APPENDIX A

Noise and Air Quality Analysis for BNA Supplemental Environmental Assessment

APPENDIX A.1

Noise and Air Quality Analysis for BNA Supplemental EA

HMMH
700 District Avenue, Suite 800
Burlington, MA 01803
781.229.0707

UPDATED TECHNICAL MEMORANDUM

To:	Avant Ramsey Ricondo & Associates 700 17th Street, Suite 2000 Denver, CO 80202
From:	Robert Mentzer, Principal Consultant Aofei Li, Consultant Philip DeVita, Principal Consultant
Date:	December 8, 2022
Subject:	Noise and Air Quality Analysis for BNA Supplemental EA
Reference:	HMMH Project Number 313520

HMMH is assisting Ricondo & Associates in preparing an Environmental Assessment (EA) for the Concourse A and Concourse D Gate Expansion Supplemental EA at Nashville International Airport (BNA). This analysis builds on the CAGE EA completed in 2021. The purpose of this technical memorandum is to present the noise and air quality modeling approach, input data, assumptions, and results.

In accordance with the scope of work, the noise and air quality analyses include an updated No Action and a Proposed Action case for 2035, based on revised forecast levels of operations assuming full operation of the planned expansions to both Concourse A (9 additional gates), Concourse E (8 new gates) and Concourse D (5 additional gates. The air quality analysis also considers construction emissions that would occur during the concourse expansion process; that assessment assumes that the construction would be completed in 2027.

The subsequent sections address the noise and air quality assessment separately. Both analyses include modeling with the Federal Aviation Administration (FAA)'s Aviation Environmental Design Tool (AEDT). FAA guidance on use of the AEDT specifies using the most recent version of the model that is available at the time the project commences. In this case, it is AEDT Version 3e[1]. All AEDT modeling conducted for this study adheres to "*Guidance on Using the AEDT to Conduct Environmental modeling for FAA Actions Subject to NEPA*." [2]

1.0 Noise Analysis

The noise analysis for this Environmental Assessment (EA) was conducted in accordance with FAA Order 1050.1F and its associated Environmental Desk Reference. These documents specify several requirements for evaluating noise impacts, including:

- Acceptable noise models to be used and the circumstances under which their use is required.
- The metrics to be used for characterizing the noise environment and quantifying impacts; and
- Thresholds of significance for determining whether the effects of an action would constitute a significant impact under the National Environmental Policy Act (NEPA).

For an action occurring on, or in the vicinity of a single airport, the Environmental Desk Reference directs the use of the latest version of the Aviation Environmental Design Tool (AEDT) for detailed noise modeling or another model, as approved by FAA. The model must be used to produce Day-Night Average Sound Level (DNL) 65 dB, DNL

[1] Released May 9, 2022. Available: https://aedt.faa.gov/3e_information.aspx
[2] Published October 27, 2017

70 dB, and DNL 75 dB contours, and others as needed. FAA considers DNL 65 dB as the threshold below which all land uses are compatible.

FAA Orders 1050.1F and 5050.4B determine a significant noise impact to be a DNL increase of 1.5 dB or more at a noise-sensitive location with a DNL of 65 dB or higher. For example, an increase from 63.5 dB to 65 dB within the same timeframe due to the Proposed Project would be considered a significant impact. If a noise increase is determined to be a significant impact to any of the surrounding noise sensitive properties, as defined in FAA Order 1050.1F, mitigation would be required.

Most aircraft noise studies focus on Day-Night Average Sound Level (DNL), the metric adopted by FAA and Environmental Protection Agency (EPA) as the most appropriate long-term measure of airport noise. DNL is determined by adding up the noise energy from all modeled aircraft activity at every individual point of a large array of grid points around an airport. In the DNL calculation, a 10-decibel weighting is applied to night[3] operations. Appendix A provides an overview of basic airport noise terminology, including details of how DNL is calculated.

Computer-generated estimates of DNL are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). The contours usually reflect long-term (annual average) operating conditions, accounting for the average flights per day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft normally fly.

The FAA requires that the following information must be disclosed for each modeled scenario that is analyzed:

- The number of residences or people residing within each noise contour where aircraft noise exposure is at or above DNL 65 dB, and the net increase or decrease in the number of people or residences exposed to that level of noise.
- The location and number of noise sensitive uses in addition to residences (e.g., schools, hospitals, parks, recreation areas) exposed to DNL 65 dB or greater.
- The identification of noise sensitive areas within the DNL 60 dB contour that are exposed to aircraft noise at or above DNL 60 dB, but below DNL 65 dB, and are projected to experience a noise increase of DNL 3 dB or more, only when DNL 1.5 dB increases are documented within the DNL 65 dB contour.
- Discussion of the noise impact on noise sensitive areas within the DNL 65 dB contour; and
- Mapping providing land use data, noise contours, and flight tracks for each scenario.

1.1 Noise Modeling Methodology and Inputs

AEDT noise model inputs are developed under the following categories:

- Physical description of the airport layout
- Aircraft operations
- Aircraft noise and performance characteristics
- Runway utilization
- Aircraft maintenance runup activity
- Flight track geometry and usage

[3] Night is defined as 10 pm to 7 am

- Meteorological conditions
- Terrain data

Section **Error! Reference source not found.** through Section **Error! Reference source not found.** address the noise model inputs for each of these categories. Section **Error! Reference source not found.** presents the resulting DNL contours.

1.1.1 Physical Description of the Airport Layout

BNA is located within Davidson County, approximately six miles southeast of downtown Nashville, TN. Error! Reference source not found. depicts the BNA airfield layout. As shown in the figure, the airport includes four, 150-foot wide runways, three of which are parallel, oriented in a north-northeast to south-southwest direction, and one "crosswind" runway that is roughly perpendicular to the parallel runways.

Each runway end is designated by a number that, with the addition of a trailing "0," reflects the magnetic heading of the runway to the nearest 10°, as seen by the pilot. Thus, "Runway 13-31" has the designation "13" at the west end of the pavement looking eastward, indicating that it is aligned on a magnetic heading of approximately 130°, while the opposite end of the same piece of pavement has the designation "31" indicating its orientation on an approximate heading of 310°. Runway 13-31 is 11,030 feet long. The three parallel runways, 2L-20R, 2C-20C and 2R-20L, are oriented on approximate magnetic headings of 20° and 200° and are 7,704 feet, 8,001 feet and 8,001 feet long, respectively. The parallel runways are distinguished from each other with letter endings "L", meaning left, "C", meaning center, and "R", meaning right, as seen by the pilot.

The parallel runways provide BNA with the greatest capacity to accommodate high numbers of aircraft operations. The crosswind runway is used for late night operations and occasionally at other times during strong crosswinds.

Runway length, runway width, instrumentation, and declared distances do not directly affect noise calculations. However, these parameters may affect which aircraft might use a particular runway and under what conditions, and therefore how often a runway would be used relative to the other runways at the airport.

Error! Reference source not found. provides the detailed parameters for each runway end. Note that each end of Runway 13/31 has a displaced landing threshold; the arrival thresholds are at the physical end of all other runways. All departures are assumed to start at the physical runway end on all runways.

Table 1. Runway Details

Runway End	Latitude (dd-mm-ss)	Longitude (dd-mm-ss)	Latitude (degrees)	Longitude (degrees)	Elevation (feet, MSL)	Displaced Landing Threshold (feet)	Glide Slope (degrees)	Threshold Crossing Height (feet)	Magnetic Orientation (degrees)
2C	36-06-11.9 N	86-41-16.6 W	36.103331	-86.687961	569	None	3	64	18
2L	36-07-03.6 N	86-41-11.3 W	36.117679	-86.686474	599	None	3	55	18
2R	36-06-45.7 N	86-40-03.5 W	36.112713	-86.667642	590	None	3	59	18
13	36-08-28.6 N	86-41-43.2 W	36.141276	-86.695355	536	800	3	55	133
20C	36-07-27.2 N	86-40-46.5 W	36.124233	-86.679597	572	None	3	68	198
20R	36-08-16.2 N	86-40-42.8 W	36.137842	-86.678566	556	None	3	79	198
20L	36-08-01.0 N	86-39-33.4 W	36.133614	-86.659277	540	None	3	50	198
31	36-07-13.7 N	86-40-05.4 W	36.120496	-86.668178	582	741	3	51	313
PAD 1	36-06-37.3 N	86-41-1.2 W	36.110385	-86.683677	577	Note: This is a helipad used to model helicopter operations at the intersection of Taxiways S and T4			

Sources: Approach plates published on http://airnav.com/airport/KBNA and FAA Form 5010, https://www.faa.gov/airports/airport_safety/airportdata_5010/, as of 11/23/2022

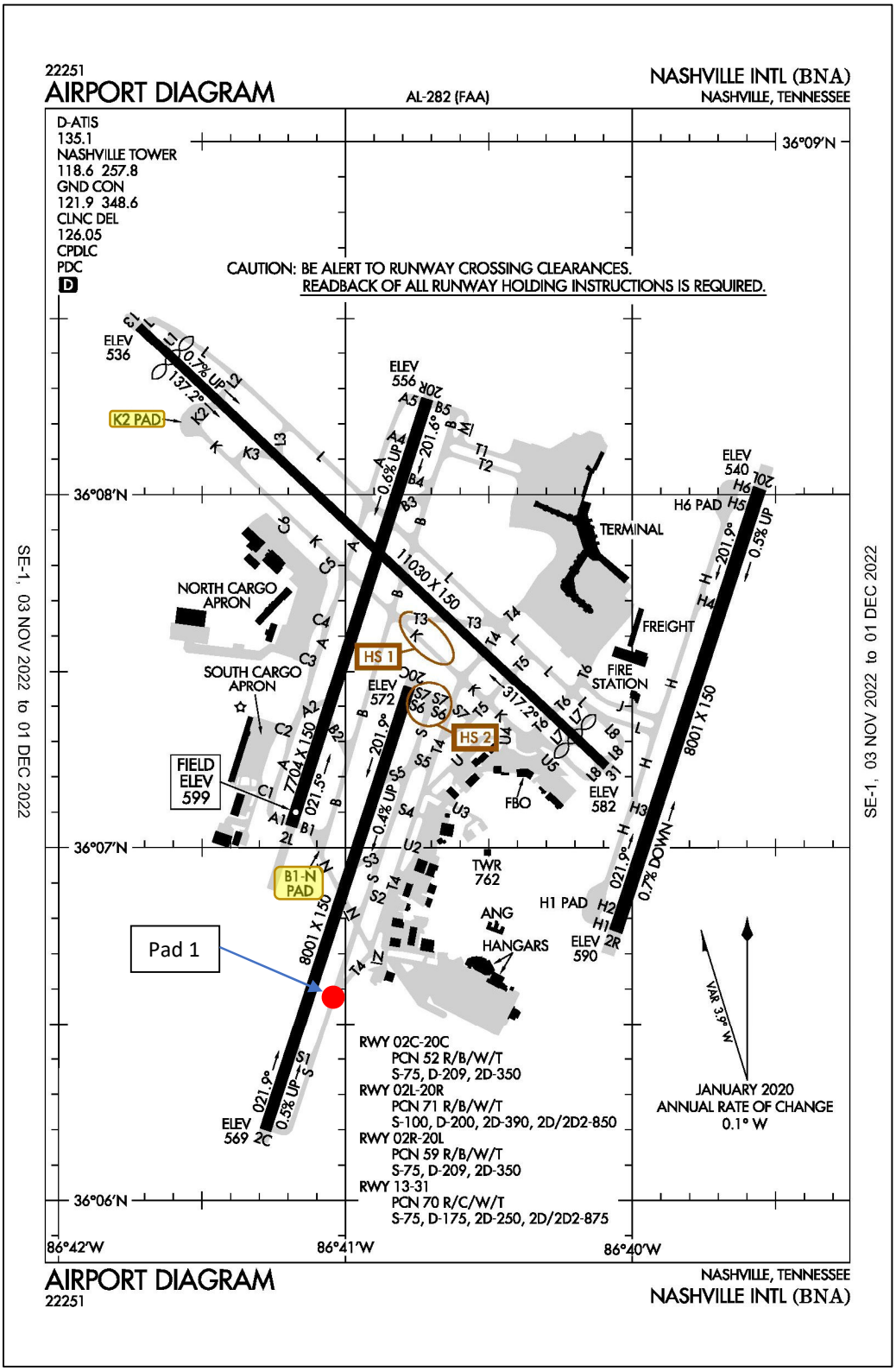


Figure 1. Existing BNA Airport Layout

Sources: FAA, MNAA
Note: Modeled Helipad location, "PAD 1," indicated by red dot, modeled runup locations highlighted

1.1.2 Aircraft Operations

The No Action and Proposed Action cases in this Supplemental EA have been updated and are representative of forecast year operations for 2035. The Master Plan Baseline Scenario forecast data (prepared by AECOM dated August 21, 2018) for 2035 was compared to the FAA 2021 Terminal Area Forecast (TAF) and the BNA Strategic Forecast. The BNA Strategic Forecast was prepared by MNAA once passenger levels rebounded from the pandemic above expectations. The BNA Strategic Forecast is very similar to the FAA 2021 TAF so therefore the FAA 2021 TAF for 2035 operation totals were used for the 2035 Proposed Action case. Because the proposed action includes the construction of 22 new gates, the number of forecasted air carrier passenger operations in the 2035 Proposed Action Case was reduced by 7,785 annual operations[4] to represent the 2035 No Action case. Error! Reference source not found. presents the annual operations modeled for the two cases.

Table 2. Modeled Annual Aircraft Operations

Case	Air Carrier		General Aviation		Military	Total Annual Operations	Total Average Daily Operations
	Passenger	Cargo	Air Taxi	Other GA			
2035 No Action	225,378	3,782	43,652	49,446	3,550	**325,808**	**892.6**
2035 Proposed Action	233,163	3,782	43,652	49,446	3,550	**333,593**	**914.0**

Sources: Ricondo & Associates, FAA 2021 TAF, 2022

The derivative forecast prepared by AECOM for the 2020 Noise Exposure Map (NEM) Update included specific fleet mix assumptions for all categories of aircraft operating at BNA. It also separated arrival and departure operations by the day and nighttime periods used in the calculation of DNL (7:00 a.m. to 10:00 p.m. for daytime and 10:00 p.m. to 7:00 a.m. for nighttime, as discussed in Appendix A), and further divided departure operations by stage length (discussed in section 1.1.3).

For this analysis, in addition to scaling the derivative forecast operations by category to the 2035 yearly totals shown in Error! Reference source not found., several specific aircraft type changes were made to represent a likely future fleet mix for 2035, based on observed trends and expectations in fleet retirements at this time. The Airbus A319 operations were replaced by Airbus A320 NEO, while the passenger Boeing 757 operations were replaced by Airbus A321 NEO. Additionally, it was assumed that about 75 percent of the operations being flown by A320 or A321 aircraft in the five-year forecast would also be replaced by A320 NEO and A321 NEO, respectively. Many of the smaller passenger jet operations by Boeing 717 or Canadair and Embraer models in the five-year forecast would occur in Airbus 220-100 or Airbus 220-300 aircraft instead. The 2035 forecast assumes that Boeing 737 operations would be upgraded to the "MAX" versions of those aircraft and the share of operations by Boeing 787-8 aircraft was increased slightly. In the cargo category, the Airbus A300 and Boeing 767-200 aircraft would be replaced by Boeing 767-300s, and the Boeing 757s would be replaced by 737-800s. In the GA category, 50 percent of the Gulfstream 400/450 aircraft were assumed to be replaced by the Gulfstream 650.

Error! Reference source not found. presents the 2035 No Action case detailed forecast of average daily operations by aircraft type for arrivals and departures. Error! Reference source not found. contains the modeled average daily operations for the 2035 Proposed Action case. The fleet mix percentages and the day/night split of operations for the Proposed Action case were assumed to be the same as for the No Action case; the only difference is the total number of operations by the passenger air carrier category. The column labeled "Runway Use Group" in Error! Reference source not found. and Error! Reference source not found. indicates how the operations with similar runway requirements were combined, as discussed in Section **Error! Reference source not found.**.

[4] The 7,785 operations represent the portion of the change in operations from the 2035 No Action case which could be attributed to the increase in gates comprised by the Action.

1.1.3 Aircraft Noise and Performance Characteristics

AEDT requires the use of specific noise and performance data for each aircraft type operating at the airport. Noise data are specified in the form of Sound Exposure Level (SEL) at a range of distances (from 200 feet to 25,000 feet) from a receiver on the ground to a particular aircraft with engines operating at a range of thrust levels. Performance data include thrust, speed and altitude profiles for takeoff and landing operations. The AEDT automatically accesses the noise and performance data for takeoff and landing operations by those aircraft types.

Within the AEDT database, aircraft departure profiles are defined by a range of trip distances identified as "stage lengths." Higher stage lengths (longer trip distances) are associated with heavier aircraft due to the increase in fuel requirements for the flight. The noise calculations presented in this document used the standard AEDT departure profiles.

Table 3. Modeled Average Daily Aircraft Operations for 2035 No Action

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Passenger Air Carrier						
Narrow-Body Jet	Airbus 220-100	737-700	18.70	3.38	20.58	1.50
Narrow-Body Jet	Airbus 220-300	737-700	24.22	1.90	22.20	3.91
Narrow-Body Jet	Airbus320 Neo	A320-271N	20.43	2.76	19.02	4.17
Narrow-Body Jet	Airbus 321 Neo	A321-232	5.21	0.32	5.20	0.32
Narrow-Body Jet	Airbus A320	A320-211	2.73	0.20	2.69	0.24
Narrow-Body Jet	Airbus A321	A321-232	1.63	0.09	1.62	0.10
Narrow-Body Jet	Boeing 737 MAX 8	737MAX8	1.88	0.24	1.94	0.19
Narrow-Body Jet	Boeing 737-700 Max	737MAX8	100.30	14.52	99.30	15.52
Narrow-Body Jet	Boeing 737-800 Max	737MAX8	40.91	10.24	42.24	8.91
Narrow-Body Jet	Boeing 737-900 Max	737800	1.63	0.12	1.57	0.18
Wide-Body Jet	Boeing 787-8	7878R	2.03	0.00	2.03	0.00
Other Jet	Canadair Regional Jet 900	CRJ9-ER	14.65	4.36	16.82	2.20
Other Jet	DHC-8-400 Dash 8Q	DHC830	1.26	0.00	1.26	0.00
Other Jet	Embraer RJ135	EMB175	1.10	0.21	1.02	0.29
Other Jet	Embraer 170	EMB170	3.96	0.08	4.01	0.03
Other Jet	Embraer 175 (long wing)	EMB175	18.09	2.02	17.80	2.31
Other Jet	Embraer 175 (short wing)	EMB175	9.25	0.31	8.97	0.60
Passenger Air Carrier Subtotals			**267.99**	**40.75**	**268.27**	**40.47**
Cargo Air Carrier						
Turboprop	Beechcraft 1900	1900D	0.01	0.02	0.01	0.01
Cargo	Boeing 737-800	737800	0.97	2.68	0.65	3.01
Cargo	Boeing 767-300	767300	0.26	1.16	0.45	0.97
Turboprop	Cessna 208 Caravan	CNA208	0.02	0.02	0.03	0.00
Cargo	McDonnell Douglas MD-11	MD11PW	0.02	0.00	0.02	0.00
Turboprop	SWEARINGEN Merlin 4	DHC6	0.01	0.02	0.02	0.01
Cargo Air Carrier Subtotals			**1.28**	**3.90**	**1.18**	**4.00**
General Aviation						
Other Jet	Beech Jet	MU3001	5.15	0.74	5.37	0.51

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Other Jet	Cessna 525 Citation Jet	CNA525C	6.31	0.91	6.58	0.63
Other Jet	Cessna 525B Citation Jet III	CNA525C	3.48	0.50	3.63	0.35
Other Jet	Cessna 550 Citation II	CNA55B	5.61	0.81	5.86	0.56
Other Jet	Citation Excel	CNA560U	5.47	0.78	5.70	0.55
Other Jet	Cessna 500 Citation II	CNA500	0.52	0.08	0.55	0.05
Other Jet	CJ1	CNA525C	0.24	0.03	0.25	0.02
Other Jet	CJ2	CNA525C	2.56	0.37	2.68	0.26
Other Jet	CJ4	CNA525C	3.52	0.51	3.67	0.35
Other Jet	Embraer 145XR	EMB14L	0.36	0.05	0.37	0.04
Other Jet	Embraer 170	EMB170	0.28	0.04	0.29	0.03
Other Jet	Embraer Phenom 100	CNA510	2.36	0.34	2.46	0.24
Other Jet	Embraer Phenom 300	CNA55B	2.90	0.42	3.03	0.29
Other Jet	Falcon 50	FAL900EX	6.20	0.89	6.47	0.62
Other Jet	Falcon 7	GIV	0.60	0.09	0.63	0.06
Other Jet	Falcon 9	FAL900EX	8.59	1.23	8.97	0.86
Other Jet	Global Express	BD-700-1A10	1.12	0.16	1.17	0.11
Other Jet	Gulfstream 400/450	GIV	2.82	0.40	2.94	0.28
Other Jet	Gulfstream 650	G650ER	2.82	0.40	2.94	0.28
Other Jet	Gulfstream 500	GV	2.89	0.41	3.01	0.29
Other Jet	Learjet 35	LEAR35	0.39	0.06	0.40	0.04
Other Jet	Mitsubishi MU-300	MU3001	0.04	0.01	0.04	0.00
Turboprop	Beech 200 Super King Air	DHC6	9.90	1.04	10.31	0.62
Turboprop	Beech 350 Super King Air	DHC6	7.64	0.80	7.96	0.48
Turboprop	Beech 90 King Air	DHC6	5.27	0.55	5.49	0.33
Turboprop	Cessna 208 Grand Caravan	CNA208	0.56	0.06	0.58	0.04
Turboprop	Pilatus PC-12 Eagle	CNA208	4.65	0.49	4.84	0.29
Piston	Beech 58 Baron	BEC58P	3.29	2.17	4.11	1.36
Piston	Beech Bonanza	GASEPV	0.22	0.28	0.48	0.01
Piston	Cessna 172 Skyhawk	CNA172	5.05	6.35	11.09	0.30
Piston	Cirrus SR-22	COMSEP	1.67	2.11	3.68	0.10
Piston	Piper Cherokee	PA28	0.89	1.12	1.96	0.05
General Aviation Subtotals			**103.36**	**24.17**	**117.53**	**10.01**
Military						
Helicopter	Blackhawk Helicopter	S70	3.08	0.00	3.08	0.00
Other Jet	F18H - F/A 18 Hornet	F-18	0.41	0.00	0.41	0.00
Narrow-Body Jet	Boeing 737-700	737700	0.11	0.01	0.11	0.01
Wide-Body Jet	Boeing 747 All Series	747400	0.01	0.00	0.01	0.00
Wide-Body Jet	Boeing KC-135 Stratotanker	KC135R	0.03	0.00	0.03	0.00
Turboprop	Lockheed 130 Hercules	C130	0.23	0.01	0.22	0.02

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Other Jet	Bombardier Learjet 35/36	LEAR35	0.43	0.01	0.43	0.01
Piston	Raytheon Texan 2	GASEPV	0.28	0.00	0.28	0.00
Turboprop	Beech 200 Super King	CNA441	0.26	0.00	0.25	0.01
Military Subtotals			**4.83**	**0.03**	**4.81**	**0.05**
Grand Totals			**377.46**	**68.85**	**391.78**	**54.53**
			446.31		**446.31**	

Sources: AECOM NEM forecast, Ricondo & Associates, and HMMH, 2022
Notes: Totals and subtotals may not match exactly due to rounding. Operations are carried out to 8 decimal places but are only presented to 2 decimal places (1/100th). 1/100th of an average annual day operation is less than 4 flights per year.
* The passenger aircraft type DHC-8 is not a jet aircraft but was modeled with the same runway usage as the "Other Jet" group.

