINATION WITH CT DEEP

Table 6.5 describes the process for projects (as defined in this RSMP or other) including the process for mitigation of new impacts under this RSMP, level of correspondence with CT DEEP, and the projects that require no mitigation or notice to CT DEEP.

Table 6.5: CT DEEP Coordination for Projects

Level of Coordination	Project Examples
No Coordination	Work within pavement or developing a parcel known to have no rare species habitat
Notice to CT DEEP, but no prior approval or mitigation is required	Maintenance or temporary impacts to safety areas outside the breeding season if a pre-survey shows no low frostweed habitat and the area is restored by the breeding season
Notice to CT DEEP with assumed approval if no response within 30 days. Notice will include: <ul style="list-style-type: none"> • Project/Work area • Description of any minor alteration from project presented in RSMP • Update to Table 6.2 with impacts and mitigation calculated according to ratios in Section 6.3 • Update of HMP figure showing where the mitigation will be located. 	Project requiring mitigation as proposed in RSMP or with minor alterations
Coordinate with CT DEEP for approval (CT DEEP will respond within 45 days or the proposal shall be considered accepted.) <ul style="list-style-type: none"> • Present project description, potential impacts, and proposed mitigation 	Project with significant alteration or a new project that has a regulated species according to the habitat defined herein (This process aids the Airport by having known/defined habitat areas, and eliminates the first steps in correspondence with CT DEEP to define which species may need to be investigated etc.)



7.0 HABITAT MANAGEMENT AND ESTABLISHMENT

As part of updating the RSMP, this habitat management section has been developed to codify management of the habitat both long-term and in the short-term relative to restoration and mitigation work. The intent of this section is to:

- provide long-term general management practices/BMPs for habitats identified as being utilized by rare species;
- provide short-term BMPs for airport projects that may impact rare species; and
- provide BMPs for habitat creation whether for mitigation or restoration as part of construction projects.

The proposed RSMP projects and their potential effects on the rare moths and beetles will be mitigated by the continued management of on-airport grassland habitat as needed by the Airport in Table 6.2 (above) and restoration of on-Airport grassland. Additionally, the parcels across Route 20 may be used for mitigation on a project by project basis.

Most of the habitat management for which the Airport is responsible (since management of the MOU off-airport property is DEEP’s responsibility) will occur with the continued management of the grasslands around the runways (Figure 7). These areas, which were managed previously under the MOU as areas with mowing as needed (frequent mowing - FM) and areas that are only mowed outside the grassland bird breeding season (infrequent mowing – IM), have entirely transitioned to FM to maintain the grasses between 6 and 12 inches in accordance with the Airport’s 2019 Wildlife Hazard Management Plan to maintain safe airspace. This new mowing plan revises the no-mow procedures that were included in the original MOU to meet Federal requirements and safety concerns. As RSMP projects proceed, grassland areas will continue to be managed in accordance with the Airport’s current WHMP. This section will propose the long-term habitat management and short-term BMPs for the establishment of new habitat areas. Any new mitigation areas that need to be created will be started prior to or generally concurrent with projects that impact rare species. Follow-up maintenance of these habitats will be implemented as part of a long-term management strategy for rare species preservation at the Airport.

7.1 LONG-TERM HABITAT MANAGEMENT

The long-term management protocols established within vegetative communities are discussed below and shown on Figure 7. Table 7.1 provides the proposed maintenance schedule, which may vary slightly as this is an adaptive HMP.

Table 7.1: Habitat Maintenance by Habitat

Habitat	Location	Maintenance
Frequently Mown (FM) Grasslands	Safety Areas and other FAA critical areas	Mow as needed to maintain 6-8” height for safety
Shrubland / Pitch Pine	Existing Habitat Southeast of RW 6 Approach	Maintain as early successional as under NDDB Determination 202207363. Currently, this includes selective hack and quirt herbicide treatment of undesirable woody species, with some seeding of new pitch pine trees to be maintained below Airport’s allowed heights. The proposed management is under study as discussed in Section 4.0 and this maintenance would be revised as needed after the results of the proposed work are analyzed to determine success.



7.1.1 Grasslands/ Grassland/Sand Barren

The grassland and sand barrens areas at the Airport are mown as needed to maintain grass heights from 6-12 inches to meet FAA standards for safety and to prevent wildlife hazards. This will be updated to meet any FAA and/or USDA standards as they change in the future. This area may provide habitat for low frostweed because this species remains short and prefers disturbed areas. It also may provide habitat for rare beetles and/or moths whose host plants do prefer disturbance.

7.1.2 Shrubland/ pitch pine areas

The shrubland/pitch-pine habitat on the Airport is currently limited to the small area in the southeastern portion of the RW 6 approach. Continued maintenance of this area under NDDB Determination 202207363 benefits both the Airport by maintaining airspace free of penetration and the rare species by maintaining habitat for pitch pine and shrubland moths. Management will include periodic thinning or topping of pitch pine or scrub oak to maintain allowed heights at the airport and reduction of undesirable sapling species (species such as poplar, red oak, white pine, black cherry, and grey birch) that although native, do not provide habitat for the rare moths or preserve the pitch pine scrub oak community that is rare in Connecticut and grow too tall to be sustainable long term with airspace restrictions. Undesirable sapling removal shall be controlled using the hack and squirt method of herbicide treatment during the late fall. This method will allow the species to be targeted specifically and allows for a visual success indicator in the next growing season. Hack and squirt will leave them standing so no removal methods or large quantities of wood debris will disturb the duff and soil where the *Zanclognatha martha* lives. Additionally, by timing the treatment during the dormant season, less herbicide can be used, and it is highly protective of non-target plant species. Treated species will fall slowly over time and the staggered timing as well as degradation prior to deposition will not create a mulching effect on the lower vegetation.

Currently, the Airport has also proposed to collect up to 200 viable pitch pine cones at the site and use heat offsite to collect seeds and create seed ball in a silt/loam medium. Approximately 200 seed balls will then be established at the Airport in 20 established plots in spring 2023. Each 5' diameter plot will receive 10 evenly spaced seed balls. The plot centers will be marked with numbered wire flags and the locations recorded on the project site plan. Data recording during installation shall include a counting of pitch pine in the groundcover layer (those under 3' high), and photo documentation. These plots will be monitored in 2024 and 2025 to determine if this is an effective method of generating young pitch pine growth at the site. This method was chosen to try to enhance the pitch pine habitat without using controlled burns, which the Airport considers a safety concern. This method of pitch pine enhancement will only be repeated if there is the need for increased pitch pine in the habitat. But should it be successful, pitch pine propagation through heated cones and seed balls may be used for mitigation projects in the future.

Should the adjacent off-airport parcel be acquired making the contiguous habitat larger, similar preservation and management may be proposed there as well if needed for mitigation.

7.2 CONSTRUCTION PROCEDURES FOR GRASSLAND IMPACTS AND GRASSLAND RESTORATION

Some of the projects occur entirely or partially within grassland habitat. The following section presents the methods to minimize and avoid these impacts to the extent practicable as planned in the RSMP. For the projects occurring within the grasslands, potential avoidance measures include staking of work area limits or pre-surveys for low frostweed prior to construction where this is relevant as determined through coordination with CT DEEP. The construction procedures are listed below by rare species habitat type.



7.2.1 Grasslands/ Grassland/Sand Barren

The grassland habitat for rare moths and low frostweed will be protected during construction to the maximum extent practicable. For the projects (or portions of projects) in Table 5.1, as defined during the RSMP process, some grassland impact is unavoidable, and methods will be used to minimize the effects. Impacts to breeding grassland birds have been mitigated by the MOU. Impacts to rare moths, plants and beetles will be minimized by mitigating all lost habitat according to this RSMP; limiting the area of grassland disturbance to the minimum necessary.

For the temporary impacts to grassland, because all the rare species habitats and vegetation are adapted to the soils at the Airport, restoration that does not involve the use of fertilizers and existing topsoil will be scraped off prior to grading and stockpiled to be re-used after grading has occurred. New or disturbed grassland areas will be restored with an approved grassland seed mix with Little Bluestem as the dominant species. When large contiguous areas are to be restored it is recommended that the seeding procedure include smoothing the native topsoil and dormant seeding with a Brillion seeder by criss-crossing the area multiple times to increase seed-soil contact. This method worked well with 100% Little Bluestem seed in a mitigation area for other airports in the region. When grassland restoration occurs, the Airport will monitor the restoration area for establishment 1-2 years post construction.

7.2.1.1 Transplantation Protocols for Low Frostweed

Projects within appropriate habitat and 200 feet of known populations of low frostweed will survey for the rare plant prior to construction. If projects impact Low Frostweed plants, they will be transplanted to a mitigation area. The following subsection details the BMPs for surveying and marking the plants prior to construction, transplantation, and monitoring.

Demarcation and Staff Education/Site Protection

Rare species plant colonies within the RSMP parcels will be demarcated by someone familiar with the species and shown to the airport personnel. This demarcation will alert the Airport/contractors as to the host plants' presence to avoid incidental disturbance, and to allow the Airport/contractors to transplant the plants as staffing allows.

Transplants will be identified and demarcated with flagging during the appropriate growing season. Low frostweed within project footprints will be transplanted to the proposed mitigation areas across Route 20 or other area with suitable long-term maintenance. Any existing rare plant locations at the transplant site will also be marked and shown to the Airport/contractors so the transplant process does not disturb any healthy plants.

Transplant Methods

Low Frostweed can grow by runners and it has an interconnected root system so when moving it, it is best to grab a colony of plants together rather than try to separate out individuals. This could be done by hand with shovels or possibly with a bucket loader. All transplants will be moved to the potential mitigation areas across Route 20 or other area with suitable long-term maintenance. If the schedule allows, transplants will occur during the dormant season of the plant to reduce damage (fall is preferred). Prior to transplantation, a hole will be dug and watered, and the low frostweed will be transplanted to the watered hole. The number or size of colonies transplanted will be documented by an onsite biological monitor and the transplant location will be marked for future monitoring. If the transplant does not occur in the dormant season of the plants, the plants will be irrigated during dry weather. The biological observer will monitor the plants after the transplant – the next day, then once a week for 2 weeks, then every other week for a month, then once a month for the remainder of the growing season for as long as that is.



7.2.2 Shrubland/ pitch pine areas

This section provides construction BMPs and transplantation protocols for mitigation of this habitat type or transplant of host plant habitat such as Lowbush Blueberries for Sandplain *Euchlaena* or *Prunus spp.* for brown bordered geometer. If projects impact significant amounts of host plants, they will be transplanted to a mitigation area. The following subsection details the BMPs for surveying and marking the plants prior to construction, transplantation, and monitoring.

Demarcation and Staff Education/Site Protection

Prior to construction, rare species host plant colonies within the RSMP parcels will be demarcated by someone familiar with the species and shown to the airport personnel. This demarcation will alert the Airport/contractors as to the host plants' presence to avoid incidental disturbance, and to allow the Airport/contractors to transplant the plants as staffing allows.

Transplants will be identified and demarcated with flagging during the appropriate growing season. Since these are woody species, they can be identified during most of the year. Significant amounts of *Prunus spp.* within project footprints will be transplanted to the expand the existing pitch pine/scrub shrub habitat area in the southeast portion of the airport or to another area with suitable long-term maintenance. Lowbush Blueberry can grow within the sandplain grassland areas and is a common species. Should a new mitigation area be required for this species, transplanting is possible, but unlikely to be needed for individual plants that may occur within a work area. Any existing rare host plant locations at the transplant site will also be marked and shown to the Airport/contractors so the transplant process does not disturb any healthy plants.

Transplant Methods

Lowbush Blueberry can spread from its roots to cover a large area and have an interconnected root system so if this species is moving it is best to grab a colony of plants together rather than try to separate out individuals. This could be done with a bucket loader grabbing areas of the low growing shrub. *Prunus spp.* and pitch pine are less likely to occur in larger colonies and could be transplanted by bucket loader or tree spade depending on the species and the growth habitat of the plant observed onsite. Alternatively, pitch pine could be propagated from cones under the method detailed in Section 4.0 and Section 7.1.2 above if this method proves successful.

All transplants will be moved to the pitch pine/shrub scrub area or other area with suitable long-term maintenance. If the schedule allows, transplants will occur during the dormant season of the plant to reduce damage (fall is preferred). Prior to transplantation, a hole will be dug and watered, and the shrubs will be transplanted to the watered hole. The number or size of colonies transplanted will be documented by an onsite biological monitor and the transplant location will be marked for future monitoring. If the transplant does not occur in the dormant season of the plants, the plants will be irrigated during dry weather. The biological observer will monitor the plants after the transplant – the next day, then once a week for 2 weeks, then every other week for a month, then once a month for the remainder of the growing season for as long as that is.

7.3 MONITORING SCHEDULE

As per the RSMP, a monitoring program has been developed in coordination with CT DEEP to help ensure that the HMP is consistent with the RSMP, and management continues to provide habitat for the known rare species and that any restoration areas have been established as planned. This monitoring includes periodic habitat assessments and reporting. The observations will consist of an assessment of the beetle/moth habitat, evaluation of host plant areal vegetative cover within the shrubland (if needed), and overall site stability. Additional notes will be made relative to functional values, the



overall health and vitality of the rare species mitigation area, and any recommendations to achieve or maintain the mitigation areas. Table 7.2 presents the monitoring schedule for the habitat mitigation and rare species surveys.

A summary monitoring report will be submitted to CT DEEP to document habitat monitoring and incidental rare species findings for any prescribed monitoring activities. The following proposed table of contents will be adapted to only include those sections that are being monitored in any year of monitoring. With that consideration, the outline will be roughly as follows:

- Introduction – including overview of any projects or monitoring for the year
- Grassland - status of grassland habitat as compared to habitat goals, including any created or restored areas
 - Open sandy areas for beetles
 - Low Frostweed transplant status
- Shrubland/Pitch Pine –habitat observations and rough percent cover of host plant species.
- Conclusions/Recommendations – any conclusions or recommendations for adapting the management to meet the habitat goals.


Table 7.2: Monitoring Schedule

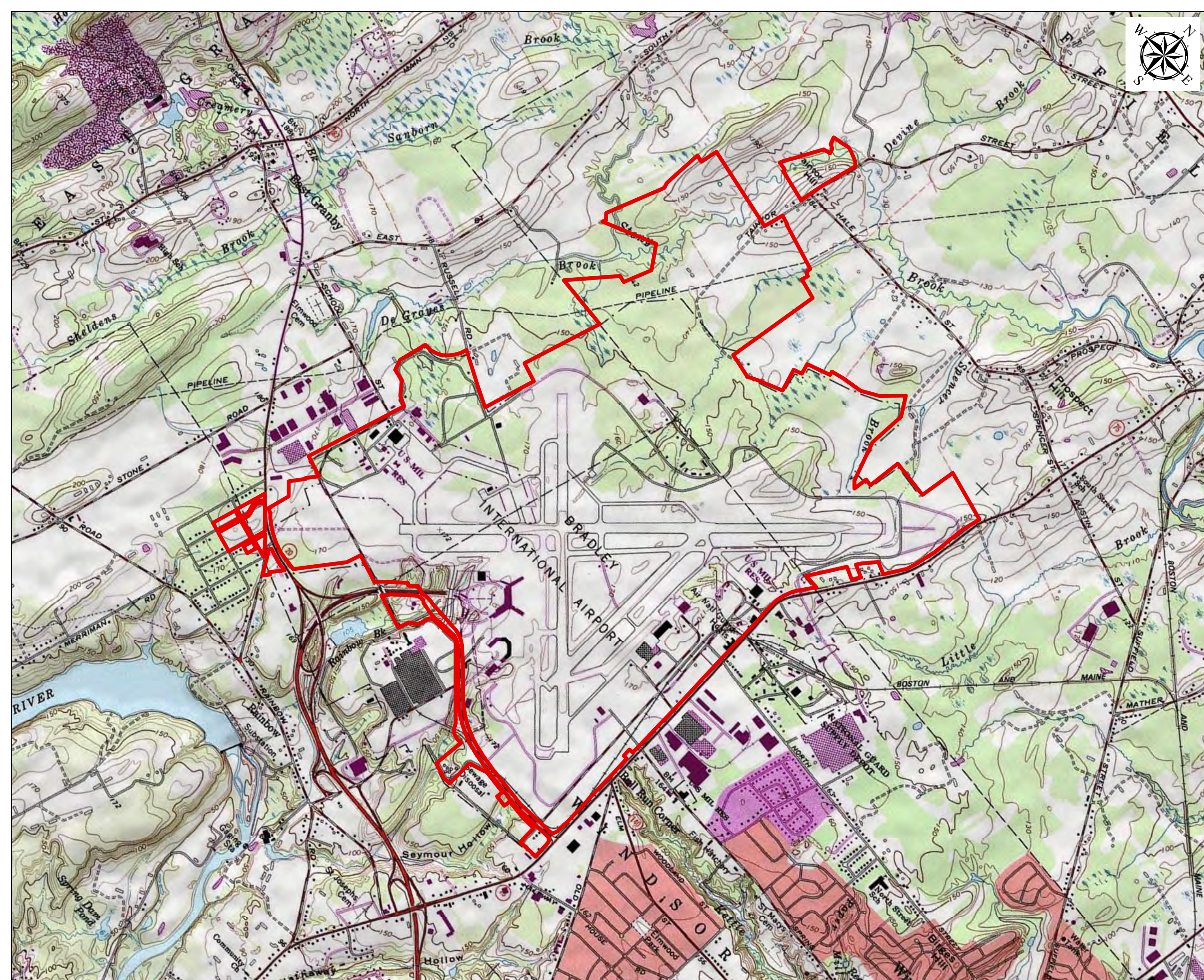
Habitat	Year 1	Year 2	Year 3	Year 4	Year 5
Cultural Grassland	No monitoring	No monitoring	Field review of grassland for habitat quality	No monitoring	No monitoring
Restored Grassland Areas	Timing depends on construction impacts, but monitoring will occur during construction year and after the second growing season to assess restored habitat				
Shrubland /Pitch Pine	No monitoring	No monitoring	Field review of grassland for habitat quality	No monitoring	No monitoring



Figures

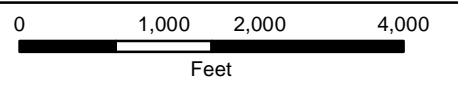
LEGEND

 PARCEL BOUNDARY



NOTES:


1. BASE MAP SOURCE: COPYRIGHT: © 2013 NATIONAL GEOGRAPHIC SOCIETY, I-CUBED

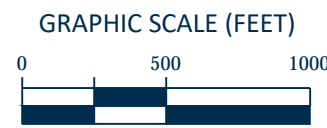
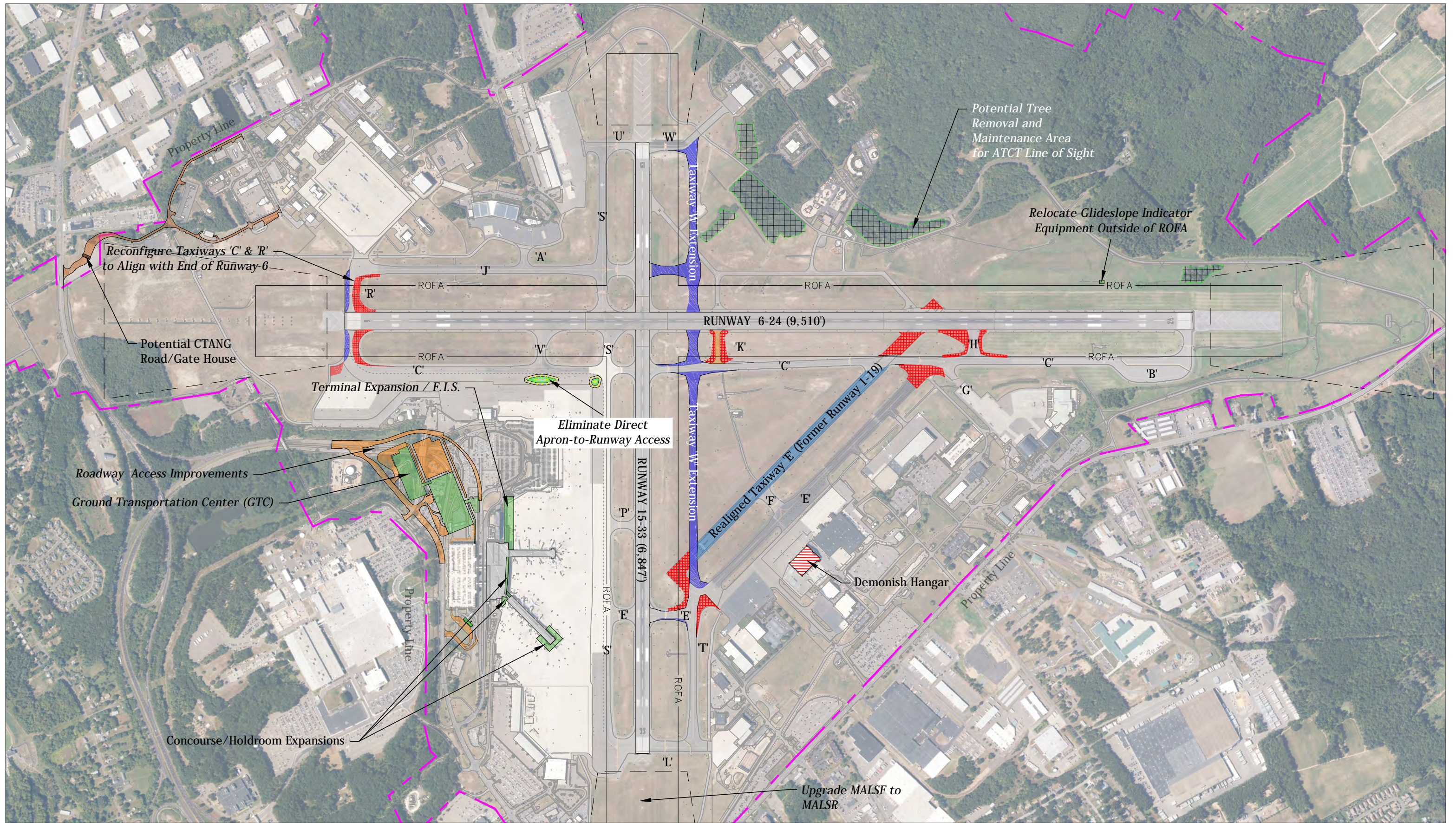


UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

LOCUS MAP

PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301	
PROJ MGR: ERH DESIGNED BY: JRC DATE: 02/07/2023	REVIEWED BY: GPD DRAWN BY: JRC PROJECT NO: 15.0166708.01	CHECKED BY: SLL SCALE: 1 in = 2,000 ft REVISION NO:	FIGURE ϕ-55



LEGEND


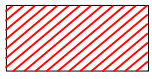

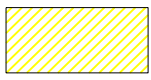
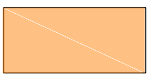
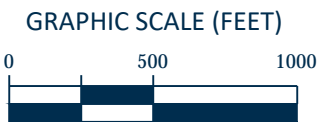
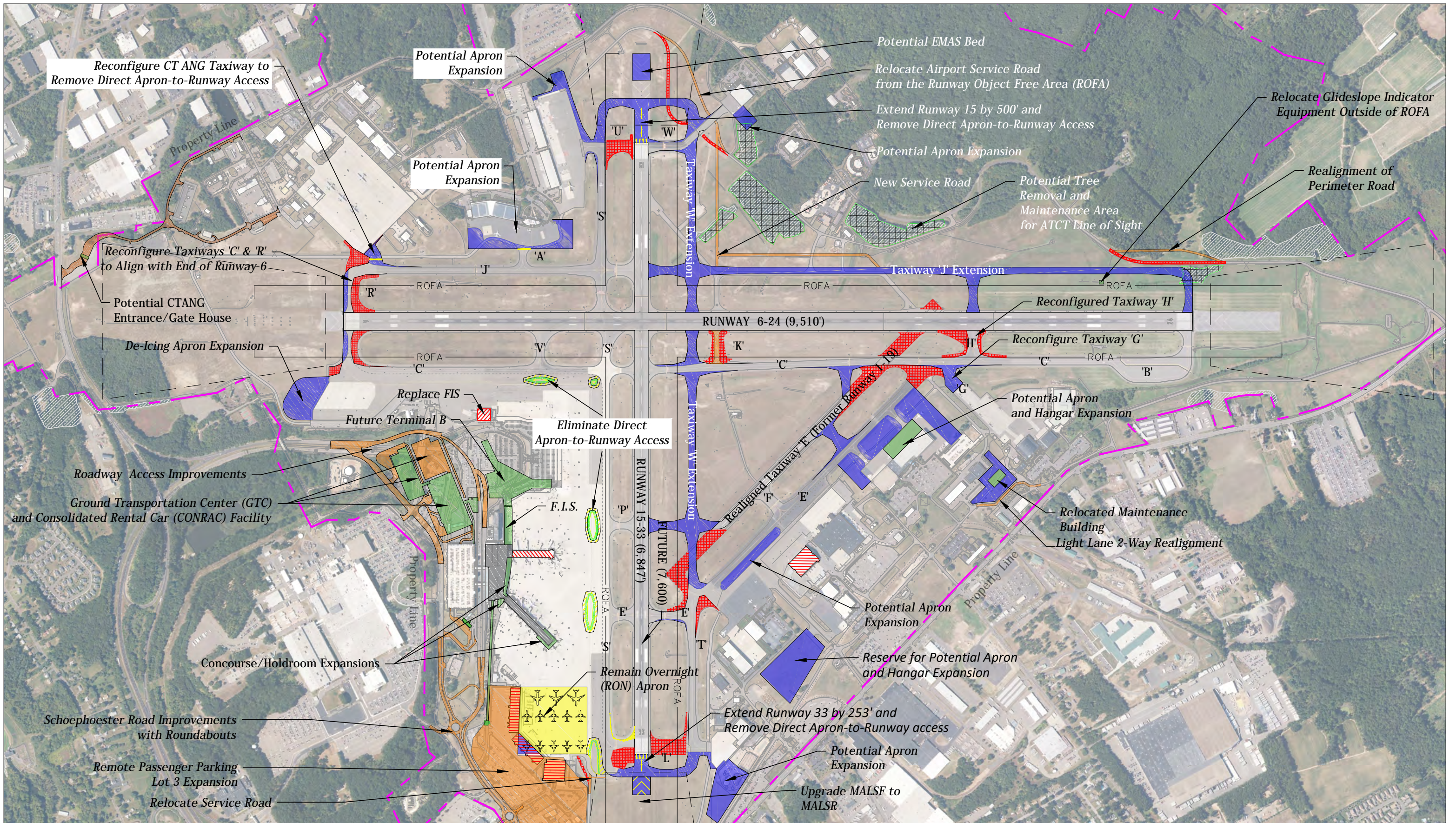
	Proposed Airside Pavement		Building Removal
	Pavement Removal		Pavement Striping
	Proposed Landside Pavement		

Figure 2



LEGEND


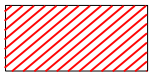


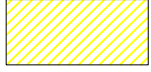

 Proposed Airside Pavement	 Building Removal	 Proposed Building
 Pavement Removal	 Pavement Striping	 Proposed Landside Pavement

Figure 3
Recommended Plan C-57

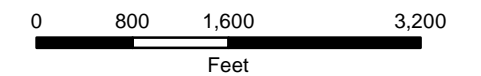


LEGEND

- ⊙ MOTH/INVERTEBRATE TRAPPING LOCATIONS
- TIGER BEETLE OCCUPIED AREA
- Low Frostweed Population
- HIGH QUALITY SANDPLAIN GRASSLAND
- MODERATE QUALITY SANDPLAIN GRASSLAND
- LOW QUALITY SANDPLAIN GRASSLAND
- COOL SEASON GRASSLAND
- COOL SEASON GRASSLAND / WET MEADOW
- WET MEADOW
- SCRUB SHRUB UPLAND
- SCRUB SHRUB WETLAND
- PITCH PINE / SHRUB OAK
- WARM SEASON / OPEN SAND
- FLOODPLAIN / RIPARIAN FOREST
- FORESTED WETLAND
- ACTIVE AGRICULTURE
- UPLAND FOREST
- LANDSCAPED / MANAGED LAWN
- PARCEL BOUNDARY

NOTES:

1. BASE MAP SOURCE: BING 2019-2021 IMAGERY.
2. HABITAT BOUNDARIES SHOWN HEREON WERE DELINEATED IN JULY AND AUGUST, 2020, BY GZA 1350 MAIN STREET, SUITE 1400, SPRINGFIELD, MA 01103.



UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

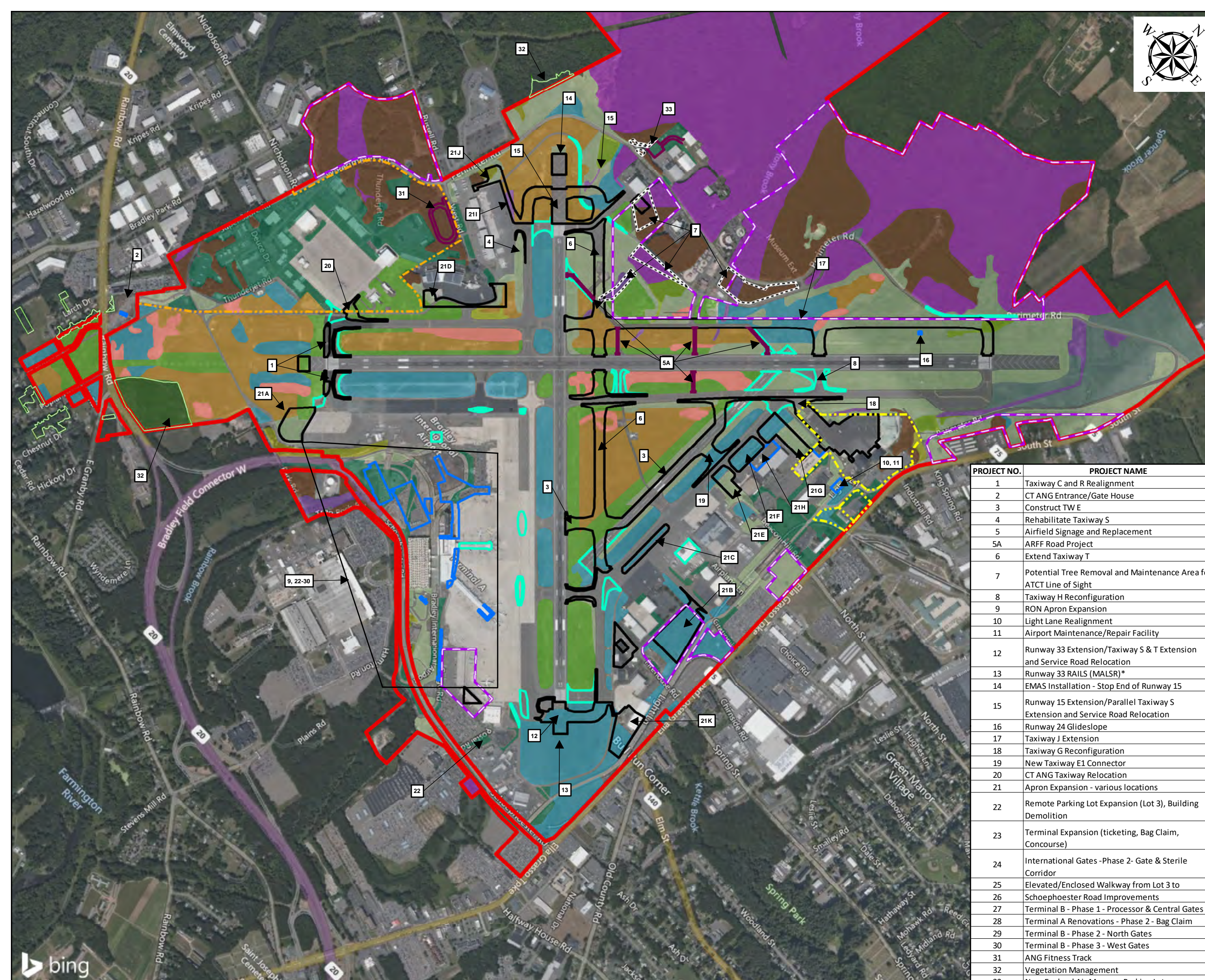
NATURAL COMMUNITY MAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301	
PROJ MGR: SDR	REVIEWED BY: GPD	CHECKED BY: SDR	FIGURE C-58 4
DESIGNED BY: JRC	DRAWN BY: JRC	SCALE: 1 in = 1,600 ft	
DATE: 02/16/2023	PROJECT NO: 15.0166708.01	REVISION NO:	

Rare Lepidoptera at BDL (2003, 2020)

Species		Trap				Total
		1	2	4	5	
<i>Apantesis phyllira</i>	Phyllira Tiger Moth (E)	1*				1
<i>Dargida rubripennis</i>	Pink Streak (T)		1		1	2
<i>Euxoa violaris</i>	Violet Dart Moth (SC)	6*	9	6*		9
<i>Schinia spinosae</i>	Showy Flower (SC)	*			1	1
<i>Euchlaena madusaria</i>	Scrub Euchlaena (T)	*				
<i>Eumacaria madopata (latiferrugata)</i>	Brown Bordered Geometer (T)		*			
<i>Zanclognatha martha</i>	Pine Barrens Zanclognatha (T)				*	

*: Found by Wagner here in 2003

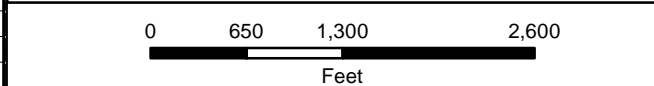


LEGEND

- POTENTIAL TREE CLEARING
- VEGETATION MANAGEMENT AREA
- POTENTIAL NEW AIRFIELD PAVEMENT TO BE INSTALLED
- POTENTIAL NEW BUILDINGS
- POTENTIAL NEW ROAD PAVEMENT TO BE INSTALLED
- POTENTIAL PAVEMENT TO BE REMOVAL
- AREA AVAILABLE FOR POTENTIAL FUTURE DEVELOPMENT
- HIGH QUALITY SANDPLAIN GRASSLAND
- MODERATE QUALITY SANDPLAIN GRASSLAND
- LOW QUALITY SANDPLAIN GRASSLAND
- COOL SEASON GRASSLAND
- COOL SEASON GRASSLAND / WET MEADOW
- WET MEADOW
- SCRUB SHRUB UPLAND
- SCRUB SHRUB WETLAND
- PITCH PINE / SHRUB OAK
- WARM SEASON / OPEN SAND
- FORESTED WETLAND
- ACTIVE AGRICULTURE
- UPLAND FOREST
- LANDSCAPED / MANAGED LAWN
- - - - - CTANG - PROPERTY LINE
- - - - - CTARNG - PROPERTY LINE
- PARCEL BOUNDARY

PROJECT NO.	PROJECT NAME
1	Taxiway C and R Realignment
2	CT ANG Entrance/Gate House
3	Construct TW E
4	Rehabilitate Taxiway S
5	Airfield Signage and Replacement
5A	ARFF Road Project
6	Extend Taxiway T
7	Potential Tree Removal and Maintenance Area for ATCT Line of Sight
8	Taxiway H Reconfiguration
9	RON Apron Expansion
10	Light Lane Realignment
11	Airport Maintenance/Repair Facility
12	Runway 33 Extension/Taxiway S & T Extension and Service Road Relocation
13	Runway 33 RAILS (MALSR)*
14	EMAS Installation - Stop End of Runway 15
15	Runway 15 Extension/Parallel Taxiway S Extension and Service Road Relocation
16	Runway 24 Glideslope
17	Taxiway J Extension
18	Taxiway G Reconfiguration
19	New Taxiway E1 Connector
20	CT ANG Taxiway Relocation
21	Apron Expansion - various locations
22	Remote Parking Lot Expansion (Lot 3), Building Demolition
23	Terminal Expansion (ticketing, Bag Claim, Concourse)
24	International Gates -Phase 2- Gate & Sterile Corridor
25	Elevated/Enclosed Walkway from Lot 3 to
26	Schoepfoester Road Improvements
27	Terminal B - Phase 1 - Processor & Central Gates
28	Terminal A Renovations - Phase 2 - Bag Claim
29	Terminal B - Phase 2 - North Gates
30	Terminal B - Phase 3 - West Gates
31	ANG Fitness Track
32	Vegetation Management
33	New England Air Museum Parking Lot

NOTES:
 1. BASE MAP SOURCE: BING 2019-2021 IMAGERY.
 2. HABITAT BOUNDARIES SHOWN HEREON WERE DELINEATED IN JULY AND AUGUST, 2020, BY GZA 1350 MAIN STREET, SUITE 1400, SPRINGFIELD, MA 01103.



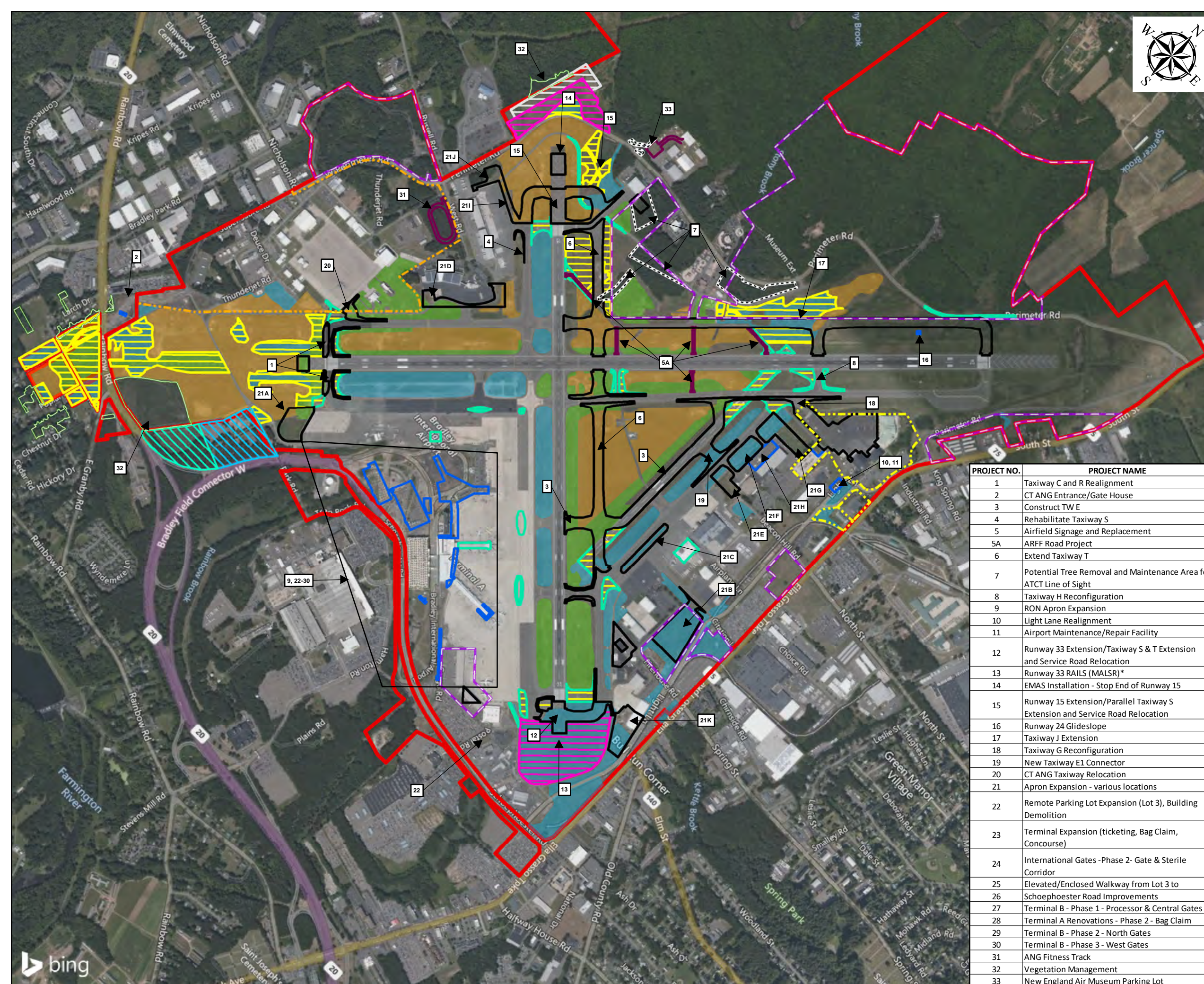
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

NATURAL COMMUNITIES WITH PROPOSED PROJECTS

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301
PROJ MGR: ERH DESIGNED BY: JRC DATE: 02/16/2023	REVIEWED BY: GPD DRAWN BY: JRC PROJECT NO: 15.0166708.01
CHECKED BY: SLL SCALE: 1 in = 1,300 ft REVISION NO:	FIGURE 5-59





LEGEND

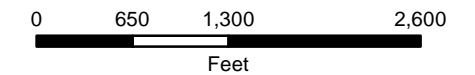
- POTENTIAL TREE CLEARING
- VEGETATION MANAGEMENT
- POTENTIAL NEW AIRFIELD PAVEMENT TO BE
- POTENTIAL NEW BUILDINGS
- POTENTIAL NEW ROAD PAVEMENT TO BE INSTALLED
- POTENTIAL PAVEMENT TO BE REMOVAL
- [Pink hatched box] AREA AVAILABLE FOR POTENTIAL ENHANCEMENT TO HIGHER QUALITY WARM SEASON GRASSLAND (30.7 ACRES)
- [Yellow hatched box] AREA AVAILABLE FOR POTENTIAL ENHANCEMENT TO HIGHER QUALITY SANDPLAIN GRASSLAND / OPEN SAND (86.7 ACRES)
- [Grey hatched box] AREA AVAILABLE FOR POTENTIAL CREATION OF PITCH PINE SCRUB OAK SHRUB COMMUNITY (4.9 ACRES)
- [Blue hatched box] AREA AVAILABLE FOR POTENTIAL FUTURE ACQUISITION - DEVELOPMENT
- [Green hatched box] AREA AVAILABLE FOR POTENTIAL FUTURE ACQUISITION - HABITAT CREATION
- [Purple hatched box] AREA AVAILABLE FOR POTENTIAL FUTURE DEVELOPMENT
- [Orange box] HIGH QUALITY SANDPLAIN GRASSLAND
- [Light green box] MODERATE QUALITY SANDPLAIN GRASSLAND
- [Light blue box] LOW QUALITY SANDPLAIN GRASSLAND
- [Dashed orange line] CTANG - PROPERTY LINE
- [Dashed yellow line] CTARNG - PROPERTY LINE
- [Red outline box] PARCEL BOUNDARY

PROPOSED PAVEMENT TO BE INSTALLED OVER SANDPLAIN GRASSLAND: 52.5 ACRES

PROPOSED PAVEMENT TO BE REMOVED AND ENHANCED INTO SANDPLAIN GRASSLAND: 17.9 ACRES

- NOTES:
1. BASE MAP SOURCE: BING 2019-2021 IMAGERY.
 2. HABITAT BOUNDARIES SHOWN HEREON WERE DELINEATED IN JULY AND AUGUST, 2020, BY GZA 1350 MAIN STREET, SUITE 1400, SPRINGFIELD, MA 01103.

PROJECT NO.	PROJECT NAME
1	Taxiway C and R Realignment
2	CT ANG Entrance/Gate House
3	Construct TW E
4	Rehabilitate Taxiway S
5	Airfield Signage and Replacement
5A	ARFF Road Project
6	Extend Taxiway T
7	Potential Tree Removal and Maintenance Area for ATCT Line of Sight
8	Taxiway H Reconfiguration
9	RON Apron Expansion
10	Light Lane Realignment
11	Airport Maintenance/Repair Facility
12	Runway 33 Extension/Taxiway S & T Extension and Service Road Relocation
13	Runway 33 RAILS (MALS)*
14	EMAS Installation - Stop End of Runway 15
15	Runway 15 Extension/Parallel Taxiway S Extension and Service Road Relocation
16	Runway 24 Glideslope
17	Taxiway J Extension
18	Taxiway G Reconfiguration
19	New Taxiway E1 Connector
20	CT ANG Taxiway Relocation
21	Apron Expansion - various locations
22	Remote Parking Lot Expansion (Lot 3), Building Demolition
23	Terminal Expansion (ticketing, Bag Claim, Concourse)
24	International Gates -Phase 2- Gate & Sterile Corridor
25	Elevated/Enclosed Walkway from Lot 3 to
26	Schoepfoester Road Improvements
27	Terminal B - Phase 1 - Processor & Central Gates
28	Terminal A Renovations - Phase 2 - Bag Claim
29	Terminal B - Phase 2 - North Gates
30	Terminal B - Phase 3 - West Gates
31	ANG Fitness Track
32	Vegetation Management
33	New England Air Museum Parking Lot



UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

POTENTIAL MITIGATION / HABITAT MANAGEMENT AREAS

PREPARED BY:	GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR:	MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301
PROJ MGR:	ERH	REVIEWED BY:	GPD
DESIGNED BY:	JRC	DRAWN BY:	JRC
DATE:	02/16/2023	PROJECT NO:	15.0166708.01
CHECKED BY:	SLL	SCALE:	1 in = 1,300 ft
REVISION NO:		FIGURE	6-60

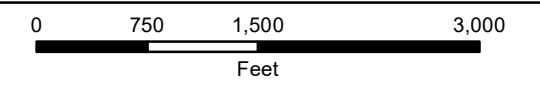




LEGEND

- FREQUENT MOWING (FM)
- PP/SS – HACK AND SQUIRT HERBICIDE TREATMENT OF TREES OTHER THAN PITCH PINE WITH SOME PITCH PINE ENHANCEMENT
- PARCEL BOUNDARY

- NOTES:
1. BASE MAP SOURCE: BING 2019-2021 IMAGERY.
 2. HABITAT BOUNDARIES SHOWN HEREON WERE DELINEATED IN JULY AND AUGUST, 2020, BY GZA 1350 MAIN STREET, SUITE 1400, SPRINGFIELD, MA 01103.

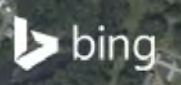


UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

HABITAT MANAGEMENT PLAN

GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301				
PROJ MGR:	ERH	REVIEWED BY:	GPD	CHECKED BY:	SLL	FIGURE 9-61
DESIGNED BY:	JRC	DRAWN BY:	JRC	SCALE:	1 in = 1,300 ft	
DATE:	02/07/2023	PROJECT NO.:	15.0166708.01	REVISION NO.:		





Appendices

Appendix A

GZA 2020 Rare Species Findings Report



Appendix B

PREVIOUS CT DEEP/NDDB CORRESPONDENCE

- **Memorandum of Understanding for Grassland Birds**
 - **Taxiway C and Taxiway R Realignment (NDDB Determination No. 201802821)**
- **Runway 1-19/Construct Taxiway E and Taxiway P Extension (NDDB Determination No. 202079007)**
 - **Airport Signage Replacement Project (NDDB Determination No. 202004125)**
 - **CAA Response to NDDB Determination 202004125**
- **Taxiway S Rehabilitation and Reconstruction (NDDB Determination No. 202009135)**
 - **CAA Response to NDDB Determination 202009135**
- **Correspondence between Stantec and NDDB for RW 6-15 Airspace Obstruction Removal (Previous NDDB Determination No. 201607290 and new NDDB Determination No. 202207363)**



Appendix D – USDA Custom Soil Resources Report



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for State of Connecticut, Western Part



October 6, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
State of Connecticut, Western Part.....	13
23A—Sudbury sandy loam, 0 to 5 percent slopes.....	13
36A—Windsor loamy sand, 0 to 3 percent slopes.....	14
306—Udorthents-Urban land complex.....	16
308—Udorthents, smoothed.....	17
Soil Information for All Uses	19
Suitabilities and Limitations for Use.....	19
Land Classifications.....	19
Farmland Classification.....	19
References	25

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

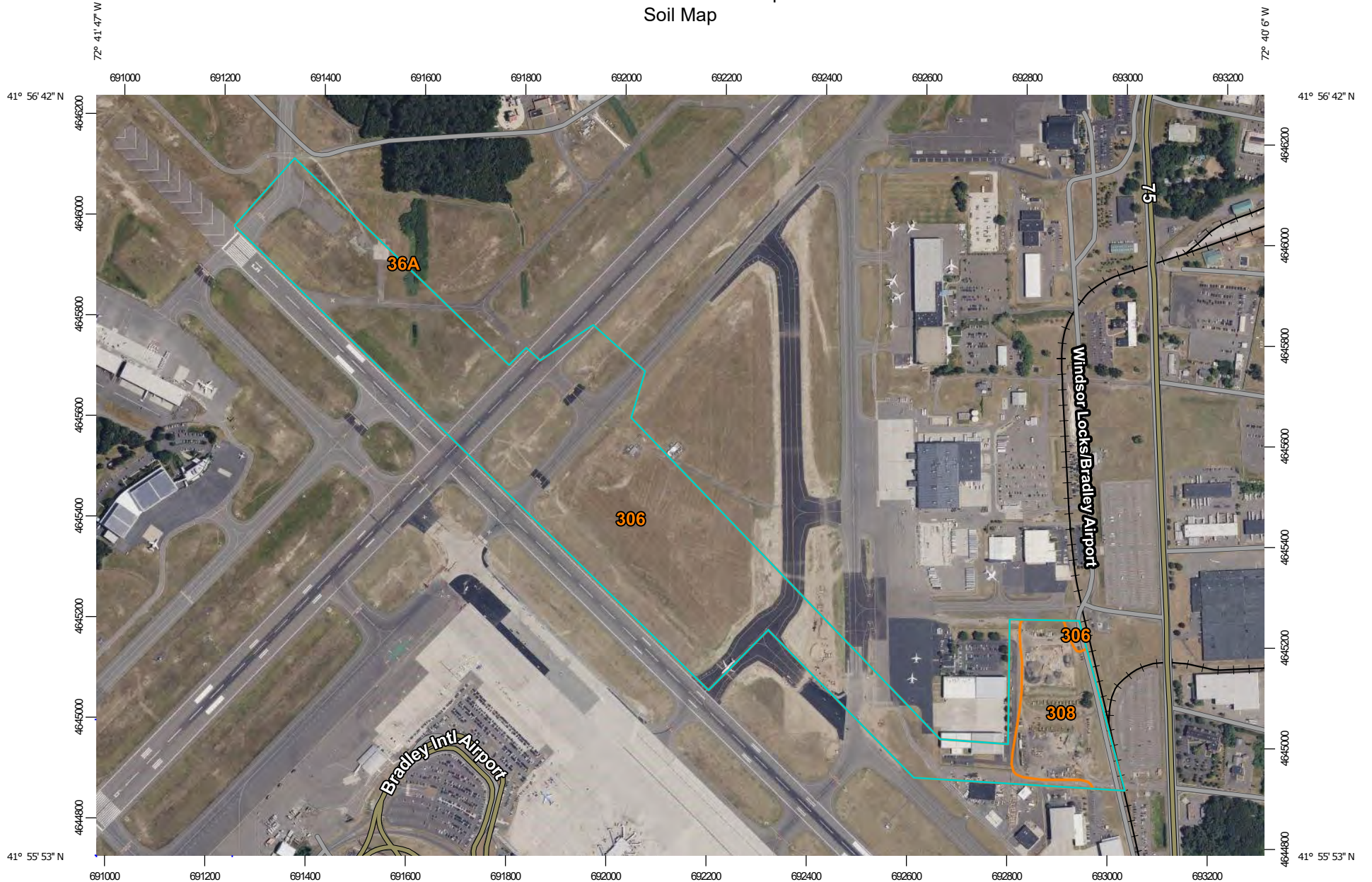
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