Table 4. Modeled Average Daily Aircraft Operations for 2035 Proposed Action

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Passenger Air Carrier						
Narrow-Body Jet	Airbus 220-100	737-700	19.35	3.49	21.29	1.55
Narrow-Body Jet	Airbus 220-300	737-700	25.06	1.96	22.97	4.05
Narrow-Body Jet	Airbus 320 Neo	A320-271N	21.14	2.85	19.67	4.32
Narrow-Body Jet	Airbus 321 Neo	A321-232	5.39	0.33	5.38	0.33
Narrow-Body Jet	Airbus A320	A320-211	2.82	0.21	2.78	0.25
Narrow-Body Jet	Airbus A321	A321-232	1.69	0.09	1.68	0.10
Narrow-Body Jet	Boeing 737 MAX 8	737MAX8	1.95	0.25	2.01	0.19
Narrow-Body Jet	Boeing 737-700 Max	737MAX8	103.77	15.02	102.73	16.06
Narrow-Body Jet	Boeing 737-800 Max	737MAX8	42.32	10.60	43.70	9.22
Narrow-Body Jet	Boeing 737-900 Max	737800	1.69	0.12	1.63	0.18
Wide-Body Jet	Boeing 787-8	7878R	2.10	0.00	2.10	0.00
Other Jet	Canadair Regional Jet 900	CRJ9-ER	15.16	4.51	17.40	2.27
Other Jet	DHC-8-400 Dash 8Q	DHC830	1.30	0.00	1.30	0.00
Other Jet	Embraer RJ135	EMB175	1.14	0.22	1.06	0.30
Other Jet	Embraer 170	EMB170	4.10	0.08	4.15	0.03
Other Jet	Embraer 175 (long wing)	EMB175	18.72	2.09	18.42	2.39
Other Jet	Embraer 175 (short wing)	EMB175	9.57	0.32	9.28	0.62
Passenger Air Carrier Subtotals			**277.25**	**42.16**	**277.53**	**41.87**
Cargo Air Carrier						
Turboprop	Beechcraft 1900	1900D	0.01	0.02	0.01	0.01
Cargo	Boeing 737-800	737800	0.97	2.68	0.65	3.01
Cargo	Boeing 767-300	767300	0.26	1.16	0.45	0.97
Turboprop	Cessna 208 Caravan	CNA208	0.02	0.02	0.03	0.00

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Cargo	McDonnell Douglas MD-11	MD11PW	0.02	0.00	0.02	0.00
Turboprop	SWEARINGEN Merlin 4	DHC6	0.01	0.02	0.02	0.01
Cargo Air Carrier Subtotals			**1.28**	**3.90**	**1.18**	**4.00**
General Aviation						
Other Jet	Beech Jet	MU3001	5.15	0.74	5.37	0.51
Other Jet	Cessna 525 Citation Jet	CNA525C	6.31	0.91	6.58	0.63
Other Jet	Cessna 525B Citation Jet III	CNA525C	3.48	0.50	3.63	0.35
Other Jet	Cessna 550 Citation II	CNA55B	5.61	0.81	5.86	0.56
Other Jet	Citation Excel	CNA560U	5.47	0.78	5.70	0.55
Other Jet	Cessna 500 Citation II	CNA500	0.52	0.08	0.55	0.05
Other Jet	CJ1	CNA525C	0.24	0.03	0.25	0.02
Other Jet	CJ2	CNA525C	2.56	0.37	2.68	0.26
Other Jet	CJ4	CNA525C	3.52	0.51	3.67	0.35
Other Jet	Embraer 145XR	EMB14L	0.36	0.05	0.37	0.04
Other Jet	Embraer 170	EMB170	0.28	0.04	0.29	0.03
Other Jet	Embraer Phenom 100	CNA510	2.36	0.34	2.46	0.24
Other Jet	Embraer Phenom 300	CNA55B	2.90	0.42	3.03	0.29
Other Jet	Falcon 50	FAL900EX	6.20	0.89	6.47	0.62
Other Jet	Falcon 7	GIV	0.60	0.09	0.63	0.06
Other Jet	Falcon 9	FAL900EX	8.59	1.23	8.97	0.86
Other Jet	Global Express	BD-700-1A10	1.12	0.16	1.17	0.11
Other Jet	Gulfstream 40/450	GIV	2.82	0.40	2.94	0.28
Other Jet	Gulfstream 650	G650ER	2.82	0.40	2.94	0.28
Other Jet	Gulfstream 500	GV	2.89	0.41	3.01	0.29
Other Jet	Learjet 35	LEAR35	0.39	0.06	0.40	0.04
Other Jet	Mitsubishi MU-300	MU3001	0.04	0.01	0.04	0.00
Turboprop	Beech 200 Super King Air	DHC6	9.90	1.04	10.31	0.62
Turboprop	Beech 350 Super King Air	DHC6	7.64	0.80	7.96	0.48
Turboprop	Beech 90 King Air	DHC6	5.27	0.55	5.49	0.33
Turboprop	Cessna 208 Grand Caravan	CNA208	0.56	0.06	0.58	0.04
Turboprop	Pilatus PC-12 Eagle	CNA208	4.65	0.49	4.84	0.29
Piston	Beech 58 Baron	BEC58P	3.29	2.17	4.11	1.36
Piston	Beech Bonanza	GASEPV	0.22	0.28	0.48	0.01
Piston	Cessna 172 Skyhawk	CNA172	5.05	6.35	11.09	0.30
Piston	Cirrus SR-22	COMSEP	1.67	2.11	3.68	0.10
Piston	Piper Cherokee	PA28	0.89	1.12	1.96	0.05
General Aviation Subtotals			**103.36**	**24.17**	**117.53**	**10.01**
Military						
Helicopter	Blackhawk Helicopter	S70	3.08	0.00	3.08	0.00

Runway Use Group	Aircraft Type	AEDT Type	Departures		Arrivals	
			Day	Night	Day	Night
Other Jet	F18H - F/A 18 Hornet	F-18	0.41	0.00	0.41	0.00
Narrow-Body Jet	Boeing 737-700	737700	0.11	0.01	0.11	0.01
Wide-Body Jet	Boeing 747 All Series	747400	0.01	0.00	0.01	0.00
Wide-Body Jet	Boeing KC-135 Stratotanker	KC135R	0.03	0.00	0.03	0.00
Turboprop	Lockheed 130 Hercules	C130	0.23	0.01	0.22	0.02
Other Jet	Bombardier Learjet 35/36	LEAR35	0.43	0.01	0.43	0.01
Piston	Raytheon Texan 2	GASEPV	0.28	0.00	0.28	0.00
Turboprop	Beech 200 Super King	CNA441	0.26	0.00	0.25	0.01
Military Subtotals			**4.83**	**0.03**	**4.81**	**0.05**
Grand Totals			**386.72**	**70.26**	**401.05**	**55.93**
			456.98		**456.97**	

Sources: AECOM NEM forecast, Ricondo & Associates, and HMMH, 2022
Notes: Totals and subtotals may not match exactly due to rounding. Operations are carried out to 8 decimal places but are only presented to 2 decimal places (1/100th). 1/100th of an average annual day operation is less than 4 flights per year.
* The passenger aircraft type DHC-8 is not a jet aircraft but was modeled with the same runway usage as the "Other Jet" group.

1.1.4 Runway Utilization

Weather, particularly wind direction and wind speed, is the primary factor affecting runway use at airports. Additional factors that may affect runway use include the position of a facility (such as a passenger terminal) relative to the runways and temporary runway closures, generally for airfield maintenance and construction. In the development of the updated BNA noise exposure maps, runway usage rates were calculated for six aircraft groups sharing common runway use characteristics, using actual operations data from the Metropolitan Nashville Airport Authority (MNAA) Flight Track Monitoring System (FTMS). Large jet aircraft are divided into wide-body and narrow-body categories, and cargo jet aircraft are in their own category. Smaller passenger jets (regional jets) and general aviation jets are in the "other jet" category. Non-jet aircraft are the piston and turboprop groups. With no anticipation of significant difference in runway use for the five-year forecast, the same runway usage was modeled for the five-year forecast as for the existing conditions.

No change in runway use is anticipated from the NEM conditions to the 2035 forecast cases, nor for the Proposed Action case in comparison to the No Action case. Error! Reference source not found. provides the modeled jet runway use percentages for departures and arrivals for the day and nighttime periods used in the calculation of DNL. Error! Reference source not found. provides the same information for the non-jet aircraft.

Table 5. Modeled Average Daily Jet Runway Use for Both 2035 Cases

Runway	Departure		Arrival	
	Day	Night	Day	Night
	Wide-Body Jet			
2L	17.0%	39.2%	20.0%	15.4%
2C	2.8%	--	10.0%	7.7%
2R	6.6%	--	7.9%	3.8%
13	2.8%	3.6%	0.7%	--
20L	--	--	21.4%	19.2%

	Departure		Arrival	
	Day	Night	Day	Night
Runway	**Wide-Body Jet**			
20C	23.6%	17.9%	1.4%	3.8%
20R	27.4%	17.9%	31.5%	23.1%
31	19.8%	21.4%	7.1%	27.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Runway	**Narrow-Body Jet**			
2L	19.4%	14.5%	9.0%	12.4%
2C	3.8%	1.7%	19.4%	17.3%
2R	15.0%	10.5%	20.1%	14.8%
13	0.1%	0.1%	0.1%	0.6%
20L	1.1%	6.6%	29.5%	26.3%
20C	40.8%	32.7%	3.2%	2.1%
20R	9.2%	8.3%	17.6%	20.1%
31	10.6%	25.6%	1.1%	6.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Runway	**Cargo**			
2L	33.6%	36.7%	30.1%	25.3%
2C	3.7%	0.6%	11.4%	5.7%
2R	4.5%	0.2%	8.1%	0.4%
13	--	0.1%	--	--
20L	0.7%	0.2%	10.2%	5.0%
20C	30.6%	15.6%	2.5%	2.4%
20R	20.9%	34.1%	36.0%	42.0%
31	6.0%	12.5%	1.7%	19.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Runway	**Other Jet**			
2L	7.7%	4.4%	4.1%	3.6%
2C	21.9%	12.5%	32.3%	31.4%
2R	7.6%	5.0%	11.7%	6.6%
13	0.1%	--	--	--
20L	1.1%	1.9%	21.7%	19.7%
20C	50.0%	43.7%	20.1%	19.0%
20R	2.6%	1.3%	9.1%	10.2%
31	9.0%	31.2%	1.0%	9.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BNA Noise Exposure Map (NEM) Update, 2020, BNA CAGE EA, 2021
Note: Individual entries may not add exactly to 100% due to rounding.

Table 6. Modeled Average Daily Non-Jet Runway Use for Both 2035 Cases

	Departure		Arrival	
	Day	Night	Day	Night
Runway	Piston			
2L	5.9%	-	2.0%	3.8%
2C	20.6%	6.1%	34.1%	61.9%
2R	8.0%	2.9%	12.2%	-
13	-	-	-	-
20L	0.9%	-	19.6%	6.1%
20C	51.9%	77.4%	24.1%	17.2%
20R	3.7%	2.5%	5.2%	1.1%
31	9.0%	11.1%	2.8%	9.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Runway	**Turboprop**			
2L	14.3%	-	16.0%	17.5%
2C	15.1%	19.8%	25.3%	32.9%
2R	5.0%	3.6%	6.4%	-
13	-	-	0.1%	-
20L	0.6%	-	15.9%	9.5%
20C	38.6%	58.9%	14.2%	20.4%
20R	16.8%	3.0%	21.8%	13.9%
31	9.6%	14.7%	0.3%	5.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BNA Noise Exposure Map (NEM) Update, 2020, BNA CAGE EA, 2021
Note: Individual entries may not add exactly to 100% due to rounding.

1.1.5 Aircraft Maintenance Runup Activity

The DNL contours include the effect of maintenance engine runup activity conducted at two designated on-airfield runup locations. Those locations are marked as K2 and B1-N on the airport diagram (**Figure 1**). For the purposes of this analysis, the five-year forecast level of runup operations from the NEM Update are scaled up by 12.5 percent to represent 2035 conditions for the Supplemental EA. Also, corresponding to what was done for the modeling of the flight operations, specific aircraft type changes[5] were made from the 2025 fleet to represent a likely future fleet mix for 2035. **Table 7** shows the maintenance runup modeling details for the 2035 cases.

Table 7. Modeled Average Daily Runup Operations for Both 2035 Cases

Aircraft	Runup Location	Heading (Deg. Mag.)	Percent Power	Duration (Seconds)	Runups Per Day	
					7 am – 10 pm	10 pm – 7 am
DHC6	K2	310	80	600	0.023	0.000
DHC6	B1-N	200	80	600	0.023	0.000
GASEPV	K2	310	80	600	0.045	0.000
GASEPV	B1-N	200	80	600	0.045	0.000
MU3001	K2	310	100	180	0.045	0.000
MU3001	K2	310	75	600	0.045	0.000

[5] A description of the fleet modernization assumptions is provided prior to Error! Reference source not found..

Aircraft	Runup Location	Heading (Deg. Mag.)	Percent Power	Duration (Seconds)	Runups Per Day	
					7 am – 10 pm	10 pm – 7 am
BEC58P	K2	310	80	600	0.023	0.000
BEC58P	B1-N	200	80	600	0.023	0.000
CNA500	K2	310	100	180	0.180	0.000
CNA500	K2	310	75	600	0.180	0.000
CNA55B	K2	310	100	180	0.045	0.000
CNA55B	K2	310	75	600	0.045	0.000
CNA560U	K2	310	100	180	0.045	0.000
CNA560U	K2	310	75	600	0.045	0.000
CNA525C	K2	310	100	180	0.045	0.000
CNA525C	K2	310	75	600	0.045	0.000
LEAR35	K2	310	100	180	0.045	0.000
LEAR35	K2	310	75	600	0.045	0.000
FAL900EX	K2	310	100	120	0.018	0.000
GIV	B1-N	200	50	180	0.074	0.000
A320-271N	K2	310	100	180	0.000	0.014
A320-271N	B1-N	200	100	180	0.000	0.068
737-700	K2	310	100	180	0.000	0.005
737-700	B1-N	200	100	180	0.000	0.009
737MAX8	K2	310	100	180	0.000	0.041
737MAX8	B1-N	200	100	180	0.000	0.011
A321-232	K2	310	100	180	0.000	0.020
A321-232	B1-N	200	100	180	0.000	0.011
737-700	K2	310	85	180	0.000	0.111
EMB170	K2	310	85	180	0.000	0.445
737-700	B1-N	200	90	300	0.000	0.562
737-700	K2	310	90	300	0.000	0.562
EMB175	B1-N	200	90	300	0.000	0.981
EMB175	K2	310	90	300	0.000	0.981

Sources: BNA Noise Exposure Map (NEM) Update, 2020, BNA CAGE EA, 2021

1.1.6 Flight Track Geometry and Use

In addition to runway usage, radar data from the MNAA's FTMS provided an ideal source of information for identifying where aircraft fly and how often they use different flight corridors in the vicinity of the airport. In the development of the updated BNA NEM, sets of prototypical flight tracks were defined for noise modeling. Known as "backbones," these tracks follow the central tendency of more dispersed paths flown by aircraft along each major flight corridor. Additional tracks were created to either side of the backbones to account for the dispersion within each corridor, and traffic is distributed normally[6] onto each track group to reflect the spreading of noise along the corridor.

Aircraft are assigned to specific modeling tracks based on historical averages determined through analysis of the radar data. Knowledge of destinations for departures from the airport or points of origin for arrivals to the airport are also considered. The standard procedure for model track development entails separating tracks by operation type, (e.g., arrival or departure) and runway end. Next, the destination direction (e.g. northeast, south, west, etc.) defines flight track groups. HMMH analyzed flight tracks with the same operation type, runway end, and destination direction for similar geometry and this resulted in the final flight track bundles used to create model tracks.

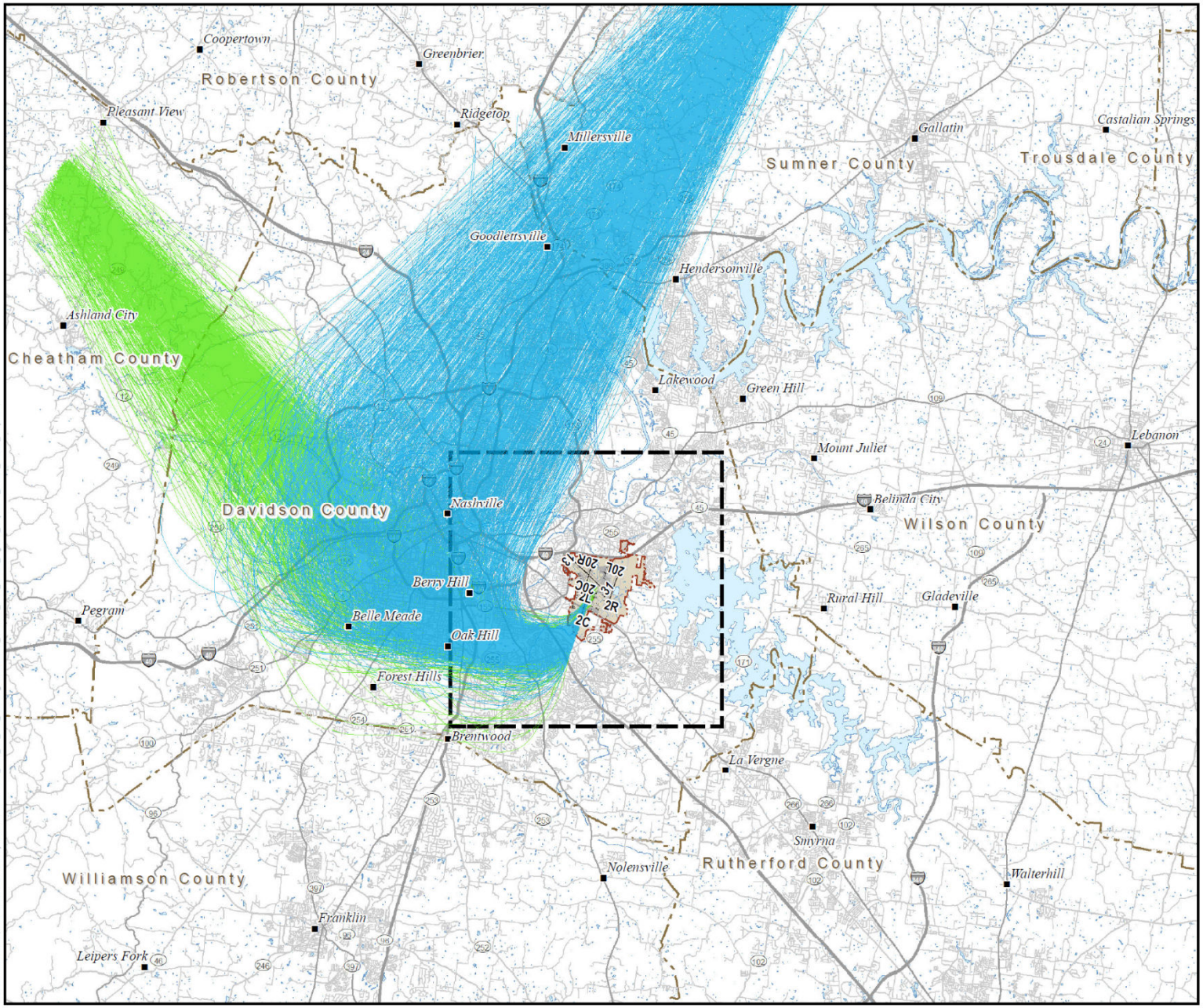
[6] According to a statistical normal (Gaussian) distribution

This process is illustrated in **Error! Reference source not found.** and **Error! Reference source not found.**. **Error! Reference source not found.** displays jet radar tracks from Runway 20C to the northwest and northeast destinations in different colors and **Error! Reference source not found.** displays just the northeast set of Runway 20C jet departures with the AEDT model backbone and sub-tracks. Model flight tracks are labeled with a number following the designations distinguish tracks that take different routes from the same runway end. For example, flight track ADJD20C_14 identifies the time of day (D for day, as opposed to N for night), the primary aircraft type, (J for jet, as opposed to N for non-jet), a departure flight track (D, as opposed to A if it were an arrival) from Runway 20C (20C). The number at the end of the track name differentiates it from others in its group.

All fixed-wing aircraft flight tracks start or end at runway ends (or at displaced landing thresholds for arrivals to both ends of Runway 13-31). Helicopter tracks generally start and end at a defined helipad and thus are modeled as flights to and from the midfield area (the helipad "PAD 1" identified in Error! Reference source not found. and marked on Error! Reference source not found.).

Error! Reference source not found. and Error! Reference source not found. present the modeled flight track geometry, for north- and south-flow operations, respectively. These tracks were developed during the NEM Update from the MNAA's FTMS. The set of flight tracks reflects existing operations following RNAV departures and some Required Navigational Performance (RNP) arrival procedures, which are a subset of the more advanced Performance Based Navigation (PBN) procedures that the FAA is in the process of implementing across the U.S. There was no reason to anticipate any significant difference in flight track geometry or usage for the Supplemental EA forecast, so the same flight track inputs were modeled for the No Action 2035 contours.

No change in flight track geometry or usage is anticipated for the Proposed Action case in comparison to the No Action case. **Table 8** presents the modeled flight track usage rates by runway end and aircraft type category, for arrivals and departures. The usage rates were developed using the same sample of radar data that formed the basis of the runway use and flight track geometry.



BNA Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

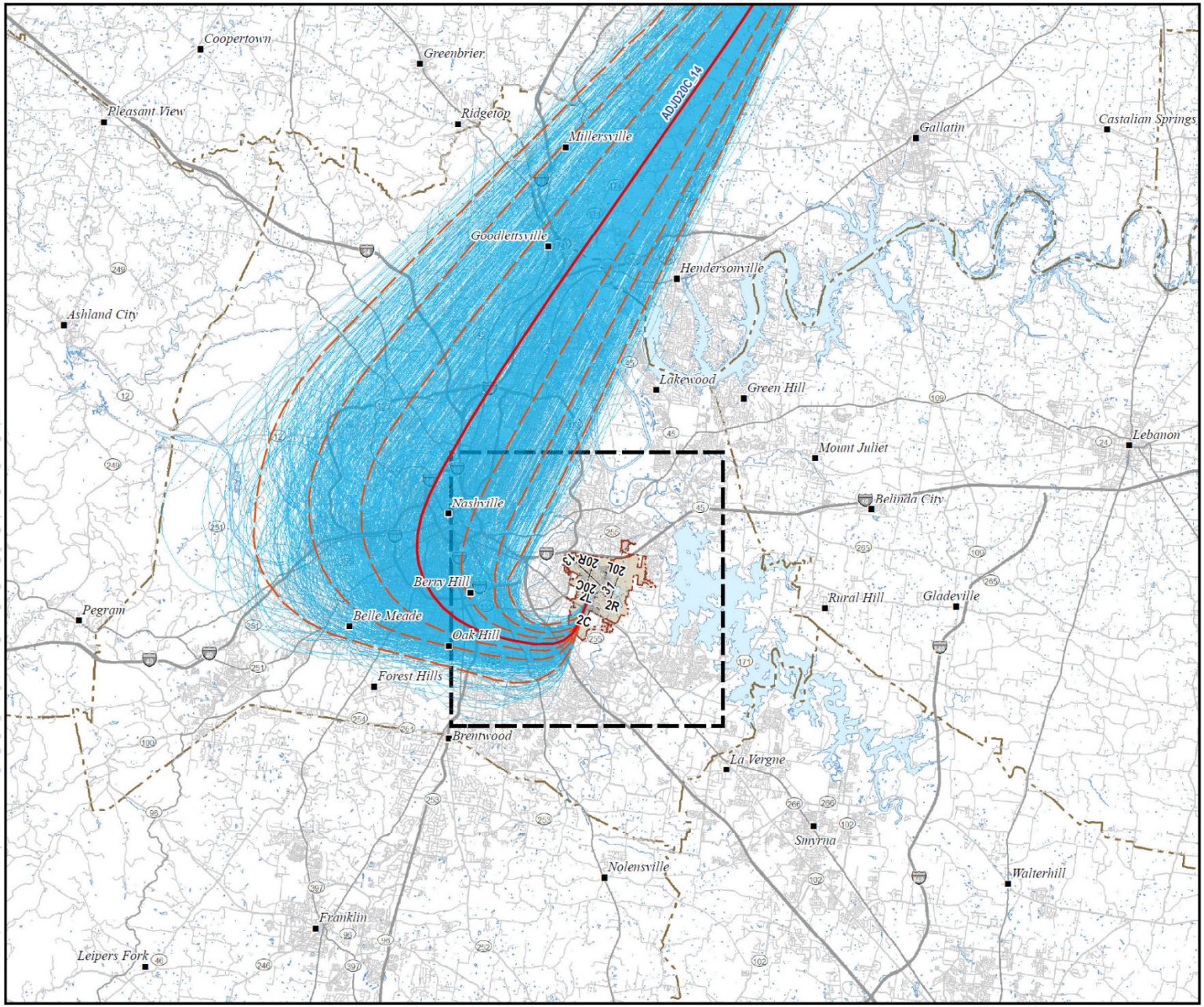
Figure: 2

Jet Departure Radar Tracks from Runway 20C with Northwest or Northeast Destinations

- Radar Tracks Northeast (Departure)
- Radar Tracks Northwest (Departure)
- BNA Airport Boundary (Approximate)
- Runway
- BNA Study Area
- State Boundary
- County Boundary
- Water / Stream
- Highway
- Minor Roads
- Major Roads

0 3 6 NMi

N



Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

Figure: 3

Jet Departure Radar Tracks and AEDT Model Track Set from Runway 20C with Northeast Destinations

- Model Backbone Track (Departure)
- Model Track Backbone (Departure)
- Radar Tracks Northeast (Departure)
- BNA Airport Boundary (Approximate)
- Runway
- BNA Study Area
- State Boundary
- County Boundary
- Water / Stream
- Highway
- Major Roads
- Minor Roads