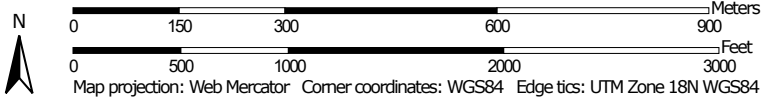
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:10,700 if printed on A landscape (11" x 8.5") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut, Western Part
 Survey Area Data: Version 1, Sep 15, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	0.0	0.0%
36A	Windsor loamy sand, 0 to 3 percent slopes	0.0	0.0%
306	Udorthents-Urban land complex	95.0	88.2%
308	Udorthents, smoothed	12.7	11.8%
Totals for Area of Interest		107.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

Custom Soil Resource Report

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut, Western Part

23A—Sudbury sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9lkv
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sudbury and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sudbury

Setting

Landform: Outwash plains, terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: sandy loam
Bw1 - 5 to 17 inches: gravelly sandy loam
Bw2 - 17 to 25 inches: sandy loam
2C - 25 to 60 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 17 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Kames, outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ninigret

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent
Landform: Outwash plains, terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Walpole

Percent of map unit: 2 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

36A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg
Elevation: 0 to 990 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent

Landform: Outwash plains, terraces, deltas

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent

Landform: Outwash plains, eskers, kames, deltas

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 39 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Human-transported material

Typical profile

^A - 0 to 5 inches: loam
^C1 - 5 to 21 inches: gravelly loam
^C2 - 21 to 79 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 6 inches: cemented material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Udorthents, wet substratum

Percent of map unit: 9 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

308—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9lmj
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Human-transported material

Typical profile

^A - 0 to 5 inches: loam
^C1 - 5 to 21 inches: gravelly loam
^C2 - 21 to 79 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Custom Soil Resource Report

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Udorthents, wet substratum

Percent of map unit: 7 percent

Hydric soil rating: No

Urban land

Percent of map unit: 5 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Landform: Hills

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

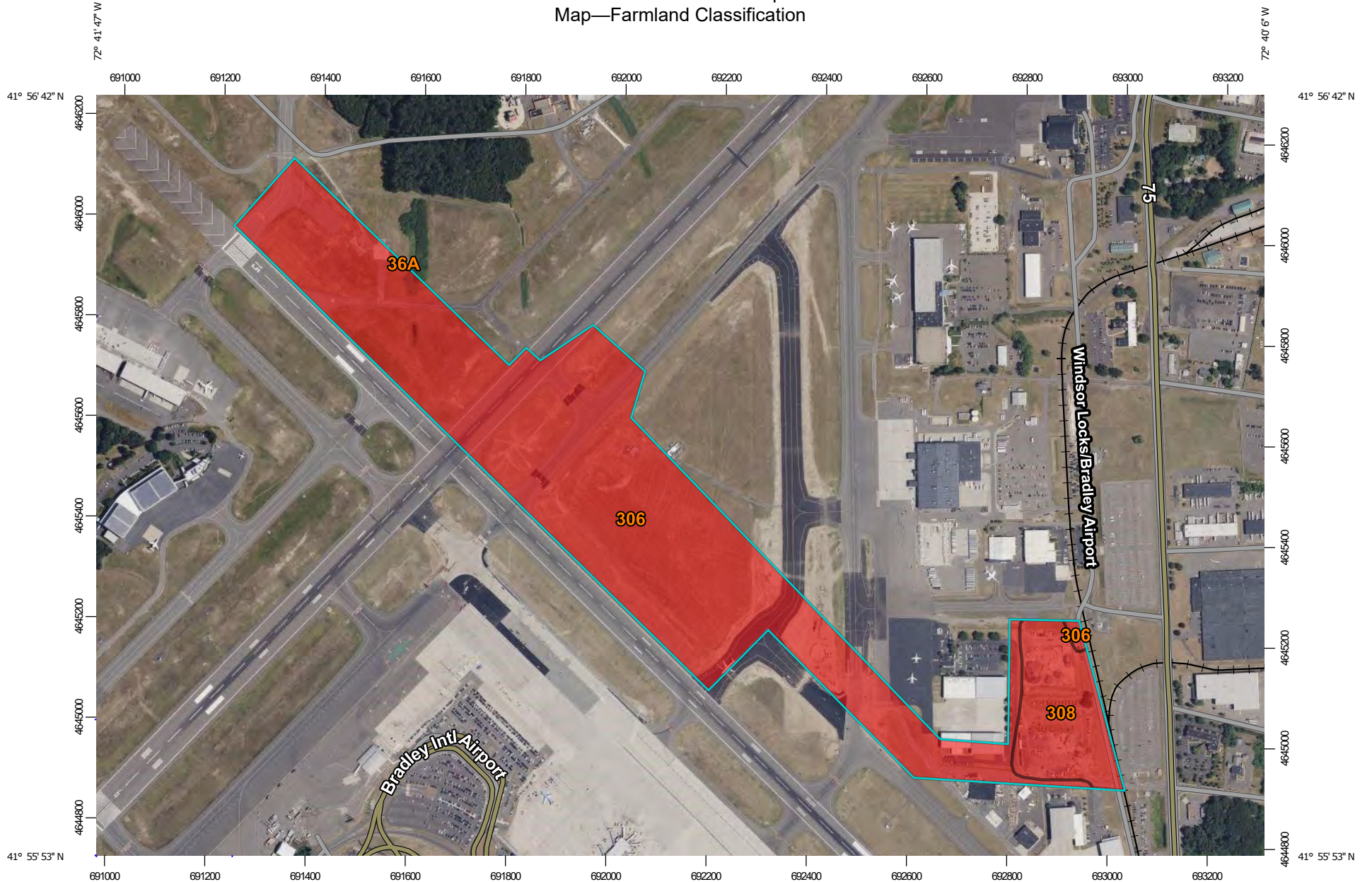
Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

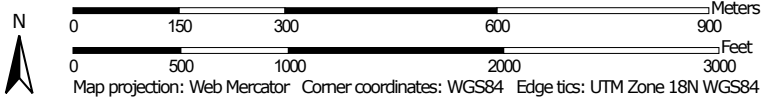
Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Custom Soil Resource Report Map—Farmland Classification



Map Scale: 1:10,700 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Custom Soil Resource Report









MAP LEGEND








Area of Interest (AOI)






 Area of Interest (AOI)








Soils



Soil Rating Polygons

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season









-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of statewide importance, if drained
-  Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated

-  Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated and drained
-  Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
-  Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

-  Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough
-  Farmland of statewide importance, if thawed
-  Farmland of local importance
-  Farmland of local importance, if irrigated

-  Farmland of unique importance
-  Not rated or not available

Soil Rating Lines

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Custom Soil Resource Report

	Prime farmland if subsoiled, completely removing the root inhibiting soil layer		Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season		Farmland of unique importance		Prime farmland if subsoiled, completely removing the root inhibiting soil layer
	Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60		Farmland of statewide importance, if irrigated and drained		Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season		Not rated or not available
	Prime farmland if irrigated and reclaimed of excess salts and sodium		Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season	Soil Rating Points	
	Farmland of statewide importance		Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer		Farmland of statewide importance, if warm enough		Not prime farmland
	Farmland of statewide importance, if drained		Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60		Farmland of statewide importance, if thawed		All areas are prime farmland
	Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if irrigated		Farmland of local importance		Prime farmland if drained
	Farmland of statewide importance, if irrigated		Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season		Farmland of local importance, if irrigated		Prime farmland if protected from flooding or not frequently flooded during the growing season
			Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season				Prime farmland if irrigated
			Farmland of statewide importance, if warm enough				Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
			Farmland of statewide importance, if thawed				Prime farmland if irrigated and drained
			Farmland of local importance				Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
			Farmland of local importance, if irrigated				Farmland of statewide importance, if drained
							Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
							Farmland of statewide importance, if irrigated

Custom Soil Resource Report

<ul style="list-style-type: none"> Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season Farmland of statewide importance, if irrigated and drained Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60 	<ul style="list-style-type: none"> Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season Farmland of statewide importance, if warm enough Farmland of statewide importance, if thawed Farmland of local importance Farmland of local importance, if irrigated 	<ul style="list-style-type: none"> Farmland of unique importance Not rated or not available <p>Water Features</p> <ul style="list-style-type: none"> Streams and Canals <p>Transportation</p> <ul style="list-style-type: none"> Rails Interstate Highways US Routes Major Roads Local Roads <p>Background</p> <ul style="list-style-type: none"> Aerial Photography 	<p>The soil surveys that comprise your AOI were mapped at 1:12,000.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: State of Connecticut, Western Part Survey Area Data: Version 1, Sep 15, 2023</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>
---	---	---	---

Table—Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	All areas are prime farmland	0.0	0.0%
36A	Windsor loamy sand, 0 to 3 percent slopes	Farmland of statewide importance	0.0	0.0%
306	Udorthents-Urban land complex	Not prime farmland	95.0	88.2%
308	Udorthents, smoothed	Not prime farmland	12.7	11.8%
Totals for Area of Interest			107.7	100.0%

Rating Options—Farmland Classification

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix E – EJSCREEN Report

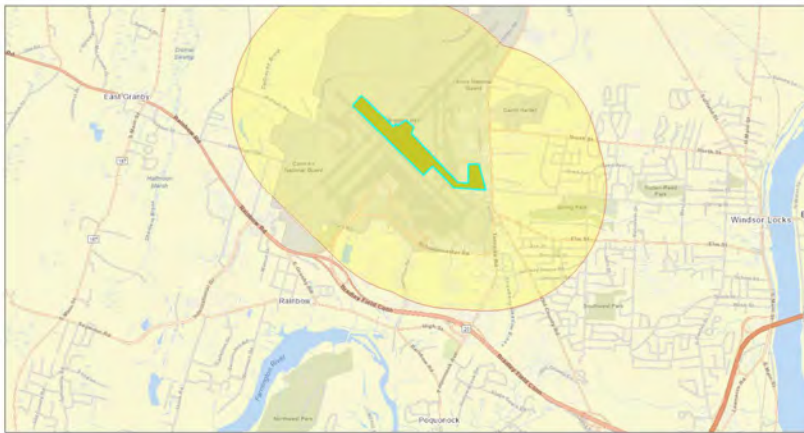
EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

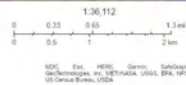
Windsor Locks, CT

1 mile Ring around the Area
 Population: 1,701
 Area in square miles: 6.23

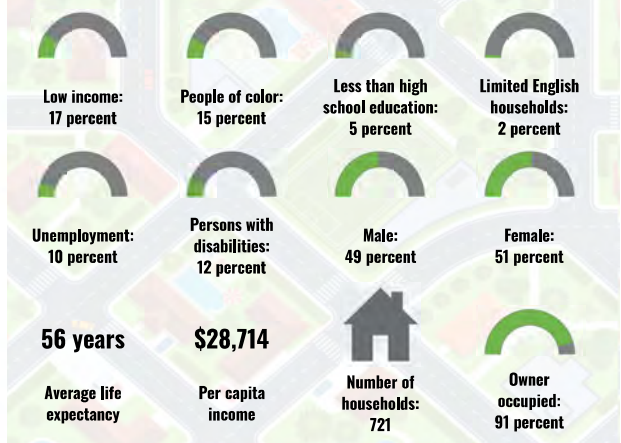
A3 Landscape



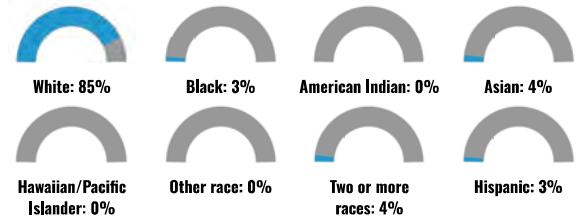
December 6, 2023
 Project Area
 Project Areas



COMMUNITY INFORMATION



BREAKDOWN BY RACE



BREAKDOWN BY AGE



LIMITED ENGLISH SPEAKING BREAKDOWN



LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	86%
Spanish	3%
Russian, Polish, or Other Slavic	1%
Other Indo-European	5%
Korean	1%
Vietnamese	1%
Tagalog (including Filipino)	1%
Other Asian and Pacific Island	1%
Total Non-English	14%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race. Source: U.S. Census Bureau, American Community Survey (ACS) 2017-2021. Life expectancy data comes from the Centers for Disease Control.

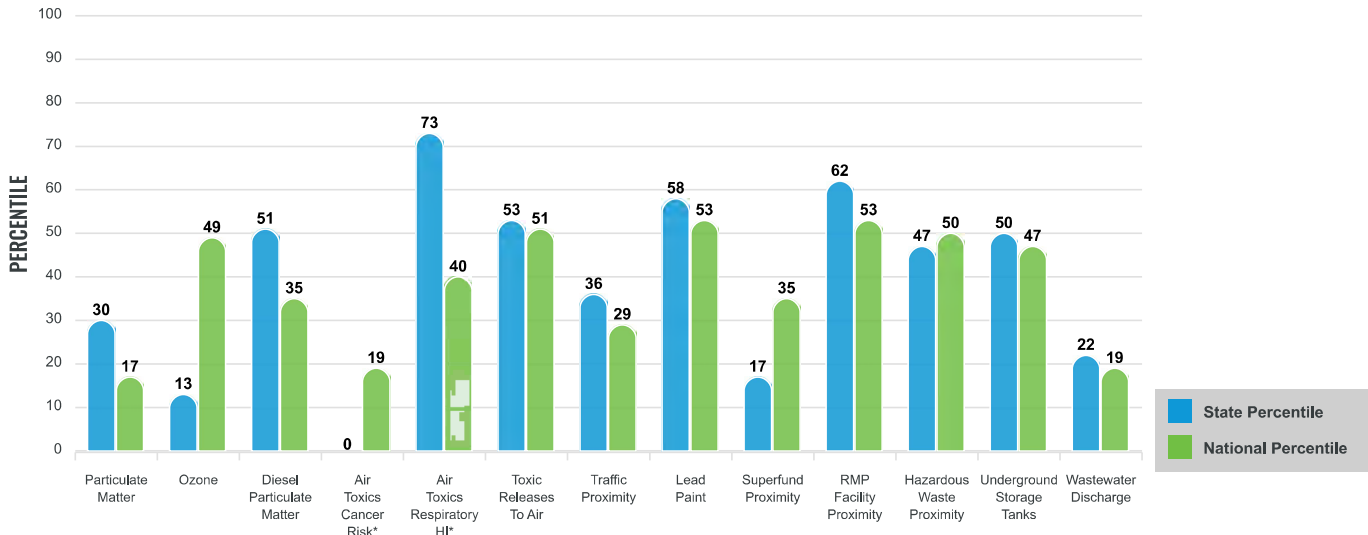
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the [EJScreen website](#).

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

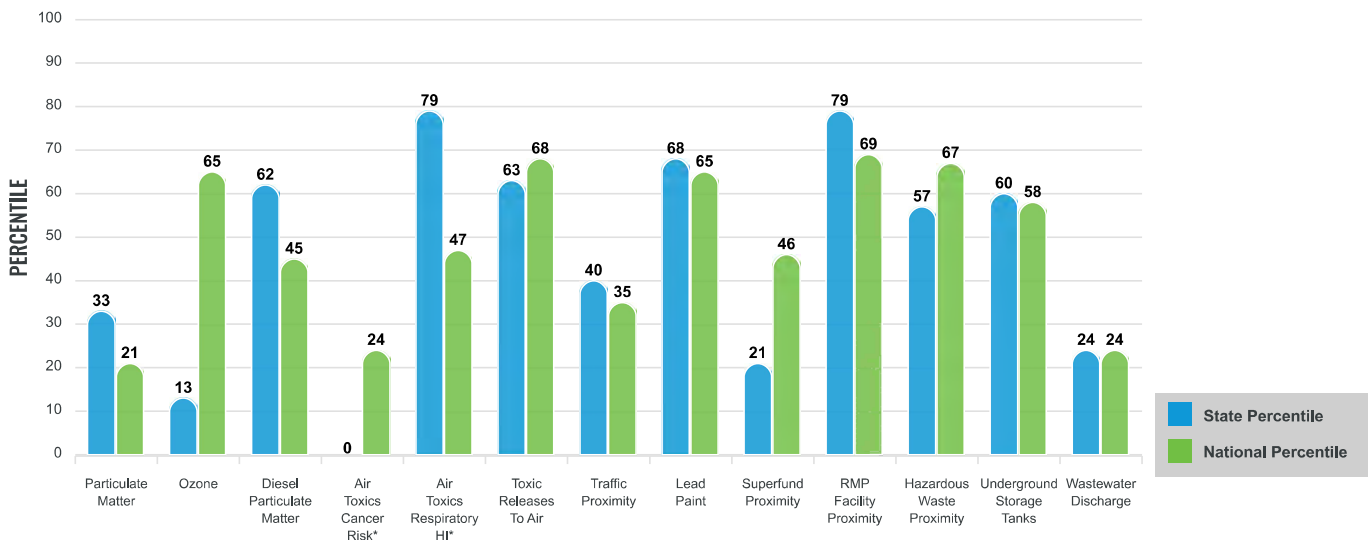
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for 1 mile Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu\text{g}/\text{m}^3$)	6.95	7.27	25	8.08	19
Ozone (ppb)	64.4	69.7	9	61.6	72
Diesel Particulate Matter ($\mu\text{g}/\text{m}^3$)	0.189	0.183	57	0.261	42
Air Toxics Cancer Risk* (lifetime risk per million)	20	21	0	25	5
Air Toxics Respiratory HI*	0.3	0.24	0	0.31	4
Toxic Releases to Air	3,000	3,600	59	4,600	79
Traffic Proximity (daily traffic count/distance to road)	36	230	31	210	34
Lead Paint (% Pre-1960 Housing)	0.6	0.44	71	0.3	80
Superfund Proximity (site count/km distance)	0.052	0.13	17	0.13	44
RMP Facility Proximity (facility count/km distance)	1.1	0.27	96	0.43	89
Hazardous Waste Proximity (facility count/km distance)	2.8	3.2	53	1.9	79
Underground Storage Tanks (count/km ²)	2.5	4.6	57	3.9	63
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0016	0.4	56	22	52
SOCIOECONOMIC INDICATORS					
Demographic Index	16%	28%	38	35%	23
Supplemental Demographic Index	11%	12%	55	14%	38
People of Color	15%	34%	31	39%	30
Low Income	17%	23%	51	31%	32
Unemployment Rate	10%	6%	81	6%	82
Limited English Speaking Households	2%	5%	57	5%	65
Less Than High School Education	5%	9%	47	12%	37
Under Age 5	4%	5%	54	6%	45
Over Age 64	18%	18%	57	17%	61
Low Life Expectancy	18%	18%	56	20%	36

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: <https://www.epa.gov/haps/air-toxics-data-update>.

Sites reporting to EPA within defined area:

Superfund	0
Hazardous Waste, Treatment, Storage, and Disposal Facilities	3
Water Dischargers	29
Air Pollution	14
Brownfields	0
Toxic Release Inventory	7

Other community features within defined area:

Schools	0
Hospitals	0
Places of Worship	1

Other environmental data:

Air Non-attainment	Yes
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	No
Selected location contains an EPA IRA disadvantaged community	Yes

Report for 1 mile Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	18%	18%	56	20%	36
Heart Disease	6.4	5.7	75	6.1	58
Asthma	10.9	10.5	64	10	75
Cancer	7.5	6.7	67	6.1	81
Persons with Disabilities	10.4%	11.6%	45	13.4%	35

CLIMATE INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	3%	11%	18	12%	28
Wildfire Risk	0%	0%	0	14%	0

CRITICAL SERVICE GAPS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	15%	11%	74	14%	63
Lack of Health Insurance	3%	5%	45	9%	21
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Footnotes

Report for 1 mile Ring around the Area

Appendix F – Air Quality Assessment

Bradley International Airport Taxiway T Extension Environmental Assessment

Draft Air Quality Analysis Technical Report

Harris Miller Miller & Hanson Inc. (HMMH) is assisting C&S Engineers, Inc. and the Connecticut Airport Authority (CAA) on the Environmental Assessment (EA) for the proposed construction of the Taxiway T extension on the northeast side of Runway 15-33 from the intersection between Taxiway T and E to the existing Taxiway W at the Runway 15 end at Bradley International Airport (BDL) in Windsor Locks, Connecticut.

This Technical Report provides detailed information for the National Environmental Policy Act (NEPA) air quality and climate analysis of the Environmental Assessment (EA) including the methodology and assumptions for the construction and demolition activity based on the information provided by CAA to support the EA.

The air quality analysis includes comparison of the criteria pollutant emissions from the construction and demolition activities for the Proposed Action to EPA *de minimis* thresholds to determine significant impacts under General Conformity and NEPA. The Proposed Action is not anticipated to increase the number of forecast aircraft operations, change the fleet mix, taxi times, or number of vehicle trips compared to the No Action, therefore, aircraft and associated ancillary activities were not evaluated and the air quality analysis only included the construction and demolition activities.

The next sections present and discuss the potential for air quality impacts from the Proposed Action associated with the construction and demolition activities.

1. Affected Environment

Under the National Environmental Policy Act (NEPA), federal agencies must consider the impact their actions will have on the environment compared to a No Action alternative. According to FAA NEPA implementing guidance (FAA Order 1050.1F and Desk Reference, and FAA Order 5050.4B), impacts to air quality must be considered as part of the environmental analysis under NEPA. Potential effects of the Proposed Action are evaluated against the National Ambient Air Quality Standards (NAAQS), as promulgated by the United States (US) Environmental Protection Agency (US EPA) under the Federal Clean Air Act (CAA).

1.1 National Ambient Air Quality Standards

The US EPA currently regulates six criteria pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead (Pb). Particulate matter is divided into two particle size categories: coarse particles with a diameter less than 10 micrometers (PM₁₀) and fine particles with a diameter of less than 2.5 micrometers (PM_{2.5}). The NAAQS are expressed in terms of pollutant concentration measured (or averaged) over a defined period of time and are two-tiered. The first tier (the “primary standard”) is intended to protect public health; the second tier (the “secondary standard”) is intended to protect public welfare and prevent further degradation of the environment.

Table 1 shows the primary and secondary NAAQS for the criteria pollutants. Section 176(c) of the Clean Air Act states that federal agencies cannot engage, support, or provide financial assistance for licensing, permitting, or approving any project that could cause or contribute to the severity and/or number of violations of the NAAQS, or could inhibit the expeditious attainment of these standards.

The standards in **Table 1** apply to the concentration of a pollutant in outdoor ambient air. If the air quality in a geographic area is equal to or better than the national standard, the US EPA will typically designate the region as an “attainment area.” An area where air quality does not meet the national standard is typically designated by the US EPA as a “non-attainment area.” Once the air quality in a non-attainment area improves to the point where it meets the standards and the additional requirements outlined in the Clean Air Act, the US EPA can re-designate the area to attainment upon approval of a Maintenance Plan, and these areas are then referred to as “maintenance areas.” Each state is required to prepare a State Implementation Plan (SIP) that outlines measures that regions within the state will implement to attain the applicable air quality standard in non-attainment areas for applicable criteria air pollutant, and to maintain compliance with the applicable air quality standard in maintenance areas. The status and severity of pollutant concentrations in a particular area will impact the types of measures a state must take to reach attainment with the NAAQS. The US EPA must review and approve each state’s SIP to ensure the proposed measures are sufficient to either attain or maintain compliance with the NAAQS within a set period of time.

The Clean Air Act Amendments (CAAA) of 1990 require states to make recommendations to the US EPA regarding the attainment status of all areas within their borders when the US EPA finalizes an update to any NAAQS. Under its CAAA authority, the US EPA further classifies non-attainment areas for some pollutants – such as ozone – based on the severity of the NAAQS violation as marginal, moderate, serious, severe, and extreme. To further improve the nation’s air quality, the US EPA lowered the ozone standard in 2015 to 0.070 parts per million (ppm). Similarly in February 2024, US EPA strengthened the primary annual PM_{2.5} standard to 9 $\mu\text{g}/\text{m}^3$ from 12 $\mu\text{g}/\text{m}^3$ ¹.