0 3 6 NMi

N

hmmh



BNA Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

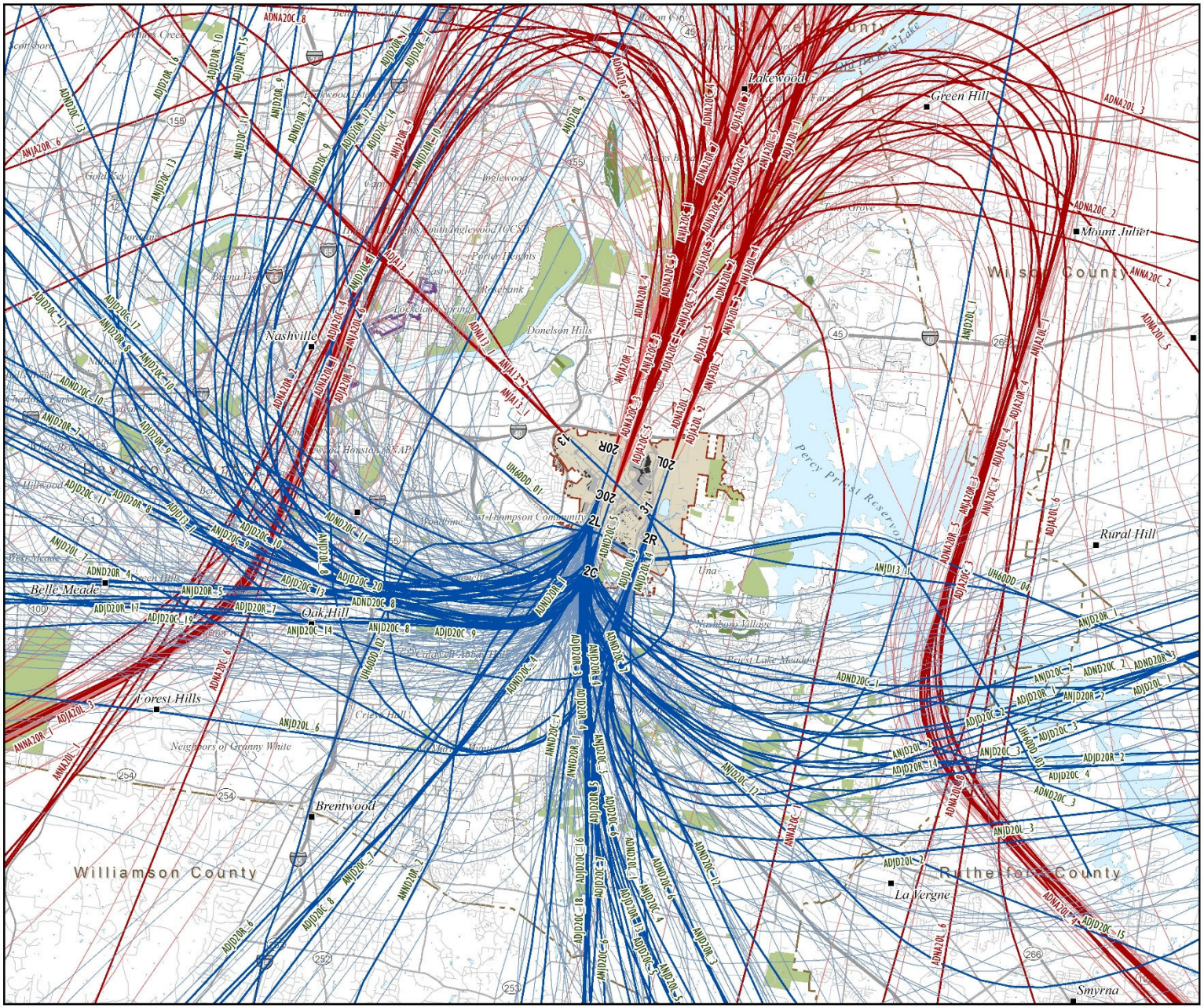
Figure: 4

North Flow Arrival and Departure Flight Tracks

- Model Backbone Track (Arrival)
- Model Backbone Track (Departure)
- Model Track (Arrival)
- Model Track (Departure)
- BNA Airport Boundary (Approximate)
- Runway
- State Boundary
- Municipal Boundary
- Highway
- Minor Roads
- Major Roads
- Railroad
- Recreational / Open Space / Golf
- Water / Stream

0 10,000 20,000 Feet

N



BNA Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

Figure: 5

South Flow Arrival and Departure Flight Tracks

- Model Backbone Track (Arrival)
- Model Backbone Track (Departure)
- Model Track (Arrival)
- Model Track (Departure)
- BNA Airport Boundary (Approximate)
- Runway
- State Boundary
- Municipal Boundary
- Highway
- Minor Roads
- Major Roads
- Railroad
- Recreational / Open Space / Golf
- Water / Stream

0 10,000 20,000 Feet

N

hmmh

Table 8. Modeled Jet Flight Track Utilization

Jet						
Runway	Departures			Arrivals		
	Track ID	Percent Use		Track ID	Percent Use	
		Day	Night		Day	Night
2C	ADJD02C_1 (1)	3.42%	-	ADJA02C_1 (7)	39.18%	-
	ADJD02C_2 (1)	5.75%	-	ADJA02C_2 (7)	15.60%	-
	ADJD02C_3 (3)	11.51%	-	ADJA02C_3 (7)	32.71%	-
	ADJD02C_4 (3)	8.89%	-	ADJA02C_4 (7)	11.04%	-
	ADJD02C_5 (1)	3.06%	-	ADJA02C_5 (3)	1.28%	-
	ADJD02C_6 (3)	6.63%	-	ADJA02C_6 (1)	0.19%	-
	ADJD02C_7 (1)	2.11%	-	ANJA02C_1 (5)	-	36.64%
	ADJD02C_8 (3)	6.92%	-	ANJA02C_2 (5)	-	26.48%
	ADJD02C_9 (3)	12.89%	-	ANJA02C_3 (5)	-	9.93%
	ADJD02C_10 (3)	17.48%	-	ANJA02C_4 (5)	-	17.73%
	ADJD02C_12 (1)	3.57%	-	ANJA02C_5 (5)	-	9.22%
	ADJD02C_13 (1)	1.46%	-	ANJA02C_1 (5)	-	36.64%
	ADJD02C_14 (1)	3.57%	-			
	ADJD02C_15 (1)	3.35%	-			
	ADJD02C_16 (1)	2.04%	-			
	ADJD02C_17 (1)	5.68%	-			
	ADJD02C_18 (1)	1.68%	-			
	ANJD02C_1 (5)	-	29.23%			
	ANJD02C_2 (5)	-	16.92%			
	ANJD02C_3 (5)	-	13.08%			
	ANJD02C_4 (3)	-	16.15%			
	ANJD02C_5 (3)	-	14.62%			
	ANJD02C_6 (3)	-	10.00%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
2L	ADJD02L_1 (3)	7.70%	-	ADJA02L_1 (7)	28.10%	-
	ADJD02L_2 (7)	24.77%	-	ADJA02L_2 (5)	18.64%	-
	ADJD02L_3 (3)	2.68%	-	ADJA02L_3 (7)	27.86%	-
	ADJD02L_4 (3)	3.80%	-	ADJA02L_4 (1)	0.56%	-
	ADJD02L_5 (3)	4.07%	-	ADJA02L_5 (7)	23.19%	-
	ADJD02L_6 (7)	19.73%	-	ADJA02L_6 (1)	1.22%	-
	ADJD02L_7 (7)	23.80%	-	ADJA02L_7 (1)	0.43%	-
	ADJD02L_8 (3)	7.92%	-	ANJA02L_1 (7)	-	21.47%
	ADJD02L_9 (1)	0.65%	-	ANJA02L_2 (7)	-	15.57%
	ADJD02L_10 (1)	0.35%	-	ANJA02L_3 (5)	-	33.08%
	ADJD02L_11 (1)	0.50%	-	ANJA02L_4 (5)	-	1.67%
	ADJD02L_12 (1)	1.32%	-	ANJA02L_5 (5)	-	1.81%
	ADJD02L_13 (1)	0.57%	-	ANJA02L_6 (7)	-	26.41%
	ADJD02L_15 (1)	0.82%	-			
	ADJD02L_16 (1)	0.44%	-			
	ADJD02L_17 (1)	0.49%	-			
	ADJD02L_18 (1)	0.39%	-			
	ANJD02L_1 (5)	-	10.06%			
	ANJD02L_2 (3)	-	35.25%			
	ANJD02L_3 (5)	-	4.00%			
	ANJD02L_4 (5)	-	5.88%			
	ANJD02L_5 (5)	-	20.69%			
	ANJD02L_6 (5)	-	15.56%			
	ANJD02L_7 (5)	-	5.63%			
	ANJD02L_8 (5)	-	2.94%			

Jet						
Runway	**Departures**			**Arrivals**		
	Track ID	**Percent Use**		**Track ID**	**Percent Use**	
		Day	**Night**		**Day**	**Night**
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
2R	ADJD02R_1 (1)	0.37%	-	ADJA02R_1 (3)	2.77%	-
	ADJD02R_2 (3)	2.38%	-	ADJA02R_2 (7)	45.08%	-
	ADJD02R_3 (7)	35.31%	-	ADJA02R_3 (3)	1.40%	-
	ADJD02R_4 (3)	2.26%	-	ADJA02R_4 (7)	49.64%	-
	ADJD02R_5 (7)	17.96%	-	ADJA02R_5 (1)	1.12%	-
	ADJD02R_6 (7)	31.51%	-	ANJA02R_1 (5)	-	10.60%
	ADJD02R_7 (3)	4.54%	-	ANJA02R_2 (5)	-	34.25%
	ADJD02R_8 (3)	1.94%	-	ANJA02R_3 (5)	-	42.96%
	ADJD02R_9 (1)	1.10%	-	ANJA02R_4 (5)	-	12.19%
	ADJD02R_10 (1)	0.99%	-			
	ADJD02R_11 (1)	0.92%	-			
	ADJD02R_12 (1)	0.38%	-			
	ADJD02R_13 (1)	0.34%	-			
	ANJD02R_1 (3)	-	3.16%			
	ANJD02R_2 (5)	-	7.23%			
	ANJD02R_3 (7)	-	38.08%			
	ANJD02R_4 (5)	-	3.62%			
	ANJD02R_5 (5)	-	13.33%			
	ANJD02R_6 (5)	-	32.77%			
	ANJD02R_7 (5)	-	1.81%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
13	ADJD31_1 (1)	6.69%	-	ADJA31_1 (1)	21.65%	-
	ADJD31_2 (1)	10.55%	-	ADJA31_2 (1)	10.31%	-
	ADJD31_3 (1)	5.48%	-	ADJA31_3 (1)	20.62%	-
	ADJD31_5 (1)	4.87%	-	ADJA31_5 (1)	47.42%	-
	ADJD31_6 (1)	19.68%	-	ANJA31_1 (5)	-	5.95%
	ADJD31_7 (3)	23.12%	-	ANJA31_2 (5)	-	38.70%
	ADJD31_8 (1)	14.00%	-	ANJA31_3 (5)	-	45.71%
	ADJD31_9 (1)	3.65%	-	ANJA31_5 (5)	-	9.63%
	ADJD31_10 (1)	11.97%	-			
	ANJD31_1 (5)	-	8.82%			
	ANJD31_2 (3)	-	1.33%			
	ANJD31_3 (3)	-	16.35%			
	ANJD31_4 (3)	-	1.73%			
	ANJD31_5 (3)	-	17.48%			
	ANJD31_6 (3)	-	17.36%			
	ANJD31_7 (5)	-	5.03%			
	ANJD31_8 (3)	-	14.78%			
	ANJD31_9 (5)	-	1.09%			
	ANJD31_10 (5)	-	1.09%			
	ANJD31_11 (5)	-	5.03%			
	ANJD31_12 (5)	-	7.45%			
	ANJD31_13 (5)	-	2.46%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
20C	ADJD20C_1 (7)	14.34%	-	ADJA20C_1 (3)	19.06%	-
	ADJD20C_2 (7)	11.88%	-	ADJA20C_2 (5)	24.86%	-
	ADJD20C_3 (3)	2.87%	-	ADJA20C_3 (5)	26.92%	-
	ADJD20C_4 (7)	7.45%	-	ADJA20C_4 (5)	27.42%	-
	ADJD20C_5 (7)	9.87%	-	ADJA20C_5 (1)	1.73%	-
	ADJD20C_6 (3)	2.28%	-	ANJA20C_1 (5)	-	25.13%

Jet						
Runway	**Departures**			**Arrivals**		
	Track ID	**Percent Use**		**Track ID**	**Percent Use**	
		Day	**Night**		**Day**	**Night**
	ADJD20C_7 (3)	3.26%	-	ANJA20C_2 (5)	-	31.94%
	ADJD20C_8 (5)	3.97%	-	ANJA20C_3 (5)	-	14.66%
	ADJD20C_9 (7)	10.70%	-	ANJA20C_4 (5)	-	28.27%
	ADJD20C_10 (3)	0.98%	-			
	ADJD20C_11 (7)	13.16%	-			
	ADJD20C_12 (7)	7.51%	-			
	ADJD20C_13 (1)	0.57%	-			
	ADJD20C_14 (7)	9.16%	-			
	ADJD20C_15 (1)	0.55%	-			
	ADJD20C_16 (1)	0.38%	-			
	ADJD20C_17 (1)	0.41%	-			
	ADJD20C_18 (1)	0.25%	-			
	ADJD20C_19 (1)	0.16%	-			
	ADJD20C_20 (1)	0.23%	-			
	ANJD20C_1 (3)	-	15.26%			
	ANJD20C_2 (7)	-	21.26%			
	ANJD20C_3 (3)	-	8.82%			
	ANJD20C_4 (5)	-	13.69%			
	ANJD20C_5 (5)	-	2.50%			
	ANJD20C_6 (3)	-	1.12%			
	ANJD20C_7 (5)	-	1.80%			
	ANJD20C_8 (5)	-	10.13%			
	ANJD20C_9 (5)	-	12.47%			
	ANJD20C_10 (7)	-	3.11%			
	ANJD20C_11 (7)	-	6.60%			
	ANJD20C_12 (3)	-	0.48%			
	ANJD20C_13 (3)	-	1.60%			
	ANJD20C_14 (5)	-	1.15%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
20L	ADJD20L_1 (3)	52.38%	-	ADJA20L_1 (7)	8.69%	-
	ADJD20L_2 (1)	21.09%	-	ADJA20L_2 (7)	39.88%	-
	ADJD20L_3 (1)	26.53%	-	ADJA20L_3 (7)	7.08%	-
	ANJD20L_1 (3)	-	5.74%	ADJA20L_4 (7)	41.64%	-
	ANJD20L_2 (5)	-	17.05%	ADJA20L_5 (3)	2.48%	-
	ANJD20L_3 (5)	-	11.48%	ADJA20L_6 (1)	0.22%	-
	ANJD20L_4 (3)	-	9.84%	ANJA20L_1 (5)	-	29.73%
	ANJD20L_5 (5)	-	14.75%	ANJA20L_2 (5)	-	12.73%
	ANJD20L_6 (5)	-	13.44%	ANJA20L_3 (5)	-	16.06%
	ANJD20L_7 (3)	-	17.05%	ANJA20L_4 (5)	-	19.93%
	ANJD20L_8 (5)	-	3.61%	ANJA20L_5 (5)	-	10.86%
	ANJD20L_9 (3)	-	7.05%	ANJA20L_6 (5)	-	10.69%
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
20R	ADJD20R_1 (3)	13.37%	-	ADJA20R_1 (7)	36.98%	-
	ADJD20R_2 (1)	1.91%	-	ADJA20R_2 (5)	9.69%	-
	ADJD20R_3 (5)	15.88%	-	ADJA20R_3 (7)	47.08%	-
	ADJD20R_4 (3)	3.55%	-	ADJA20R_4 (5)	5.91%	-
	ADJD20R_5 (1)	2.31%	-	ADJA20R_5 (1)	0.35%	-
	ADJD20R_6 (1)	1.33%	-	ANJA20R_1 (7)	-	22.70%
	ADJD20R_7 (3)	10.11%	-	ANJA20R_2 (5)	-	31.49%
	ADJD20R_8 (3)	13.66%	-	ANJA20R_3 (5)	-	11.35%
	ADJD20R_9 (3)	11.64%	-	ANJA20R_4 (5)	-	27.69%

Jet						
Runway	Departures			Arrivals		
	Track ID	Percent Use		Track ID	Percent Use	
		Day	Night		Day	Night
	ADJD20R_10 (3)	6.58%	-	ANJA20R_5 (5)	-	4.86%
	ADJD20R_11 (5)	13.77%	-	ANJA20R_6 (5)	-	1.90%
	ADJD20R_12 (1)	2.22%	-			
	ADJD20R_13 (1)	0.84%	-			
	ADJD20R_14 (1)	0.78%	-			
	ADJD20R_15 (1)	0.92%	-			
	ADJD20R_16 (1)	0.43%	-			
	ADJD20R_17 (1)	0.69%	-			
	ANJD20R_1 (5)	-	20.74%			
	ANJD20R_2 (3)	-	4.36%			
	ANJD20R_3 (3)	-	7.27%			
	ANJD20R_4 (3)	-	4.55%			
	ANJD20R_5 (3)	-	15.70%			
	ANJD20R_7 (3)	-	3.20%			
	ANJD20R_8 (5)	-	8.04%			
	ANJD20R_9 (5)	-	9.30%			
	ANJD20R_10 (5)	-	26.84%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
31	ADJD13_1 (1)	100.00%	-	ADJA13_1 (1)	100.00%	-
	ANJD13_1 (1)	-	100.00%	ANJA13_1 (5)	-	64.29%
				ANJA13_2 (3)	-	35.71%
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**

Source: BNA Noise Exposure Map (NEM) Update, 2020, BNA CAGE EA, 2021
Note: the parentheses following each track name indicates the number of sub-tracks used to model the dispersion

Table 9. Modeled Non-Jet and Helicopter Flight Track Utilization

Non-Jet						
Runway	Departure			Arrival		
	Track ID	Percent Use		Track ID	Percent Use	
		Day	Night		Day	Night
2C	ADND02C_1 (3)	10.98%	-	ADNA02C_1 (7)	22.22%	-
	ADND02C_2 (1)	3.33%	-	ADNA02C_2 (3)	18.54%	-
	ADND02C_3 (3)	20.98%	-	ADNA02C_3 (3)	11.05%	-
	ADND02C_4 (1)	17.25%	-	ADNA02C_6 (3)	9.96%	-
	ADND02C_5 (3)	23.53%	-	ADNA02C_7 (3)	17.63%	-
	ADND02C_6 (1)	4.51%	-	ADNA02C_9 (1)	1.51%	-
	ADND02C_7 (1)	8.04%	-	ADNA02C_10 (3)	10.02%	-
	ADND02C_8 (1)	4.51%	-	ADNA02C_11 (1)	5.74%	-
	ADND02C_9 (1)	6.86%	-	ADNA02C_13 (1)	1.81%	-
	ANND02R_1 (1)	-	100.00%	ADNA02C_14 (1)	1.51%	-
				ADNA02C_1 (7)	22.22%	-
				ADNA02C_2 (3)	18.54%	-
				ADNA02C_3 (3)	11.05%	-
				ADNA02C_6 (3)	9.96%	-
				ANNA02C_1 (3)	-	54.13%
				ANNA02C_2 (5)	-	16.12%
				ANNA02C_3 (5)	-	18.18%
				ANNA02C_4 (5)	-	11.57%
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**

Non-Jet						
Runway	**Departure**			**Arrival**		
	Track ID	**Percent Use**		**Track ID**	**Percent Use**	
		Day	**Night**		**Day**	**Night**
2L	ADND02L_1 (3)	27.47%	-	ADNA02L_1 (5)	76.10%	-
	ADND02L_2 (1)	6.04%	-	ADNA02L_2 (1)	9.17%	-
	ADND02L_3 (3)	55.77%	-	ADNA02L_3 (1)	5.78%	-
	ADND02L_4 (1)	10.71%	-	ADNA02L_4 (1)	6.00%	-
	ANND02C_2 (5)	-	100.00%	ADNA02L_5 (1)	2.94%	-
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**0.0%**
2R	ADND02R_1 (3)	39.43%	-	ADNA02R_1 (3)	58.09%	-
	ADND02R_2 (1)	32.11%	-	ADNA02R_2 (3)	18.98%	-
	ADND02R_4 (5)	28.46%	-	ADNA02R_3 (1)	11.55%	-
				ADNA02R_4 (1)	3.63%	-
				ADNA02R_5 (1)	7.76%	-
	Total	**100.0%**	**0.0%**	**Total**	**100.0%**	**0.0%**
13	ADND31_1 (5)	61.11%	-	ADNA31_1 (1)	100.00%	-
	ADND31_2 (5)	38.89%	-	ANNA31_1 (5)	-	100.00%
	ANND31_1 (1)	-	100.00%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
20C	ADND20C_1 (5)	18.30%	-	ADNA20C_1 (1)	8.53%	-
	ADND20C_2 (5)	14.22%	-	ADNA20C_2 (3)	34.46%	-
	ADND20C_3 (5)	4.43%	-	ADNA20C_3 (1)	6.76%	-
	ADND20C_4 (5)	11.22%	-	ADNA20C_4 (3)	24.64%	-
	ADND20C_5 (5)	7.08%	-	ADNA20C_5 (1)	9.02%	-
	ADND20C_6 (5)	9.44%	-	ADNA20C_6 (1)	3.86%	-
	ADND20C_7 (5)	2.07%	-	ADNA20C_7 (1)	5.48%	-
	ADND20C_8 (5)	10.08%	-	ADNA20C_8 (1)	3.86%	-
	ADND20C_9 (5)	9.72%	-	ADNA20C_9 (1)	3.38%	-
	ADND20C_10 (5)	8.43%	-	ANNA20C_1 (5)	-	55.38%
	ADND20C_11 (5)	1.43%	-	ANNA20C_2 (1)	-	44.62%
	ADND20C_12 (5)	2.07%	-			
	ADND20C_13 (5)	1.50%	-			
	ANND20C_1 (1)	-	100.00%			
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
20L	ADND20L_1 (5)	100.00%	-	ADNA20L_1 (3)	12.16%	-
				ADNA20L_2 (3)	28.66%	-
				ADNA20L_3 (1)	8.44%	-
				ADNA20L_4 (3)	27.54%	-
				ADNA20L_5 (1)	6.58%	-
				ADNA20L_6 (1)	5.96%	-
				ADNA20L_7 (1)	4.71%	-
				ADNA20L_8 (1)	5.96%	-
				ANNA20L_1 (1)	-	100.00%
	Total	**100.0%**	**0.0%**	**Total**	**100.0%**	**100.0%**
20R	ADND20R_1 (5)	76.99%	-	ADNA20R_1 (1)	4.65%	-
	ADND20R_2 (5)	15.04%	-	ADNA20R_2 (5)	68.44%	-
	ADND20R_3 (5)	4.53%	-	ADNA20R_3 (3)	11.76%	-
	ADND20R_4 (5)	3.44%	-	ADNA20R_4 (1)	7.28%	-
	ANND20R_1 (1)	-	75.00%	ADNA20R_5 (1)	1.69%	-
	ANND20R_2 (1)	-	25.00%	ADNA20R_6 (1)	3.47%	-
				ADNA20R_7 (1)	2.71%	-
				ANNA20R_1 (1)	-	100.00%
	Total	**100.0%**	**100.0%**	**Total**	**100.0%**	**100.0%**
31				ADNA13_1 (1)	100.00%	-

Non-Jet						
Runway	Departure			Arrival		
	Track ID	Percent Use		Track ID	Percent Use	
		Day	Night		Day	Night
	Total	0.0%	0.0%	Total	100.0%	0.0%

Runway	Helicopter					
	Departures			Arrivals		
	Track ID	Percent Use		Track ID	Percent Use	
		Day	Night		Day	Night
PAD_1				UH60DA_01 (1)	69.56%	-
				UH60DA_02 (1)	4.35%	-
				UH60DA_03 (1)	8.70%	-
				UH60DA_04 (3)	17.39%	-
	Total	**0.00%**	**0.00%**	**Total**	**100.00%**	**0.00%**
PAD_1	UH60DD_01 (1)	10.59%	-			
	UH60DD_03 (1)	17.65%	-			
	UH60DD_02 (3)	70.00%	-			
	UH60DD_04 (1)	1.76%	-			
	Total	**100.00%**	**0.00%**	**Total**	**0.00%**	**0.00%**

Source: BNA Noise Exposure Map (NEM) Update, 2020, BNA CAGE EA, 2021
Notes: All helicopter operations occur in daytime hours (between 7:00 am and 10:00 pm). The parentheses following each track name indicates the number of subtracks used to model the dispersion.

1.1.7 Meteorological Data

Meteorological settings within the AEDT affect its calculation of aircraft performance profiles and sound propagation. These settings include average annual temperature, barometric pressure, relative humidity, and average headwind speed. The AEDT contains standard reference ten-year average climatological data for airports throughout the US.

The noise modeling utilized the following average data for BNA from the AEDT database:

- Temperature: 60.99° F
- Station Pressure: 995.46 mbar
- Sea Level Pressure: 1018.18 mbar
- Dew point: 49.31° F
- Relative humidity: 65.45%

The headwind speed was set to the AEDT default of 5.76 knots.

1.1.8 Terrain

Terrain data describes the elevation of the ground surrounding the airport, and on airport property. The AEDT uses terrain data to adjust the ground level under the flight paths. The terrain data does not affect the aircraft's performance or noise levels but does affect the vertical distance between the aircraft and a "receiver" on the ground. This in turn affects assumptions about how noise propagates over ground. The National Elevation Dataset (NED) 1/3 arc second terrain data were obtained from the United States Geological Survey (USGS).[7] The NED data set has a resolution of 10 meters or 33 feet.

1.2 Noise Modeling Results

The AEDT uses the model inputs described above to calculate DNL at every individual point of a large array of grid points around an airport. The program then connects points of equal value to produce the DNL contour lines.

[7] Data downloaded from https://viewer.nationalmap.gov/basic/?howTo=true on 03/07/2018 in 1/3 Arc second GridFloat format.

Error! Reference source not found. shows the annual average day DNL contours for the 2035 No Action case and Error! Reference source not found. displays the DNL contours for the 2035 Proposed Action case. Error! Reference source not found. shows a comparison of the two 2035 cases. Compared to the No Action case, the Proposed Action 65 DNL contour encompasses a slightly larger area. The difference in size of the noise exposure contours is a result of the expected increase in passenger aircraft operations related to the concourse expansion. The shape of the contours is essentially the same, as runway usage, flight track geometry, and flight track usage assumptions were held constant.

Table 10 presents the calculated land area within each contour interval for both analysis cases. The 2035 Proposed Action adds only about 40 acres to the area exposed to 65 DNL or higher, for a total of 2,619 acres as compared to the 2035 No Action result of 2,579 acres; the land area increase is approximately 2.0 percent.

Both sets of DNL contours for 2035 are slightly larger than the BNA CAGE EA DNL contours due to the increase in passenger operations. Like the BNA CAGE EA DNL contours, these DNL contours are smaller than the NEM 2025 DNL contours despite an increase in aircraft operations. This is due to the assumption of quieter aircraft as airline fleets continue to modernize.

Table 10. Comparison of Land Area Enclosed by the No Action and Proposed Action Contours

Analysis Case	Land area within noise contour interval (in acres)			Total acreage within 65 DNL
	65-70 dB DNL	70-75 dB DNL	75+ dB DNL	
2035 No Action	1,410.2	576.9	592.1	**2,579.3**
2035 Proposed Action	1,438.0	583.0	598.2	**2619.2**
2035 Change	**27.8**	**6.1**	**6.1**	**39.9**

Source: HMMH, 2022

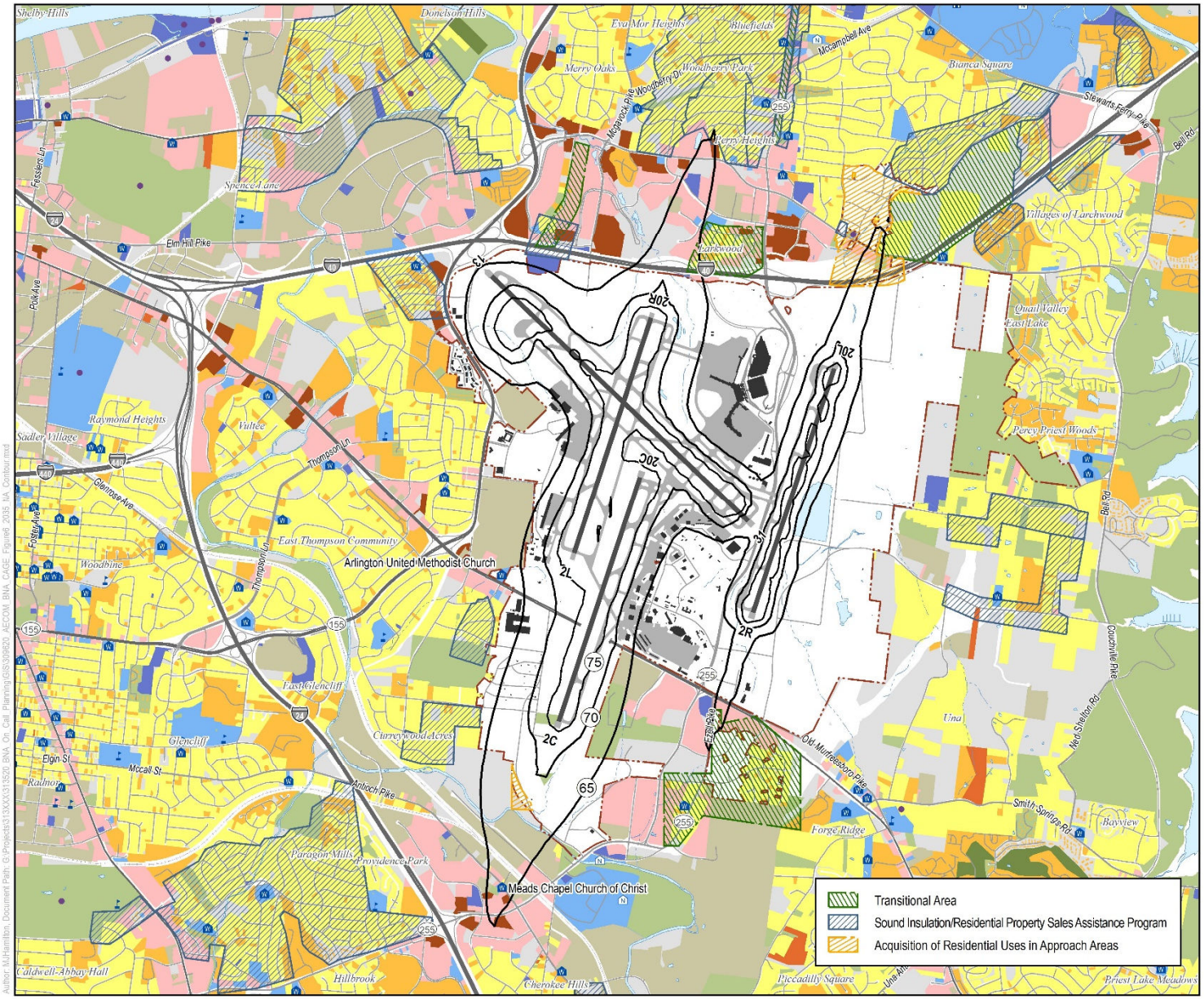
FAA Order 1050.1F defines a "significant impact" as an increase of 1.5 dB in DNL at noise-sensitive land use locations (e.g., residences, schools, etc.) exposed to aircraft noise of 65 DNL or higher under the proposed action. For example, an increase from 63.5 dB to 65 dB is considered a significant impact. A noise exposure grid analysis checked for areas of significant impact resulting from the Proposed Action. The results of the analysis indicated that no points within the 65 DNL contour would experience an increase of 1.5 dB or more as a result of the proposed action.

An inventory of noise sensitive land uses within the 65 DNL contour has been prepared for the No Action and the Proposed Action cases for 2035. **Table 11** charts the estimated population, number of housing units, and other identified noise-sensitive parcels within the 65 DNL contour, listed by 5-dB contour intervals. The data in **Table 11** indicate an increase of seven people in three housing units between the 2035 No Action and Proposed Action cases. There are no population or housing units within the 70 DNL contour in either case. There are no noise sensitive parcels that move into a higher 5 dB contour band within the 65 DNL contour as a result of the proposed action.

Table 11. Noise Sensitive Parcels and Estimated Population within 65 DNL contour for the 2035 No Action and Proposed Action Contours

DNL (dB)	No Action			Proposed Action		
	Estimated Population	Housing Units Note 1	Other Noise Sensitive Parcels Note 2	Estimated Population	Housing Units Note 1	Other Noise Sensitive Parcels Note 2
65-70	26	7	1	33	10	1
70-75	0	0	0	0	0	0
75+	0	0	0	0	0	0
Total within 65 DNL	**26**	**7**	**1**	**33**	**10**	**1**

Source: HMMH, 2020 US Census
Notes:
1. Of the housing units within the 65 DNL contour, all are in noise mitigation areas.
2. Noise Sensitive Parcels include schools, places of worship, hospitals, nursing homes, and designated historical sites. Only one identified such noise sensitive parcel is within the 65 DNL contour for either case: it is the Meades Chapel Church of Christ (place of worship).



BNA Nashville International Airport

Supplemental EA for Concourse D Extension Environmental Assessment

Figure: 6

BNA Supplemental EA Forecast 2035
No Action DNL Contours

- Forecast 2035 No Action DNL Contour (65-75 dB)
- BNA Airport Boundary (Approximate)
- Runway
- State Boundary
- Municipal Boundary
- Highway
- Minor Roads
- Major Roads
- Railroad

Land Use

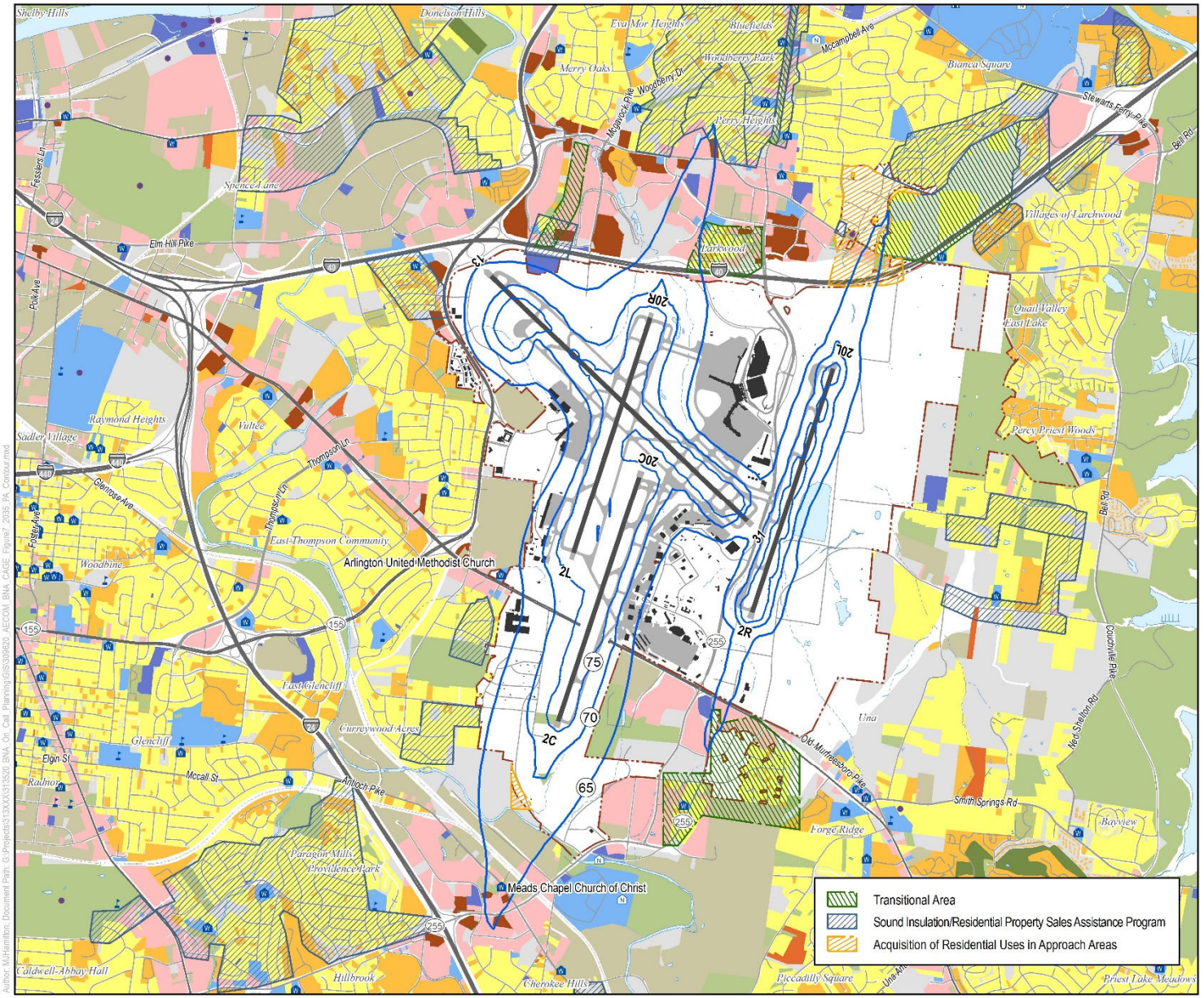
- Residential
- Multi-Family Residential
- Mobile Home Park
- Transient Lodging
- Public Use (Non-Compatible)
- Public Use (Compatible)
- Recreational / Open Space / Golf
- Commercial Use
- Manufacturing and Production
- Vacant / Undefined
- Water / Stream
- School
- Library
- Nursing Home
- Place of Worship
- Hospital
- National Register of Historic Places

0 3,000 6,000 Feet

N

nmmh

Author: M.J.Hamilton, Document Path: G:\Projects\313XX\313520_BNA_On_Call_Planning\GIS\309620_AECOM_BNA_CAGE_Figure6_2035_NA_Contour.mxd



BNA Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

Figure: 7

BNA Supplemental EA Forecast 2035
Proposed Action DNL Contours

- Forecast 2035 Proposed Action DNL Contour (65-75 dB)
- BNA Airport Boundary (Approximate)
- Runway
- State Boundary
- Municipal Boundary
- Highway
- Minor Roads
- Major Roads
- Railroad

Land Use

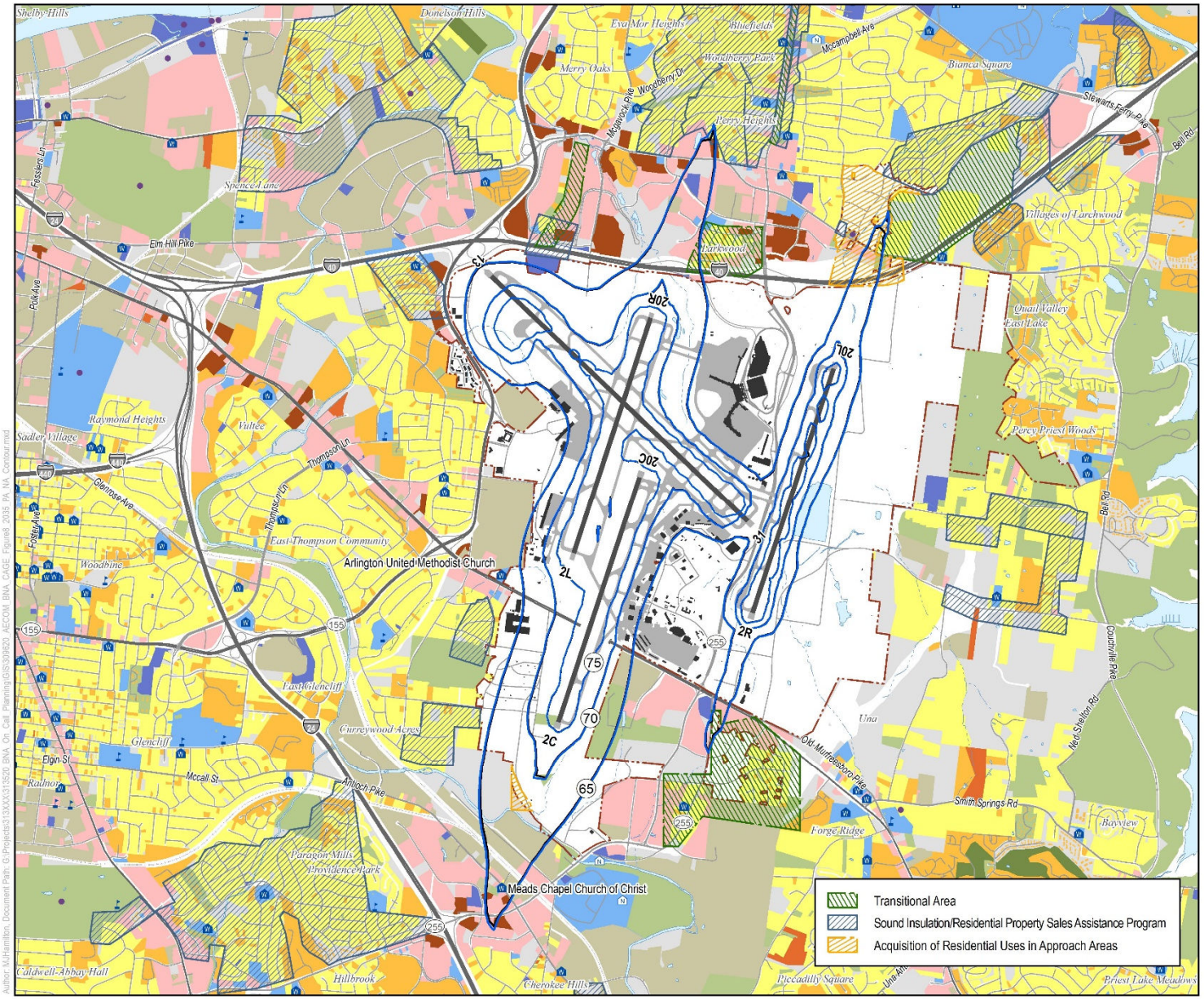
- Residential
- Multi-Family Residential
- Mobile Home Park
- Transient Lodging
- Public Use (Non-Compatible)
- Public Use (Compatible)
- Recreational / Open Space / Golf
- Commercial Use
- Manufacturing and Production
- Vacant / Undefined
- Water / Stream
- School
- Library
- Nursing Home
- Place of Worship
- Hospital
- National Register of Historic Places

0 3,000 6,000 Feet

N

hmmh

Author: M.Hamilton Document Path: G:\Projects\313XXX\313520_BNA_On_Call_Planning\GIS\320820_AECOM_BNA_CAGE_Figure7_2035_PA_Contour.mxd



BNA Nashville International Airport

Supplemental EA for Concourse D Extension
Environmental Assessment

Figure: 8

BNA Supplemental EA Comparison of 2035 No Action and Proposed Action DNL Contours

- Forecast 2035 No Action DNL Contour (65-75 dB)
- Forecast 2035 Proposed Action DNL Contour (65-75 dB)
- BNA Airport Boundary (Approximate)
- Runway
- State Boundary
- Municipal Boundary
- Highway
- Minor Roads
- Major Roads
- Railroad

Land Use

- Residential
- Multi-Family Residential
- Mobile Home Park
- Transient Lodging
- Public Use (Non-Compatible)
- Public Use (Compatible)
- Recreational / Open Space / Golf
- Commercial Use
- Manufacturing and Production
- Vacant / Undefined
- Water / Stream
- School
- Library
- Nursing Home
- Place of Worship
- Hospital
- National Register of Historic Places

0 3,000 6,000 Feet

N

hmmh

Author: M.Hamilton Document Path: G:\Projects\313XX\313526 BNA On Call Planning\GIS\300820_AECOM_BNA_OAGE_Figure8_2035_EA_NA_Contour.mxd

As shown in Error! Reference source not found.**,** the 65 DNL contours for both of the 2035 cases do not extend into residential areas on the south side of the airport, and barely reach into a residential area on the north side of the airport.

- The 2035 No-Action 65-70 DNL contour interval encompasses seven housing units. Of these, all have been mitigated and none are considered noncompatible.
- The 2035 Proposed Action 65-70 DNL contour interval encompasses ten housing units. Of these, all have been mitigated and none are considered noncompatible.
- There are no noise-sensitive land uses within the 70 dB DNL contour for either of the 2035 cases.

2.0 Air Quality Analysis

This section presents and discusses the potential for air quality impacts from the Proposed Action associated with (1) the construction and demolition activities of the Concourse A and Concourse D Gate Expansion and (2) additional aircraft and associated auxiliary operation changes. Comparing the inventory of air pollutant emissions associated with each of those items to the General Conformity *de minimis* thresholds for significance is the basis for evaluating the potential for air quality impacts.

2.1 Affected Environment

2.1.1 National Ambient Air Quality Standards

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 EPA under the Federal Clean Air Act (CAA).

The EPA currently regulates six criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead (Pb). Particulate matter is divided into two particle size categories: coarse particles with a diameter less than 10 micrometers (PM_{10}) 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 12 shows the primary and secondary NAAQS for the criteria pollutants. Section 176(c) of the CAA 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 12** 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 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 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 CAA, the 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 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 EPA regarding the attainment status of all areas within their borders when the EPA finalizes an update to any NAAQS. Under its CAAA authority, the 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 EPA lowered the ozone standard in 2015 to 0.070 parts per million (ppm).

Table 12. National Ambient Air Quality Standards

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	Eight-hour (2015 standard) Note 4	0.070 ppm	Same as Primary
$PM_{2.5}$	Annual Arithmetic Mean	12 µg/m^3 Note 1	15 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

Source: U.S. EPA NAAQS https://www.epa.gov/criteria-air-pollutants/naaqs-table
Notes:
1. For PM_{10}, the 24-hour standard 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% of the daily concentrations, averaged over three years, are equal to or are less than the standard.
2. 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).
3. 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.
4. EPA updated the NAAQS for O_3 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.

2.1.2 Attainment Status

Air quality in the BNA area (i.e., Davidson County) is designated by EPA as being in attainment for all criteria pollutants. Since the area is designated as attainment with the current EPA air quality standards, the General Conformity Rule does not apply. However, the construction and demolition emissions and net operational aircraft change in air emissions was still compared to the applicable U.S. EPA *de minimis* levels for determining significant impacts[8] for the purposes of NEPA.

2.1.3 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 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 SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such

[8] Emissions below the *de minimis* levels are considered not significant

standards. Federally funded and approved actions at airports are subject to the U.S. EPA's general conformity regulations. The General Conformity Rule[9] applies to all federal actions except for certain highway and transit programs which must comply with the Transportation Conformity Plans.[10]

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 EPA-designated non-attainment and maintenance areas, the General Conformity requirements *do not* apply to projects at BNA.[11]

2.1.4 Representative Monitoring Data

Existing air quality conditions in the BNA area can be reflected through the current status of the NAAQS attainment (as discussed above) and the recent ambient air monitoring data collected by the state agencies.
The Tennessee Department of Environment and Conservation Air Pollution Control Division along with the Metro Public Health Department operates and collects the state of Tennessee's air monitoring sites to continuously monitor pollutant levels throughout the state, including ambient (i.e., outdoor) air monitoring sites. This data is used to monitor compliance with federal and state ambient air quality standards and is provided to the public in annual reports.

The latest three years of values (2018-2020) were obtained from the EPA Outdoor Air Quality Data Monitor Values Report[12] and were reviewed for carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide and particulate matter. **Table 13** summarizes data from the three closest monitoring stations to BNA in Davidson County where relevant data are available. These sites are considered representative of the study area. **Table 13** shows that the Davidson County measured value for each pollutant is below the NAAQS level.

Table 13. 2018 to 2020 Davidson County Monitor Values at Nearby Representative Measurement Locations

Site ID	Address	Pollutant	Period	2018	2019	2020	NAAQS
				Concentration			
470370040	Elm Hill Pike	CO	1-hour 8-hour	1.8 ppm 1.6 ppm	1.5 ppm 1.2 ppm	1.7 ppm 1.3 ppm	35 ppm 9 ppm
470370011	1015 Trinity Lane	NO_2	1-hour Annual	33 ppb 7.83 ppb	35 ppb 6.47 ppb	43 ppb 7.30 ppb	100 ppb 53 ppb
470370011	1015 Trinity Lane	Ozone	8-hour 4th Max	0.068 ppm	0.064 ppm	0.060 ppm	0.07 ppm
470370040	Elm Hill Pike	$PM_{2.5}$	24-hour 98th Annual	18 $\mu g/m^3$ 9.2 $\mu g/m^3$	18 $\mu g/m^3$ 10.8 $\mu g/m^3$	20.0 $\mu g/m^3$ 8.8 $\mu g/m^3$	35 $\mu g/m^3$ 15 $\mu g/m^3$
470370040	105 South 17th Street	PM_{10}	24-hour	41 $\mu g/m^3$	32 $\mu g/m^3$	58 $\mu g/m^3$	150 $\mu g/m^3$
470370011	1015 Trinity Lane	SO_2	1-hour	4 ppb	8 ppb	3 ppb Note 1	75 ppb

Source: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

[9] 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).
[10] 40 CFR Part 93, Subpart A
[11] BNA is located in an EPA designated attainment area for all pollutants
[12] https://www.epa.gov/outdoor-air-quality-data/monitor-values-report (accessed on November 28, 2022)

Note 1. 2020 SO_2 values at 1113 Elm Hill Pike, Nashville-Davidson (Site 470370040)

2.2 Environmental Consequences of Proposed Action

Potential air quality impacts associated with construction and demolition of the Proposed Action are discussed in this section. After construction, the Proposed Action would induce additional aircraft operations or passengers beyond expected growth but will not change the aircraft fleet or taxi times using BNA. Therefore, additional aircraft operation emissions were also inventoried and evaluated.

2.2.1 Demolition and Construction Activities

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:

- Haul trucks,
- Site clearing, and
- Grading.

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,
- Land clearing,
- Material handling,
- Equipment movement on unpaved roads and
- Evaporative emissions from the application of asphalt paving.

Demolition and construction activities associated with the Proposed Action are expected to begin in in approximately April of 2023 and be completed in approximately September 2027. **Table 14** 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).[13]

Table 14. Proposed Action Construction and Demolition

Project Action Component	Estimated Project Costs ($)	Area (Square Feet)	Construction Start	Construction End
Multi Purpose Building	1.62M	47,000	2023: April 1	2023: August 15
Multi Purpose Infrastructure	3.58M	351,200	2023: April 1	2023: August 15
Demolition Triturator Building	$10,000	1,700	2023: May 1	2023: October 1
Demolition Fuel Tanks	$10,000	2,000	2023: May 1	2023: October 1
Demolition Adjacent Pavement	$10,000	70,000	2023: May 1	2023: October 1

[13] ACRP, 2014 https://crp.trb.org/acrp0267/acrp-report-102-guidance-for-estimating-airport-construction-emissions/

Construction New Triturator Building	1.66M	2,040	2023: May 22	2023: September 13
Construction New Apron	1.0M	8,500	2023: May 1	2023: October 1
Construction New Fuel AGST	0.67M	9,500	2023: July 19	2023: September 13
Demolition Air Freight Building	0.48M	87,000	2023: September 1	2023: November 15
Demolition Landside Pavement	$150,000	150,000	2023: October 1	2023: December 1
Construction New Air Freight Building	12M	70,000	2027: January 1	2027: September 1
Construction New Landside Pavement	0.51M	85,000	2027: January 1	2027: March 1
Concourse D Expansion Site Utilities	2.33M	75,000	2024: January 4	2024: July 17
Gate 6 Reconfiguration	$250,000	10,000	2024: January 3	2024: March 27
Construction New Concourse D Building	30.47M	75,000	2024: January 4	2025: August 28
Construction New Asphalt Curbing	$240,000	40,500	2024: December 1	2025: April 16
New Building Infrastructure	34.67M	75,000	2024: May 2	2025: March 12
New Fuel System	2.45M	85,000	2024: July 11	2024: November 27
New Apron Paving	6.58M	265,000	2024: December 1	2025: April 16
Site Clearing and Grading	2.50M	1,670,000	2024: January 1	2024: July 1

Source: Ricondo, October 20, 2022 e-mail

The ACRP ACEIT model[14] 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 EPA and industry standard models and methodologies. *However, the current version of ACEIT includes an older version of the U.S 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 MOVES (Version 3.04), which includes the latest version of NONROAD model, to develop on-road and nonroad emission factors for Davidson County,[15] which were applied to estimates of vehicle miles traveled (VMT) and construction equipment (hours, horsepower, load factor), respectively, as generated in ACEIT for each construction activity and year.* Emission factors generated in NONROAD assume the phasing of Tier 1, Tier 2, Tier 3, and Tier 4 engines over time based on EPA regulations.[16] Construction-related emissions of criteria pollutants during the construction period 2023 to 2027 are summarized in **Table 15.**

Table 15. Construction Emission Inventory - Proposed Action

Year	Relevant Criteria Pollutant Emissions (tons per year)						
	CO	**VOC** Note 1	**NO_2** Note 1	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e** Note 2
2023	2.8	0.9	3.6	0.01	0.7	0.2	3,923
2024	11.8	0.9	3.1	0.02	0.7	0.2	5,037
2025	5.6	0.7	2.4	0.02	00.8	0.1	3,559
2026	No planned construction activities						

[14] http://onlinepubs.trb.org/onlinepubs/acrp/docs/ACRP02-33_FR.pdf

[15] Construction emissions used in NONROAD2008a assumed a blend of Tier 1, Tier 2, Tier 3, and Tier 4 for Davidson County based on EPA phasing ratios of older equipment in future years and does not reflect the primary use of either Tier 1 thru 4 engines. MOVES emission factors are specific to Davidson County as generated within MOVES for each year.