The Connecticut Department of Energy and Environmental Protection (CT DEEP) monitors air quality to protect public health and the environment under the Clean Air Act. The closest CT DEEP monitoring station is to the south of BDL in Hartford (Huntley Place) and East Hartford (McAuliffe Park)²

¹ [Final Reconsideration of the National Ambient Air Quality Standards for Particulate Matter \(epa.gov\)](#)

² https://portal.ct.gov/-/media/DEEP/air_monitoring/CT2022NetworkPlanFinal_old.pdf

Table 1. National Ambient Air Quality Standards

Source: US EPA NAAQS Accessed on February 20, 2024 <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

Pollutant	Averaging Time	Primary Standards	Secondary Standards
CO	Eight-hour	9 parts per million (ppm)	None
	One-hour	35 ppm	
Pb	Rolling Three-Month Average	0.15 micrograms (µg) /cubic meter of air (m ³)	Same as Primary
NO ₂	Annual Arithmetic Mean	0.053 ppm (100 µg/m ³)	Same as Primary
	One-hour	0.100 ppm ^{Note 2}	None
O ₃	8-hour (2015 standard) ^{Note 4}	0.070 ppm	Same as Primary
PM _{2.5}	Annual Arithmetic Mean	9 µg/m ³ ^{Note 5}	12 µg/m ³
	24-hour	35 µg/m ³	Same as Primary
PM ₁₀	24-Hour	150 µg/m ³ ^{Note 1}	Same as Primary
SO ₂	One-hour	75 parts per billion (ppb) ^{Note 3}	None
	Three-hour	None	0.5 ppm

Table Notes:

- For PM₁₀, the 24-hour standard is not to be exceeded more than once per year on average over three years. For PM_{2.5}, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or are less than the standard.
- To attain this standard, the three-year average of the 98th percentile of the daily maximum one-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).
- Final rule signed June 2, 2010. To attain this standard, the three-year average of the 99th percentile of the daily maximum one-hour average at each monitor within an area must not exceed 75 ppb.
- US EPA updated the NAAQS for O₃ to strengthen the primary eight-hour standard to 0.07 ppm on October 1, 2015. An area will meet the standard if the fourth-highest maximum daily eight-hour ozone concentration per year, averaged over three years is equal to or less than 70 ppb.
- US EPA strengthened the annual PM_{2.5} standard to 9 µg/m³ on February 7, 2024. <https://www.epa.gov/newsreleases/epa-finalizes-stronger-standards-harmful-soot-pollution-significantly-increasing>

1.2 Attainment Status

Air quality in the Windsor Locks area (including Hartford County) is currently designated by the US EPA Greenbook as being in attainment for all criteria pollutants except for the 2008 (serious) and 2015 (moderate) 8-hour ozone standard which is designated by the US EPA as non-attainment.³ It should be noted that state of Connecticut is in attainment for carbon monoxide, with Hartford County redesignated to attainment in January of 1996⁴. Because the Windsor Locks area is designated as non-attainment for some criteria pollutants, the US EPA General Conformity Rule applies to this Proposed Action.

1.3 General Conformity Rule

The General Conformity Rule defines a federal action as any activity engaged in by a department, agency, or instrumentality of the federal government, or any activity that a department, agency, or

³ https://www3.epa.gov/airquality/greenbook/anavo_ct.html

⁴ <https://portal.ct.gov/DEEP/Air/Carbon-Monoxide>



instrumentality of the federal government supports in any way, provides financial assistance for, licenses, permits, or approves. General Conformity is defined as demonstrating that a project or action conforms to the State Implementation Plan's (SIP's) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. Federally funded and approved actions at airports are subject to the US EPA's General Conformity regulations. The General Conformity Rule⁵ applies to all federal actions except for certain highway and transit programs which must instead comply with the Transportation Conformity Plans.⁶

The General Conformity Rule includes annual emissions thresholds for nonattainment and maintenance areas that trigger the need for a General Conformity determination and defines projects that are typically excluded from General Conformity requirements. Since the General Conformity Rule applies to federally funded projects in US EPA-designated non-attainment and maintenance areas, the General Conformity requirements apply to this Proposed Action at BDL.⁷

Under the General Conformity Rule and NEPA, a project's impact on air quality is assessed by evaluating whether it would cause a new violation of a NAAQS or contribute to a new violation in a manner that would increase the frequency or severity of a new violation.⁸ For this analysis, the air emissions from the Proposed Action (i.e. construction emissions) were compared to the applicable US EPA *de minimis* levels for determining significant impacts.

2. Environmental Consequences of Proposed Action

Potential air quality impacts associated with construction and demolition activity for the Proposed Action are discussed in this section. The Proposed Action would not induce changes in aircraft operations and/or additional vehicle trips or stationary sources compared to the No Action alternative after construction. Therefore, air emissions associated with aircraft, general access vehicles, or stationary sources were not inventoried and evaluated as part of this analysis.

⁵ Revisions to the General Conformity Rule are codified under 40 CFR Parts 51 and 93, Subpart W, Revisions to the General Conformity Regulations, Final Rule (April 2010).

⁶ 40 CFR Part 93, Subpart A.

⁷ BDL is located in an US EPA-designated non-attainment area for ozone.

⁸ https://www.faa.gov/sites/faa.gov/files/about/office_org/headquarters_offices/apl/1-air-quality.pdf



2.1 Methodology

This section documents the methods used to calculate emissions of carbon monoxide (CO), volatile organic compounds (VOCs), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), particulate matter (PM₁₀ and PM_{2.5}), and greenhouse gases (GHG) from construction and demolition-related sources associated with the Proposed Action. This analysis develops emissions inventories pursuant to NEPA for determining whether emissions associated with the Proposed Action would be significant as well as General Conformity Applicability.

Estimates of construction and demolition-related emissions were developed for the Proposed Action using standard industry methodologies and techniques including the FAA Aviation Emissions and Air Quality Handbook and associated US EPA guidance, MOVES4 (latest available edition) for both on road and nonroad source emission factors. These techniques are described in more detail in the following sections. Construction activities associated with the Proposed Action for were estimated for the years 2026 and 2027.

2.1.1 Demolition and Construction Activities

Construction and demolition emissions were not estimated for the No Action alternative, because no demolition or construction activity would be associated with the No Action alternative. The demolition and construction associated with the Proposed Action would result in short-term changes in air emissions from sources such as exhaust from nonroad construction equipment such as:

- milling and paving,
- site clearing,
- grading,
- demolition, and
- runway marking and lighting.

On-road vehicles include those associated with:

- transport and delivery of supplies,
- materials and equipment to and from the site, and
- construction worker trips.

Additionally, fugitive dust emissions sources include:

- site preparation and land clearing,
- equipment movement on unpaved and paved roads, and
- evaporative emissions from the application of asphalt paving.

Demolition and construction activities associated with the Proposed Action are expected to begin in the spring of 2026 and be completed in late 2027. **Table 2** presents the primary components of the Proposed Action, including estimated activity costs, area estimates (square feet) and anticipated start and end dates of construction. These costs and area estimates were used for deriving construction equipment schedules with the Airport Cooperative Research Board's (ACRP) Airport Construction Emissions Inventory Tool (ACEIT).⁹

⁹ ACRP, 2014 <https://crp.trb.org/acrp0267/acrp-report-102-guidance-for-estimating-airport-construction-emissions/>



Table 2. Proposed Action Construction and Demolition Activities

Source: CAA September 2023 email

Project Action Component	Estimated Project Costs (\$)	Area (Square Feet)	Construction Start	Construction End
Phase 1				
Alignment of New Taxiway E to Runway 6-24	\$16,000,000	247,942 Runway Pavement	4/1/2026	11/30/2026
		180,344 Shoulder Pavement		
Demolition of Taxiway C3		61,780 Asphalt Demolition	06/01/2026	08/31/2026
Total Grading, hydroseeding, and soil erosion	N/A	1,299,953.28	4/1/2026	11/30/2026
Additional Truck trips for onsite and offsite fill	N/A	10,600 trips	4/1/2026	11/30/2026
Phase 2				
Runway 6-24 Intersection to Runway 15 tying into existing runway end	\$14,000,000.00	194,840 Runway Pavement	4/1/2027	11/30/2027
		120,372 Shoulder Pavement		
Demolition of surface roadways on Runway 15 end (Vortac Road)		76,226 Asphalt Demolition	06/01/2027	08/31/2027
Demolition of Concrete Pad		500 Concrete Demolition	06/01/2027	08/31/2027
Total Grading, hydroseeding, and soil erosion	N/A	635,531.71	4/1/2027	11/30/2027
Additional Truck trips for onsite and offsite fill	N/A	8,600 trips	4/1/2027	11/30/2027

The ACRP ACEIT model¹⁰ was used to estimate the construction schedule of equipment only for each project component based on the project dimensions and project costs for each activity. The model has the ability to generate construction schedules for a variety of standard airport construction projects including the associated activity types and the equipment used for this project.

ACEIT can also produce emission factors for nonroad and on-road construction equipment, as well as for fugitive emission sources using US EPA and industry standard models and methodologies. *However, the current version of ACEIT includes an older version of the US EPA’s Motor Vehicle Emission Simulator (MOVES) emission model, MOVES2010a and NONROADs, which have both been updated over the years. For this analysis, emission factors were generated outside of ACEIT using the current version of MOVES4 (latest Version) to develop on-road and nonroad emission factors for Hartford County.*¹¹ These emission factors were applied to estimates of vehicle miles traveled (VMT) and construction equipment (hours, horsepower, load factor), respectively, for each construction activity and year. Spreadsheet calculations for construction and demolition are presented in **Appendix A**.

¹⁰ http://onlinepubs.trb.org/onlinepubs/acrp/docs/ACRP02-33_FR.pdf

¹¹ Construction emissions used in MOVES4 NONROAD assumed a blend of Tier 1, Tier 2, Tier 3, and Tier 4 for Hartford County based on US EPA phasing ratios of older equipment in future years and does not reflect the primary use of either Tier 1 thru Tier 4 engines. MOVES emission factors are specific to Hartford County as generated within MOVES for each year.



2.1.2 Off-Road Construction Equipment

As discussed above, off-road equipment emission factors for each construction year using the MOVES4 emission model which incorporates county level data representative of Hartford County for both criteria pollutants/precursors and greenhouse gases. Emission factors in grams per horsepower (hp-hr) for each off-road equipment type were applied to the equipment size (in hp), load factor, and anticipated activity levels (in hours per year) of expected equipment use, as generated in the construction equipment inventory by ACEIT.

The annual emissions for off-road construction equipment were computed using the following equation:

$$\text{Off-road Vehicle Construction emissions (tons per year)} = \text{emission factor (grams per hp-hr)} \times \text{size (hp)} \times \text{load factor} \times \text{hours per year} \times (1 \text{ pound}/453.6 \text{ grams}) \times (1 \text{ ton}/2,000 \text{ pounds})$$

2.1.3 On-Road Construction Passenger/Truck Delivery Vehicles

VMT data for each on-road employee trip and truck delivery vehicles were derived from round trip distances and the number of employee hours from the activity-specific construction schedule in ACEIT. It is assumed that all on-road equipment would use gasoline for passenger vehicles and diesel fuel for truck deliveries. Emission factors in grams per mile (g/mile) for each on-road vehicle type were applied to the anticipated VMT. Additional truck trips associated with the removal of offsite fill during the construction activities in 2026 (10,600 trips) and 2027 (8,600 trips) were included. Similar to the way emissions are estimated for offroad equipment, the MOVES4 model uses US EPA vehicle default data representative of Hartford County for both criteria pollutants/precursors and greenhouse gases to estimate emissions factors in grams per mile. A round trip distance of 30 miles was assumed for employee trips and 40 miles was assumed for material delivery trips (including additional truck fill trips) which are the standard industry default values used in ACEIT.

The annual emissions for on-road passenger/delivery vehicles were computed for each year using the following equation:

$$\text{On-road construction vehicles emissions (tons per year)} = \text{emission factor (g/mile)} \times \text{annual VMT} \times (1 \text{ pound}/453.6 \text{ grams}) \times (1 \text{ ton}/2,000 \text{ pounds})$$

2.1.4 Fugitive Dust Emissions

Fugitive dust emissions from site preparation and land clearing, equipment movement on unpaved and paved areas, along with evaporative emissions from asphalt paving activities were estimated using US EPA emission factors and methodologies. These are all included in the total construction emissions.

2.2 Summary of Construction-Related Emissions

Construction-related emissions of criteria pollutants during the 2026 thru 2027 construction period under the Proposed Action are summarized in **Table 3**. For this analysis, GHG emissions associated with the Proposed Action were calculated, for disclosure purposes, as carbon dioxide equivalent (CO₂e) in metric tons per year, relevant to their global warming potential.¹² **Section 0** provides additional discussion on GHG emissions related to the Proposed Action.

¹² Global warming potentials are based on the latest Intergovernmental Panel on Climate Change (IPCC), *Sixth Assessment Report (AR6)*, March 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_07_Supplementary_Material.pdf

Table 3. Construction Emission Inventory - Proposed Action

Source: HMMH, 2024, Based on MOVES4 for On-road and NONROAD using construction information provided by CAA

Year	Relevant Criteria Pollutant Emissions (tons per year)						
	CO	VOC ^{Note 1}	NO _x ^{Note 1}	SO ₂	PM ₁₀	PM _{2.5}	CO _{2e} ^{Note 2}
2026	5.09	0.79	3.08	0.02	0.77	0.09	3,347
2027	4.25	0.60	2.24	0.02	0.61	0.06	2,744

Notes:
 1. Following standard industry practice, ozone was evaluated by evaluating emissions of VOC and NO_x, which are precursors in the formation of ozone.
 2. CO_{2e} emissions are in metric tons per year equivalent relevant to their global warming potential (GWP).

2.3 Aircraft Operational Emissions

As discussed above, implementation of the Proposed Action would not increase the number of aircraft operations compared to the No Action alternatives, therefore, aircraft operational emissions were not estimated as part of the Proposed Action.

2.3.1 Significance Thresholds

As provided in FAA Order 1050.1F, an action would cause a significant air quality impact if pollutant concentrations would exceed one or more of the NAAQS established by the US EPA under the Clean Air Act, for any of the time periods analyzed, or would increase the frequency or severity of any such existing violations. Additionally, the Clean Air Act requires federal agencies such as the FAA to ensure their actions conform to the appropriate SIP. Conformity requires that a project or action adheres to the SIP’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.

If General Conformity applies, an applicability analysis is performed to determine if a General Conformity Determination is required to demonstrate that the Proposed Action conforms to the approved SIP(s). A conformity determination is required if the total direct and indirect pollutant emissions resulting from a project are above the *de minimis* emissions threshold levels specified in the conformity regulations.¹³ The *de minimis* thresholds represent emission quantities of a NAAQS-regulated pollutant, or its applicable precursors, over which a proposed action in a nonattainment or maintenance area may cause or contribute to a new or continued violation of the NAAQS. A conformity determination is not required if the differences in emissions between the Proposed Action and the No Action alternatives are below the applicable *de minimis* emission threshold levels, or if the Proposed Action is exempt or included in the FAA list of “presumed to conform activities.”

As stated in **Section 1.2**, BDL is located in Hartford County, which the US EPA has designated as “attainment” for all criteria pollutants with the NAAQS except for the 2008 (serious) and 2015 (moderate) 8-hour ozone standard which is designated by US EPA as non-attainment.¹⁴ Since the area is designated as non-attainment with the current US EPA air quality standards, the General Conformity Rule applies to this Proposed Action.

¹³ US Environmental Protection Agency, General Conformity *De Minimis* Tables, <https://www.epa.gov/general-conformity/de-minimis-tables> (accessed June 4, 2019).

¹⁴ https://www3.epa.gov/airquality/greenbook/anayo_ct.html



Federal US EPA *de minimis* emission thresholds for nonattainment areas relevant to Hartford County are listed in **Table 4**. As noted in the table, pollutants designated as attainment do not have US EPA *de minimis* thresholds, however, the maintenance *de minimis* thresholds were used to determine significant impacts under NEPA for attainment pollutants.

Table 4 General Conformity US EPA De Minimis Pollutant Emission Thresholds²

Source: US EPA, 2024

Pollutants	Attainment Status (Severity)	Pollutants	Threshold (tons per year)
Carbon Monoxide (CO)	Attainment ³	CO	100
Nitrogen Dioxide (NO ₂)	Attainment ³	NO ₂	100
Ozone (O ₃) ¹	Serious 2008 Standard ⁴ Moderate 2015 Standard ⁴	Nitrogen Oxides (NO _x)	50
		Volatile Organic Compounds (VOC)	50
Particulate Matter (PM ₁₀ /PM _{2.5})	Attainment ³	PM ₁₀ /PM _{2.5}	100
Sulfur Dioxide (SO ₂)	Attainment ³	SO ₂	100
Lead (Pb)	Attainment ³	Pb	25
<p>Notes:</p> <ol style="list-style-type: none"> Following standard industry practice, ozone was evaluated by evaluating emissions of VOC and NO_x, which are precursors in the formation of ozone. https://www.epa.gov/general-conformity/de-minimis-tables Pollutants designated as attainment, no <i>de minimis</i> threshold exists for attainment pollutants. Therefore, the <i>de minimis</i> threshold for maintenance was assumed for determining significant impacts under NEPA. Hartford County is classified as Serious for the 2008 ozone standard and Moderate for the 2015 standard. The lower threshold of 50 tpy for NO_x and VOC for Serious designation inside the ozone transport region was used for determining significance under General Conformity and NEPA for ozone. 			

2.3.2 Construction Emissions Impacts

Table 5 presents the construction emissions associated with demolition and construction of the Proposed Action for the 2026 and 2027 construction years compared with the appropriate US EPA *de minimis* thresholds. As the table shows, the annual total emissions for the 2026 and 2027 construction years would be below established *de minimis* thresholds for all pollutants. Therefore, a General Conformity determination is not required for the construction and demolition activities for the Proposed Action. Additionally for pollutants not subject to General Conformity, in accordance with the FAA 1050.1 Desk Reference,¹⁵ the Proposed Action can be determined to “not cause a significant air quality impact, since it is unlikely the pollutant concentration analyzed would exceed *de minimis* thresholds or the NAAQS.” No significant adverse air quality impacts would be expected to result from construction of the Proposed Action. It should be noted that no lead emissions are expected with construction emission activity as expected fuel usage of gasoline and diesel fuel has no lead content.

¹⁵https://www.faa.gov/about/office_org/headquarters_offices/apl/enviro_n_policy_guidance/policy/faa_nepa_order/desk_ref



Table 5. Total Construction and Demolition Emissions Compared to *De Minimis* Thresholds

Source: HMMH, 2024

Year	Relevant Criteria Pollutant Emissions (tons per year)						
	CO ^{Note 1}	VOC	NOx	SO ₂ ^{Note 1}	PM ₁₀ ^{Note 1}	PM _{2.5} ^{Note 1}	Lead ^{Note:2}
2026							
Total Emissions of Construction and Demolition	5.09	0.79	3.08	0.02	0.77	0.09	0.0
US EPA De Minimis Threshold	100	50	50	100	100	100	25
Emissions below de minimis thresholds?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2027							
Total Emissions of Construction and Demolition	4.25	0.60	2.24	0.02	0.61	0.06	0.0
US EPA De Minimis Threshold	100	50	50	100	100	100	25
Emissions below de minimis thresholds?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Notes:							
<ol style="list-style-type: none"> 1. Since pollutants are designated attainment by US EPA, no <i>de minimis</i> thresholds exist. The maintenance area designation <i>de minimis</i> thresholds were used to determine significance under NEPA. 2. Pb emissions for construction emissions were not estimated since the fuel use for these sources are gasoline and diesel which do not contain lead 							

2.3.3 No Action Alternative

The No Action alternative assumes that the Proposed Action is not implemented, and air quality would remain unchanged for 2026 and 2027. Therefore, no additional air quality impacts would occur as a result of choosing the No Action alternative.

2.3.4 Mitigation

As indicated in Section 2.3.2, air quality impacts associated with construction of the Proposed Action would not be significant; therefore, no mitigation measures are required for construction emissions.

3. Climate

Climate change is a global phenomenon that can have local impacts.¹⁶ Scientific measurements show that Earth’s climate is warming, with concurrent impacts including warmer air temperatures, increased sea level rise, increased storm activity, and an increased intensity in precipitation events. Increasing concentrations of GHG emissions in the atmosphere affect global climate.^{17, 18} GHG emissions result from anthropogenic sources, including the combustion of fossil fuels. GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and fluorinated gases.¹⁹ CO₂ is the most important

¹⁶ As explained by the US EPA, “greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States.” U.S. Environmental Protection Agency, Climate Change Division, Office of Atmospheric Programs, Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3, 2009, <https://www.epa.gov/ghgemissions/technical-support-document-endangerment-and-cause-or-contribute-findings-greenhouse>.

¹⁷ Global warming potentials are based on the latest Intergovernmental Panel on Climate Change (IPCC), Sixth Assessment Report (AR6), March 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_07_Supplementary_Material.pdf.

¹⁸ U.S. Global Change Research Program, Global Climate Change Impacts in the United States, 2009, <http://www.globalchange.gov/what-we-do/assessment/previous-assessments/global-climate-change-impacts-in-the-us-2009>.

¹⁹ U.S. Environmental Protection Agency, Overview of Greenhouse Gases, <http://www3.epa.gov/climatechange/ghgemissions/gases.html>.



anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years. Anthropogenic sources of GHG emissions include the combustion of fossil fuels. Scientific measurements show that Earth's climate is warming, with concurrent impacts including warmer air temperatures, increased sea level rise, increased storm activity, and an increased intensity in precipitation events.

The earth's global temperature has risen by 1.5°F over the past century and is projected to continue to rise.²⁰ Small changes in the global temperature over time can translate into large and potentially dangerous shifts in climate and weather on a global scale and even at the local level. Many states have seen changes in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves.²¹

3.1 Regulatory Framework

Research has shown that there is a direct link between fuel combustion and GHG emissions. Therefore, sources that require fuel or power at an airport are the primary sources that would generate GHGs including construction emissions.

While US aviation has seen increased traffic in terms of passengers over the past 30 years, aviation's share of US CO₂ emissions has remained relatively constant. In 2019, civil aviation's share of US CO₂ emissions was about 2.7 percent of total domestic emissions.²² Aircraft in the national air space are operating much more efficiently—moving more passengers using the same amount of energy. In 2018, the U.S aviation sector carried about 32 percent more passengers than in the year 2000, while using almost the same amount of fuel (and emissions), due in large part as result of the fuel efficiency improvements of the fleet over time. Today's fleet of aircraft has an average fuel efficiency of 57.5 passenger-miles per gallon of fuel.²³

Researchers developed the Global Warming Potential (GWP) indicator as a way to compare the global warming impacts of different gases, by converting each gas amount to a carbon dioxide equivalent (CO₂e). GWPs provide a common unit of measure, which allows for consistency when estimating emissions of these different gases. CO₂ has a GWP of one because it is the gas used as the reference point. CH₄ does not last as long in the atmosphere as CO₂; however, it absorbs much more energy. In comparison, one ton of CH₄ has 29.8 times more heat-capturing potential than one ton of CO₂. The amount of CH₄ emissions would be multiplied by 29.8 to determine its CO₂e value. Nitrous oxide lasts in the atmosphere far longer than CO₂. The amount of nitrous oxides emissions would be multiplied by 273 to determine its CO₂e value.

Although no federal standards have been set for GHG emissions, it is well established that GHG emissions can affect climate. The CEQ recently released interim guidance on GHG and climate impacts for NEPA and is currently in the comment period but can be used for new NEPA projects²⁴. The recently issued interim guidance to assist agencies in analyzing GHG and climate change effects of their proposed actions under the NEPA.²⁵ This interim GHG guidance, effective upon publication, builds upon and updates CEQ's 2016 *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act*

²⁰ <https://www.aqhelp.com/AQdocs.html>

²¹ <https://aqhelp.com/Documents/FINAL%20-%20AF%20AQ%20EAP%20Guide%20Vol%201%20-%20202019.pdf>

²² US EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks," available at: www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.

²³ United States, "United States Efforts to Address Aviation's Climate Impact," A40-WP/531, ICAO 40th General Assembly, Executive Committee, available at: www.icao.int/Meetings/a40/Documents/WP/wp_531_en.pdf.

²⁴ <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>

²⁵ Federal Register: National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change



Reviews (“2016 GHG Guidance”), highlighting best practices for analysis grounded in science and agency experience.²⁶ CEQ issued this guidance to provide for greater clarity and more consistency in how agencies address climate change in NEPA reviews.

Furthermore, per FAA Order 1050.1F, the discussion of potential climate impacts should be documented in a separate section of the NEPA document, distinct from air quality.²⁷ Where the proposed action or alternative(s) would result in an increase in GHG emissions, the emissions should be assessed either qualitatively or quantitatively. The guidance recommends consideration of: (1) the potential effects of a proposed action or its alternatives on climate change as indicated by its GHG emissions; (2) the implications of climate change for the environmental effects of a proposed action or alternatives. The overall reduction of aviation related GHG emissions impacts on climate is a goal, but it is not a regulatory mandate.