[16] Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b (PDF) (177 pp, 15.4 MB, EPA-420-R-18-009, July 2018)

Year	Relevant Criteria Pollutant Emissions (tons per year)						
	CO	**VOC** Note 1	**NO_2** Note 1	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e** Note 2
2027	2.9	0.4	1.5	0.01	0.4	0.1	2,465

Source: HMMH, 2022, Construction schedule generated using ACEIT, while emission factors were derived using latest version of MOVES3.0.4. Construction information provided by Ricondo, October 20, 2022.
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 GWP.

2.2.2 Aircraft Operational Activities

As discussed above, implementation of the Proposed Action would increase the number of aircraft operations compared to the No Action alternatives, therefore operational emissions were estimated. To satisfy NEPA requirements, the operational emissions change related to the Proposed Action were compared to General Conformity *de minimis* levels for significance. It should be noted the Proposed Action would only change the number of operations and will not change how the aircraft maneuver around the airfield, therefore estimated taxi times will remain unchanged for both the Proposed and No Action Alternatives.

The latest version of AEDT produced emissions estimates for both the No Action and the Proposed Action cases for 2035, using the same set of model inputs that were used for the noise calculations, as documented in Section 1 of this memorandum. Both of the cases assume that runway and taxiway configurations remain unchanged from the existing conditions. The forecast Proposed Action case assumes changes to the aircraft operations only. The net change in aircraft operational emissions includes emissions from the ground support equipment and auxiliary power units associated with the Proposed Action.

Table 16 provides the forecast No Action and Proposed Action operational emissions for 2035, as calculated by the AEDT. The net change in emissions is provided in bold.

Table 16. Operational Emissions Inventory of the Forecast No Action and Proposed Action Cases

Aircraft Operations Case	Relevant Criteria Pollutant Emissions (tons per year) Note 2					
	CO	VOC Note 1	NO_2 Note 1	SO_2	PM_{10}	$PM_{2.5}$
2035 No Action	1,164.7	204.6	1,112.4	90.5	13.1	13.1
2035 Proposed Action	1,190.1	207.3	1,148.2	93.3	13.5	13.4
2035 Net Change	**+25.4**	**+2.7**	**+36.0**	**+2.8**	**+0.4**	**+0.3**

Source: HMMH, 2022
Notes:
1. Following standard industry practice, ozone was evaluated by evaluating emissions of VOC and NOx, which are precursors in the formation of ozone.
2. Operational emissions denote emissions associated with aircraft operations only.
3. All analysis cases assumed default taxi times in AEDT.

2.2.3 General Conformity Applicability Analysis/Significance Thresholds

As discussed above, the Airport is located in Davidson County, which is designated as attainment with the NAAQS by EPA for all criteria pollutants, therefore the General Conformity Rule does not apply

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 CAA, for any of the time periods analyzed, or would increase the frequency or severity of any such existing violations. Additionally, the CAA requires federal agencies such as the FAA to ensure their actions conform to the appropriate State Implementation Plan (SIP).

For NEPA purposes, as a conservative assumption, the emissions associated with the Proposed Action for Construction and Operations are compared to the General Conformity *de minimis* levels for maintenance areas (in lieu of there are no *de minimis* thresholds for attainment areas) were used for determining significant impacts.[17] The *de minimis* thresholds represent emission quantities of a NAAQS-regulated pollutant or its applicable precursors over which net emissions in a nonattainment or maintenance area may cause or contribute to a new or continued violation of the NAAQS. The current EPA *de minimis* thresholds for maintenance areas relevant are listed in **Table 17**.

Table 17. General Conformity EPA *De Minimis* Pollutant Emission Thresholds Note 2

Pollutants	Attainment Status (Severity)	Pollutants	Threshold (tons Per Year)
Carbon Monoxide (CO)	**Attainment** Note 3	CO	**100**
Nitrogen Dioxide (NO_2)	**Attainment** Note 3	NO_2	**100**
Ozone (O_3) Note 1	**Attainment** Note 3	Nitrogen Oxides (NOX)	**100**
		Volatile Organic Compounds (VOC)	**100**
Coarse Particulate Matter (PM_{10})	**Attainment** Note 3	PM_{10}	**100**
Fine Particulate Matter ($PM_{2.5}$)	**Attainment** Note 3	$PM_{2.5}$	**100**
Sulfur Dioxide (SO_2)	**Attainment** Note 3	SO_2	**100**

Notes:
1. Following standard industry practice, ozone was evaluated by evaluating emissions of VOC and NOx, which are precursors in the formation of ozone.
2. https://www.epa.gov/general-conformity/de-minimis-tables
3. CO, Ozone, SO2, NOx, and PM10/PM2.5 are designated as attainment and no de minimis threshold exists for attainment pollutants. As a conservative approach, the de minimis threshold for maintenance was assumed to determine significant impacts.

[17] Emissions below the *de minimis* levels are considered not significant and have minimal emissions increase.

2.2.4 Summary of Emissions

Table 18 presents the total emissions associated with demolition and construction of the Proposed Action for each year of the construction period (2023 through 2027), compared with the appropriate *de minimis* thresholds. As the table shows, the total emissions for each construction year (i.e., 2023, 2024, 2025, and 2027) would be below established maintenance area designation *de minimis* thresholds for all pollutants and would not result in a significant air quality impact.

Table 18. Total Construction and Demolition Emissions Compared to *De Minimis* Thresholds

Year	Relevant Criteria Pollutant Emissions (tons per year)					
	CO	**VOC**	**NO_2**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2023						
Total Emissions of Construction and Demolition	2.8	0.9	3.6	0.01	0.7	0.2
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2024						
Total Emissions of Construction and Demolition	11.8	0.9	3.1	0.02	0.7	0.2
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2025						
Total Emissions of Construction and Demolition	5.6	0.7	2.4	0.02	0.8	0.1
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2026						
Total Emissions of Construction and Demolition	No construction emissions anticipated					
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2027						
Total Emissions of Construction and Demolition	2.9	0.4	1.5	0.01	0.4	0.1
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Source: HMMH, 2022

Similarly, Table 19 presents the net change in operational emissions from the implementation of the Proposed Action and compares those emissions changes to the maintenance area designation *de minimis* thresholds for significance determination. As the table shows, the net change would be below established *de minimis* thresholds for all pollutants and therefore the Proposed Action would not result in a significant air quality impact.

Table 19. Net Operational Emission Changes Compared to *De Minimis* Thresholds

	Relevant Criteria Pollutant Emissions (tons per year)					
	CO	**VOC**	**NO_2**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2035 Net Change in Operational Emissions due to the Proposed Action	+25.4	+2.7	+36.0	+2.8	+0.4	+0.3
EPA De Minimis Threshold	**100**	**100**	**100**	**100**	**100**	**100**
Emissions below *de minimis* thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Source: HMMH, 2022

2.2.5 No Action Alternative

The No Action Alternative assumes that the proposed action is not implemented, and air quality would remain unchanged. Therefore, no additional air quality impacts would occur as a result of the No Action case.

2.2.6 Mitigation

As indicated above, impacts to air quality with the implementation of the Proposed Action would not be significant when compared to the No Action; therefore, no mitigation measures are required.

2.3 Climate

Climate change is a global phenomenon that can have local impacts.[18] 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 greenhouse gas (GHG) emissions in the atmosphere affect global climate.[19,20] GHG emissions result from anthropogenic sources, including the combustion of fossil fuels. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and fluorinated gases.[21] CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.

2.3.1 Regulatory Framework

Although no federal standards have been set for GHG emissions, it is well established that GHG emissions can affect climate. Based on guidance from the FAA Order 1050.1F Desk Reference, state and local policies and programs that address climate change are discussed in this section. 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.

2.3.2 Affected Environment

Nashville Electric Service worked with the Department of Health to inventory existing Metropolitan Government of Nashville and Davidson County (Metro) GHG sources to provide an understanding of its emission sources. The Metro GHG baseline emissions inventory was also conducted to develop a baseline for which environmental efforts can be measured and indicate where improvement may be needed. Information for the GHG baseline emissions inventory was collected from various local utilities, Metro government operations and employees, as well as Metro Nashville Public School (MNPS). Nashville and Davidson County community produced approximately 14.4 million tons of CO_2 equivalents (CO_2e) in 2005.

---

[18] As explained by the 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 (accessed September 28, 2018).

[19] Intergovernmental Panel on Climate Change, *Fifth Assessment Report*, 2014, https://www.ipcc.ch/report/ar5/syr/ 9 (accessed September 28, 2018).

[20] 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 (accessed September 28, 2018).

[21] U.S. Environmental Protection Agency, Overview of Greenhouse Gases, http://www3.epa.gov/climatechange/ghgemissions/gases.html (accessed May 11, 2017).

2.3.3 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 (CO_2e) 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) and multiplying by the global warming potential equivalent (GWP) of each pollutant and adding them together. For example, the GWP of CO_2 is 1, CH_4 is 28 GWP, and N_2O is 265 GWP, according to the IPCC Fifth Assessment Report.[22]

The methodology and assumptions for the GHG analysis are consistent with the air quality analysis discussed in Sections 2.2.1 and 2.2.2. GHG emissions associated with the construction and demolition activities as well as the increase in GHG emissions due to operational changes of the Proposed Action were qualitatively evaluated. The results are compared to U.S., local, and global levels.

2.3.4 Environmental Consequences of Proposed Action Alternative

Table 20 presents the annual greenhouse gas emissions for demolition and construction activities as well as operational emissions associated with the future Proposed Action and No Action for 2035.

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. As shown in Section 2.2.4, construction and the net change in operational emissions under the Proposed Action would not result in a significant air quality impact. Similarly, any greenhouse gas emissions increase from construction and operational activity associated with the Proposed Action would comprise a very small fraction of the baseline Nashville and Davidson County GHG emissions of 14.4 million metric tons of carbon dioxide equivalents ($MMTCO_2e$), the U.S. based emissions of 6,472 $MMTCO_2e$, and even less than the 49 gigatons of carbon dioxide equivalent global GHG emissions.[23,24,25] Mitigation measures for the Proposed Action would not be required.

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.[26]

Table 20. GHG Emissions Associated with Construction and Operations for the Proposed Action

Year	Greenhouse Gases (metric tons/year)			CO_2e (metric tons/year) Note 3
	CO_2	CH_4	N_2O	
Construction Note 1				
2023	**3,923**	**0.008**	**0.001**	**3,923**
2024	**5,035**	**0.030**	**0.006**	**5,037**
2025	**3,558**	**0.013**	**0.003**	**3,559**
2026	**No construction activity anticipated**			
2027	**2,464**	**0.007**	**0.002**	**2,465**
Operational Note 2				
	CO_2	CH_4	N_2O	CO_2e (metric tons/year)	Fuel Burn (Tons per year)

[22] https://www.ipcc.ch/assessment-report/ar5/
[23] https://www.nashville.gov/Portals/0/SiteContent/Sustainability/2009GreenhouseGasInventory.pdf
[24] https://www.epa.gov/sites/production/files/2019-02/documents/us-ghg-inventory-2019-main-text.pdf
[25] http://ipcc.ch/publications_and_data/ar4/syr/en/contents.html
[26] 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

Year	Greenhouse Gases (metric tons/year)				CO_2e (metric tons/year) Note 3
	CO_2	CH_4		N_2O	
2035 No Action	**205,373**	**0.492**	**0.0**	**205,387**	**71,755**
2035 Proposed Action	**211,621**	**0.495**	**0.0**	**211,635**	**73,937**

Source: HMMH, 2022
Notes:
1. Construction schedule derived from ACEIT. Emission factors were generated using MOVES3.0.4.
2. Operational GHG emissions derived from AEDT.
3. Emissions are reported as metric tons of carbon dioxide equivalents to present a normalized unit of greenhouse gas emissions based on the global warming potential of each gas. CO_2e is a combination of CO2 emissions with the CO2-equivalent emissions of other greenhouse gases.

2.3.5 Environmental Consequences of No Action Alternative

The No Action Alternatives would not result in increases in fuel burn or GHG emissions. No changes to GHG emissions would occur and there would be no impact as a result of implementation of the No Action Alternative.

APPENDIX A – BASIC NOISE TERMINOLOGY

Noise is a very complex physical quantity. The properties, measurement, and presentation of noise involve specialized terminology that is often difficult to understand. To assist reviewers in interpreting the complex noise metrics used in evaluating airport noise, this appendix introduces six acoustical descriptors of noise, roughly in increasing degree of complexity:

- Decibel, dB
- A-Weighted Decibel, dBA
- Maximum A-Weighted Sound Level, L_{max}
- Sound Exposure Level, SEL
- Equivalent A-Weighted Sound Level, L_{eq}
- Day-Night Average Sound Level, DNL

These noise metrics form the basis for the majority of noise analyses conducted at U.S. airports.

Decibel, dB

All sounds come from a sound source -- a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source is transmitted through the air in sound waves -- tiny, quick oscillations of pressure just above and just below atmospheric pressure. The ear detects these oscillating pressures interpreting it as "sound."

Our ears are sensitive to a wide range of sound pressures. Although the loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear, our ears are incapable of detecting small differences in these pressures. Thus, to better match how we hear this sound energy, we compress the total range of sound pressures to a more meaningful range by introducing the concept of sound pressure level.

Sound pressure level (SPL) is measured in decibels (dB). Decibels are logarithms of a ratio, the numerator being the pressure of the sound source of interest, and the denominator being the reference pressure (equivalent to the quietest sound that an average healthy young adult can hear):

$$\textit{Sound Pressure Level (SPL)} = 20 * Log\left(\frac{P_{source}}{P_{reference}}\right) dB$$

The logarithmic conversion of sound pressure to sound pressure level means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels on the order of 30 to 100 dB.

Because decibels are logarithmic, combining decibels is unlike common arithmetic. For example, if two sound sources each produce 100 dB and they are then operated together, they produce 103 dB -- not the 200 decibels we might expect. Four equal sources operating simultaneously produce another three decibels of noise, resulting in a total sound pressure level of 106 dB. For every doubling of the number of equal sources, the sound pressure level goes up another three decibels. A tenfold increase in the number of sources makes the sound pressure level go up 10 dB. A hundredfold increase makes the level go up 20 dB, and it takes a thousand equal sources to increase the level 30 dB.

If one noise source is much louder than another, the two sources together will produce virtually the same sound pressure level (and sound to our ears) as the louder source alone. For example, a 100 dB source plus an 80 dB source produce approximately 100 dB when operating together (actually, 100.04 dB). The louder source "masks"

the quieter one. But if the quieter source gets louder, it will have an increasing effect on the total sound pressure level such that, when the two sources are equal, as described above, they produce a level three decibels above the sound of either one by itself.

Conveniently, people also hear or interpret sound pressure in a logarithmic fashion. Two useful rules of thumb to remember when comparing sound pressure levels are: (1) a 6 to 10 dB increase is generally perceived to be about a doubling of loudness, and (2) changes in sound pressure level of less than about three decibels are not readily detectable outside of a laboratory environment.

A-Weighted Decibel, dBA

An important characteristic of sound is its frequency, or "pitch." This is the per-second rate of repetition of the sound pressure oscillations as they reach our ear, expressed in units known as Hertz (Hz), formerly called cycles per second.

When analyzing the total noise of any source, acousticians often break the noise into frequency bands to determine how much is low-frequency noise, how much is middle-frequency noise, and how much is high-frequency noise. This breakdown is important for two reasons:

- Our ear is better equipped to hear mid and high frequencies and is less sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.

- Engineering solutions to a noise problem are different for different frequency ranges. Low-frequency noise is generally harder to control.

The normal frequency range of hearing for most people extends from a low of about 20 Hz to a high of about 10,000 to 15,000 Hz. People respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. The acoustical community has defined several “filters,” which approximate this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

The so-called "A" filter (“A weighting”) generally does the best job of matching human response to most environmental noise sources, including natural sounds and sound from common transportation sources. Because of the correlation with our hearing, the U. S. Environmental Protection Agency (EPA) and nearly every other federal and state agency have adopted A-weighted decibels as the metric for use in describing environmental and transportation noise.
Figure A-2 depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz. As the figure shows, A-weighting significantly de-emphasizes noise content at lower and higher frequencies where we do not hear as well, and has little effect, or is nearly "flat,” in for mid-range frequencies between 1,000 and 5,000 Hz.

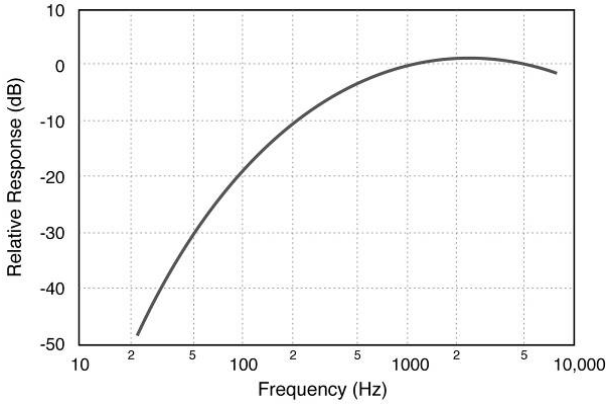


Figure A-2. Frequency-Response Characteristics of Various Weighting Networks

Source: HMMH, 2011

Figure A-3 depicts representative A-weighted sound levels for a variety of common sounds.

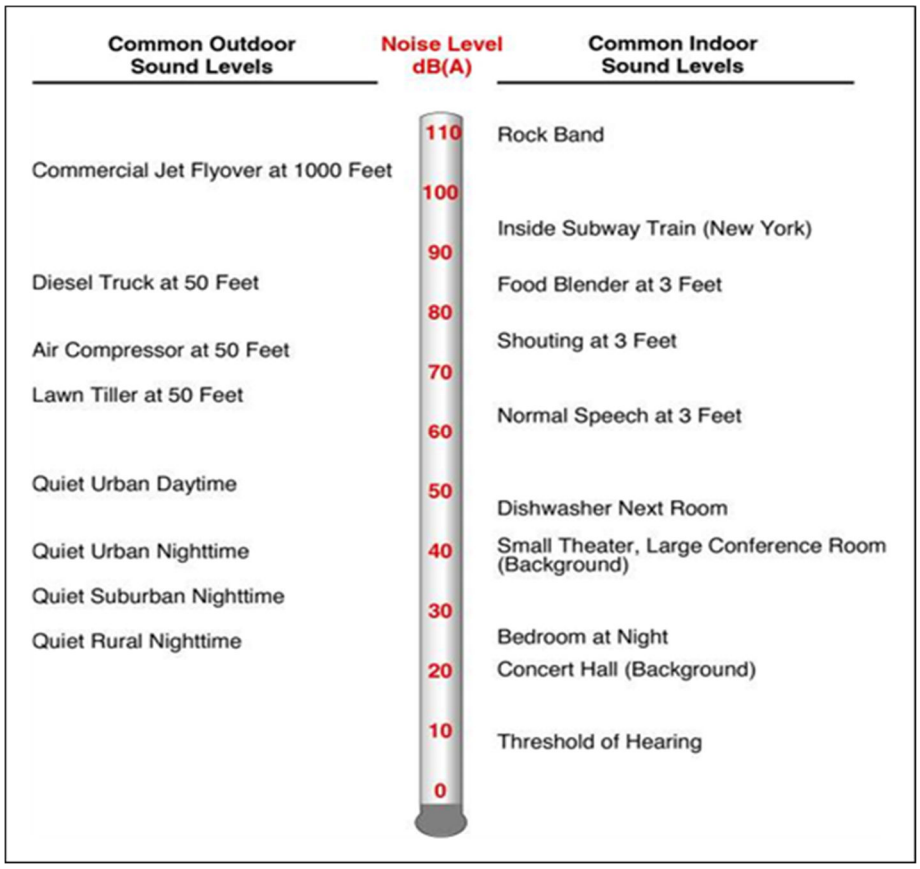


Figure A-3. Representative A-Weighted Sound Levels
Source: HMMH, 2011

Maximum A-Weighted Sound Level, L_{max}

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance (though even the background varies as birds chirp, the wind blows, or a vehicle passes by). This is illustrated in **Figure A-4**.

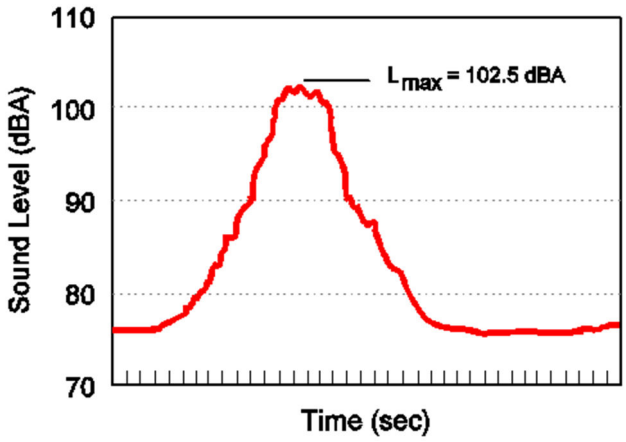


Figure A-4. Variation in the A-Weighted Sound Level over Time
Source: HMMH, 2011

Because of this variation, it is often convenient to describe a particular noise "event" by its maximum sound level, abbreviated as L_{max} (or LA_{max}, if the decibel abbreviation dB is used). In Figure A-4 the L_{max} is approximately 102.5 dBA.

While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative "noisiness" of an event such as an aircraft flyover; i.e., it describes only one dimension of the event and provides no information on the event's overall, or cumulative, noise exposure. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next sections introduce two closely related measures that account for this concept of a noise "dose," or the cumulative exposure associated with an individual "noise event" such as an aircraft flyover.

Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, or SEL. SEL is a summation of the A-weighted sound energy over the entire duration of a noise event. SEL expresses the accumulated energy in terms of the one-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level.

In simple terms, SEL "compresses" the energy into a single second. **Figure A-5** depicts this compression:

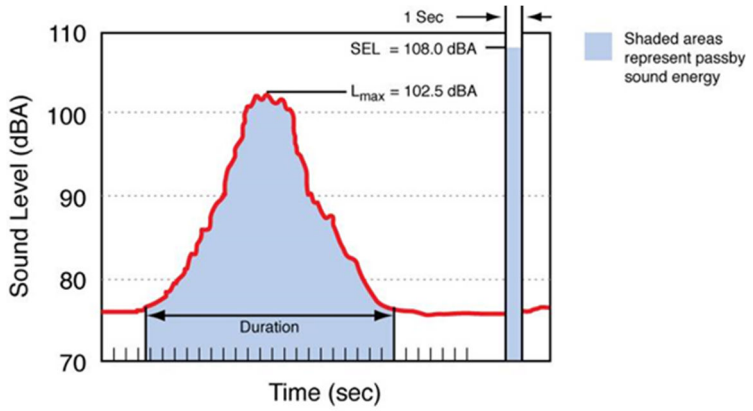


Figure A-5. Graphical Depiction of Sound Exposure Level
Source: HMMH, 2011

Note that because SEL is normalized to one second, it almost always will be higher than the event's L_{max}. In fact, for most aircraft flyovers, SEL is on the order of five to 12 dB higher than L_{max}.

SEL provides a basis for comparing noise events that generally match our impression of their overall "noisiness," including the effects of both duration and level; the higher the SEL, the more annoying a noise event is likely to be. **Figure A-6** illustrates this concept; of the two noise events shown, the event on the left has the higher maximum level, but the event on the right lasts longer and is therefore perceived as "noisier." Compressing or "normalizing" the equivalent sound energy to a one-second interval results in a higher SEL value for the event on the right.

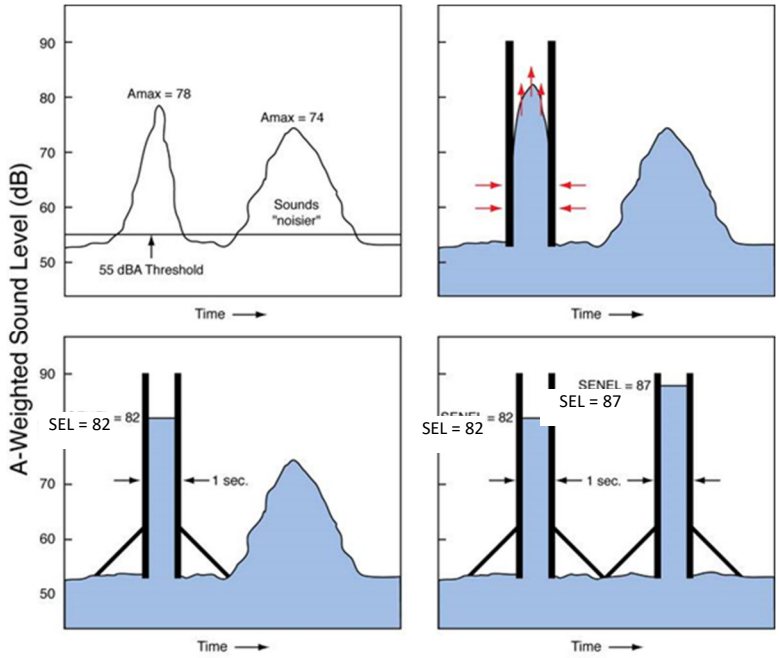


Figure A-6. Graphical Depiction of Sound Exposure Level for Two Noise Events with Different Maximums and Durations

Source: HMMH, 2011

Equivalent A-Weighted Sound Level, L_{eq}

The Equivalent Sound Level, abbreviated L_{eq}, is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest; e.g., an hour, an eight-hour school day, nighttime, or a full 24-hour day. The applicable period should always be identified or clearly understood when discussing the metric.

L_{eq} may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. This is illustrated in **Figure A-7**.

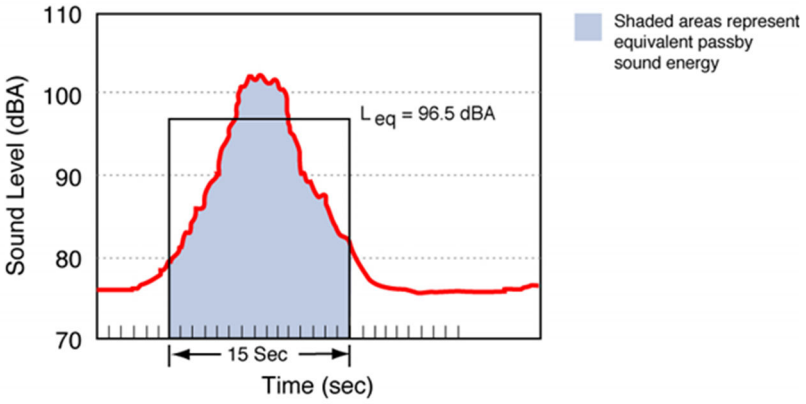


Figure A-7. Example of a One-Minute Equivalent Sound Level

Source: HMMH, 2011

In airport noise applications, L_{eq} is often presented for consecutive one-hour periods to illustrate how the hourly noise dose rises and falls throughout a 24-hour period as well as how certain hours are significantly affected by a few loud aircraft.

Day-Night Average Sound Level, DNL or L_{dn}

The previous sections address noise measures that account for short term fluctuations in A-weighted levels as sound sources come and go affecting the overall noise environment. The Day-Night Average Sound Level (abbreviated as DNL or L_{dn}) represents a 24-hour A-weighted noise dose. DNL is essentially equal to the 24-hour A-weighted L_{eq}, with one important adjustment: noise occurring at night – from 10 pm through 7 am – is "factored up." The factoring up can be made in one of two ways:

- Weighting, by counting each nighttime noise contribution 10 times; e.g., if DNL is calculated by summing the SEL of aircraft operations over a 24-hour period, each nighttime operation is represented by 10 identical daytime operations.

- Penalizing, by adding 10 dB to all nighttime noise contributions; e.g., if DNL is calculated from the SEL of aircraft operations occurring over a 24-hour period, 10 dB are added to the SEL values for nighttime operations.

The 10 dB adjustment accounts for our greater sensitivity to nighttime noise and the fact lower ambient levels at night tend to make noise events, such as aircraft flyovers, more intrusive. **Figure A-8** depicts this adjustment graphically.

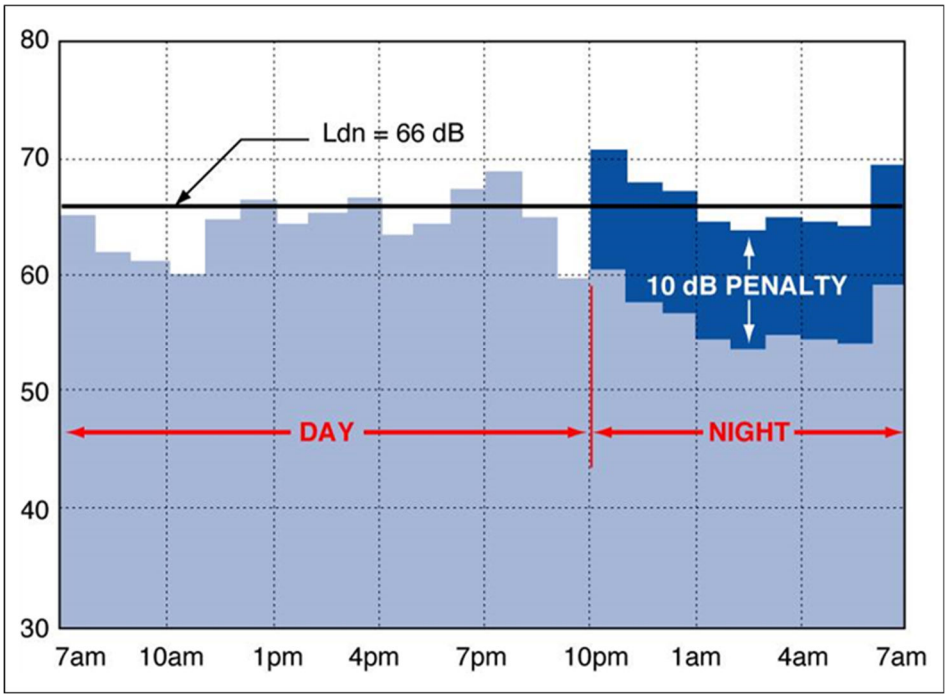


Figure A-8. Example of a Day-Night Average Sound Level Calculation
Source: HMMH, 2011

Most aircraft noise studies utilize computer-generated estimates of DNL, determined by adding up the energy from the SELs from each event, with the 10 dB penalty / weighting applied to night operations. Computed values of DNL are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). The contours usually reflect long-term (annual average) operating conditions, taking into account the average flights per day, how often each runway is used throughout

the year, and where over the surrounding communities the aircraft normally fly. Alternative time frames may also be helpful in understanding shorter term aspects of a noise environment.

Why is DNL used to describe noise around airports? The U.S. Environmental Protection Agency identified DNL as the most appropriate measure of evaluating airport noise based on the following considerations:

- It is applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods of time.
- It correlates well with known effects of noise on individuals and the public.
- It is simple, practical, and accurate. In principal, it is useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics is commercially available.
- It was closely related to existing methods currently in use.

Representative values of DNL in our environment range from a low of 40 to 45 dB in extremely quiet, isolated locations, to highs of 80 or 85 decibels immediately adjacent to a busy truck route. DNL would typically be in the range of 50 to 55 dB in a quiet residential community and 60 to 65 decibels in an urban residential neighborhood. **Figure A-9** presents representative outdoor DNL values measured at various U.S. locations.

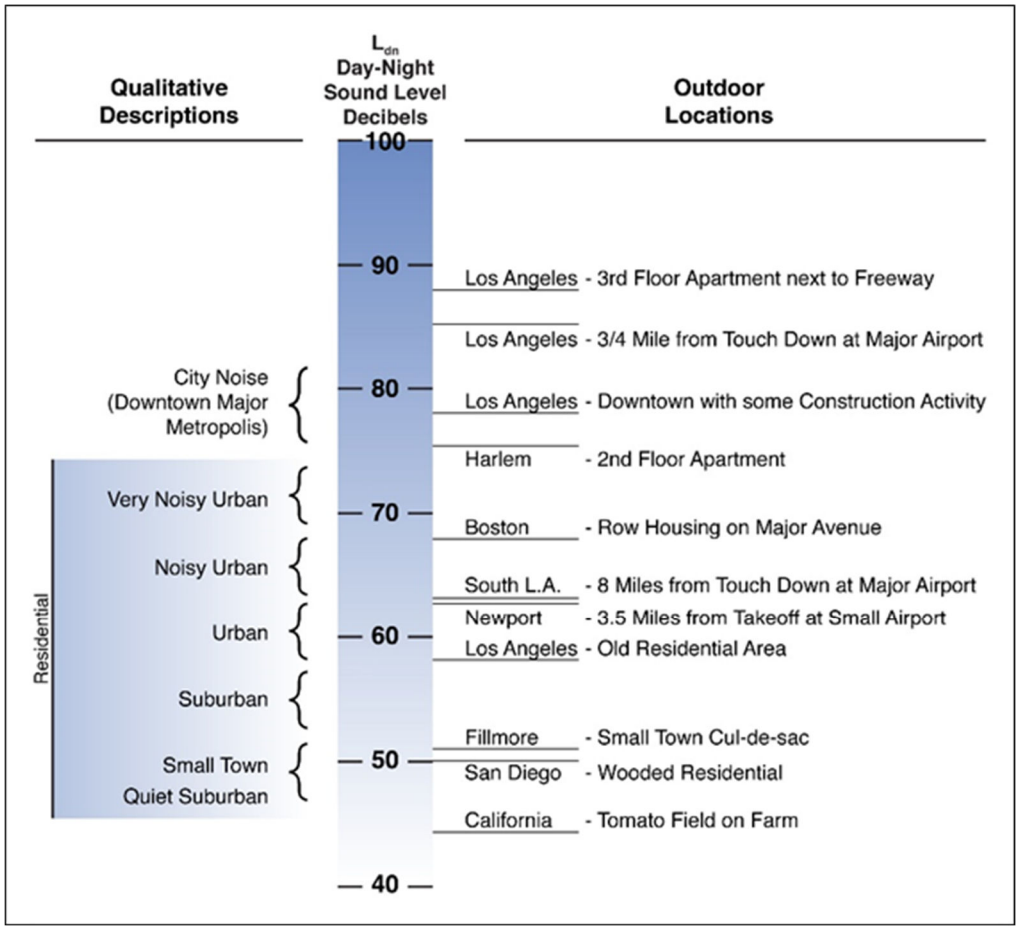


Figure A-9. Examples of Measured Day-Night Average Sound Levels

Source: HMMH, 2011

When preparing environmental noise analyses, the FAA considers a change of 1.5 dB within the DNL 65 dB contour to be "significant." If a change of 1.5 dB is observed, analysts should look between the 60 and 65 dB contours to see if there are areas of change of 3 dB or more; this is considered a "reportable impact."

The first section of this appendix provided rules of thumb for interpreting moment-to-moment changes in sound level; the following table presents guidelines for interpreting changes in cumulative exposure:

Table A-21. Guidelines for Interpreting Changes in Cumulative Exposure

DNL Change	Community Response	Mitigation
0 – 2 dB	May be noticeable	Abatement may be beneficial
2 – 5 dB	Generally noticeable	Abatement should be beneficial
Over 5 dB	A change in community reaction is likely	Abatement definitely beneficial

Source: HMMH, 2011

Most public agencies dealing with noise exposure, including the Federal Aviation Administration (FAA), Department of Defense, and Department of Housing and Urban Development (HUD), have adopted DNL in their guidelines and regulations.

APPENDIX B

Draft Protected Species Assessment

Project Number: 05171446-1
November 30, 2022

Professional Service Industries, Inc.
95 Chastain Road, NW | Suite 301 | Kennesaw, GA 30144
Phone: (770) 424-6200
Fax: (770) 424-0199

BNA – Nashville International Airport
140 BNA Park Drive, Suite 520
Nashville, Tennessee 37214

Attention: Traci Holton, P.E., C.M. – VP, Chief Engineer & Deputy COO, Engineering
Traci.Holton@flynashville.com

Re: **Draft Protected Species Assessment**
Proposed Development - ~35-acres
Southwest of Currey Road and Knight Valley Drive, Nashville Tennessee
Purchase Order PO22-002856-2 (Task 3)

Dear Ms. Holton:

Professional Service Industries, Inc. (PSI), an Intertek company, is pleased to inform you of our findings for the above referenced project. The project was conducted at the proposed development site at the southwest corner of Currey Road and Knight Valley Drive in Nashville, Tennessee (subject property) and included a Protected Species Assessment of the 35-acre site. The work was conducted in accordance with PSI Proposal 0517-383045 dated September 16, 2022.

DRAFT

Project Understanding

The subject property consists of an approximate 35-acre parcel of land located at southwest corner of Currey Road and Knight Valley Drive in Nashville, Tennessee. The subject property consists of undeveloped and wooded land. Topography is generally sloped from the northwest and northeast to the south.

The south adjoining property consists of a small wooded area followed by a large industrial warehouse building. The north adjoining property consists of Currey Road followed by a residential neighborhood. The east adjoining property consists of Knight Valley Drive followed by the Nashville International Airport. The west adjoining property consists of a mix of undeveloped wooded land and a residential neighborhood.

Based on historical aerial photographs on Google Earth™, the subject property consisted of undeveloped wooded land since 1985. See Appendix A for a Topographical Map and Site Location Map.

PSI was requested to document the presence and/or potential for occurrence of federal and/or state listed and other protected plant and animal species within and immediately adjacent to the subject property through: 1) the interpretation of existing state and federal databases of known listed species occurrences; and, 2) pedestrian survey of the subject property for habitat types critical to the occurrence of state and/or federal listed species.

Background

Before a plant or animal species can receive protection under the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 to 1543), it must first be placed on the United States Fish and Wildlife Service (USFWS) federal list of endangered and threatened wildlife and plants. The USFWS listing program follows a strict legal process to determine whether to list a species, depending on the degree of threat it faces. An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future. A "candidate" species is at risk and is petitioned or proposed for listing under the ESA. Although "candidate" species are not afforded the same amount of protection under the ESA and an official USFWS consultation is not required, the USFWS recommends that a "conference" be performed prior to impacting these species, if present.

Findings

PSI requested a consultation with the USFWS via their online ECOS Information for Planning and Consultation (IPaC) system. The consultation data package is provided in **Appendix B**. The ECOS-IPaC Consultation identified eleven (11) potential threatened/endangered/candidate species that could be located on the subject property based on its presence in Davidson County.

Table 1: USFWS Listed Species in Davidson County, TN

Common Name	Scientific Name	Status
MAMMALS		
Gray Bat	*Myotis grisescens*	Endangered
Indiana Bat	*Myotis sodalist*	Endangered
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened
Tricolor Bat	*Perimyotis subflavus*	Proposed Endangered
INSECTS		
Monarch Butterfly	*Danaus plexippus*	Candidate
CRUSTACEANS		
Nashville Crayfish	Orconectes shoupi	Endangered
VASCULAR/FLOWERING PLANTS		
Braun's Rock-cress (Small)	*Arabis perstellata*	Endangered
Guthrie's Ground-plum	*Astragalus bibullatus*	Endangered
Leafy Praire-clover	*Dalea foliosa*	Endangered
Price's Potato-bean	*Apios priceana*	Threatened
Short's Bladderpod	*Physaria globose*	Endangered

DRAFT

The report did not identify any Critical Habitat, National Refuge Land, or Fish Hatcheries on the subject property.

The report identified eleven (11) bird species that are not considered threatened or endangered, but are listed as a Bird of Conservation Concern (BCC) and are protected under the USFWS Migratory Bird Treaty Act, which makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, any migratory bird, or the parts, nests, or eggs except under the terms of a valid Federal permit. The eleven birds include: Bald Eagle (*Haliaeetus leucocephalus),* Black-billed Cuckoo *(Coccyzus erythropthalmus),* Bobolink *(Dolichonyx oryzivorus),* Cerulean Warbler (*Dendroica cerulea*), Chimney Swift (*Chaetura pelagica*), Field Sparrow (*Spizella pusilla*), Kentucky Warbler (Oporonis *formosa*), Prairie Warbler (Dendroica dicolor), Prothonatary Warbler (Protonnotaria citrea), Rusty Blackbird (*Euphagus carolinus*), and the Wood Thrush (*Hylocichla mustelina*).

Required Habitat

Required habitat of the listed species was investigated to include both typical habitat and "Critical Habitat". Typical habitat is the type of natural environment, characterized by physical and biological features, where an organism lives, finds food, shelters, and mates for reproduction. Critical Habitat is defined in Section 3 of the ESA as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species, and (b) that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. No Critical Habitat was identified in the ECOS-IPaC Consultation.

Review of USFWS databases indicated the following required habitats of the listed species and migratory birds summarized below in Tables 2 and 3.

Table 2: Required Habitat of Listed Species

Common Name	Habitat
Gray Bat	Primarily hibernates and roosts in caves and have rarely been known to move into mines or abandoned buildings. Gray bats forage primarily over streams, flying close to the water's surface.
Indiana Bat	Primarily hibernates and roosts in caves and has been known to move into tunnels or loose bark of dead or dying trees or in tree cavities. Foraging occurs in riparian (wooded) areas, upland forests, ponds, and fields; however forested landscapes are more important in agricultural settings.
Northern Long-eared Bat	A small bat. During summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on

DRAFT

	their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.
Tricolor Bat	Associated with forested landscapes, often in open woods, intact, unfragmented forests near perennial streams. It forms day roosts and maternity colonies in older forest mainly in dead or live tree foliage and occasionally in barns or other structures, caves, mines, and rock crevices. They can also be found over water and adjacent to water edges. Sparse vegetation and early successional stands utilized as foraging habitat.
Monarch Butterfly	Monarchs overwinter in high altitude Mexican conifer forests or coastal California conifer or Eucalyptus groves between October and March. Migratory stopovers occur in North America starting in March/April until fall. Habitat includes patches of milkweed.
Nashville Crayfish	This crayfish has been found in gravel and cobble runs, pools with up to 10 cm (3.9 in) of settled sediment, and in small pools with intermittent flow; found in impoundments that include overflow pools and retention ponds adjacent to Mill Creek and its tributaries.
Braun's Rockcress	The plant grows in shady forest habitat on limestone substrates, usually near streams or rivers. Often found in disturbed habitat such as roadcuts. Mostly limited to Franklin County, Kentucky.
Guthrie's Ground-plum	The species only grows along the deeper soiled glade margins or in areas within the cedar glades that are partially shaded. Cedar glades are typically wet in winter and spring, and dry and very hot in summer and fall. Sites associated with thin-bedded, fossiliferous Lebanon limestone outcroppings. The plants produce purple flowers in April and May.
Leafy Praire-clover	The plant is native to glades and prairies with limestone substrates. The habitat may be moist or wet with seeps in the calcareous ground. It can be found in sunny, open dolomite prairies and river terraces that are periodically burned in the natural fire regime. The species is fire-dependent because the seeds must be scarified if they are to germinate. Blooming occurs in summer.
Price's Potato-bean	A climbing yellow-green vine. The fragrant pale pink or greenish-yellow pea-like flowers bloom in mid-June through August. Grows in forest openings and along wood edges in well-drained soils. It is often found where bluffs descend to streams. Some populations also occur in disturbed areas such as roadside rights-of-way or powerline cuts.
Short's Bladderpod	A small plant covered with dense hairs giving it a grayish appearance. It produces yellow flowers in the spring, and its fruit is globe shaped. Its preferred habitat is steep, rocky, dry limestone cliffs, barrens, cedar glades, steep wooded slopes, and talus areas (sloping mass of rock fragments below a bluff or ledge). Infrequent on sites with little topographic relief. Closely associated with calcareous outcrops. Usually found on south to west facing slopes near rivers or streams. Requires low levels of shading from overstory and midstory vegetation. Flowers from March through June.

DRAFT

Table 3: Habitat/Migration of Migratory Birds	
Common Name	**Habitat/Migration**
Bald Eagle	Their habitat includes estuaries, large lakes, reservoirs, rivers, and some seacoasts. In winter, the birds congregate near open water in tall trees for spotting prey and night roosts for sheltering. This species is found in Tennessee year-round. *Note: On June 28, 2007 the Interior Department took the American bald eagle off the endangered species list. The eagle is still state protected by 68A-16.002 FAC and federally protected by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA).
Black-billed Cuckoo	Most commonly found around the edges of mature deciduous or mixed forests and much less frequently in coniferous forests. They can also be found in much younger growth forests with a lot of shrubs and thickets. Wetlands with a lot of alder and willow are another prime location to see them. Can also inhabit more open areas such as abandoned farmland, golf courses and residential parks. Must also have a water source nearby such as a lake, river, marsh or pond. Found in Tennessee during their migration north to breed and their return south, typically in the spring and fall. On their wintering grounds in South America, they can inhabit tropical rainforests, deciduous or semi-open woodlands as well as scrub forests
Bobolink	Breeding habitat includes tall grass areas, flooded meadows, prairie, deep cultivated grains, untilled fields, and hayfields. Nests are on the ground in small hollows in areas of concealing herbaceous vegetation. This species migrates through Tennessee in spring (April) and fall (late July-early October). It breeds in extreme North America and Canada in the summer and winters in South and Central America.
Cerulean Warbler	Deciduous forests, especially in river valleys. Breeds in mature hardwoods either in uplands or along streams. Prefers elm, soft maple, oak, birch, hickory, beech, basswood, linden, sycamore, or black ash. Nests only in tall forest with clear understory. This species migrates through Tennessee in spring (late March-mid May) and fall (late July-early October), breeds in the north Tennessee Appalachian Mountains and northward (mid-May), and winters in the northern Andes.
Chimney Swift	It is found over open country, savanna, wooded slopes and humid forests. It once nested in hollow trees, but today it nearly always nests in chimneys or other structures (air vents, wells, hollow trees, and caves). They forage over urban and suburban areas, rivers, lakes, forests, and fields. They arrive in the southern US in mid-March for the breeding season, which lasts through August. They remain through October, when they begin migration to South America for the winter.
Field Sparrow	It is found in bushy pastures, brush, scrub. Found at all seasons in brushy overgrown fields, second growth, woodland edges, hedgerows in open country. Sometimes around brushy

DRAFT

	edges of marshes. Does not usually live in wide-open grassy fields unless they contain scattered shrubs. Can be found in Tennessee all year round, but nest March-August.
Kentucky Warbler	Woodland undergrowth. In summer, prefers deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous woods, and edges of swamps. They need large tracts of forest habitat (over 1,200 acres) for nesting, although gaps such as treefall gaps, trails, or small roads are important for creating a patchwork of shaded and well-lit areas. This species can be found in Tennessee in the spring (late April) through summer (August) and overwinters in Central and South America (late August-early October).
Prairie Warbler	Small, yellow songbird. Inhabits brushy slashings, bushy pastures, and low pines. Breeds in dry old clearings, edges of forest, and sandy pine barrens with undergrowth of scrub oaks, especially on ends of slopes and ridges. Likes thick second growth of hickory, dogwood, hazel, or laurel with blackberry vines. Found in flat, grassy lands with scattered trees and bushes in the South. Not a bird of open prairies, this warbler nests mainly in young second growth scrub and densely overgrown fields in eastern North America. Migration to the subject property likely occurs mid-April through late-September during the breeding season. In late-September they migrate to south Florida and the Caribbean and return the following spring.
Prothonotary Warbler	Mature deciduous floodplain, river, and swamp forests; wet lowland forest. Primary habitats are almost always near standing water; swamps that are somewhat open with scattered dead stumps are preferred. Bottomland forests and extensive willow thickets near lakes or ponds are also quite suitable. Requires dense underbrush along streambanks. Can be found in Tennessee April through July.
Rusty Blackbird	Breeding habitat includes moist woodland (primarily coniferous), bushy bogs and fens, and wooded edges of water courses and beaver ponds. Nests are in trees or shrubs, usually in or near water, frequently in a conifer to about 6 meters above ground. During migration and winter, habitat is primarily wooded wetlands and riparian areas but also includes various open woodlands, scrub, pastures, and cultivated lands. This species overwinters in Tennessee, arriving in the late fall (October-November) and departs in the early spring (March). It breeds in extreme North America, Canada and Alaska in the summer.
Wood Thrush	Inhabits mainly deciduous woodlands. It breeds in the understory of woodlands, mostly deciduous but sometimes mixed, in areas with tall trees. More numerous in damp forest and near streams than in drier woods; it will nest in suburban areas where there are enough large trees. In migration, it is found in various kinds of woodland. It winters in understory of lowland tropical forests. Migration at subject property likely mid-April through late-September. This species breeds in Tennessee in the spring and summer (May-August), arriving in the spring (April) and departing in the fall (October). It overwinters in Central America.

DRAFT

United States Geological Survey Topo Maps and Aerial Photographs

PSI reviewed the 7.5-minute Series Quadrangle USGS Topographical Map "Antioch, TN" dated 2021. We also reviewed historical aerial photographs from the following years: 1985, 1992, 1997, 1999, 2003, 2004, 2005, 2006, 2007, 2008, 2010, 2011, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, and 2022 from Google Earth.

Based on the review of historical documentation, the subject property appears to have been undeveloped, wooded land since at least 1985. No lakes, streams, wetlands, or other WUS were identified on the subject property from historical aerials and topos. The closest mapped waterbodies include Mill Creek approximately 1,600-feet to the southwest and an unnamed tributary to Mill Creek approximately 1,600-feet to the east.

The historical topographic maps and aerials can be found in **Appendix B.**

Natural Resources Conservation Service (NRCS) Soil Surveys

PSI reviewed soil maps provided by the USDA NRCS for the subject property. Four soils were mapped on the property: StC (Stiversville loam, 5 to 12 percent slopes) in the western portion, StD (Stiversville loam, 12 to 25 percent slopes) in the southwest/central/southeastern portions, SvD (Stiversville-Urban Land, 3 to 25 percent slopes) in the northern portions, and TrC (Talbott-Rock Outcrop Complex, 5 to 15 percent slopes) in the southern portions.

According to the USDA's NRCS, the Stiversville and Talbott-Rock Outcrop Complex series are both derived from weathered limestone.

The soil maps can be found in **Appendix D.**

TDEC Consultation

PSI contacted the TDEC TN Wildlife Resources Agency (TWRA) for a threatened and endangered species list for the subject property and surrounding areas. Ms. Katie M. Murphy, Region 2 Aquatic Habitat Biologist, responded on November 28, 2022, stating that they anticipate no adverse impacts to state listed species under their authority due to development of the property except for the Nashville Crayfish (*Orconectes shoupi*). Ms. Murphy deferred an opinion on the crayfish to the USFWS Cookeville Field Office, which they share authority over this species. Ms. Murphy recommended that best management practices to address erosion and sediment be implemented and maintained during construction activities.

This crayfish requires streams with gravel and cobble runs, pools with up to 10 cm (3.9 in) of settled sediment, and in small pools with intermittent flow; found in impoundments that include overflow pools and retention ponds adjacent to Mill Creek and its tributaries. As discussed on the following sections, PSI did not observe flowing streams, pools, or retention ponds on the subject property. PSI did, however, observe two ephemeral stream systems on the property. These stream systems only flow in direct response to rain events, and do not support seasonal (intermittent) or permanent (perennial) stream flow. As a result, these dry stream channels would not provide the necessary water flow to support the Nashville Crayfish.

See the Appendices for a copy of correspondence with the TDEC TWRA.

DRAFT

Field Investigation

On November 21, 2022, Andrew Peiken, Certified Ecologist, conducted a pedestrian survey of the subject property to determine the potential occurrence of the habitat(s) listed in **Tables 2 and 3**. The weather was sunny and cool with temperatures in the 30's-50's ^{o}F. The previously recorded rainfall was 0.25-inches on November 15, 2022 (per USGS stream gauge #03431100 at Glendale Lane, Nashville, TN).