3.2 Affected Environment

Through the state’s Greenhouse Gas Emissions Inventory, first published in 2003, the Department of Energy and Environmental Protection (DEEP) provides a report card on 30 years of GHG emissions in the state, from 1990 to 2020, and tracks progress toward the state’s statutory GHG emission-reduction targets²⁸.

Figure 1 shows the total economy-wide GHG emissions from Connecticut from 1990–2021 while **Figure 2** shows the GHG emissions for Connecticut broken down by economic sector. The main takeaways from the inventory is that as of 2021: transportation remains the top emitter in the state and has not decreased significantly from 1990 level while residential heating has replaced the electric sector as the second-largest emitter in the state; and electric-sector emissions continue to decrease. More recently, in 2019, Connecticut emitted 39.3 MMTCO₂e of greenhouse gases which was 13.9 percent lower than in 1990. GHG emissions reached a low of 32.7 MMTCO₂e in 2020—due to the effects of the global COVID-19 pandemic—and rebounded to an estimated and still anomalous low of 34.7 MMTCO₂e in 2021 as the economy began reopening. Overall, Connecticut’s GHG emissions peaked in 2004 at nearly 53 MMTCO₂e and since have been declining 0.9 MMTCO₂e a year on average.

²⁶ CEQ, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 81 FR 51866 (Aug. 8, 2016), https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf. On April 5, 2017, CEQ withdrew the final 2016 guidance, as directed by E.O. 13783. 82 FR 16576 (Apr. 5, 2017). On June 26, 2019, CEQ issued draft GHG guidance. 84 FR 30097 (June 26, 2019). CEQ rescinded this draft guidance on February 19, 2021, pursuant to E.O. 13990. 86 FR 10252 (Feb. 19, 2021). In addition, on April 20, 2022, CEQ issued a Final Rule for its “Phase 1” NEPA rulemaking. 87 FR 23453. CEQ will be proceeding with updates to the NEPA regulations as set forth in the 2022 Regulatory Agenda.

²⁷ https://www.faa.gov/sites/faa.gov/files/about/office_org/headquarters_offices/apl/3-climate.pdf

²⁸ Connecticut’s greenhouse gas inventory relies heavily on data sets compiled by the U.S. EPA and released annually in its State Inventory Tool (SIT). The latest SIT was released in 2023 and contains data necessary to produce this inventory through 2020. Some data are available for 2021 and have been used with SIT calculators to produce a preliminary estimate of 2021 GHG emissions. Complete data for 2021 are expected by mid-2023.



Figure 1 Total Economy-wide GHG Emissions from Connecticut, 1990-2020

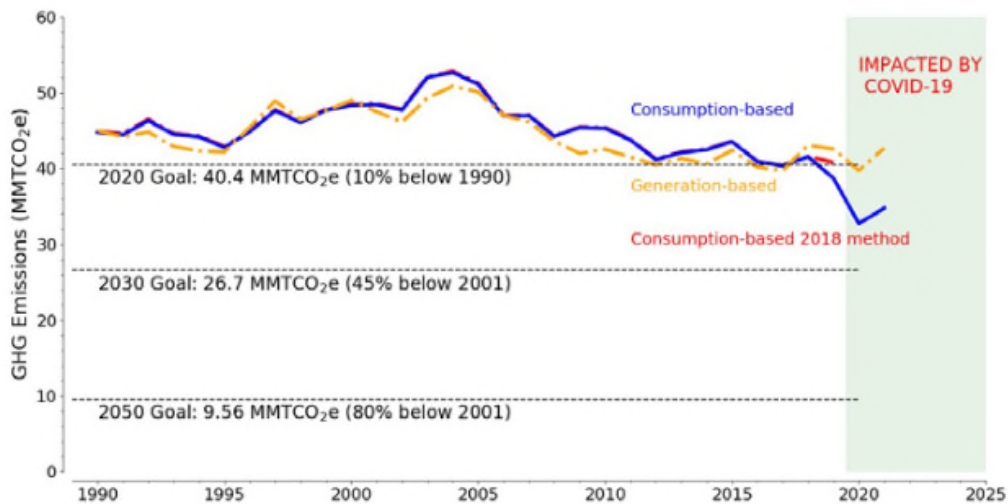
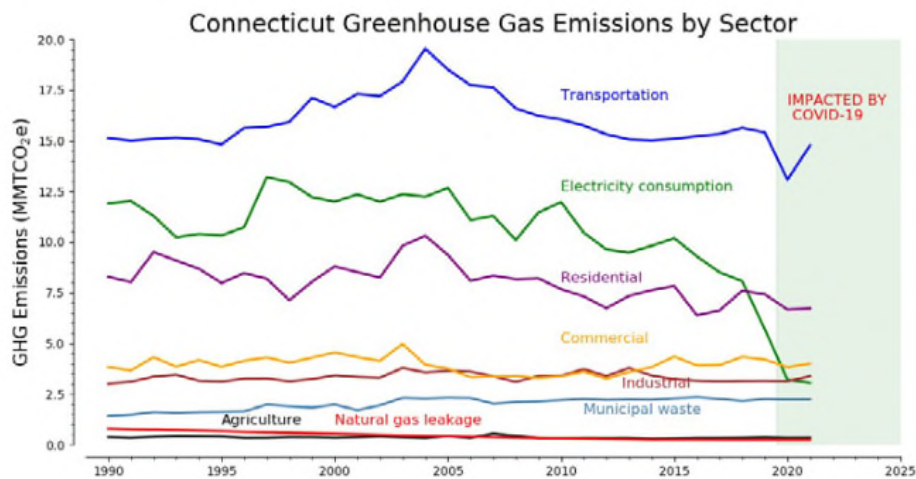


Figure 2 GHG Emissions for Connecticut Broken Down By Economic Sector.



Source: https://portal.ct.gov/-/media/DEEP/climatechange/1990-2021-GHG-Inventory/DEEP_GHG_Report_90-21_Final.pdf

3.3 Analysis Methodology

For this analysis, GHG emissions associated with the Proposed Action were prepared for carbon dioxide, methane, and nitrous oxide and presented as carbon dioxide equivalent (CO₂e) in metric tons per year relevant to their global warming potential. The carbon dioxide equivalent is estimated by taking the mass equivalent of each pollutant (TPY), multiplying by the GWP equivalent of each pollutant, and then adding them together. For example, CO₂ is 1 GWP, CH₄ is 29.8 GWP, and N₂O is 273 GWP, according to the IPCC Sixth Assessment Report²⁹.

²⁹ <https://erce.energy/ercepccsixthassessment/>



The methodology and assumptions for the GHG analysis are consistent with the air quality analysis discussed in **Section 2.1**. GHG emissions associated with the construction and demolition activities were qualitatively evaluated.

3.4 Environmental Consequences of Proposed Action Alternative

Table 6 presents the annual greenhouse gas emissions for demolition and construction activities associated with the Proposed Action for 2026 and 2027.

In summary, while there are no significance thresholds established for climate impacts, GHGs associated with the Proposed Action have been calculated in accordance with the latest FAA guidelines (1050.1F) for climate impacts in a NEPA document^{30, 31} and included in the emission spreadsheets in **Appendix A**. As ongoing scientific research works to improve the understanding of construction and aviation’s relationship to climate change, FAA guidance will evolve if new federal requirements are established. Given the low percentage of overall emissions generated by the Proposed Action, the increase in construction emissions as a result of the project is not substantial on a state, national or global scale.

Table 6. GHG Emissions Associated with Construction/Demolition and Operations for the Proposed Action

Source: HMMH 2024

Year	Greenhouse Gases (metric tons/year)			CO ₂ e (metric tons/year) ^{Note 2,3}
	CO ₂	CH ₄	N ₂ O	
Construction ^{Note 1}				
2026	3,314	0.017	0.118	3,347
2027	2,717	0.014	0.095	2,744
Notes:				
1. Construction emissions derived from ACEIT and MOVES				
2. GWP values derived from IPC 6th Assessment Report were used in the calculation of CO ₂ e.				
3. Emissions presented in the Table include the GWP for each pollutant.				

3.5 Environmental Consequences of No Action Alternative

The No Action Alternative assumes that the Proposed Action is not implemented, and air quality would remain unchanged for 2026 and 2027. Therefore, no additional GHG impacts would occur as a result of the No Action case.

3.6 Social Costs of Carbon

The CEQ’s Interim *Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* provides direction to better assess and disclose climate impacts. The interim guidance recommends contextualizing greenhouse gas emissions by developing the social cost of carbon dioxide equivalents (SC-CO₂e) for proposed actions.

³⁰ 1050.1F Desk Reference, https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/3-climate.pdf

³¹ FAA Aviation Emissions Air Quality Handbook. Accessed July 2023. https://www.faa.gov/sites/faa.gov/files/regulations_policies/policy_guidance/envir_policy/airquality_handbook/Air_Quality_Handbook_Tutorial.pdf



SC-CO₂e is an estimate of the economic costs of emitting one additional ton of carbon dioxide into the atmosphere, and thus the benefits of reducing emissions. It provides a monetary measure (in U.S. dollars) of the future damages (e.g., changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services) associated with specified quantities of GHG resulting from the Proposed Action. For transparency and disclosure, to provide a contextualized monetary measure of the three main greenhouse gases, the social cost of GHG (SC-GHG) was calculated for the CO₂ equivalents (CO₂e) of CO₂, CH₄, and N₂O emissions for the Proposed Action, summarized in **Table 7**. These costs were calculated using the IWG 2021 Technical Support Document (TSD): Social Cost of Carbon, Methane, and Nitrous Oxide developed under EO 13990³².

Table 7. Proposed Action Estimated Social Cost of Carbon Dioxide Equivalents (SC-CO₂e) in U.S. Dollars by IWG Average Discount Rates

Discount Rates	Estimated Social Cost by Pollutant (In 2020 Dollars)			
	CO ₂	CH ₄	N ₂ O	Total
2026				
5%	\$57,633	\$14	\$824	\$58,502
3%	\$189,561	\$30	\$2,519	\$192,111
2.5%	\$279,039	\$39	\$3,603	\$282,681
3% 95th Percentile	\$571,996	\$80	\$6,499	\$578,577
2027				
5%	\$48,362	\$12	\$685	\$49,060
3%	\$158,673	\$26	\$2,075	\$160,755
2.5%	\$232,032	\$33	\$2,970	\$235,036
3% 95th Percentile	\$478,735	\$69	\$5,370	\$484,175

Source: [Technical Support Document: Social Cost of Carbon, Methane, \(whitehouse.gov\)](#)

The SC-GHGs were calculated using the IWG average discount rates: 5 percent, 3 percent, 2.5 percent and the 95th percentile damage estimate using the 3 percent discount rate interpolated between 2020, 2025, and 2030 to get the years between reflective of the construction period. The 5 percent, 3 percent, and 2.5 percent discount rates reflect the average damages from the multiple simulations at each of the three discount rates. The 95th percentile of damages estimated by applying the 3 percent discount rate reflect higher-than-expected economic impacts from climate change and the associated future economic effects; this is a low probability and high damage scenario that represents an upper bound of damages within the 3% discount rate model. The calculations of social costs for the four discount rates (5%, 3%, 2.5%, and 95th percentile of the 3%) were completed for GHG construction emissions for 2026 and 2027. The term “discount rate” refers to the reduction or discount in value per year as a future cost or benefit is adjusted to be comparable with a current cost or benefit from a proposed project. For this analysis, all three discount rates were used to estimate a range of global social costs from the increase in GHG emissions from the Proposed Action. Spreadsheet calculations to support the findings are presented in **Appendix A**.

The social cost of GHG total equivalents is estimated to range from \$58,502 to \$578,577 in 2026, when the Proposed Action begins to \$49,060 and \$484,175 at the completion of construction in 2027. The results show there is a slight reduction in the social costs from 2026 to 2027 due a slight reduction in expected construction GHG emissions during 2027 compared to 2026. This range in costs represents the

³² [Technical Support Document: Social Cost of Carbon, Methane, \(whitehouse.gov\)](#)



potential social costs associated with adding GHGs to the atmosphere in a given year. It includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services.

The foregoing social costs are estimates only and are subject to change depending on a variety of factors. They are provided for disclosure and context, but such estimated costs may not actually result.

3.7 Climate Assessment

To evaluate the effects of climate change on a proposed action, two subjective qualitative assessments are performed: (1) the impact of climate change on a proposed action, and (2) the impact of climate change on the action's environmental impacts to address the latest CEQ guidance on GHG and Climate.

The following state and local impacts were discussed for addressing the potential impacts on climate change from the Proposed Action.

3.8 Local Impacts

The US EPA has developed state specific factsheets regarding climate change impacts. The US EPA factsheet for Connecticut is presented in **Figure 3** and shows the potential state impacts as follows:

- Increasing Temperature and Changing Precipitable Patterns
- Sea Level Rise, Wetland Loss and Coastal Flooding
- Ecosystems and Agriculture
- Human Health

Figure 3. US EPA Climate Change Impacts for Connecticut

Source: https://aqhelp.com/Documents/CCFactSheets/climate-change-CT_AUG2016.pdf

EPA United States Environmental Protection Agency
August 2016
EPA 430-F-16-009

What Climate Change Means for Connecticut

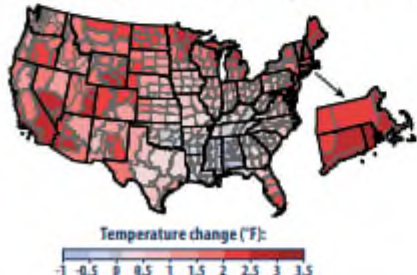
Connecticut's climate is changing. The state has warmed two to three degrees (F) in the last century. Throughout the north-eastern United States, spring is arriving earlier and bringing more precipitation, heavy rainstorms are more frequent, and summers are hotter and drier. Sea level is rising, and severe storms increasingly cause floods that damage property and infrastructure. In the coming decades, changing the climate is likely to increase flooding, harm ecosystems, disrupt farming, and increase some risks to human health.

Our climate is changing because the earth is warming. Since the late 1700s, people have increased the amount of carbon dioxide in the air by 40 percent. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years. Warming is causing snow to melt earlier in spring, and mountain glaciers are retreating. Even the great ice sheets on Greenland and Antarctica are shrinking. Thus the sea is rising at an increasing rate.


Increasing Temperature and Changing Precipitation Patterns

Rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. Average annual precipitation in the Northeast increased 10 percent from 1895 to 2011, and precipitation from extremely heavy storms has increased 70 percent since 1958. During the next century, average annual precipitation and the frequency of heavy downpours are likely to keep rising. Average precipitation is likely to increase during winter and spring, but not change significantly during summer and fall. Rising temperatures will melt snow earlier in spring and increase evaporation, and thereby dry the soil during summer and fall. So flooding is likely to be worse during winter and spring, and droughts worse during summer and fall.



Temperature change (°F):
-1 0.5 1 1.5 2 2.5 3 3.5

Rising temperatures in the last century: Connecticut has warmed twice as much as the rest of the contiguous 48 states. Source: EPA, Climate Change Indicators in the United States.



In 2011, Hurricane Irene filled the Connecticut River with muddy sediment as a result of erosion upstream. Heavy storms are becoming more common as a result of climate change. Credit: NASA.

Sea Level Rise, Wetland Loss, and Coastal Flooding

Rising sea level erodes wetlands and beaches and increases damage from coastal storms. Tidal wetlands are inherently vulnerable because of their low elevations, and shoreline development prevents them from migrating inland onto higher ground. Human activities such as filling wetlands have destroyed about one third of New England's coastal wetlands since the early 1800s. Wetlands provide habitat for many bird species, such as osprey and heron, as well as several fish species. Losing coastal wetlands would harm coastal ecosystems and remove an important line of defense against coastal flooding.

Coastal cities and towns will become more vulnerable to storms in the coming century as sea level rises, shorelines erode, and storm surges become higher. Storms can destroy coastal homes, wash out highways and rail lines, and damage essential communication, energy, and wastewater management infrastructure.



Coastal marshes in Old Saybrook and nearby properties are at risk from sea level rise. © James G. Titus; used by permission.

Ecosystems and Agriculture

Changing the climate threatens ecosystems by disrupting relationships between species. Wildflowers and woody perennials are blooming—and migratory birds are arriving—sooner in spring. Not all species adjust in the same way,

however, so the food that one species needs may no longer be available when that species arrives on its migration. Warmer temperatures allow deer populations to increase, leading to a loss of forest underbrush, which makes some animals more vulnerable to predators. Rising temperatures also enable invasive species to move into areas that were previously too cold.

Climate change may also pose challenges for agriculture: Warmer temperatures cause cows to eat less and produce less milk. That could reduce the output of Connecticut's \$70-million dairy industry, which provides 13 percent of the state's farm revenue. Some farms may be harmed if more hot days and droughts reduce crop yields, or if more flooding and wetter springs delay their planting dates. Other farms may benefit from a longer growing season and the fertilizing effect of carbon dioxide.

Human Health

Changes in temperature and precipitation could increase the incidence of acute and chronic respiratory conditions such as asthma. Higher temperatures can increase the formation of ground-level ozone (smog), a pollutant that can contribute to respiratory problems. Rising temperatures may also increase the length and severity of the pollen season for plants such as ragweed—which has already been observed in other regions. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor.

The risk of some diseases carried by insects may also increase. The ticks that transmit Lyme disease are active when temperatures are above 45°F, so warmer winters could lengthen the season during which ticks can become infected or people can be exposed to the ticks. Higher temperatures would also make more of New England warm enough for the Asian tiger mosquito, a common carrier of West Nile virus. The number of cases may or may not increase, depending on what people do to control insect populations and avoid insect bites.

The sources of information about climate and the impacts of climate change in this publication are: the national climate assessments by the U.S. Global Change Research Program, synthesis and assessment products by the U.S. Climate Change Science Program, assessment reports by the Intergovernmental Panel on Climate Change, and EPA's *Climate Change Indicators in the United States*. Mention of a particular season, location, species, or any other aspect of an impact does not imply anything about the likelihood or importance of aspects that are not mentioned. For more information about climate change science, impacts, responses, and what you can do, visit EPA's Climate Change website at www.epa.gov/climatechange.

3.9 Potential Climate Impacts

As stated earlier, there are no defined significance thresholds for aviation GHG emissions, nor has FAA identified any factors to consider in making a significance determination for GHG emissions. Any

increases in GHG emissions from construction associated with the Proposed Action would be temporary and essential for implementation of the Proposed Action. The potential impacts of climate change to the Airport as denoted by US EPA for Connecticut in **Figure 3** may be narrowed down based on the location of the airport away from the coast, as such these coastal impacts can be discarded when evaluating potential impacts at the airport environs. Therefore, the potential climate impacts at BDL could include increasing temperature and changing precipitation patterns, ecosystems and agriculture, and human health.

Increases in construction emissions compared to the No Action will be temporary but necessary for the proposed improvements at the airport. However, the increases would comprise a small portion of the state of Connecticut's 2021 GHG emissions 34.7.7 million metric tons³³ of carbon dioxide equivalent (MMTCO₂e), the US-based emissions of 6,472 million metric tons CO₂e, and even less than the 49 gigatons of carbon dioxide equivalent global GHG emissions.^{34, 35, 36} Based on all this information, no significant impact on GHGs or climate is expected as a result of the Proposed Action.

It should be noted that for this EA, the best available science, data, and rationale for the GHG analysis is based on the interim guidance. FAA's guidance/policy will evolve and change going into the future.

3.10 Mitigation Measures

In the absence of potentially significant impacts, no mitigation measures are proposed. The FAA is developing policies for the aviation industry to reduce GHG and climate impacts including the Aviation Action Plan and the Net Zero Sustainable Aviation System including the Aviation Action Plan, Net Zero Sustainable Aviation System as well as a commitment to a sustainable transportation system which includes;

- Increase the Production of Sustainable Aviation Fuels
- Eliminate Aviation Gasoline Lead Emissions by the End of 2030
- Develop New Aircraft and Engine Technologies
- Increase Operations Efficiency; and
- Reduce Airport Emissions and Improve Fuel Efficiency

³³ https://portal.ct.gov/-/media/DEEP/climatechange/1990-2021-GHG-Inventory/DEEP_GHG_Report_90-21_Final.pdf

³⁴ <https://www.dallasclimateaction.com/ghg-inventory>

³⁵ <https://www.epa.gov/sites/production/files/2019-02/documents/us-ghg-inventory-2019-main-text.pdf>

³⁶ http://ipcc.ch/publications_and_data/ar4/syr/en/contents.html



Appendix A
Air Emission Spreadsheet Calculations

STUDY

Study Name

BDL TW T EA

Study Description

Construction Analysis 2026

EMISSIONS INVENTORY - DETAILS:

Non-Road Sources
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario ID	Year	Project	Construction Activity	Equipment	MOVES Equipment	MOVES Lookup	Fuel	HP Average	Load Factor	Hours of Activity	MOVES Emission Factors (g-hp-hr)							NONROAD Emissions (TPY)						
											CO (g-hp-hr)	NOx (g-hp-hr)	SO2 (g-hp-hr)	PM10 (g-hp-hr)	PM2.5 (g-hp-hr)	VOC (g-hp-hr)	CO2 (g-hp-hr)	CO (tpy)	NOx (tpy)	SO2 (tpy)	PM10 (tpy)	PM2.5 (tpy)	VOC (tpy)	CO2 Equivalent (tpy)
1	2026	Rehabilitate Runway	Asphalt Placement	Asphalt Paver	Pavers	Pavers175	Diesel	175	0.59	34.396	0.0970165	0.2865494	0.0014314	0.0239311	0.0232132	0.0149085	536.7861339	0.00038	0.00112	5.604E-06	0.00009	9.09E-05	5.84E-05	2.10139
1	2026	Rehabilitate Runway	Asphalt Placement	Dump Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	12.888	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00151	0.0066	6.854E-05	0.00040	0.000391	0.000527	25.949
1	2026	Rehabilitate Runway	Asphalt Placement	Other General Equipment	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.43	68.792	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00098	0.00264	8.338E-06	0.00022	0.000217	0.000203	3.06271
1	2026	Rehabilitate Runway	Asphalt Placement	Pickup Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	34.396	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00042	0.00183	1.903E-05	0.00011	0.000109	0.000146	7.2049
1	2026	Rehabilitate Runway	Asphalt Placement	Roller	Rollers	Rollers100	Diesel	100	0.59	34.396	0.2612412	1.0316300	0.0016007	0.0438282	0.0425134	0.0201059	596.0992109	0.00058	0.00211	3.581E-06	0.00010	9.51E-05	4.5E-05	1.33348
1	2026	Rehabilitate Runway	Asphalt Placement	Skid Steer Loader	Skid Steer Loaders	Skid Steer Loaders75	Diesel	75	0.21	34.396	1.6623054	4.8115374	0.0023054	0.0510267	0.6314962	0.8580889	693.4844869	0.00278	0.00287	1.377E-06	0.00039	0.000377	0.000512	0.41413
1	2026	Rehabilitate Runway	Asphalt Placement	acing Equipment (Grov	Other Construction Equipment	her Construction Equipment1	Diesel	25	0.59	44.027	1.4893550	3.7626635	0.0012884	1.703796	1.652683	0.3517185	595.1481430	0.01017	0.00269	1.567E-06	0.00012	0.000118	0.000252	0.42603
1	2026	Rehabilitate Runway	Cold Milling	Cold Planer	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.59	55.034	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00107	0.0029	1.952E-06	0.00025	0.000238	0.000223	3.36189
1	2026	Rehabilitate Runway	Cold Milling	Dump Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	55.034	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00067	0.00293	3.045E-05	0.00018	0.000174	0.000234	11.5279
1	2026	Rehabilitate Runway	Cold Milling	Pickup Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	55.034	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00067	0.00293	3.045E-05	0.00018	0.000174	0.000234	11.5279
1	2026	Rehabilitate Runway	Cold Milling	Sweepers	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.43	55.034	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00078	0.00211	6.67E-06	0.00018	0.000174	0.000162	2.45010
1	2026	Rehabilitate Runway	Cold Milling	Water Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	55.034	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00067	0.00293	3.045E-05	0.00018	0.000174	0.000234	11.5279
1	2026	Rehabilitate Runway	Concrete Demolition	Concrete Saws	Other Construction Equipment	her Construction Equipment1	Diesel	40	0.59	495.8	0.2882579	2.5368897	0.0015718	0.0227173	0.0220358	0.0931505	595.8770809	0.00372	0.03272	2.027E-05	0.00029	0.000284	0.001204	7.68567
1	2026	Rehabilitate Runway	Concrete Demolition	Dump Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	495.8	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00604	0.02641	0.0002743	0.00161	0.001566	0.002111	103.855
1	2026	Rehabilitate Runway	Concrete Demolition	Excavator	Excavators	Excavators175	Diesel	175	0.59	495.8	0.0651696	0.2115698	0.0014195	0.0152535	0.0147959	0.0104469	536.8001487	0.00368	0.01194	8.01E-05	0.00086	0.000835	0.000909	30.2911
1	2026	Rehabilitate Runway	Concrete Demolition	Hydraulic Hammer	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.59	495.8	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00098	0.02614	8.245E-05	0.00021	0.002147	0.002006	30.2871
1	2026	Rehabilitate Runway	Concrete Demolition	Other General Equipment	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.43	495.8	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00705	0.01905	6.009E-05	0.00161	0.001565	0.001462	22.0737
1	2026	Rehabilitate Runway	Concrete Demolition	Pickup Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	495.8	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00604	0.02641	0.0002743	0.00161	0.001566	0.002111	103.855
1	2026	Rehabilitate Runway	Dust Control	Water Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	1920	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.02339	0.10227	0.0010623	0.00625	0.006064	0.008174	402.181
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Dozer	Crawler Tractor/Dozers	Crawler Tractor/Dozers175	Diesel	175	0.59	18.345	0.0076540	0.2523701	0.0014242	0.0186005	0.0180425	0.0121825	536.7955091	0.00016	0.00053	2.974E-06	0.00004	3.77E-05	2.54E-05	1.12079
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Dump Truck (12 cy)	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	61.149	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00075	0.0031	3.833E-05	0.00015	0.00015	0.00026	10.8605
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Excavator	Excavators	Excavators175	Diesel	175	0.59	18.345	0.0651696	0.2115698	0.0014195	0.0152535	0.0147959	0.0104469	536.8001487	0.00314	0.0094	2.964E-06	0.00003	3.09E-05	2.18E-05	1.1208
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Pickup Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	18.345	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00022	0.00098	1.015E-05	0.00006	5.79E-05	7.81E-05	3.84271
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Roller	Rollers	Rollers100	Diesel	100	0.59	18.345	0.2612412	1.0316300	0.0016007	0.0438282	0.0425134	0.0201059	596.0992109	0.00031	0.00123	1.91E-06	0.00005	5.07E-05	2.4E-05	0.71121
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Dozer	Crawler Tractor/Dozers	Crawler Tractor/Dozers175	Diesel	175	0.59	8.633	0.0076540	0.2523701	0.0014242	0.0186005	0.0180425	0.0121825	536.7955091	0.00016	0.00025	1.399E-06	0.00002	1.77E-05	1.2E-05	0.52743
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Excavator	Crawler Tractor/Dozers	Crawler Tractor/Dozers175	Diesel	175	0.59	31.826	0.0076540	0.2523701	0.0014242	0.0186005	0.0180425	0.0121825	536.7955091	0.00028	0.00091	1.519E-06	0.00007	6.54E-05	4.41E-05	1.94441
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Grader	Graders	Graders300	Diesel	300	0.59	31.826	0.0317732	0.1558077	0.0014210	0.0089344	0.0095394	0.0122458	536.7924544	0.00023	0.00097	8.824E-06	0.00006	5.93E-05	7.6E-05	3.33316
1	2026	Rehabilitate Runway	to Fill (Assume 20% rr	Roller	Rollers	Rollers100	Diesel	100	0.59	31.826	0.2612412	1.0316300	0.0016007	0.0438282	0.0425134	0.0201059	596.0992109	0.00054	0.00214	3.313E-06	0.00009	8.8E-05	4.16E-05	1.23384
1	2026	Rehabilitate Runway	Hydroseeding	Hydroseeder	Other Construction Equipment	her Construction Equipment6	Diesel	600	0.59	28.643	5.0581188	1.8262074	0.0015726	0.0734137	0.0712112	0.0171126	536.6232251	0.00565	0.0434	1.758E-05	0.00082	0.000796	0.000795	5.99788
1	2026	Rehabilitate Runway	Hydroseeding	Off-Road Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	28.643	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00035	0.00153	1.585E-05	0.00009	9.05E-05	0.000122	5.99982
1	2026	Rehabilitate Runway	Lighting	Dump Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	34.387	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00042	0.00183	1.903E-05	0.00011	0.000109	0.000146	7.20301
1	2026	Rehabilitate Runway	Lighting	Loader	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes17	Diesel	175	0.59	34.387	0.8127613	1.5982557	0.0018336	0.1793327	0.1799528	0.2549715	625.8019572	0.00318	0.00626	7.176E-06	0.00070	0.000681	0.000998	2.44922
1	2026	Rehabilitate Runway	Lighting	Other General Equipment	Other Construction Equipment	her Construction Equipment1	Diesel	175	0.43	34.387	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	0.00049	0.00132	1.468E-06	0.00014	0.000109	0.000162	11.52095
1	2026	Rehabilitate Runway	Lighting	Pickup Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	34.387	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00042	0.00183	1.903E-05	0.00011	0.000109	0.000146	7.20301
1	2026	Rehabilitate Runway	Lighting	Skid Steer Loader	Skid Steer Loaders	Skid Steer Loaders75	Diesel	75	0.21	34.387	1.6623054	4.8115374	0.0023054	0.0510267	0.6314962	0.8580889	693.4844869	0.00278	0.00287	1.376E-06	0.00039	0.000377	0.000512	0.41402
1	2026	Rehabilitate Runway	Lighting	Tractors/Loaders/Backho	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes10	Diesel	100	0.21	34.387	2.0023538	2.2738044	0.0020361	0.0281699	0.2733162	0.3503493	694.9765579	0.00159	0.00181	1.621E-06	0.00022	0.000218	0.000279	0.55321
1	2026	Rehabilitate Runway	Markings	Flattbed Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	566.629	0.0312242	0.1365070	0.0014179	0.0083447										

Year	Project	Equipment	Equipment Category	Moves	LookUp	road Actn	Fuel	adjway Typ	Distance for fugitmer of Vehes Or SM ¹	er of Project	Project Length	Project Width	Project Area	Building Ft (Building number of Tractivity)	VMT	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O			
2026	New Runway Drainage - 24 inch SICPP	Excavator	Excavators	Excavators175	Diesel	175	0.59	3.52	0.0651696	0.2115698	0.0014195	0.0152535	0.0147959	0.0104469	536.8001487	2.6E-05	8.5E-05	5.687E-07	0.00001	5.93E-06	4.19E-06	0.2150E														
2026	New Runway Drainage - 24 inch SICPP	Loader	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes17	Diesel	175	0.59	3.52	0.8127613	1.5985257	0.0018336	0.1793327	0.1793528	0.2549715	625.8019572	0.00033	0.00064	7.346E-07	0.00007	6.97E-05	0.00010	0.25071														
2026	New Runway Drainage - 24 inch SICPP	Pickup Truck	Other Construction Equipment	her Construction Equipment11	Diesel	175	0.43	3.52	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	5E-05	0.0001	4.26E-07	0.00001	1.11E-05	1.5E-05	0.27333														
2026	New Runway Drainage - 24 inch SICPP	Pickup Truck	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	3.52	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00035	0.00052	6.152E-05	0.00036	0.00031	0.000473	23.2898														
2026	New Runway Drainage - 24 inch SICPP	Roller	Rollers	Rollers100	Diesel	100	0.59	3.52	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	6E-05	0.00024	3.65E-07	0.00001	9.73E-06	4.6E-06	0.13646														
2026	New Runway e - 6 inch Perforated Unc	Dump Truck	Off-highway Trucks	Off-highway Trucks600	Diesel	600	0.59	1.956	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	2.4E-05	0.0001	1.082E-06	0.00001	6.18E-06	8.33E-06	0.40972														
2026	New Runway e - 6 inch Perforated Unc	Loader	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes17	Diesel	175	0.59	1.956	0.8127613	1.5985257	0.0018336	0.1793327	0.1793528	0.2549715	625.8019572	0.00018	0.00036	4.082E-07	0.00004	3.87E-05	5.68E-05	0.13932														
2026	New Runway e - 6 inch Perforated Unc	General Equipment	Other Construction Equipment	her Construction Equipment11	Diesel	175	0.43	1.956	0.1714723	0.4632789	0.0014612	0.0392330	0.0380560	0.0355417	536.7288839	2.8E-05	7.5E-05	2.371E-07	0.00001	6.17E-06	5.77E-06	0.08708														
2026	New Runway e - 6 inch Perforated Unc	Pickup Truck	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	1.956	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	2.4E-05	0.0001	1.082E-06	0.00001	6.18E-06	8.33E-06	0.40972														
2026	New Runway e - 6 inch Perforated Unc	Tractor/Loader/Backhoe	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes10	Diesel	100	0.21	1.956	2.0023538	2.2738044	0.0020361	0.2817699	0.2733162	0.3503493	694.9765579	9.1E-05	0.0001	9.219E-08	0.00001	1.24E-05	1.59E-05	0.03147														
2026	New Runway Dust Control	Water Truck	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	1.920	0.2031242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.02339	0.01027	0.0010623	0.00625	0.006064	0.008174	0.02181														
2026	New Runway Excavation (Borrow)	Dozer	Crawler Tractor/Dozers	Crawler Tractor/Dozers175	Diesel	175	0.59	1.185	0.0776540	0.2523701	0.0014242	0.0186005	0.0180425	0.0121825	536.7955091	0.00098	0.00319	1.802E-05	0.00024	0.000228	0.000154	6.79284														
2026	New Runway Excavation (Borrow)	Dump Truck (12 cy)	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	1.1185	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00135	0.00592	6.152E-05	0.00036	0.000351	0.000473	23.2898														
2026	New Runway Excavation (Borrow)	Pickup Truck	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	1.1185	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Borrow)	Roller	Rollers	Rollers100	Diesel	100	0.59	53.136	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00087	0.00344	5.342E-06	0.00015	0.000142	6.71E-05	1.98944														
2026	New Runway Excavation (Cut to Fill)	Dozer	Crawler Tractor/Dozers	Crawler Tractor/Dozers175	Diesel	175	0.59	83.389	0.0776540	0.2523701	0.0014242	0.0186005	0.0180425	0.0121825	536.7955091	0.00074	0.0024	1.352E-05	0.00018	0.000171	0.000116	5.09465														
2026	New Runway Excavation (Cut to Fill)	Dump Truck (12 cy)	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	22.371	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00271	0.01185	0.000123	0.00072	0.000702	0.000947	46.7598														
2026	New Runway Excavation (Cut to Fill)	Excavator	Excavators	Excavators175	Diesel	175	0.59	66.711	0.0651696	0.2115698	0.0014195	0.0152535	0.0147959	0.0104469	536.8001487	0.00049	0.0161	1.078E-05	0.00012	0.000112	7.93E-05	4.07574														
2026	New Runway Excavation (Cut to Fill)	Pickup Truck	Off-Highway Trucks	Off-Highway Trucks600	Diesel	600	0.59	66.711	0.0312242	0.1365070	0.0014179	0.0083447	0.0080944	0.0109099	536.7969728	0.00081	0.00355	3.691E-05	0.00022	0.000211	0.000284	19.3799														
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	53.136	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00087	0.00344	5.342E-06	0.00015	0.000142	6.71E-05	1.98944														
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711	0.2612412	0.1031630	0.0016007	0.0438282	0.0425134	0.0201059	596.0992199	0.00113	0.00448	6.945E-06	0.00019	0.000184	0.000184	7.2E-05	2.58627													
2026	New Runway Excavation (Cut to Fill)	Roller	Rollers	Rollers100	Diesel	100	0.59	66.711																												

2026	NonRoad	0.25	0.88	0.01	0.06	0.05	0.07	2392.61	--	--	
2026	OnRoad	3.799662105	2.130256193	0.0048482	0.033904231	0.031110061	0.169404	1260.773	0.019189	0.1298	
2026	Fugitive	1.03605	0.0647	0.0119	0.6797755		0.532	--	--	--	
2026 TOTAL		5.09	3.08	0.023	0.77	0.09	0.791	3314	0.017408	0.11775	3347

INPUT DATA AND SPECIFICATIONS

Project Final Selections

Scenario	Project	Construction Activity	Equipment	Fuel Type
1	Rehabilita	Asphalt Placement	Asphalt Paver	Diesel
1	Rehabilita	Asphalt Placement	Dump Truck	Diesel
1	Rehabilita	Asphalt Placement	Other General Equipme	Diesel
1	Rehabilita	Asphalt Placement	Pickup Truck	Diesel
1	Rehabilita	Asphalt Placement	Roller	Diesel
1	Rehabilita	Asphalt Placement	Skid Steer Loader	Diesel
1	Rehabilita	Asphalt Placement	Surfacing Equipment (G)	Diesel
1	Rehabilita	Cold Milling	Cold Planer	Diesel
1	Rehabilita	Cold Milling	Dump Truck	Diesel
1	Rehabilita	Cold Milling	Pickup Truck	Diesel
1	Rehabilita	Cold Milling	Sweepers	Diesel
1	Rehabilita	Cold Milling	Water Truck	Diesel
1	Rehabilita	Concrete Demolition	Concrete Saws	Diesel
1	Rehabilita	Concrete Demolition	Dump Truck	Diesel
1	Rehabilita	Concrete Demolition	Excavator	Diesel
1	Rehabilita	Concrete Demolition	Hydraulic Hammer	Diesel
1	Rehabilita	Concrete Demolition	Other General Equipme	Diesel
1	Rehabilita	Concrete Demolition	Pickup Truck	Diesel
1	Rehabilita	Dust Control	Water Truck	Diesel
1	Rehabilita	Excavation (Cut to Fill)	Dozer	Diesel
1	Rehabilita	Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel
1	Rehabilita	Excavation (Cut to Fill)	Excavator	Diesel
1	Rehabilita	Excavation (Cut to Fill)	Pickup Truck	Diesel
1	Rehabilita	Excavation (Cut to Fill)	Roller	Diesel
1	Rehabilita	Excavation (Topsoil Str	Dozer	Diesel
1	Rehabilita	Grading	Dozer	Diesel
1	Rehabilita	Grading	Grader	Diesel
1	Rehabilita	Grading	Roller	Diesel
1	Rehabilita	Hydroseeding	Hydroseeder	Diesel
1	Rehabilita	Hydroseeding	Off-Road Truck	Diesel
1	Rehabilita	Lighting	Dump Truck	Diesel
1	Rehabilita	Lighting	Loader	Diesel
1	Rehabilita	Lighting	Other General Equipme	Diesel
1	Rehabilita	Lighting	Pickup Truck	Diesel
1	Rehabilita	Lighting	Skid Steer Loader	Diesel
1	Rehabilita	Lighting	Tractors/Loader/Backho	Diesel
1	Rehabilita	Markings	Flatbed Truck	Diesel
1	Rehabilita	Markings	Other General Equipme	Diesel
1	Rehabilita	Markings	Pickup Truck	Diesel
1	Rehabilita	Sealing Random Cracks	Crack Cleaner	Diesel
1	Rehabilita	Sealing Random Cracks	Crack Filler (Trailer Mou	Diesel
1	Rehabilita	Sealing Random Cracks	Flatbed Truck	Diesel
1	Rehabilita	Sealing Random Cracks	Other General Equipme	Diesel
1	Rehabilita	Sealing Random Cracks	Pickup Truck	Diesel
1	Rehabilita	Soil Erosion/Sediment	Other General Equipme	Diesel
1	Rehabilita	Soil Erosion/Sediment	Pickup Truck	Diesel
1	Rehabilita	Soil Erosion/Sediment	Pumps	Diesel
1	Rehabilita	Soil Erosion/Sediment	Tractors/Loader/Backho	Diesel
1	Rehabilita	Subbase Placement	Dozer	Diesel
1	Rehabilita	Subbase Placement	Dump Truck (12 cy)	Diesel
1	Rehabilita	Subbase Placement	Pickup Truck	Diesel
1	Rehabilita	Subbase Placement	Roller	Diesel
1	Rehabilita	Topsoil Placement	Dozer	Diesel
1	Rehabilita	Topsoil Placement	Dump Truck	Diesel
1	Rehabilita	Topsoil Placement	Pickup Truck	Diesel
2	New Run	Asphalt Placement	Asphalt Paver	Diesel
2	New Run	Asphalt Placement	Dump Truck	Diesel
2	New Run	Asphalt Placement	Other General Equipme	Diesel
2	New Run	Asphalt Placement	Pickup Truck	Diesel
2	New Run	Asphalt Placement	Roller	Diesel
2	New Run	Asphalt Placement	Skid Steer Loader	Diesel
2	New Run	Asphalt Placement	Surfacing Equipment (G)	Diesel
2	New Run	Clearing and Grubbing	Chain Saw	Diesel
2	New Run	Clearing and Grubbing	Chipper/Stump Grinder	Diesel
2	New Run	Clearing and Grubbing	Pickup Truck	Diesel
2	New Run	Concrete Placement	Air Compressor	Diesel
2	New Run	Concrete Placement	Concrete Saws	Diesel
2	New Run	Concrete Placement	Concrete Truck	Diesel
2	New Run	Concrete Placement	Other General Equipme	Diesel
2	New Run	Concrete Placement	Pickup Truck	Diesel
2	New Run	Concrete Placement	Rubber Tired Loader	Diesel
2	New Run	Concrete Placement	Slip Form Paver	Diesel
2	New Run	Concrete Placement	Surfacing Equipment (G)	Diesel
2	New Run	Drainage - 24 inch SICP	Dozer	Diesel
2	New Run	Drainage - 24 inch SICP	Dump Truck	Diesel
2	New Run	Drainage - 24 inch SICP	Excavator	Diesel
2	New Run	Drainage - 24 inch SICP	Loader	Diesel
2	New Run	Drainage - 24 inch SICP	Other General Equipme	Diesel
2	New Run	Drainage - 24 inch SICP	Pickup Truck	Diesel
2	New Run	Drainage - 24 inch SICP	Roller	Diesel
2	New Run	Drainage - 6 inch Perfo	Dump Truck	Diesel
2	New Run	Drainage - 6 inch Perfo	Loader	Diesel
2	New Run	Drainage - 6 inch Perfo	Other General Equipme	Diesel
2	New Run	Drainage - 6 inch Perfo	Pickup Truck	Diesel
2	New Run	Drainage - 6 inch Perfo	Tractors/Loader/Backho	Diesel
2	New Run	Dust Control	Water Truck	Diesel
2	New Run	Excavation (Borrow)	Dozer	Diesel
2	New Run	Excavation (Borrow)	Dump Truck (12 cy)	Diesel
2	New Run	Excavation (Borrow)	Pickup Truck	Diesel
2	New Run	Excavation (Borrow)	Roller	Diesel

*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***

2 New RunwExcavation (Cut to Fill) Dozer	Diesel
2 New RunwExcavation (Cut to Fill) Dump Truck (12 cy)	Diesel
2 New RunwExcavation (Cut to Fill) Excavator	Diesel
2 New RunwExcavation (Cut to Fill) Pickup Truck	Diesel
2 New RunwExcavation (Cut to Fill) Roller	Diesel
2 New RunwExcavation (Cut to Fill) Scraper	Diesel
2 New RunwExcavation (Topsoil Stri) Dozer	Diesel
2 New RunwFencing Concrete Truck	Diesel
2 New RunwFencing Dump Truck	Diesel
2 New RunwFencing Other General Equipme	Diesel
2 New RunwFencing Pickup Truck	Diesel
2 New RunwFencing Skid Steer Loader	Diesel
2 New RunwFencing Tractors/Loader/Backho	Diesel
2 New RunwGrading Dozer	Diesel
2 New RunwGrading Grader	Diesel
2 New RunwGrading Roller	Diesel
2 New RunwHydroseeding Hydroseeder	Diesel
2 New RunwHydroseeding Off-Road Truck	Diesel
2 New RunwLighting Dump Truck	Diesel
2 New RunwLighting Loader	Diesel
2 New RunwLighting Other General Equipme	Diesel
2 New RunwLighting Pickup Truck	Diesel
2 New RunwLighting Skid Steer Loader	Diesel
2 New RunwLighting Tractors/Loader/Backho	Diesel
2 New RunwMarkings Flatbed Truck	Diesel
2 New RunwMarkings Other General Equipme	Diesel
2 New RunwMarkings Pickup Truck	Diesel
2 New RunwSoil Erosion/Control Other General Equipme	Diesel
2 New RunwSoil Erosion/Control Pickup Truck	Diesel
2 New RunwSoil Erosion/Control Pumps	Diesel
2 New RunwSoil Erosion/Control Tractors/Loader/Backho	Diesel
2 New RunwSubbase Placement Dozer	Diesel
2 New RunwSubbase Placement Dump Truck (12 cy)	Diesel
2 New RunwSubbase Placement Pickup Truck	Diesel
2 New RunwSubbase Placement Roller	Diesel
2 New RunwTopsoil Placement Dozer	Diesel
2 New RunwTopsoil Placement Dump Truck	Diesel
2 New RunwTopsoil Placement Pickup Truck	Diesel
3 Demolito Asphalt Demolition Dozer	Diesel
3 Demolito Asphalt Demolition Excavator	Diesel
3 Demolito Asphalt Demolition Pickup Truck	Diesel

Overall Size

Scenario	Project	Project Size	Questions	User Input	Unit
1	Rehabilita	What is the estimated			8,095 \$ Million(s)
1	Rehabilita	What is the maximum			100 Feet
1	Rehabilita	What is the maximum			2479 Feet
2	New Runw	What is the estimated			5,887 \$ Million(s)
2	New Runw	What is the maximum			100 Feet
2	New Runw	What is the maximum			1803 Feet
3	Demolito	What is the estimated			2,023 \$ Million(s)
3	Demolito	What is the maximum			100 Feet
3	Demolito	What is the maximum			618 Feet

Size Detail (Estimated based on engineering experience)

Scenario	Project	Construction Activity	Default Activity Size	Unit	User Activity Size
1	Rehabilita	Asphalt Placement	27516.9	Square Yards	
1	Rehabilita	Cold Milling	27516.9	Square Yards	
1	Rehabilita	Concrete Demolition	27516.9	Square Feet	
1	Rehabilita	Concrete Demolition	247900	Square Feet	
1	Rehabilita	Dust Control	240	Days	
1	Rehabilita	Excavation (Cut to Fill)	2293.1	Cubic Yards	
1	Rehabilita	Excavation (Topsoil Stri	5503.4	Square Yards	
1	Rehabilita	Grading	6078.1	Square Feet	31825.6
1	Rehabilita	Hydroseeding	6078.1	Square Feet	286430.4
1	Rehabilita	Lighting	5158	Linear Feet	
1	Rehabilita	Markings	247900	Square Feet	
1	Rehabilita	Sealing Random Cracks	100	Linear Feet	
1	Rehabilita	Soil Erosion/Sediment	1.3	Acres	6.6
1	Rehabilita	Subbase Placement	27516.9	Square Yards	
1	Rehabilita	Subbase Placement	9172.3	Cubic Yards	
1	Rehabilita	Topsoil Placement	1023	Cubic Yards	
2	New Runw	Asphalt Placement	20013.3	Square Yards	
2	New Runw	Clearing and Grubbing	4.6	Acres	
2	New Runw	Concrete Placement	8338.9	Cubic Yards	
2	New Runw	Drainage - 24 inch SICP	110	Linear Feet	
2	New Runw	Drainage - 6 inch Perfo	220	Linear Feet	
2	New Runw	Dust Control	240	Days	
2	New Runw	Excavation (Borrow)	8338.9	Cubic Yards	
2	New Runw	Excavation (Cut to Fill)	8338.9	Cubic Yards	
2	New Runw	Excavation (Topsoil Stri	20013.3	Square Yards	
2	New Runw	Fencing	100	Linear Feet	
2	New Runw	Grading	22136.7	Square Yards	112613.7
2	New Runw	Hydroseeding	199430	Square Feet	1013522.9
2	New Runw	Lighting	3806	Linear Feet	
2	New Runw	Markings	180300	Square Feet	
2	New Runw	Soil Erosion/Control	4.6	Acres	23.3
2	New Runw	Subbase Placement	20013.3	Square Yards	
2	New Runw	Subbase Placement	6671.1	Cubic Yards	
2	New Runw	Topsoil Placement	3689.5	Cubic Yards	
3	Demolito	Asphalt Demolition	61800	Square Feet	

Activity: Non-Road (Estimated based on engineering experience)

Scenario	Project	Construction Activity	Equipment	Fuel Type	Activity Size	Activity R	Default	Ac	Activity U	User Activity Data
1	Rehabilita	Asphalt Placement	Asphalt Paver	Diesel	27516.90	18	Hours	pe	34.4	hours
1	Rehabilita	Asphalt Placement	Dump Truck	Diesel	27516.90	18	Hours	pe	123.88	hours