The ground reconnaissance consisted of observing the periphery and interior portions of the property and viewing the site from accessible adjacent public access areas. Visual reconnaissance of adjoining properties was limited to areas and facilities that were readily observable from the subject property or from public access areas. PSI systematically toured interior portions of the property on foot. While traversing the property, particular attention was given to the presence (or absence) of habitats listed in Tables 2 and 3 including:

- Freshwater waterways (lakes, reservoirs, ponds, creeks, streams, ditches, canals, springs, rivers, etc.) with flowing (perennial) or seasonal (intermittent) flow; wetlands including floodplains and swamps and forested wetlands; unfragmented deciduous forested areas near streams, older trees with cavities and/or flaking bark; caves (with and without streams) or mines; barns or abandoned structures; milkweed patches; road-cuts and utility rights-of-way; sunny prairies and river terraces; Limestone substrate near streams/rivers; forest edges; steep rocky bluffs over water sources; cedar glades; and brushy pasture or overgrown fields.

Observed Land Use, Habitat, Vegetative Cover, and Animal Species

The majority of the subject property consisted of undeveloped, dry (mesic), deciduous wooded land. No evergreen trees were observed. Only one large dead tree was observed with loose/flaking bark. The property consisted of 10-25% steep slopes, sloping to the south and southwest. Two ephemeral stream systems were identified on the subject property, totaling approximately 1,940 linear feet in length. These stream systems were mostly dry, with one of them containing sporadic puddles of stagnant water. One large excavation/depression was observed in the west-central portion of the property. No streams or other waterbodies with seasonal/permanent water were observed. No dilapidated structures, rocky outcrops, caves/mines, open areas/fields, wetlands/prairies, road-cuts and utility rights-of-way, rocky bluffs, or cedar glades.

The overstory was thick and was comprised of mostly Sugar Maple (*Acer saccharum*), Pin Oak (*Quercus palustris*), American Chestnut (*Castanea dentata*), Hackberry (*Celtis occidentalis*), Osage Orange (*Maclura pomifera*), Black Locust (*Robinia pseudoacacia*), and Northern Red Oak (*Quercus rubra*). The thick understory (sapling/shrub stratum) was dominated by Chinese privet (*Ligustrum sinense*), Coralberry (*Symphoricarpos orbiculatus*), and saplings of the above-mentioned tree stratum species. The ground cover (herbaceous stratum) was dominated by Virginia Creeper (*Parthenocissus quinquefolia*), English Ivy (*Hedera helix*), Lilyturf (*Liriope muscari*), and tassel fern (*Polystichum polyblepharum*). The majority of the vegetation observed was dominated by facultative upland and upland species, typical of dry/mesic deciduous forests.

Besides a single dead tree with loose bark, none of the habitats of the listed species or migratory birds summarized in Tables 2 and 3 were identified on the subject property.

The only evidence of mammals observed on the subject property included the grey squirrel (*Sciurus carolinensis*, visual) and the whitetail deer (*Odocoileus virginianus*, tracks). PSI utilized the Cornell University Lab – Merlin Bird ID App for iPhone (Cornell University, 2022) to identify bird calls on the subject property. The following bird calls were identified: Hermit Thrush (*Catharus guttatus)*, Red-bellied Woodpecker (*Melanerpes carolinus*), Northern Flicker (*Colaptes auratus*), Carolina Chickadee (*Poecile carolinensis*), Yellow-

DRAFT

rumped Warbler (*Setophaga coronate)*, Blue Jay (*Cyanocitta cristata*), American Crow (*Corvus brachyrhynchos)*, and the Tufted Titmouse (*Baeolophus bicolor*).

PSI did not observe any threatened or endangered species on the subject property during our site reconnaissance. Photographs can be found in **Appendix C.**

Comparison of Observed Habitats vs. Required Habitat

The threatened and endangered species listed in Tables 1 and 2 require the following habitats for survival and reproduction:

- Lakes, reservoirs, ponds, creeks, streams, ditches, canals, springs, rivers, etc. with flowing (perennial) or seasonal (intermittent) flow.
- Wetlands including floodplains and swamps and forested wetlands
- Bluffs or cliffs over water sources.
- Sunny, open prairies over limestone substrates.
- Open woods near streams.
- Limestone substrate near streams/rivers.
- Caves or mines near streams/ponds.
- Rock crevices.
- Dead or living trees with cavities or loose bark.
- Barns or abandoned structures.
- Milkweed patches.

The migratory birds listed in Table 3 require the following habitats for survival and reproduction:

- Tall trees near estuaries, large lakes, reservoirs.
- Lakes, ponds, creeks, streams.
- Large scattered trees, orchards, farmland groves of tall trees, forest edges.
- Deciduous/mixed woodlands with large trees, damp forests near streams.
- Tall grass areas, hayfields, flooded meadows.

The following habitats were observed onsite:

- Dry, deciduous woodlands with large trees. No pine/evergreen trees were observed.
- Thick canopy and understory.
- A single dead tree with loose/flaking bark.
- 10-25% sloped terrain with ridges and valleys.
- Two ephemeral stream systems (no seasonal/permanent flow, only flow directly after a rain event).
- One depression/sinkhole (no water).
- No interior open areas were observed, except the northern/eastern boundaries adjacent to roadways.

Besides a single dead tree with loose bark, none of the above-mentioned habitats required by the threatened and endangered species or migratory birds were observed on the subject property.

DRAFT

Conclusions

None of the threatened and endangered species listed in Table 1 were directly or indirectly observed or are likely to inhabit the subject property. Besides a single dead tree with loose bark, none of the required habitats by the threatened and endangered species or migratory birds were observed on the subject property. Although the Indiana Bat and Northern Long-eared Bat have been known to utilize dead trees with loose bark for roosting during the summer, the small number of dead trees observed by PSI (one tree) would not be likely to support a reproductive population of bats on the subject property. These two bats, as well as the Gray Bat and Tricolor Bat, prefer caves/mines/barns for hibernation and roosting and prefer open wooded areas near streams and ponds for foraging. These conditions were not observed on the subject property.

Migratory birds, although not considered threatened and endangered species, are protected by the USFWS. No high-quality suitable habitat was observed on the site for the migratory birds.

It is PSI's opinion that proposed construction activities within the subject property would not likely adversely affect/not likely impact the listed threatened and endangered species. If the client develops the property including land clearing activities, PSI recommends that trees be removed during the cold weather months of November through March, when the majority of migratory birds have left the state. Additionally, most bat species are hibernating in their preferred hibernacula (constant temperature, moist caves, tunnels and mines) during this time period. PSI also recommends that best management practices to address erosion and sediment be implemented and maintained during construction activities.

In addition, land use of the surrounding areas consists of residential, light industrial, and the Nashville International Airport. Habitat fragmentation renders the subject property isolated and an unlikely area for populous, reproductive colonies of the listed or migratory species, if present. Due to the small size of the subject property, and highly developed surrounding properties with an adjoining international airport, it is PSI's opinion that it is unlikely that any federally or state listed/candidate species or the migratory birds will be impacted by the development for this site.

Recommendations

If additional state or federal permitting is required for site development, the permitting agency could require a specialized threatened/endangered species or migratory bird nest survey be accomplished prior to construction activity (habitat destruction/tree removal/etc.). Given the low-quality to non-existent habitats observed during the November 21, 2022 field visit, additional survey would likely not be required unless there is a concern by the permitting agency or consulting agencies during subsequent permitting efforts. No additional survey or analysis is recommended by PSI at this time based on survey observations (lack of species observed), lack of habitat, and low potential for listed species to be present within the site.

If an additional survey is later requested/required through additional federal permitting efforts, specifically for migratory birds, it should be accomplished during the nesting/migration season as summarized in Table 2. Habitat alteration/disturbance outside of the nesting/migration season, would have less potential to impact the listed species, and would be less of a concern for any agencies that may have a survey requirement. If there is a survey requirement brought forward during any potentially necessary permitting efforts, the permitting agency would dictate the need for survey and survey timing.

DRAFT

Warranty

PSI only warrants the information in this report to be correct at the time of completion of this report. PSI warrants that the results and conclusions contained herein were accomplished in general accordance with the standard sampling protocols. These methodologies represent good commercial and customary practice for conducting a **Protected Species Assessment** of a site for the purpose of identifying recognized endangered, threatened, or "species of special concern". However, these results and conclusions contain all of the limitations inherent in these methodologies, which are referred to in the protocol.

PSI believes that the information obtained from the literature review and site visit is reliable. The methodologies of this assessment are not intended to produce all-inclusive or comprehensive results, but rather to provide the client with information regarding apparent suspicions of existing and potential conditions relating to the subject property. No other warranties are implied or expressed.

Thank you for choosing PSI as your consultant for this project. If you have any questions, or if we can be of additional service, please call us at (678) 354-3007.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Andrew Peiken, C.E.
Certified Ecologist

Eric Lowe
Environmental Department Manager

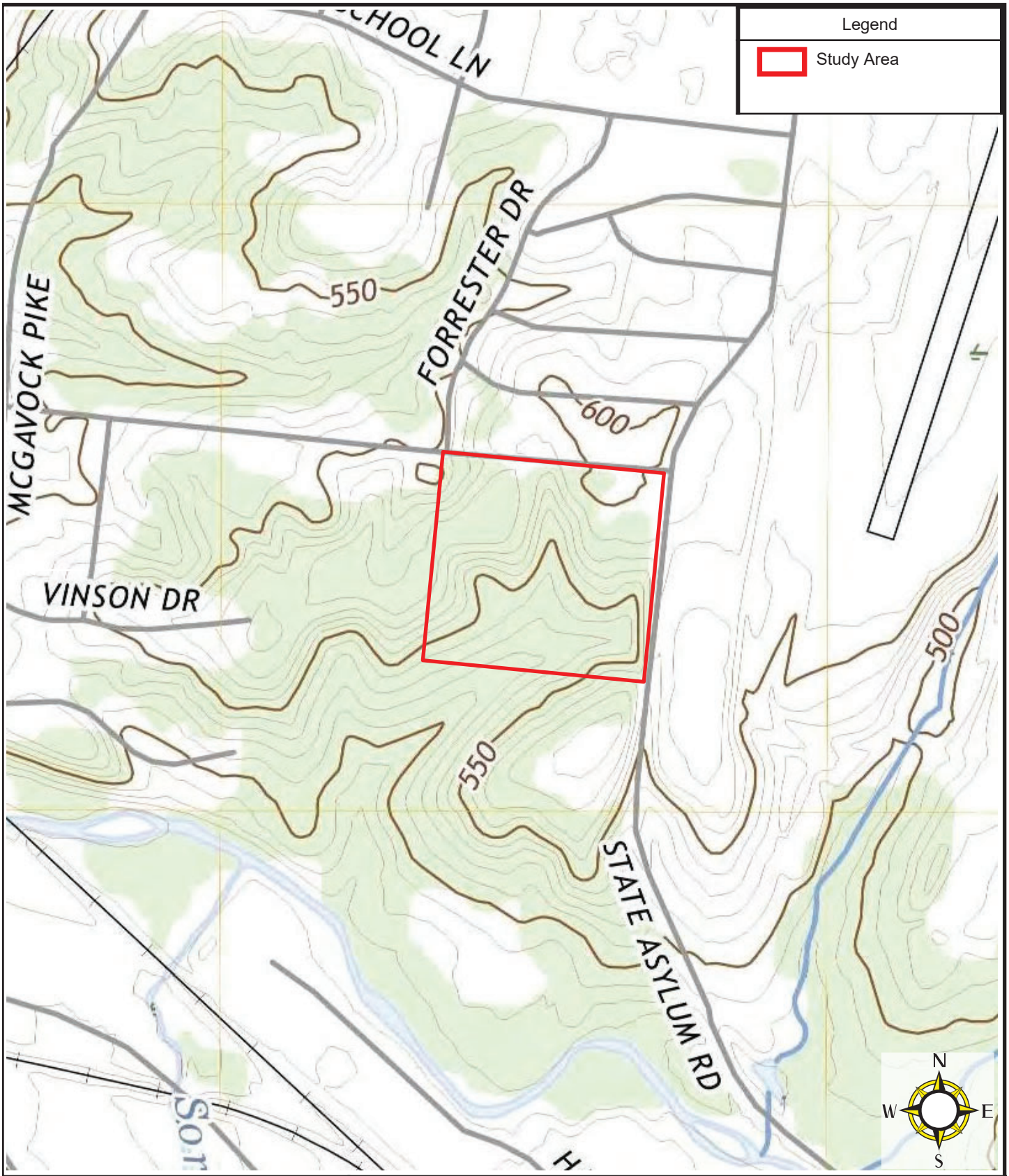
Attachments:
Appendix A – Figures
Appendix B – ECOS-IPaC Consultation
Appendix C – Site Photographs
Appendix D – Support Documents

DRAFT

APPENDICES

APPENDIX A

FIGURES



intertek psi
95 Chastain Road, NW
Suite 301
Kennesaw, Georgia
30144
Tel +1 770.424.6200
Fax +1 770.424.0199
intertek.com/building

Topographical Map with Study Area

BNA – Nashville International Airport
Southwest of Currey Road and Knight Valley Drive
Nashville, TN

Project No.: 05171446-1	Date: 11/10/2022
Drawn by: ASP Checked by: EL	Source: USGS 2021 Antioch, TN 7.5-min Topo

Figure 1



intertek psi
95 Chastain Road, NW
Suite 301
Kennesaw, Georgia
30144
Tel +1 770.424.6200
Fax +1 770.424.0199
intertek.com/building

Site Observations – 11/21/2022
BNA – Nashville International Airport
Southwest of Currey Road and Knight Valley Drive
Nashville, TN

Project No.: 05171446-1	Date: 11/22/2022
Drawn by: ASP Checked by: EL	Source: Google Earth 2022

Figure 2

APPENDIX B

ECOS-IPaC Consultation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: November 10, 2022
Project Code: 2023-0014713
Project Name: BNA - Nashville 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 ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system 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:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.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 https://www.fws.gov/birds/policies-and-regulations.php.

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/birds/bird-enthusiasts/threats-to-birds.php.

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/birds/policies-and-regulations/executive-orders/e0-13186.php.

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
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

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:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

Project Summary

Project Code: 2023-0014713
Project Name: BNA - Nashville International Airport
Project Type: Clearing Land
Project Description: Land Clearing
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.102659599999996,-86.69404078746041,14z



Counties: Davidson County, Tennessee

Endangered Species Act Species

There is a total of 11 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 Fisheries[1], 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
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened
Tricolored Bat *Perimyotis subflavus* 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 *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Crustaceans

NAME	STATUS
Nashville Crayfish *Orconectes shoupi*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7181

Flowering Plants

NAME	STATUS
Braun's Rock-cress *Arabis perstellata*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/4704

Guthrie's (=pyne's) Ground-plum *Astragalus bibullatus*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/1739

Leafy Prairie-clover *Dalea foliosa*	Endangered

Population:
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/5498

Price"s Potato-bean *Apios priceana*	Threatened

Population:
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7422

Short's Bladderpod *Physaria globosa*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/7206

Critical habitats

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

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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 OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* 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.	Breeds Sep 1 to Jul 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 23 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Field Sparrow *Spizella pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Aug 15
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

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 and understand the FAQ "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:

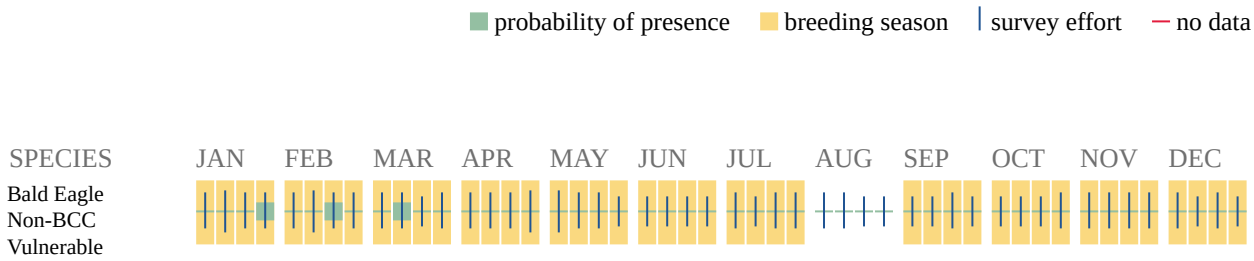
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability 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.

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.

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.





Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

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 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.

Wetlands

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.

FRESHWATER POND

- Palustrine

IPaC User Contact Information

Agency:	PSI, Inc.
Name:	andrew peiken
Address:	95 Chastain Road
Address Line 2:	Suite 301
City:	Kennesaw
State:	GA
Zip:	30144
Email	andrew.peiken@intertek.com
Phone:	7703643632

APPENDIX C

SITE PHOTOGRAPHS



Photo 1: Subject property (north boundary)



Photo 2: Subject property (east boundary)



Photo 3: Low area in northwest corner of property (non-wetland)



Photo 4: Typical trash dumped on the subject property



Photo 5: Ephemeral Stream #1 (ES1)



Photo 6: Ephemeral Stream #2



Photo 7: Dead tree



Photo 8: Flaking bark on dead tree



Photo 9: White-tail deer tracks



Photo 10: Old refrigerator dumped in Ephemeral Stream #3



Photo 11: Piles of concrete/rock debris dumped on the property



Photo 12: Start of Ephemeral Stream #3 (ES3) at culvert under Knight Valley Dr.
Note: puddle of standing water



Photo 13: Ephemeral Stream #3 (dry section)



Photo 14: Ephemeral Stream #3 puddles of water (non-flowing)



Photo 15: Sinkhole #1 (SH1)



Photo 16: Typical upland area



Photo 17: Northwest adjoining residential property across Currey Rd.



Photo 18: North adjoining residential property across Currey Rd.



Photo 19: West adjoining property



Photo 20: East adjoining property (Nashville Airport across Knight Valley Drive)

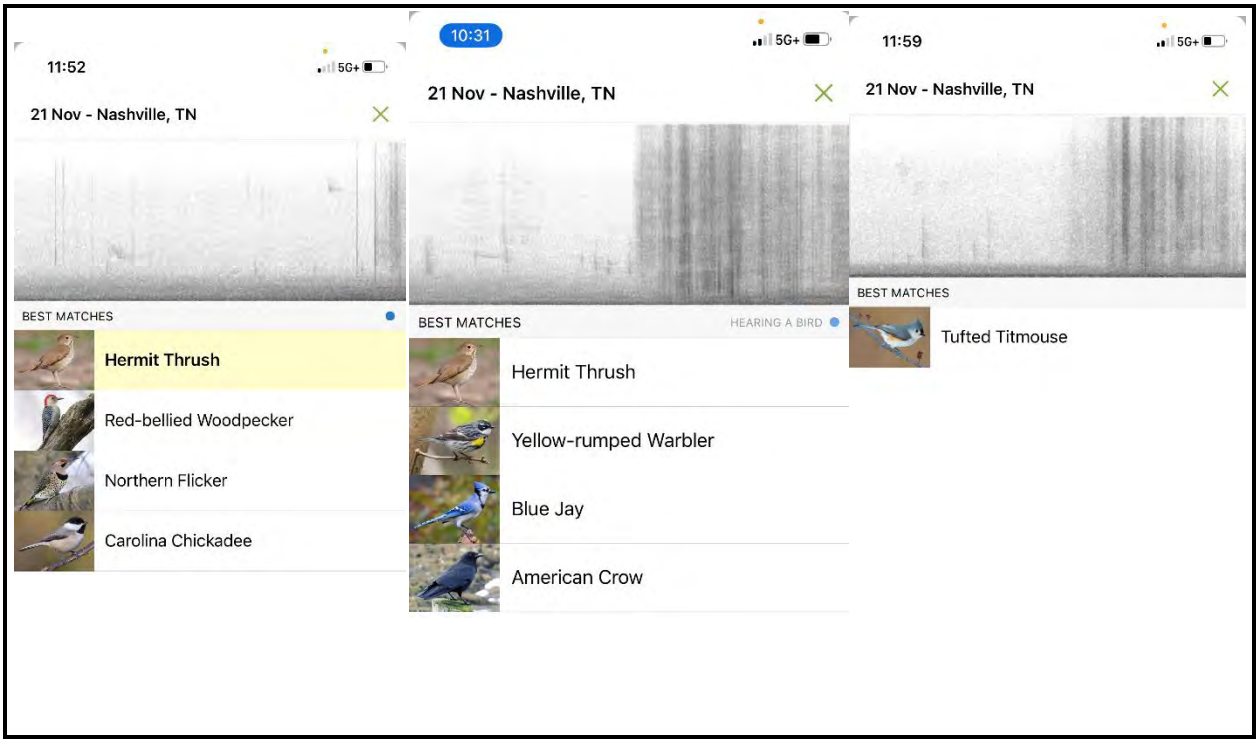


Photo 21: The Cornell University Lab – Merlin Bird ID App for iPhone (Cornell University, 2022). Example recordings/call identification screen shots.

APPENDIX D

SUPPORT DOCUMENTS

Andrew Peiken

From: Katie M. Murphy <Katie.M.Murphy@tn.gov>
Sent: Monday, November 28, 2022 1:57 PM
To: Andrew Peiken
Cc: Vincent Pontello
Subject: [External] Currey Rd and Knight Valley Dr TWRA Consultation

Good Afternoon,

The Tennessee Wildlife Resources Agency has reviewed the information that you provided. Intertek has requested an endangered species review on a study area located at the intersection of Currey Road and Knight Valley Drive in Nashville, Davidson County, TN. Since we share authority with the U.S. Fish and Wildlife Service (USFWS) on the Nashville Crayfish (*Orconectes shoupi*), we request that you consult with the USFWS Cookeville, Tennessee Field Office regarding potential impacts to these listed species; and will defer to the opinion of the U.S. Fish and Wildlife Service's Cookeville Field Office regarding potential impacts to the state and federally endangered species due to the proposed project.

Otherwise, we do not anticipate adverse impacts to state listed species under our authority due to the proposed construction; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities. Thank you for the opportunity to review and comment on this proposed project. If I may be of further assistance, please contact me at katie.m.murphy@tn.gov.

Thank you,

Katie M. Murphy
Region 2 Aquatic Habitat Biologist
Tennessee Wildlife Resources Agency
5105 Edmondson Pike, Nashville, TN 37211
615-934-6213

This message is from an EXTERNAL SENDER - please be CAUTIOUS, particularly with links and attachments.

APPENDIX C

IPaC Reports

C.1 | STAGING AND STORAGE AREA IPaC REPORT

C.2 | TERMINAL AREA IPaC REPORT

APPENDIX C.1

Staging and Storage Area IPaC Report

IPaC **U.S. Fish & Wildlife Service**

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.

NOT FOR CONSULTATION

Location

Davidson County, Tennessee



Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

NOT FOR CONSULTATION

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. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] 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 Fisheries[2]).

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).

NOT FOR CONSULTATION

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
Gray Bat Myotis grisescens Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat Myotis sodalis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Insects

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

Crustaceans

NAME	STATUS

NOT FOR CONSULTATION

Nashville Crayfish Orconectes shoupi — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7181

Flowering Plants

NAME	STATUS

Braun's Rock-cress Arabis perstellata — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/4704

Guthrie's (=pyne's) Ground-plum Astragalus bibullatus — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1739

Leafy Prairie-clover Dalea foliosa — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5498

Price''s Potato-bean Apios priceana — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7422

Short's Bladderpod Physaria globosa — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7206

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.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

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, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON

NOT FOR CONSULTATION

Bald Eagle Haliaeetus leucocephalus — Breeds Sep 1 to Jul 31
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.

Black-billed Cuckoo Coccyzus erythropthalmus — Breeds May 15 to Oct 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9399

Bobolink Dolichonyx oryzivorus — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Dendroica cerulea — Breeds Apr 23 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Field Sparrow Spizella pusilla — Breeds Mar 1 to Aug 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Kentucky Warbler Oporornis formosus — Breeds Apr 20 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler Protonotaria citrea — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

NOT FOR CONSULTATION

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 Hylocichla 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 and understand the FAQ "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 (■)

NOT FOR CONSULTATION

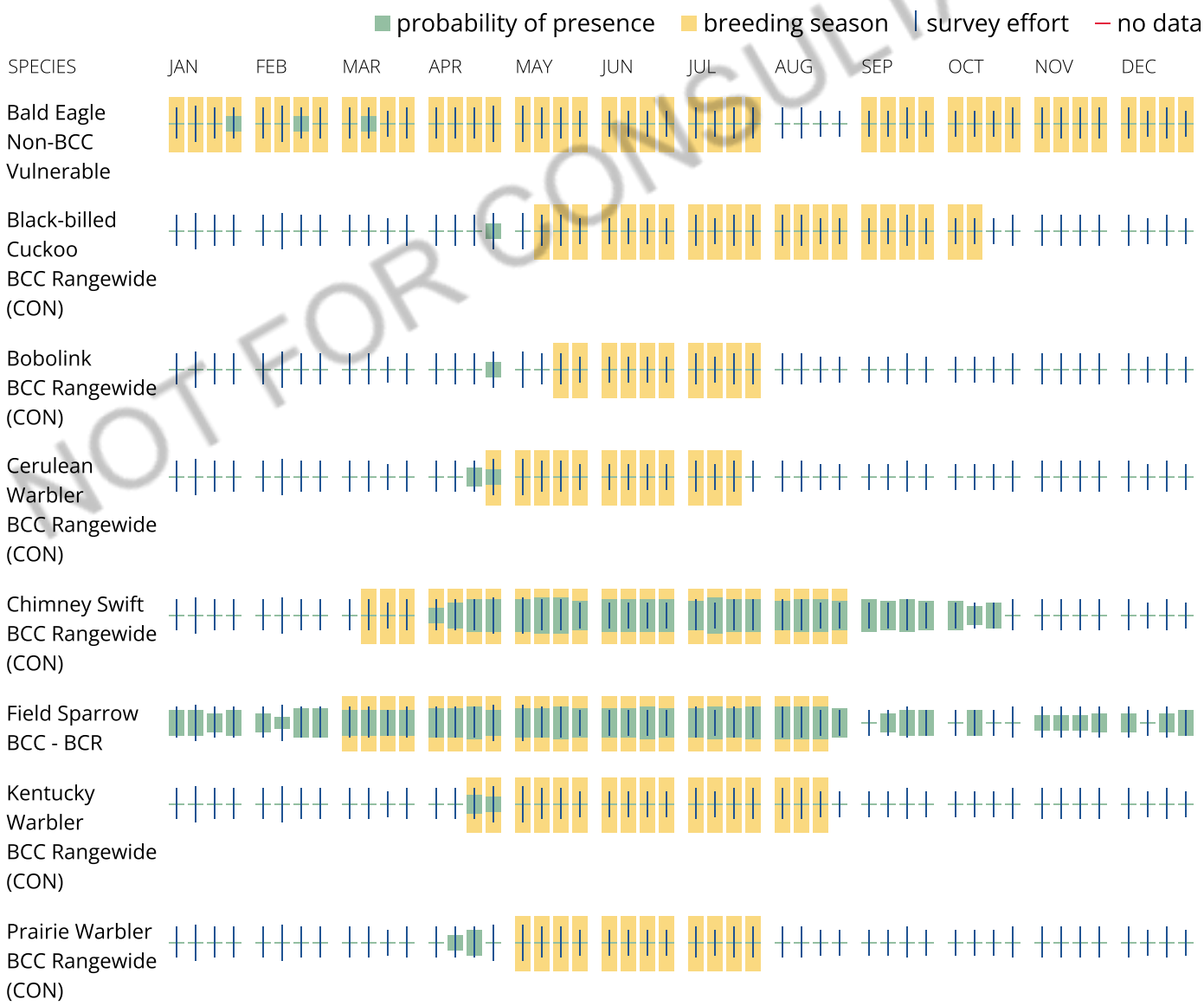
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

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.