1 Rehabilita Asphalt Placement	Other General Equipme	Diesel	27516.90	116 Hours p	68.79 hours	
1 Rehabilita Asphalt Placement	Pickup Truck	Diesel	27516.90	18 Hours pe	34.4 hours	
1 Rehabilita Asphalt Placement	Roller	Diesel	27516.90	18 Hours pe	34.4 hours	
1 Rehabilita Asphalt Placement	Skid Steer Loader	Diesel	27516.90	18 Hours pe	34.4 hours	
1 Rehabilita Asphalt Placement	Surfacing Equipment (G)	Diesel	27516.90	18 Hours pe	44.03 hours	
1 Rehabilita Cold Milling	Cold Planer	Diesel	27516.90	18 Hours pe	55.03 hours	
1 Rehabilita Cold Milling	Dump Truck	Diesel	27516.90	18 Hours pe	55.03 hours	
1 Rehabilita Cold Milling	Pickup Truck	Diesel	27516.90	18 Hours pe	55.03 hours	
1 Rehabilita Cold Milling	Sweepers	Diesel	27516.90	18 Hours pe	55.03 hours	
1 Rehabilita Cold Milling	Water Truck	Diesel	27516.90	18 Hours pe	55.03 hours	
1 Rehabilita Concrete Demolition	Concrete Saws	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Concrete Demolition	Dump Truck	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Concrete Demolition	Excavator	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Concrete Demolition	Hydraulic Hammer	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Concrete Demolition	Other General Equipme	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Concrete Demolition	Pickup Truck	Diesel	247900.00	8 Hours pe	495.8 hours	
1 Rehabilita Dust Control	Water Truck	Diesel	240.00	Da 8 Hours pe	1920 hours	
1 Rehabilita Excavation (Cut to Fill)	Dozer	Diesel	2293.10	C 8 Hours pe	18.34 hours	
1 Rehabilita Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	2293.10	C 8 Hours pe	61.15 hours	
1 Rehabilita Excavation (Cut to Fill)	Excavator	Diesel	2293.10	C 8 Hours pe	18.34 hours	
1 Rehabilita Excavation (Cut to Fill)	Pickup Truck	Diesel	2293.10	C 8 Hours pe	18.34 hours	
1 Rehabilita Excavation (Cut to Fill)	Roller	Diesel	2293.10	C 8 Hours pe	18.34 hours	
1 Rehabilita Excavation (Topsoil Str)	Dozer	Diesel	5503.40	S 8 Hours pe	8.63 hours	
1 Rehabilita Grading	Dozer	Diesel	6078.10	S 8 Hours pe	6.08 hours	31.826
1 Rehabilita Grading	Grader	Diesel	6078.10	S 8 Hours pe	6.08 hours	31.826
1 Rehabilita Grading	Roller	Diesel	6078.10	S 8 Hours pe	6.08 hours	31.826
1 Rehabilita Hydroseeding	Hydroseeder	Diesel	6078.10	S 8 Hours pe	0.61 hours	28.643
1 Rehabilita Hydroseeding	Off-Road Truck	Diesel	6078.10	S 8 Hours pe	0.61 hours	28.643
1 Rehabilita Lighting	Dump Truck	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Lighting	Loader	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Lighting	Other General Equipme	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Lighting	Pickup Truck	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Lighting	Skid Steer Loader	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Lighting	Tractors/Loader/Backho	Diesel	5158.00	L 8 Hours pe	34.39 hours	
1 Rehabilita Markings	Flatbed Truck	Diesel	247900.00	8 Hours pe	566.63 hours	
1 Rehabilita Markings	Other General Equipme	Diesel	247900.00	8 Hours pe	566.63 hours	
1 Rehabilita Markings	Pickup Truck	Diesel	247900.00	8 Hours pe	566.63 hours	
1 Rehabilita Sealing Random Cracks	Crack Cleaner	Diesel	100.00	LF 8 Hours pe	0.29 hours	
1 Rehabilita Sealing Random Cracks	Crack Filler (Trailer Mow)	Diesel	100.00	LF 8 Hours pe	0.29 hours	
1 Rehabilita Sealing Random Cracks	Flatbed Truck	Diesel	100.00	LF 8 Hours pe	0.29 hours	
1 Rehabilita Sealing Random Cracks	Other General Equipme	Diesel	100.00	LF 8 Hours pe	0.29 hours	
1 Rehabilita Sealing Random Cracks	Pickup Truck	Diesel	100.00	LF 8 Hours pe	0.29 hours	
1 Rehabilita Soil Erosion/Sediment	Other General Equipme	Diesel	1.30	Acres 4 Hours pe	5.2 hours	26.4
1 Rehabilita Soil Erosion/Sediment	Pickup Truck	Diesel	1.30	Acres 8 Hours pe	10.4 hours	52.8
1 Rehabilita Soil Erosion/Sediment	Pumps	Diesel	1.30	Acres 4 Hours pe	5.2 hours	26.4
1 Rehabilita Soil Erosion/Sediment	Tractors/Loader/Backho	Diesel	1.30	Acres 4 Hours pe	5.2 hours	26.4
1 Rehabilita Subbase Placement	Dozer	Diesel	27516.90	18 Hours pe	57.93 hours	
1 Rehabilita Subbase Placement	Dump Truck (12 cy)	Diesel	9172.30	C 8 Hours pe	407.66 hours	
1 Rehabilita Subbase Placement	Pickup Truck	Diesel	27516.90	18 Hours pe	57.93 hours	
1 Rehabilita Subbase Placement	Roller	Diesel	9172.30	C 8 Hours pe	56.44 hours	
1 Rehabilita Topsoil Placement	Dozer	Diesel	1013.00	C 8 Hours pe	13.51 hours	
1 Rehabilita Topsoil Placement	Dump Truck	Diesel	1013.00	C 8 Hours pe	13.51 hours	
1 Rehabilita Topsoil Placement	Pickup Truck	Diesel	1013.00	C 8 Hours pe	13.51 hours	
2 New Run Asphalt Placement	Asphalt Paver	Diesel	20013.30	S 8 Hours pe	25.02 hours	
2 New Run Asphalt Placement	Dump Truck	Diesel	20013.30	S 8 Hours pe	90.1 hours	
2 New Run Asphalt Placement	Other General Equipme	Diesel	20013.30	S 8 Hours pe	50.03 hours	
2 New Run Asphalt Placement	Pickup Truck	Diesel	20013.30	S 8 Hours pe	25.02 hours	
2 New Run Asphalt Placement	Roller	Diesel	20013.30	S 8 Hours pe	25.02 hours	
2 New Run Asphalt Placement	Skid Steer Loader	Diesel	20013.30	S 8 Hours pe	25.02 hours	
2 New Run Asphalt Placement	Surfacing Equipment (G)	Diesel	20013.30	S 8 Hours pe	32.02 hours	
2 New Run Clearing and Grubbing	Chain Saw	Diesel	4.60	Acres 12 Hours p	55.2 hours	
2 New Run Clearing and Grubbing	Chipper/Stump Grinder	Diesel	4.60	Acres 12 Hours p	55.2 hours	
2 New Run Clearing and Grubbing	Pickup Truck	Diesel	4.60	Acres 16 Hours p	73.6 hours	
2 New Run Concrete Placement	Air Compressor	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Concrete Placement	Concrete Saws	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Concrete Placement	Concrete Truck	Diesel	8338.90	C 8 Hours pe	277.96 hours	
2 New Run Concrete Placement	Other General Equipme	Diesel	8338.90	C 16 Hours p	133.42 hours	
2 New Run Concrete Placement	Pickup Truck	Diesel	8338.90	C 24 Hours pe	200.13 hours	
2 New Run Concrete Placement	Rubber Tired Loader	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Concrete Placement	Slip Form Paver	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Concrete Placement	Surfacing Equipment (G)	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Drainage - 24 inch SICP	Dozer	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Dump Truck	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Excavator	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Loader	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Other General Equipme	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Pickup Truck	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 24 inch SICP	Roller	Diesel	110.00	LF 8 Hours pe	3.52 hours	
2 New Run Drainage - 6 inch Perfo	Dump Truck	Diesel	220.00	LF 8 Hours pe	1.96 hours	
2 New Run Drainage - 6 inch Perfo	Loader	Diesel	220.00	LF 8 Hours pe	1.96 hours	
2 New Run Drainage - 6 inch Perfo	Other General Equipme	Diesel	220.00	LF 8 Hours pe	1.96 hours	
2 New Run Drainage - 6 inch Perfo	Pickup Truck	Diesel	220.00	LF 8 Hours pe	1.96 hours	
2 New Run Drainage - 6 inch Perfo	Tractors/Loader/Backho	Diesel	220.00	LF 8 Hours pe	1.96 hours	
2 New Run Dust Control	Water Truck	Diesel	240.00	Da 8 Hours pe	1920 hours	
2 New Run Excavation (Borrow)	Dozer	Diesel	8338.90	C 8 Hours pe	111.19 hours	
2 New Run Excavation (Borrow)	Dump Truck (12 cy)	Diesel	8338.90	C 8 Hours pe	111.19 hours	
2 New Run Excavation (Borrow)	Pickup Truck	Diesel	8338.90	C 8 Hours pe	111.19 hours	
2 New Run Excavation (Borrow)	Roller	Diesel	8338.90	C 8 Hours pe	51.32 hours	
2 New Run Excavation (Cut to Fill)	Dozer	Diesel	8338.90	C 8 Hours pe	83.39 hours	
2 New Run Excavation (Cut to Fill)	Dump Truck (12 cy)	Diesel	8338.90	C 8 Hours pe	222.37 hours	
2 New Run Excavation (Cut to Fill)	Excavator	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Excavation (Cut to Fill)	Pickup Truck	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Excavation (Cut to Fill)	Roller	Diesel	8338.90	C 8 Hours pe	66.71 hours	
2 New Run Excavation (Cut to Fill)	Scraper	Diesel	8338.90	C 8 Hours pe	83.39 hours	
2 New Run Excavation (Topsoil Str)	Dozer	Diesel	20013.30	S 8 Hours pe	31.39 hours	
2 New Run Fencing	Concrete Truck	Diesel	100.00	LF 2 Hours pe	1.11 hours	
2 New Run Fencing	Dump Truck	Diesel	100.00	LF 8 Hours pe	4.44 hours	
2 New Run Fencing	Other General Equipme	Diesel	100.00	LF 8 Hours pe	4.44 hours	
2 New Run Fencing	Pickup Truck	Diesel	100.00	LF 8 Hours pe	4.44 hours	
2 New Run Fencing	Skid Steer Loader	Diesel	100.00	LF 8 Hours pe	4.44 hours	
2 New Run Fencing	Tractors/Loader/Backho	Diesel	100.00	LF 8 Hours pe	4.44 hours	
2 New Run Grading	Dozer	Diesel	22136.70	S 8 Hours pe	22.14 hours	112.614

*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***

2 New RunwGrading	Grader	Diesel	22136.70	18	Hours pe	22.14	hours	112.614	
2 New RunwGrading	Roller	Diesel	22136.70	18	Hours pe	22.14	hours	112.614	
2 New RunHydroseeding	Hydroseeder	Diesel	19980.00	18	Hours pe	19.94	hours	101.352	
2 New RunHydroseeding	Off-Road Truck	Diesel	199430.00	18	Hours pe	19.94	hours	101.352	
2 New RunwLighting	Dump Truck	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwLighting	Loader	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwLighting	Other General Equipment	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwLighting	Pickup Truck	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwLighting	Skid Steer Loader	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwLighting	Tractors/Loader/Backho	Diesel	3806.00	18	Hours pe	25.37	hours		
2 New RunwMarkings	Flatbed Truck	Diesel	180300.00	18	Hours pe	412.11	hours		
2 New RunwMarkings	Other General Equipment	Diesel	180300.00	18	Hours pe	412.11	hours		
2 New RunwMarkings	Pickup Truck	Diesel	180300.00	18	Hours pe	412.11	hours		
2 New RunwSoil Erosion/Control	Other General Equipment	Diesel	4.60	Acre	4	Hours pe	18.4	hours	93.2
2 New RunwSoil Erosion/Control	Pickup Truck	Diesel	4.60	Acre	8	Hours pe	36.8	hours	186.4
2 New RunwSoil Erosion/Control	Pumps	Diesel	4.60	Acre	4	Hours pe	18.4	hours	93.2
2 New RunwSoil Erosion/Control	Tractors/Loader/Backho	Diesel	4.60	Acre	4	Hours pe	18.4	hours	93.2
2 New RunwSubbase Placement	Dozer	Diesel	20013.30	18	Hours pe	42.13	hours		
2 New RunwSubbase Placement	Dump Truck (12 cy)	Diesel	6671.10	C18	Hours pe	295.49	hours		
2 New RunwSubbase Placement	Pickup Truck	Diesel	20013.30	18	Hours pe	42.13	hours		
2 New RunwSubbase Placement	Roller	Diesel	6671.10	C18	Hours pe	41.05	hours		
2 New RunwTopsoil Placement	Dozer	Diesel	3689.50	C18	Hours pe	49.19	hours		
2 New RunwTopsoil Placement	Dump Truck	Diesel	3689.50	C18	Hours pe	49.19	hours		
2 New RunwTopsoil Placement	Pickup Truck	Diesel	3689.50	C18	Hours pe	49.19	hours		
3 Demolito Asphalt Demolition	Dozer	Diesel	61800.00	18	Hours pe	61.8	hours		
3 Demolito Asphalt Demolition	Excavator	Diesel	61800.00	18	Hours pe	61.8	hours		
3 Demolito Asphalt Demolition	Pickup Truck	Diesel	61800.00	18	Hours pe	123.6	hours		

Activity: On-Road (Estimated based on engineering experience)

Scenario	Project	Equipment	On-road Activity	Fuel	Roadway	Round	Trij	Number of	Number c	Project Len	Project Wid	Project Area	Building	He	Open Space	Number of	Activity Size	Activity R	Default V	User VMT
1 Rehabilita Asphalt	18 Wheeler	Material Delivery	Diesel	Urban Unr	40	--	172	100	2479	--	--	--	--	--	--	--	--	--	--	3597
1 Rehabilita Cement Mixer	Material Delivery	Diesel	Urban Unr	40	--	172	100	2479	--	--	--	--	--	--	--	--	--	--	--	57327
1 Rehabilita Dump Truck - Asphalt	Material Delivery	Diesel	Urban Unr	40	--	172	100	2479	--	--	--	--	--	--	--	--	--	--	--	5096
1 Rehabilita Dump Truck Subbase	Material Delivery	Diesel	Urban Unr	40	--	172	100	2479	--	--	--	--	--	--	--	--	--	--	--	50574
1 Rehabilita Passenger Car	Employee Commute	Gasoline	Urban Unr	30	89.045	172	--	--	--	--	--	--	--	--	--	--	--	--	--	459472
2 New RunwAsphalt 18 Wheeler	Material Delivery	Diesel	Urban Unr	40	--	172	100	1803	--	--	--	--	--	--	--	--	--	--	--	2616
2 New Runw Cement Mixer	Material Delivery	Diesel	Urban Unr	40	--	172	100	1803	--	--	--	--	--	--	--	--	--	--	--	41694
2 New Runw Dump Truck - Asphalt	Material Delivery	Diesel	Urban Unr	40	--	172	100	1803	--	--	--	--	--	--	--	--	--	--	--	3706
2 New Runw Dump Truck Subbase	Material Delivery	Diesel	Urban Unr	40	--	172	100	1803	--	--	--	--	--	--	--	--	--	--	--	22237
2 New Runw Passenger Car	Employee Commute	Gasoline	Urban Unr	30	73	172	--	--	--	--	--	--	--	--	--	--	--	--	--	376680
3 Demolito Dump Truck	Material Delivery	Diesel	Urban Unr	40	--	65	100	618	--	--	--	--	--	--	--	--	--	--	--	13733
3 Demolito Passenger Car	Employee Commute	Gasoline	Urban Unr	30	22.187	65	--	--	--	--	--	--	--	--	--	--	--	--	--	43265

Fugitive Emissions (Emission Factors from Various Sources including AP-42)

Scenario	Project	Fugitive Type	Variable	Default Values	Units	User Value
1 Rehabilita Asphalt Drying			A = Area of land affectec	23029.9	m ²	
1 Rehabilita Asphalt Drying			AR = Application rate of	1.811	l/m ²	
1 Rehabilita Asphalt Drying			VD = Volume Fraction of	0.35	fraction	
1 Rehabilita Asphalt Drying			EF = Mass fraction of dill	0.7	fraction	
1 Rehabilita Asphalt Drying			D = Density of solvent ut	1.8	lbs/l	
1 Rehabilita Asphalt Drying			VOC = A x AR x VD x EF x	18392.9	lbs	603.4
1 Rehabilita Asphalt Storage and Ba T = Mass of asphalt load				2996.1	tons	
1 Rehabilita Asphalt Storage and BaPM10 = (0.027 + 0.0004)				82.2	lbs	
1 Rehabilita Asphalt Storage and BaCO = (0.4 + 0.0004) x T				1199.6	lbs	
1 Rehabilita Asphalt Storage and BaNOx = (0.025) x T				74.9	lbs	
1 Rehabilita Asphalt Storage and BaSOx = (0.0046) x T				13.8	lbs	
1 Rehabilita Asphalt Storage and BaVOC = (0.0082 + 0.0042)				37.2	lbs	
1 Rehabilita Material Movement (U = Surface material silt t				0.043	fraction	
1 Rehabilita Material Movement (U WL = Mean vehicle weig				32	tons	
1 Rehabilita Material Movement (U VMT = Vehicle miles tra				9084	miles	
1 Rehabilita Material Movement (U PM10 = 1.5 x [s/12]^0.9				248.8	lbs	
1 Rehabilita Material Movement (P:Sl = Road surface silt loa				0.1	g/m ³	
1 Rehabilita Material Movement (P:WT = Mean vehicle weig				32	tons	
1 Rehabilita Material Movement (P:VMT = Vehicle miles tra				8600	miles	
1 Rehabilita Material Movement (P:PM10 = 0.0022 x [s]^0.9				79.8	lbs	
1 Rehabilita Soil Handling			u = Wind speed	5	mph	
1 Rehabilita Soil Handling			m = Moisture content	0.25	fraction	
1 Rehabilita Soil Handling			T = Mass of aggregate st	6817.3	tons	
1 Rehabilita Soil Handling			PM10 = T x 0.35 x 0.003;	140.3	lbs	
1 Rehabilita Unstabilized Land and IA = Area affected + L x V				5.691	acres	
1 Rehabilita Unstabilized Land and TPCor = TSP/PM10 cor				0.5	fraction	
1 Rehabilita Unstabilized Land and ICE = Control efficiency				0.63	fraction	
1 Rehabilita Unstabilized Land and t = year (e.g. 0.65 year)				0.667	years	
1 Rehabilita Unstabilized Land and PM10 = 0.38 x A x TPCor				0	lbs	
2 New RunwAsphalt Drying			A = Area of land affectec	16749.9	m ²	
2 New RunwAsphalt Drying			AR = Application rate af	1.811	l/m ²	
2 New RunwAsphalt Drying			VD = Volume fraction of	0.35	fraction	
2 New RunwAsphalt Drying			EF = Mass fraction of dill	0.7	fraction	
2 New RunwAsphalt Drying			D = Density of solvent ut	1.8	lbs/l	
2 New RunwAsphalt Drying			VOC = A x AR x VD x EF x	13377.3	lbs	438.8
2 New RunwAsphalt Storage and Ba T = Mass of asphalt load				2179.1	tons	
2 New RunwAsphalt Storage and BaPM10 = (0.027 + 0.0004)				59.7	lbs	
2 New RunwAsphalt Storage and BaCO = (0.4 + 0.0004) x T				872.5	lbs	
2 New RunwAsphalt Storage and BaNOx = (0.025) x T				54.5	lbs	
2 New RunwAsphalt Storage and BaSOx = (0.0046) x T				10	lbs	
2 New RunwAsphalt Storage and BaVOC = (0.0082 + 0.0042)				27	lbs	
2 New Runw Material Movement (U = Surface material silt t				0.043	fraction	
2 New Runw Material Movement (U WL = Mean vehicle weig				32	tons	
2 New Runw Material Movement (U VMT = Vehicle miles tra				7354.6	miles	
2 New Runw Material Movement (U PM10 = 1.5 x [s/12]^0.9				201.4	lbs	
2 New Runw Material Movement (P:Sl = Road surface silt loa				0.1	g/m ³	
2 New Runw Material Movement (P:WT = Mean vehicle weig				32	tons	
2 New Runw Material Movement (P:VMT = Vehicle miles tra				6800	miles	
2 New Runw Material Movement (P:PM10 = 0.0022 x [s]^0.9				63.9	lbs	
2 New Runw Concrete Mixing/ Batch V = Volume of asphalt =				8338.9	yd ³	
2 New Runw Concrete Mixing/ Batch PM10 = 0.037 x V				308.5	lbs	
2 New Runw Unstabilized Land and IA = Area affected + L x V				4.139	acres	

2 New RunwUnstabilized Land and TPCConv = TSP/PM10 cor	0.5	fraction
2 New RunwUnstabilized Land and ICE = Control efficiency	0.63	fraction
2 New RunwUnstabilized Land and t = year (e.g. 0.65 year)	0.667	years
2 New RunwUnstabilized Land and PM10 = 0.38 x A x TPCor	0	lbs
2 New Runw Soil Handling	u = Wind speed	5
2 New Runw Soil Handling	m = Moisture content	0.25
2 New Runw Soil Handling	T = Mass of aggregate st	4958.3
2 New Runw Soil Handling	PM10 = T x 0.35 x 0.003:	102.1
3 Demolitto Soil Handling	u = Wind speed	5
3 Demolitto Soil Handling	m = Moisture content	0.25
3 Demolitto Soil Handling	T = Mass of aggregate st	1699.5
3 Demolitto Soil Handling	PM10 = T x 0.35 x 0.003:	35
3 Demolitto Unstabilized Land and A = Area affected = L x W	1.419	acres
3 Demolitto Unstabilized Land and TPCConv = TSP/PM10 cor	0.5	fraction
3 Demolitto Unstabilized Land and ICE = Control efficiency	0.63	fraction
3 Demolitto Unstabilized Land and t = year (e.g. 0.65 year)	0.25	years
3 Demolitto Unstabilized Land and PM10 = 0.38 x A x TPCor	0	lbs
3 Demolitto Material Movement (U s = Surface material silt t	0.043	fraction
3 Demolitto Material Movement (U Wt. = Mean vehicle weig	32	tons
3 Demolitto Material Movement (U VMT = Vehicle miles tra	1052.3	miles
3 Demolitto Material Movement (U PM10 = 1.5 x (U s /12)*0.9	28.8	lbs
3 Demolitto Material Movement (P:SL = Road surface silt loa	0.1	g/m3
3 Demolitto Material Movement (P:Wt. = Mean vehicle weig	32	tons
3 Demolitto Material Movement (P:VMT = Vehicle miles tra	975	miles
3 Demolitto Material Movement (P:PM10 = 0.0022 x (SL*0.9	9.051	lbs

=====

ASSUMPTIONS

Emission factors were developed from the following models:

- On-Road Vehicles: MOVES4
- Non-Road Equipment: MOVES4

In addition to the overall project size dimensions (e.g., Length and width) provided by the user, an additional 10 ft length and 10 ft width is added to account for disturbance areas.

The number of employees is based on the higher of two methods: (1) number of equipment, and (2) multiply the project cost in million by 11.

The average employee travels 30 miles round-trip from home to construction site each day.

The average on-road material delivery round-trip distance per truck is 40 miles per day.

For calculating fugitive, re-entrained PM emissions from on-road and non-road material delivery and handling equipment, a nominal VMT of 5 miles is used for each vehicle per day.

In deriving emission factors from NONROAD, the horsepower for each equipment represents the most popular in each equipment category.

The total length of each modeled scenario is used to define the number of days associated with vehicle/equipment evaporative emissions.

The choice of location and season are assumed to adequately represent differences in fuel characteristics affecting emissions.

Only two seasons (Summer and Winter) are used to represent all seasons.

14 U.S. Counties are used to represent all other counties in the U.S. (all other counties are mapped to the 14).

The default methods assume that all construction equipment use diesel as well as heavy-duty on-road vehicles, while passenger vehicles (including motorcycles) use gasoline.

- Fugitive emissions are only modeled for:
- Asphalt drying
 - Asphalt storage and batching
 - Concrete mixing/batching
 - Soil handling
 - Unstabilized land and wind erosion
 - Material movement (unpaved roads)
 - Material movement (paved roads)

On-Road vehicle speeds are not explicitly modeled. The associated emission factors for each modeled vehicle from MOVES represent averages over the driving cycles, the roadway type, and daily temperature variations.

The default equipment hours-of-use data are developed based on the overall size of the project provided by the user and activity rates based on expert engineering judgment.

Under the Construction Activity Type list (Activity Tab), when a choice between asphalt and concrete materials occurs, asphalt is always selected as default. To choose concrete, de-select the asphalt item and select the corresponding concrete item.

Two trips per day were assumed for each on-road material handling trucks.

Only CO2, CH4, and N2O are used to represent greenhouse gas emissions. Other potential greenhouse gases including air conditioning refrigerants were not included.

The following equipment are always modeled using diesel emission factors since gasoline-based emission factors are not available:

- Asphalt Deliveries/Ten Wheelers
- Bulldozer
- Concrete Ready Mix Trucks
- Concrete Ready Trucks Mix for Cores
- Concrete Truck
- Crack Filler (Trailer Mounted)
- Delivery of Tanks (3)
- Distributing Tanker
- Dozer
- Dump Truck
- Dump Truck (12 cy)
- Excavator
- Excavator for U/G Services/Tanks
- Flat Bed or Dump Trucks
- Flatbed Truck
- Grader
- Grout Wheel Truck
- Hoist Equipment with 40 Ton Rig
- Hydraulic Hammer
- Hydroseeder
- Line Painting Truck and Sprayer
- Material Deliveries
- Off-Road Truck
- Pickup Truck

Scraper
Seed Truck Spreader
Small Doser
Survey Crew Trucks
Ten Wheelers
Ten Wheelers- Material Delivery
Tool Truck
Tractor Trailer- Equipment Delivery
Tractor Trailer- Material Delivery
Tractor Trailer- Steel Deliveries
Tractor Trailer- Stone Delivery
Tractor Trailer- Topsoil & Seed
Tractor Trailer- Truck Delivery
Tractor Trailer with Boom Hoist- Curbs Del & Place
Tractor Trailer with Boom Hoist- Delivery
Tractor Trailers- Rebar Deliveries
Tractor Trailers Temp Fac.
Truck for Topsoil & Seed Del&Spread
Water Truck
Excavator with Bucket
Excavator with Hoe Ram

STUDY
Study Name
BDL TW T EA

Study Description
Construction 2027

EMISSIONS INVENTORY - DETAILS:

Non-Road Sources
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Table with 26 columns: Searched ID, Year, Project, Construction Activity, Equipment, Moves Equip, Moves Lookup, Fuel, HP Average, Load Factor, Hours of Activity, MOVES4 Emission Factors (g-hr), NONROAD Emissions (TPV), CO2. The table lists various construction activities like 'Rehabilitate Runway' and 'New Runway' with associated equipment and emission data.

3	2027	Demolition - Asphalt	Soil Handling	3	0	0	0	0.02155	0
3	2027	Demolition - Asphalt	nstabilized Land and Wind Erosio	3	0	0	0	7.685E-09	0
4	2027	Demolition - Concrete	ateral Movement (Paved Road)	3	0	0	0	0.0015085	0
4	2027	Demolition - Concrete	terial Movement (Unpaved Roa	3	0	0	0	0.004462	0
4	2027	Demolition - Concrete	Soil Handling	3	0	0	0	0.0001415	0
4	2027	Demolition - Concrete	nstabilized Land and Wind Erosio	3	0	0	0	5.045E-11	0
				Totals	0.76265	0.04765	0.008747	0.543512	0.4071

2027 Totals

Year	Source	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O	CO2e
2027	NonRoad	0.16	0.62	0.01	0.04	0.04	0.05	1954.77	--	--	
2027	OnRoad	3.327523985	1.569137797	0.004067989	0.023579808	0.021620782	0.140206328	1040.4185	0.01593	0.10496	
2027	Fugitive	0.76265	0.04765	0.008747	0.543512		0.4071				
2027	TOTAL	4.25	2.24	0.018	0.61	0.06	0.596	2717	0.01445	0.09522	2744

INPUT DATA AND SPECIFICATIONS

Project Final Selections

Scenario	Project	Construction Activity	Equipment	Fuel Type
1	Rehabilit	Asphalt Placement	Asphalt Paver	Diesel
1	Rehabilit	Asphalt Placement	Dump Truck	Diesel
1	Rehabilit	Asphalt Placement	Other General Equipment	Diesel
1	Rehabilit	Asphalt Placement	Pickup Truck	Diesel
1	Rehabilit	Asphalt Placement	Roller	Diesel
1	Rehabilit	Asphalt Placement	Skid Steer Loader	Diesel
1	Rehabilit	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel
1	Rehabilit	Cold Milling	Cold Planer	Diesel
1	Rehabilit	Cold Milling	Dump Truck	Diesel
1	Rehabilit	Cold Milling	Pickup Truck	Diesel
1	Rehabilit	Cold Milling	Sweepers	Diesel
1	Rehabilit	Cold Milling	Water Truck	Diesel
1	Rehabilit	Concrete Demolition	Concrete Saws	Diesel
1	Rehabilit	Concrete Demolition	Dump Truck	Diesel
1	Rehabilit	Concrete Demolition	Excavator	Diesel
1	Rehabilit	Concrete Demolition	Hydraulic Hammer	Diesel
1	Rehabilit	Concrete Demolition	Other General Equipment	Diesel
1	Rehabilit	Concrete Demolition	Pickup Truck	Diesel
1	Rehabilit	Dust Control	Water Truck	Diesel
1	Rehabilit	Excavation (Cut to Fill) (As:Dozer)	Dozer	Diesel
1	Rehabilit	Excavation (Cut to Fill) (As:Dump Truck (12 cy))	Dump Truck (12 cy)	Diesel
1	Rehabilit	Excavation (Cut to Fill) (As:Excavator)	Excavator	Diesel
1	Rehabilit	Excavation (Cut to Fill) (As:Pickup Truck)	Pickup Truck	Diesel
1	Rehabilit	Excavation (Cut to Fill) (As:Roller)	Roller	Diesel
1	Rehabilit	Excavation (Topsoil Strippi)	Dozer	Diesel
1	Rehabilit	Grading	Dozer	Diesel
1	Rehabilit	Grading	Grader	Diesel
1	Rehabilit	Grading	Roller	Diesel
1	Rehabilit	Hydroseeding	Hydroseeder	Diesel
1	Rehabilit	Hydroseeding	Off-Road Truck	Diesel
1	Rehabilit	Lighting	Dump Truck	Diesel
1	Rehabilit	Lighting	Loader	Diesel
1	Rehabilit	Lighting	Other General Equipment	Diesel
1	Rehabilit	Lighting	Pickup Truck	Diesel
1	Rehabilit	Lighting	Skid Steer Loader	Diesel
1	Rehabilit	Lighting	Tractors/Loader/Backhoe	Diesel
1	Rehabilit	Markings	Flatbed Truck	Diesel
1	Rehabilit	Markings	Other General Equipment	Diesel
1	Rehabilit	Markings	Pickup Truck	Diesel
1	Rehabilit	Sealing Random Cracks	Crack Cleaner	Diesel
1	Rehabilit	Sealing Random Cracks	Crack Filler (Trailer Mounted)	Diesel
1	Rehabilit	Sealing Random Cracks	Flatbed Truck	Diesel
1	Rehabilit	Sealing Random Cracks	Other General Equipment	Diesel
1	Rehabilit	Sealing Random Cracks	Pickup Truck	Diesel
1	Rehabilit	Soil Erosion/Sediment Con	Other General Equipment	Diesel
1	Rehabilit	Soil Erosion/Sediment Con	Pickup Truck	Diesel
1	Rehabilit	Soil Erosion/Sediment Con	Pumps	Diesel
1	Rehabilit	Soil Erosion/Sediment Con	Tractors/Loader/Backhoe	Diesel
1	Rehabilit	Subbase Placement	Dozer	Diesel
1	Rehabilit	Subbase Placement	Dump Truck (12 cy)	Diesel
1	Rehabilit	Subbase Placement	Pickup Truck	Diesel
1	Rehabilit	Subbase Placement	Roller	Diesel
1	Rehabilit	Topsoil Placement	Dozer	Diesel
1	Rehabilit	Topsoil Placement	Dump Truck	Diesel
1	Rehabilit	Topsoil Placement	Pickup Truck	Diesel
2	New Run	Asphalt Placement	Asphalt Paver	Diesel
2	New Run	Asphalt Placement	Dump Truck	Diesel
2	New Run	Asphalt Placement	Other General Equipment	Diesel
2	New Run	Asphalt Placement	Pickup Truck	Diesel
2	New Run	Asphalt Placement	Roller	Diesel
2	New Run	Asphalt Placement	Skid Steer Loader	Diesel
2	New Run	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel
2	New Run	Clearing and Grubbing	Chain Saw	Diesel
2	New Run	Clearing and Grubbing	Chipper/Stump Grinder	Diesel
2	New Run	Clearing and Grubbing	Pickup Truck	Diesel
2	New Run	Concrete Placement	Air Compressor	Diesel
2	New Run	Concrete Placement	Concrete Saws	Diesel
2	New Run	Concrete Placement	Concrete Truck	Diesel
2	New Run	Concrete Placement	Other General Equipment	Diesel
2	New Run	Concrete Placement	Pickup Truck	Diesel
2	New Run	Concrete Placement	Rubber Tired Loader	Diesel
2	New Run	Concrete Placement	Slip Form Paver	Diesel
2	New Run	Concrete Placement	Surfacing Equipment (Grooving)	Diesel
2	New Run	Drainage - 24 inch SICPP	Dozer	Diesel
2	New Run	Drainage - 24 inch SICPP	Dump Truck	Diesel
2	New Run	Drainage - 24 inch SICPP	Excavator	Diesel
2	New Run	Drainage - 24 inch SICPP	Loader	Diesel
2	New Run	Drainage - 24 inch SICPP	Other General Equipment	Diesel

*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***

2 New RunDrainage - 24 inch SICPP	Pickup Truck	Diesel
2 New RunDrainage - 24 inch SICPP	Roller	Diesel
2 New RunDrainage - 6 inch Perforate	Dump Truck	Diesel
2 New RunDrainage - 6 inch Perforate	Loader	Diesel
2 New RunDrainage - 6 inch Perforate	Other General Equipment	Diesel
2 New RunDrainage - 6 inch Perforate	Pickup Truck	Diesel
2 New RunDrainage - 6 inch Perforate	Tractors/Loader/Backhoe	Diesel
2 New RunDust Control	Water Truck	Diesel
2 New RunExcavation (Borrow)	Dozer	Diesel
2 New RunExcavation (Borrow)	Dump Truck (12 cy)	Diesel
2 New RunExcavation (Borrow)	Pickup Truck	Diesel
2 New RunExcavation (Borrow)	Roller	Diesel
2 New RunExcavation (Cut to Fill)	Dozer	Diesel
2 New RunExcavation (Cut to Fill)	Dump Truck (12 cy)	Diesel
2 New RunExcavation (Cut to Fill)	Excavator	Diesel
2 New RunExcavation (Cut to Fill)	Pickup Truck	Diesel
2 New RunExcavation (Cut to Fill)	Roller	Diesel
2 New RunExcavation (Cut to Fill)	Scraper	Diesel
2 New RunExcavation (Topsoil Strippi)	Dozer	Diesel
2 New RunFencing	Concrete Truck	Diesel
2 New RunFencing	Dump Truck	Diesel
2 New RunFencing	Other General Equipment	Diesel
2 New RunFencing	Pickup Truck	Diesel
2 New RunFencing	Skid Steer Loader	Diesel
2 New RunFencing	Tractors/Loader/Backhoe	Diesel
2 New RunGrading	Dozer	Diesel
2 New RunGrading	Grader	Diesel
2 New RunGrading	Roller	Diesel
2 New RunHydroseeding	Hydroseeder	Diesel
2 New RunHydroseeding	Off-Road Truck	Diesel
2 New RunLighting	Dump Truck	Diesel
2 New RunLighting	Loader	Diesel
2 New RunLighting	Other General Equipment	Diesel
2 New RunLighting	Pickup Truck	Diesel
2 New RunLighting	Skid Steer Loader	Diesel
2 New RunLighting	Tractors/Loader/Backhoe	Diesel
2 New RunMarkings	Flatbed Truck	Diesel
2 New RunMarkings	Other General Equipment	Diesel
2 New RunMarkings	Pickup Truck	Diesel
2 New RunSoil Erosion/Control	Other General Equipment	Diesel
2 New RunSoil Erosion/Control	Pickup Truck	Diesel
2 New RunSoil Erosion/Control	Pumps	Diesel
2 New RunSoil Erosion/Control	Tractors/Loader/Backhoe	Diesel
2 New RunSubbase Placement	Dozer	Diesel
2 New RunSubbase Placement	Dump Truck (12 cy)	Diesel
2 New RunSubbase Placement	Pickup Truck	Diesel
2 New RunSubbase Placement	Roller	Diesel
2 New RunTopsoil Placement	Dozer	Diesel
2 New RunTopsoil Placement	Dump Truck	Diesel
2 New RunTopsoil Placement	Pickup Truck	Diesel
2 New RunTopsoil Placement	Dozer	Diesel
3 DemolitiAsphalt Demolition	Excavator	Diesel
3 DemolitiAsphalt Demolition	Pickup Truck	Diesel
4 DemolitiConcrete Demolition	Excavator with Bucket	Diesel
4 DemolitiConcrete Demolition	Excavator with Hoe Ram	Diesel
4 DemolitiConcrete Demolition	Pickup Truck	Diesel

Overall Size

Scenario	Project	Project Size Questions	User Input	Unit
1	Rehabilit	What is the estimated cost		6.959 \$ Million(s)
1	Rehabilit	What is the maximum leng		100 Feet
1	Rehabilit	What is the maximum wid		1948 Feet
2	New Run	What is the estimated cost		4.299 \$ Million(s)
2	New Run	What is the maximum leng		100 Feet
2	New Run	What is the maximum wid		1204 Feet
3	Demoliti	What is the estimated cost		2.722 \$ Million(s)
3	Demoliti	What is the maximum leng		100 Feet
3	Demoliti	What is the maximum wid		762 Feet
4	Demoliti	What is the estimated cost		0.0178 \$ Million(s)
4	Demoliti	What is the maximum leng		50 Feet
4	Demoliti	What is the maximum wid		10 Feet

Size Detail (Estimated based on engineering experience)

Scenario	Project	Construction Activity	Default Activity Size	Unit	User Activity Size
1	Rehabilit	Asphalt Placement		21622.8 Square Yards	
1	Rehabilit	Cold Milling		21622.8 Square Yards	
1	Rehabilit	Concrete Demolition		21622.8 Square Feet	
1	Rehabilit	Concrete Demolition		194800 Square Feet	
1	Rehabilit	Dust Control		240 Days	
1	Rehabilit	Excavation (Cut to Fill) (As:		1801.9 Cubic Yards	
1	Rehabilit	Excavation (Topsoil Strippi		4324.6 Square Yards	
1	Rehabilit	Grading		4781.4 Square Yards	17223.1
1	Rehabilit	Hydroseeding		4781.4 Square Feet	155007.7
1	Rehabilit	Lighting		4096 Linear Feet	
1	Rehabilit	Markings		194800 Square Feet	
1	Rehabilit	Sealing Random Cracks		100 Linear Feet	
1	Rehabilit	Soil Erosion/Sediment Con		1 Acres	3.6
1	Rehabilit	Subbase Placement		21622.8 Square Yards	
1	Rehabilit	Subbase Placement		7207.6 Cubic Yards	
1	Rehabilit	Topsoil Placement		796.9 Cubic Yards	
2	New Run	Asphalt Placement		13384.4 Square Yards	
2	New Run	Clearing and Grubbing		3.1 Acres	
2	New Run	Concrete Placement		5568.5 Cubic Yards	
2	New Run	Drainage - 24 inch SICPP		110 Linear Feet	
2	New Run	Drainage - 6 inch Perforate		220 Linear Feet	
2	New Run	Dust Control		240 Days	
2	New Run	Excavation (Borrow)		5568.5 Cubic Yards	
2	New Run	Excavation (Cut to Fill)		5568.5 Cubic Yards	

Table with 2 columns: Activity Description and Value. Includes items like '2 New Run Excavation (Topsoil Strippi)', '2 New Run Fencing', etc., with values like 13364.4 Square Yards, 100 Linear Feet, etc.

53391.6
480524
11

Activity: Non-Road (Estimated based on engineering experience)

Main table with columns: Scenario, Project, Construction Activity, Equipment, Fuel Type, Activity Size, Activity Rate, Default Activity, User Activity Data. Lists various construction tasks and their estimated durations and fuel requirements.

*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***

2	New RunAsphalt Drying	A = Area of land affected = L x W	11185.2	m2
2	New RunAsphalt Drying	AR = Application rate of liquefied	1.811	l/m2
2	New RunAsphalt Drying	VD = Volume fraction of diluent	0.35	Fraction
2	New RunAsphalt Drying	EF = Mass fraction of diluent wh	0.7	fraction
2	New RunAsphalt Drying	D = Density of solvent utilized	1.8	lbs/l
2	New RunAsphalt Drying	VOC = A x AR x VD x EF x D	8933	lbs
2	New RunAsphalt Storage and Batch	T = Mass of asphalt loaded = L x	1455.1	tons
2	New RunAsphalt Storage and Batch	PM10 = $(0.027 + 0.00042) \times T$	39.9	lbs
2	New RunAsphalt Storage and Batch	CO = $(0.4 + 0.0004) \times T$	582.6	lbs
2	New RunAsphalt Storage and Batch	NOx = $(0.025) \times T$	36.4	lbs
2	New RunAsphalt Storage and Batch	SOx = $(0.0046) \times T$	6.694	lbs
2	New RunAsphalt Storage and Batch	VOC = $(0.0082 + 0.0042) \times T$	18	lbs
2	New RunMaterial Movement	(Unpas = Surface material silt content	0.043	fraction
2	New RunMaterial Movement	(UnpaVt = Mean vehicle weight	32	tons
2	New RunMaterial Movement	(UnpaVMT = Vehicle miles traveled	6340.6	miles
2	New RunMaterial Movement	(UnpaPM10 = $1.5 \times \{[(5/12)^{0.9}] \times \{[Wt$	173.7	lbs
2	New RunMaterial Movement	(PavesL = Road surface silt loading	0.1	g/m3
2	New RunMaterial Movement	(PaveVt = Mean vehicle weight	32	tons
2	New RunMaterial Movement	(PaveVMT = Vehicle miles traveled	6020	miles
2	New RunMaterial Movement	(PavePM10 = $0.0022 \times \{[(5/12)^{0.9}] \times \{[Wt$	55.9	lbs
2	New RunConcrete Mixing/Batching	V = Volume of asphalt = $0.111 \times$	5568.5	yd3
2	New RunConcrete Mixing/Batching	PM10 = $0.037 \times V$	206	lbs
2	New RunUnstabilized Land and Win	A = Area affected = L x W / 4356	2.764	acres
2	New RunUnstabilized Land and Win	TPConv = TSP/PM10 conversion	0.5	Fraction
2	New RunUnstabilized Land and Win	CE = Control efficiency	0.63	Fraction
2	New RunUnstabilized Land and Win	Wint = year (e.g. 0.65 year)	0.667	years
2	New RunUnstabilized Land and Win	PM10 = $0.38 \times A \times TPConv \times \{1-C$	0	lbs
2	New RunSoil Handling	u = Wind speed	5	mph
2	New RunSoil Handling	m = Moisture content	0.25	Fraction
2	New RunSoil Handling	T = Mass of aggregate storage p	3311	tons
2	New RunSoil Handling	PM10 = $T \times 0.35 \times 0.0032 \times \{[u/5$	68.2	lbs
3	DemolitiSoil Handling	u = Wind speed	5	mph
3	DemolitiSoil Handling	m = Moisture content	0.25	Fraction
3	DemolitiSoil Handling	T = Mass of aggregate storage p	2095.5	tons
3	DemolitiSoil Handling	PM10 = $T \times 0.35 \times 0.0032 \times \{[u/5$	43.1	lbs
3	DemolitiUnstabilized Land and Win	A = Area affected = L x W / 4356	1.749	acres
3	DemolitiUnstabilized Land and Win	TPConv = TSP/PM10 conversion	0.5	Fraction
3	DemolitiUnstabilized Land and Win	CE = Control efficiency	0.63	Fraction
3	DemolitiUnstabilized Land and Win	Wint = year (e.g. 0.65 year)	0.25	years
3	DemolitiUnstabilized Land and Win	PM10 = $0.38 \times A \times TPConv \times \{1-C$	0	lbs
3	DemolitiMaterial Movement	(Unpas = Surface material silt content	0.043	fraction
3	DemolitiMaterial Movement	(UnpaVt = Mean vehicle weight	32	tons
3	DemolitiMaterial Movement	(UnpaVMT = Vehicle miles traveled	1395.3	miles
3	DemolitiMaterial Movement	(UnpaPM10 = $1.5 \times \{[(5/12)^{0.9}] \times \{[Wt$	38.2	lbs
3	DemolitiMaterial Movement	(PavesL = Road surface silt loading	0.1	g/m3
3	DemolitiMaterial Movement	(PaveVt = Mean vehicle weight	32	tons
3	DemolitiMaterial Movement	(PaveVMT = Vehicle miles traveled	1300	miles
3	DemolitiMaterial Movement	(PavePM10 = $0.0022 \times \{[(5/12)^{0.9}] \times \{[Wt$	12.1	lbs
4	DemolitiSoil Handling	u = Wind speed	5	mph
4	DemolitiSoil Handling	m = Moisture content	0.25	Fraction
4	DemolitiSoil Handling	T = Mass of aggregate storage p	13.8	tons
4	DemolitiSoil Handling	PM10 = $T \times 0.35 \times 0.0032 \times \{[u/5$	0.283	lbs
4	DemolitiUnstabilized Land and Win	A = Area affected = L x W / 4356	0.011	acres
4	DemolitiUnstabilized Land and Win	TPConv = TSP/PM10 conversion	0.5	Fraction
4	DemolitiUnstabilized Land and Win	CE = Control efficiency	0.63	Fraction
4	DemolitiUnstabilized Land and Win	Wint = year (e.g. 0.65 year)	0.25	years
4	DemolitiUnstabilized Land and Win	PM10 = $0.38 \times A \times TPConv \times \{1-C$	0	lbs
4	DemolitiMaterial Movement	(Unpas = Surface material silt content	0.043	fraction
4	DemolitiMaterial Movement	(UnpaVt = Mean vehicle weight	32	tons
4	DemolitiMaterial Movement	(UnpaVMT = Vehicle miles traveled	325.8	miles
4	DemolitiMaterial Movement	(UnpaPM10 = $1.5 \times \{[(5/12)^{0.9}] \times \{[Wt$	8.924	lbs
4	DemolitiMaterial Movement	(PavesL = Road surface silt loading	0.1	g/m3
4	DemolitiMaterial Movement	(PaveVt = Mean vehicle weight	32	tons
4	DemolitiMaterial Movement	(PaveVMT = Vehicle miles traveled	325	miles
4	DemolitiMaterial Movement	(PavePM10 = $0.0022 \times \{[(5/12)^{0.9}] \times \{[Wt$	3.017	lbs

292.9

ASSUMPTIONS

Emission factors were developed from the following models:

On-Road Vehicles: MOVES4

Non-Road Equipment: MOVES4

In addition to the overall project size dimensions (e.g., length and width) provided by the user, an additional 10 ft length and 10 ft width is added to account for disturbance areas.

The number of employees is based on the higher of two methods: (1) number of equipment, and (2) multiply the project cost in million by 11.

The average employee travels 30 miles round-trip from home to construction site each day.

The average on-road material delivery round-trip distance per truck is 40 miles per day.

For calculating fugitive, re-entrained PM emissions from on-road and non-road material delivery and handling equipment, a nominal VMT of 5 miles is used for each vehicle per day.

In deriving emission factors from NONROAD, the horsepower for each equipment represents the most popular in each equipment category.

The total length of each modeled scenario is used to define the number of days associated with vehicle/equipment evaporative emissions.

The choice of location and season are assumed to adequately represent differences in fuel characteristics affecting emissions.

Only two seasons (Summer and Winter) are used to represent all seasons.

14 U.S. Counties are used to represent all other counties in the U.S. (all other counties are mapped to the 14).

The default methods assume that all construction equipment use diesel as well as heavy-duty on-road vehicles, while passenger vehicles (including motorcycles) use gasoline.

Fugitive emissions are only modeled for:

- Asphalt drying
- Asphalt storage and batching
- Concrete mixing/batching

Soil handling
Unstabilized land and wind erosion
Material movement (unpaved roads)
Material movement (paved roads)

On-Road vehicle speeds are not explicitly modeled. The associated emission factors for each modeled vehicle from MOVES represent averages over the driving cycles, the roadway type, and daily temperature variations.

The default equipment hours-of-use data are developed based on the overall size of the project provided by the user and activity rates based on expert engineering judgment.

Under the Construction Activity Type list (Activity Tab), when a choice between asphalt and concrete materials occurs, asphalt is always selected as default. To choose concrete, de-select the asphalt item and select the corresponding concrete item.

Two trips per day were assumed for each on-road material handling trucks.

Only CO2, CH4, and N2O are used to represent greenhouse gas emissions. Other potential greenhouse gases including air conditioning refrigerants were not included.

The following equipment are always modeled using diesel emission factors since gasoline-based emission factors are not available:

Asphalt Deliveries/Ten Wheelers
Bulldozer
Concrete Ready Mix Trucks
Concrete Ready Trucks Mix for Cores
Concrete Truck
Crack Filler (Trailer Mounted)
Delivery of Tanks (3)
Distributing Tanker
Dozer
Dump Truck
Dump Truck (12 cy)
Excavator
Excavator for U/G Services/Tanks
Flat Bed or Dump Trucks
Flatbed Truck
Grader
Grout Wheel Truck
Hoist Equipment with 40 Ton Rig
Hydraulic Hammer
Hydroseeder
Line Painting Truck and Sprayer
Material Deliveries
Off-Road Truck
Pickup Truck
Scraper
Seed Truck Spreader
Small Dozer
Survey Crew Trucks
Ten Wheelers
Ten Wheelers- Material Delivery
Tool Truck
Tractor Trailer- Equipment Delivery
Tractor Trailer- Material Delivery
Tractor Trailer- Steel Deliveries
Tractor Trailer- Stone Delivery
Tractor Trailer- Topsoil & Seed
Tractor Trailer- Truck Delivery
Tractor Trailer with Boom Hoist- Curbs Del & Place
Tractor Trailer with Boom Hoist- Delivery
Tractor Trailers- Rebar Deliveries
Tractor Trailers Temp Fac.
Truck for Topsoil & Seed Del&Spread
Water Truck
Excavator with Bucket
Excavator with Hoe Ram

=====