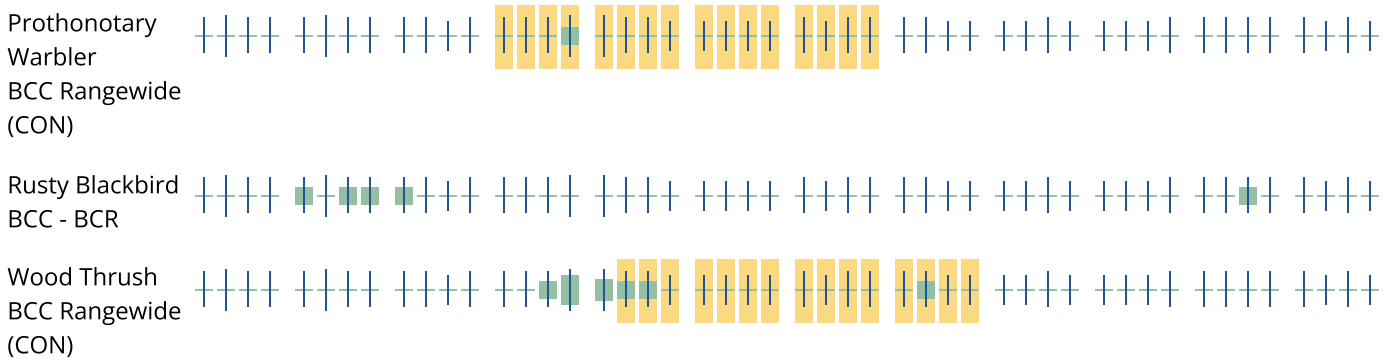
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

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.



NOT FOR CONSULTATION



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 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?

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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.

NOT FOR CONSULTATION

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

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 POND

Palustrine

A full description for each wetland code can be found at the National Wetlands Inventory website

NOT FOR CONSULTATION

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 tuberficid 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

APPENDIX C.2

Terminal Area IPaC Report

IPaC **U.S. Fish & Wildlife Service**

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.

Location

Davidson County, Tennessee



NOT FOR CONSULTATION

Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

NOT FOR CONSULTATION

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. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] 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 Fisheries[2]).

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.

NOT FOR CONSULTATION

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
Gray Bat Myotis grisescens Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat Myotis sodalis Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS

NOT FOR CONSULTATION

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

Crustaceans

NAME	STATUS

Nashville Crayfish Orconectes shoupi — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7181

Flowering Plants

NAME	STATUS

Braun's Rock-cress Arabis perstellata — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/4704

Guthrie's (=pyne's) Ground-plum Astragalus bibullatus — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1739

Leafy Prairie-clover Dalea foliosa — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5498

NOT FOR CONSULTATION

Price''s Potato-bean Apios priceana — Threatened

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7422

Short's Bladderpod Physaria globosa — Endangered

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7206

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.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species

NOT FOR CONSULTATION

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

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, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* 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/1626	Breeds Sep 1 to Jul 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NOT FOR CONSULTATION

Bobolink Dolichonyx oryzivorus — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Dendroica cerulea — Breeds Apr 23 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Field Sparrow Spizella pusilla — Breeds Mar 1 to Aug 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Kentucky Warbler Oporornis formosus — Breeds Apr 20 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler Protonotaria citrea — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

NOT FOR CONSULTATION

Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

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 and understand the FAQ "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

NOT FOR CONSULTATION

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.

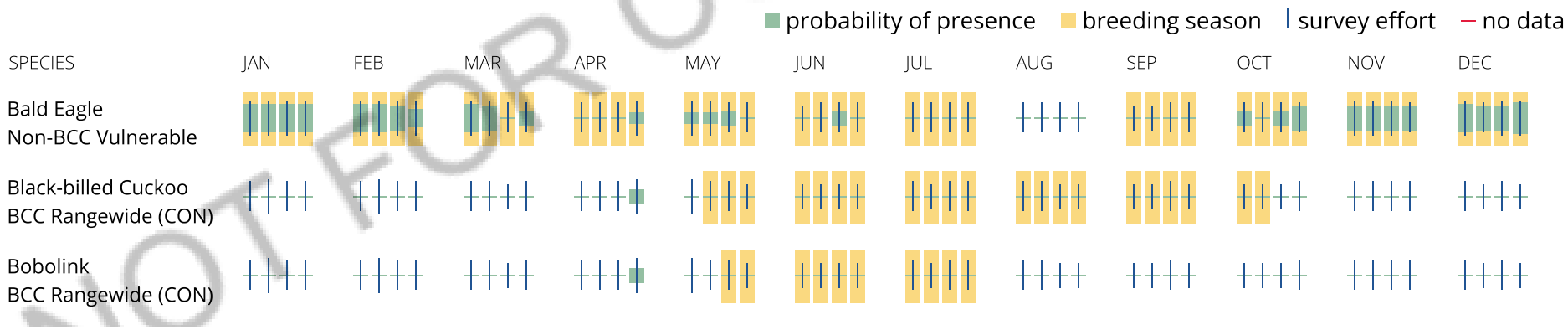
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

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.



NOT FOR CONSULTATION



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.

NOT FOR CONSULTATION

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 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).

NOT FOR CONSULTATION

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.

NOT FOR CONSULTATION

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

NOT FOR CONSULTATION

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

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.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

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.

NOT FOR CONSULTATION

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 tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

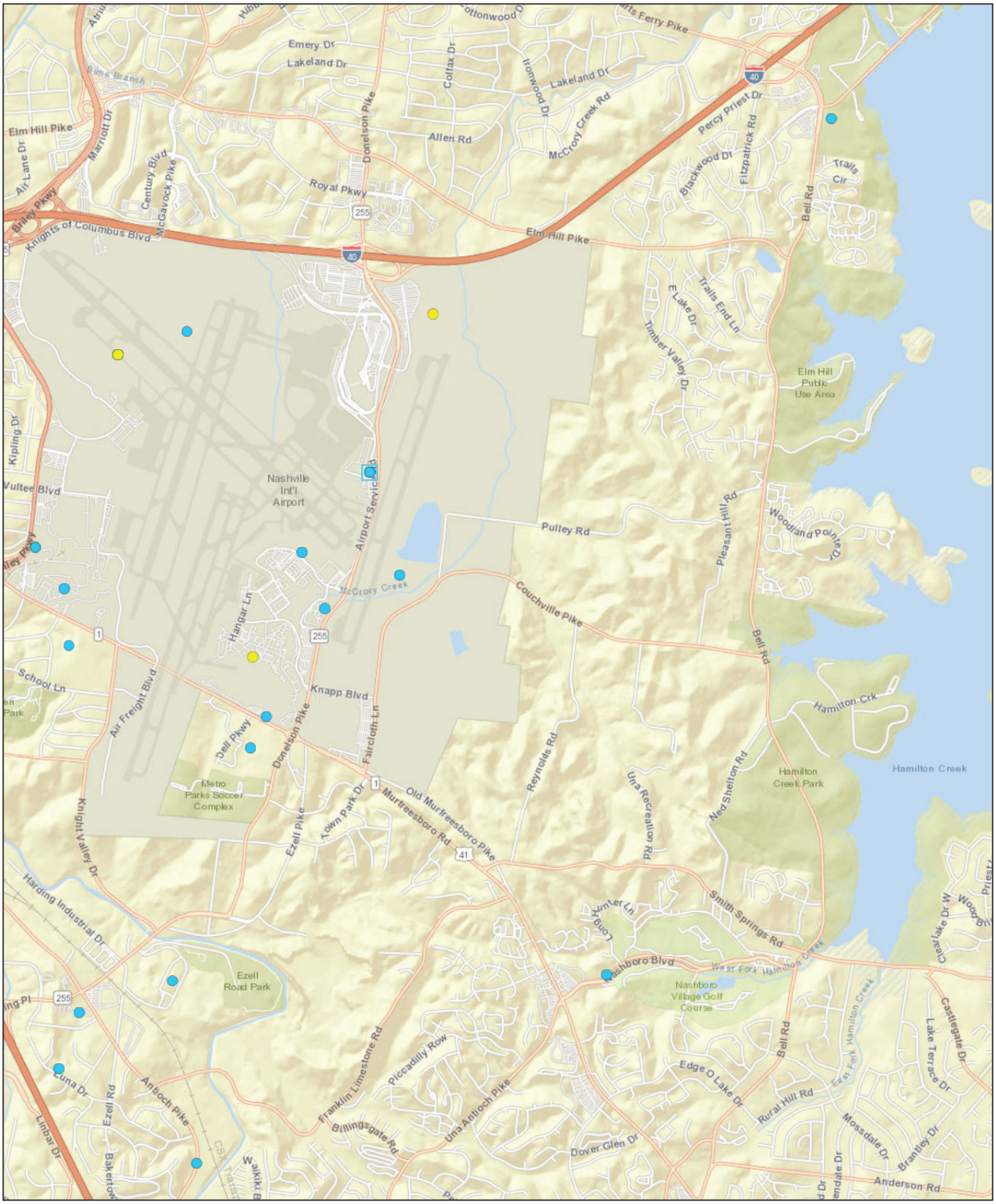
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, 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

APPENDIX D

Tennessee Department of Environment and Conservation (TDEC), Division of Remediation, Remediation Sites

TDEC Remediation Sites



12/5/2022, 3:18:46 PM

TDEC Remediation Sites

- Open
- Closed
- County Boundaries

1:36,112

0 0.33 0.65 1.3 mi

0 0.5 1 2 km

Nashville-Davidson Metro Governm, Esri, HERE, Garmin, GeoTechnologies, Inc., NGA, USGS

Nashville-Davidson Metro Governm, Esri, HERE, Garmin, GeoTechnologies, Inc., NGA, USGS |

APPENDIX E

Record of State Historic Preservation Office (SHPO) Communications

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

September 3, 2020

Mr. Ryan Mountain
Garver Engineering
4300 South J.B. Hund Dr.
Suite 240
Rogers, AR 72758

RE: FAA / Federal Aviation Administration, Nashville International Airport, Concourse A and Gate Expansion, 36.131756, -86.672327, Nashville, Davidson County, TN

Dear Mr. Mountain:

In response to your request, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

After considering the documentation submitted, it is our opinion that there are no National Register of Historic Places listed or eligible properties affected by this undertaking. We have made this determination because either: no National Register listed or eligible Historic Properties exist within the undertaking's area of potential effects, the specific location, size, scope and/or nature of the undertaking and its area of potential effects precluded affects to Historic Properties, the undertaking will not alter any characteristics of an identified eligible or listed Historic Property that qualify the property for listing in the National Register, or it will not alter an eligible Historic Property's location, setting or use. We have no objections to your proceeding with your undertaking.

This current review letter does not include potential auditory effects. Per your correspondence, it is our understanding that you will be submitting the potential auditory effects associated with the undertaking as a separate review request at a later date.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. If you are applying for federal funds, license or permit, you should submit this letter as evidence of consultation under Section 106 to the appropriate federal agency, which, in turn, should contact us as required by 36 CFR 800. If you represent a federal agency, you should submit a formal determination of eligibility and effect to us for comment. You may direct questions or comments to ((615) 687-4780, Jennifer.Barnett@tn.gov). This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

APPENDIX F

Wetland Delineation Report

PSI Project Number: 05171446-1
November 28, 2022

Professional Service Industries, Inc.
95 Chastain Road, Suite 301
Kennesaw, Georgia 30144
Phone: 770.424.6200

BNA – Nashville International Airport
140 BNA Park Drive, Suite 520
Nashville, Tennessee 37214

Attention: Traci Holton, P.E., C.M. – VP, Chief Engineer & Deputy COO, Engineering
Traci.Holton@flynashville.com

Re: **Wetland Delineation Report**
Proposed Development - ~35-acres
Southwest of Currey Road and Knight Valley Drive, Nashville Tennessee
Purchase Order PO22-002856-2 (Task 1)

Dear Ms. Holton:

Professional Service Industries, Inc. (PSI), an Intertek company, is pleased to inform you of our findings for the above referenced project. The project was conducted at the proposed development site at the southwest corner of Currey Road and Knight Valley Drive in Nashville, Tennessee and included a Wetland Delineation of the subject property, including site observations, online research, interpretations and a letter report. The work was conducted in accordance with PSI Proposal 0517-383045 dated September 16, 2022.

SITE DESCRIPTION AND PURPOSE

Intertek-PSI understands that the purpose of this wetland delineation is to provide information in support of a proposed development at the above reference property. Intertek-PSI obtained project information from you on September 9, 2022. The subject property consists of multiple parcels of land totaling approximately 35 acres in size. The parcels consist of undeveloped and wooded land. The property is located southwest of the intersection of Currey Road and Knight Valley Drive in Nashville, Tennessee.

According to the National Wetland Inventory (NWI) map, one potential open-water pond or water feature is mapped in the center of the property. It is our understanding that you would like any potential streams and/or wetlands to be delineated so the client can determine potential land use and cost to impact Waters of the United States (WUS) as defined by the United States Army Corps of Engineers (ACOE).

If any of the project information is found to be inaccurate, we request that you contact us immediately to allow us to make any necessary revisions to this proposal. The client has requested a wetland delineation to define the landward extent of the wetlands in this area for surveying purposes.

DATA COLLECTION METHODOLOGY

A records review and site reconnaissance were conducted to determine the presence of wetlands, state waters, or floodplains/floodways on the subject property. The wetland records review is intended to provide information on the potential occurrence of wetlands on the subject property. The review is not intended to establish the definitive presence or absence of wetlands. Research for potential wetland areas was performed by reviewing appropriate source documents, as available, for the property, including U.S. Fish and Wildlife Service (USFWS)

National Wetland Inventory (NWI) maps, Natural Resources Conservation Service (NRCS) maps, or information available from the United States Army Corps of Engineers (USACE).

Andrew Peiken, Certified Ecologist with PSI, conducted the site assessment on November 21, 2022. The weather was sunny and cool with temperatures in the 30's-50's °F. The previously recorded rainfall was 0.25-inches on November 15, 2022 (per USGS stream gauge #03431100 at Glendale Lane, Nashville, TN). PSI investigated the low, wooded areas in the property for indications of wetlands and/or WUS. The southern wooded areas appeared to be the lowest topographical areas of the property. Stormwater sheet flows from the property's northern and eastern portions to the south and southwest.

Potential streams and other WUS including wetlands, if present, were delineated. PSI delineated the landward extent of the on-site WUS in the field with flagging tape and/or stakes in accordance with methodologies outlined in Chapter 62-340, F.A.C., *U.S. Army Corps of Engineers (ACOE) Corps Wetland Delineation Manual* (1987), and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual*: *Eastern Mountains and Piedmont Region (Version 2.0).* This technique uses a multi-parameter approach which requires positive identification of three criteria:

- Hydrophytic vegetation
- Hydric soil
- Wetland hydrology

Areas exhibiting the above three wetland characteristics, as well as streams and tributary systems, will be considered jurisdictional and will be marked in the field with plastic survey flags by PSI personnel in preparation for ACOE and appropriate local and state agency verification, if required. Please note that the wetland and waters boundary line identified in the field is not an official jurisdictional delineation until verified by the ACOE and the appropriate local and state agencies.

The distribution of distinctive vegetative communities, combined with topographic and hydrologic data, were used to determine if wetlands or streams are present within the study area limits. The subject property and suspect areas were photographed to provide the client, and potentially the USACE, with visual information regarding the wetland and stream characteristics, as necessary.

The specific methods used and the results of the assessment are presented in this report.

Suspect areas within the study area were examined in accordance with the procedures set forth in the 1987 Manual and regional supplement. The upper soil profile was probed, and samples were examined to determine the soil's consistency, color, and moisture content. The soil color, value and chroma, as well as consistency, were used to characterize sampled soils. The soil moisture condition was used to determine the potential saturation or other wetland hydrology characteristics. Random soil probe samples were taken to a depth of approximately 6-12 inches.

Detailed results of the delineation, including specific species of plants, hydrologic indicators and soil characteristics, can be found on the Wetland Determination Data Forms (attached). One data form was completed for the assessment. The vicinity of the data point was photographed. The location of the data point is shown on Figure 2.

After the field inspection was completed, the following sources were consulted to prepare the report:

- The List of Hydric Soils (National Resource Conservation Service (NRCS 2007)
- The National List of Plant Species that Occur in Wetlands: 1988 National Summary (Reed)
- USACE Eastern Mountains 2020 Subregional Wetland Plant List (USACE, 2020)
- The Soil Survey of Davidson County, GA (online NRCS Web Soil Survey)
- USDA/NRCS PLANTS database (http://plants.usda.gov/)
- FEMA FIRMette National Flood Hazard Map (47037C0377H effective 4/5/2017)

Hydrophytic Vegetation

The indicator status of each plant species, assigned by the United States Department of the Interior, Fish and Wildlife Service (USFWS), is a measure of how often a species is located in a wetland area. Obligate Wetland (OBL) plant species are found in a wetland >99% of the time. Facultative Wetland (FACW) plant species are found in a wetland 67-99% of the time. Facultative (FAC) plant species are found in a wetland 34-66% of the time. Facultative Upland (FACU) plant species are found in a wetland 1-33% of the time. Obligate Upland (UPL) plant species are found in a wetland <1% of the time. Modifiers ("+" and "-") are used to further modify the indicator status, so that a FAC+ species is more likely to occur in a wetland than a FAC- species.

The wooded area overstory (tree stratum) was dominated by Sugar Maple (*Acer saccharum*, FACU), Pin Oak (*Quercus palustris*, FACW), American Chestnut (*Castanea dentata*, UPL), Hackberry (*Celtis occidentalis*, FACU), Osage Orange (*Maclura pomifera*, UPL), Black Locust (*Robinia pseudoacacia*, FACU), and Northern Red Oak (*Quercus rubra*, FACU). The wooded understory (sapling/shrub stratum) was dominated by Chinese privet (*Ligustrum sinense,* FACU), Coralberry (*Symphoricarpos orbiculatus*, FACU), and saplings of the above-mentioned tree stratum species. The ground cover (herbaceous stratum) was dominated by Virginia Creeper (*Parthenocissus quinquefolia*, FACU), English Ivy (*Hedera helix*, FACU), Lilyturf (*Liriope muscari*, UPL), and tassel fern (*Polystichum polyblepharum*, UPL). The woody vine stratum was dominated by Saw Greenbrier (*Smilax bona-nox*, FACU).

As can be seen above, the vegetation was dominated by FACU (facultative upland) and UPL (upland) designations. The total estimated cover percentage of each species' indicator status is recorded and multiplied by a constant to determine the total prevalence index. If the sum of the prevalence indices is less than or equal to 3.0, the plot area is within a wetland community. The Prevalence Index Worksheet on the attached Wetland Determination Data Form indicated that the vegetation observed was not considered to be hydrophytic.

Hydric Soils & NWI Map

A soil map and description of the soil acronyms are included in the figures section of the Appendix.

The Davidson County soil survey map indicated that the soils mapped on the property are composed of four (4) soil types: StC (Stiversville loam, 5 to 12 percent slopes) in the western portion, StD (Stiversville loam, 12 to 25 percent slopes) in the southwest/central/southeastern portions, SvD (Stiversville-Urban Land, 3 to 25 percent slopes) in the northern portions, and TrC (Talbott-Rock outcrop complex, 5 to 15 percent slopes) in the southern portions. According to the USDA's Natural Resources Conservation Service (NRCS), none of the four soil types are considered hydric.

On-site soils probed generally matched the NRCS description. None of the soils probed during the assessment, including portions of the wooded low areas and the ephemeral stream beds, were saturated with moisture. None of the soils were determined to be hydric (see the attached Wetland Determination Data Form).

The USFWS National Wetlands Inventory (NWI) map indicates a small freshwater pond (~0.14-acres) in the south central portion of the property. No streams or wetlands were mapped on the property. The freshwater pond was identified as PUBFx (Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Excavated) by the NWI map. PSI did not identify hydric soils, hydrophytic vegetation, or hydrologic indicators indicative of a wetland or water feature in the general area of this PUBFx pond. However, PSI did identify an excavated area of approximately 0.07-acres in this general location. It was approximately 55' W x 85' L x 20' D. It did not contain water. It should be noted that the NWI map is generated based on historical aerial photography, and not based on ground-truthed investigation by the USFWS. The NWI map is appended.

Topographical Maps
According to the USGS topographical map ("Antioch, TN 2021"), no indications of wetlands, streams, or ponds were apparent on the subject property. Topography is generally sloped from the northwest and northeast to the south. The closest mapped waterbodies include Mill Creek approximately 1,600-feet to the southwest and an unnamed tributary to Mill Creek approximately 1,600-feet to the east. See the Appendix for a copy of the topographical map.

Aerial Photographs
The 2022 aerial photograph (Google Earth) indicated the subject property was heavily wooded, with a thick, evergreen tree canopy. No indicators of a stream, pond, or wetland could be observed due to the thick canopy on the photo. The north adjoining properties consisted of Currey Road followed by residential land. The western adjoining properties were heavily wooded. The south adjoining property was developed with a light industrial building. The east adjoining property consisted of Knight Valley Drive followed by the Nashville International Airport. The aerial photograph is appended.

Hydrologic Conditions
Hydrology is a dynamic characteristic in wetlands and is often not present during periods of minimal seasonal precipitation. Indirect indicators are used to determine if wetland hydrology such as extended saturation or ponding has been present during the growing season. Examples of indirect hydrology indicators include water staining, flow patterns, buttressing of trees, and moss growth on trees near the ground surface. Water staining in leaves occurs when they are saturated or inundated for extended periods, causing the tannins or brown coloring in the leaves to leach out, leaving a grayish hue to the leaves. Mosses tend to colonize on trees in wet, damp wooded areas.

PSI did not observe evidence of extended soil saturation or other hydrologic indicators within the low wooded areas or ephemeral stream beds on the subject property (see the attached Wetland Determination Data Form).

FEMA Flood Maps
PSI reviewed the FEMA FIRMette National Flood Hazard Map (#47037C0377H effective 4/5/2017) to determine if the subject property is in a flood zone. According to the flood map, the subject property lies within Zone X (unshaded), which indicates it falls outside the 0.2-1.0 annual chance flood hazard, a low risk. The FEMA FIRMette map is included in the figures section of the Appendix.

WETLAND DATA FORMS
One data point (DP1) was established on the subject property, in a topographic low point in the bed of Ephemeral Stream #1 (ES1). A Routine Wetland Determination Data Form was completed at this data point. As detailed on the data form in the Appendix, the data point did not exhibit any of the three wetland criteria and is not considered to represent a wetland.

Data Point #	Soil Type	Vegetation Type	Wetland Hydrology	Conclusion
1	Non-hydric	Non-Hydrophytic	None	Upland

OBSERVATIONS

The subject property consists of multiple parcels of land totaling approximately 35 acres in size. The parcels consist of undeveloped and wooded land. The property is located southwest of the intersection of Currey Road and Knight Valley Drive in Nashville, Tennessee. The subject property was heavily wooded with a thick tree canopy and understory. Terrain was steep in places.

Based on our observations, no hydric soils, hydrophytic vegetation, or hydrologic conditions were present. No wetlands or streams that would be considered jurisdictional were observed. However, two ephemeral stream systems and one excavation/depressional feature were identified on the property as described below:

- Ephemeral Stream #1 (ES1) – ES1 started in the north-central portion of the property in the valley between two ridges (see Figure 2). It continued southerly for approximately 958-feet where it merged with another ephemeral stream system (ES2/ES3 see below). Total relief for ES1 was approximately 50-feet in elevation. The eastern bank of ES1 was flagged with thirteen (13) flagging tape points while the western bank was flagged with eleven (11) points, for a total of twenty-four flags for ES1. ES1 exhibited a defined bed and bank structure, however, no flowing water or Ordinary High Water (OHW) mark was observed. Some vegetation was rooted in the stream bed. The stream bed consisted of mostly clay bottom with scattered flat cobble rocks and leaf-litter. One data point was collected in the stream bed (see Wetland Data Forms above) to determine whether hydric soils and other hydrologic conditions existed. PSI determined that besides the stream bank/bed structure, no other hydrologic conditions, hydric soils, or hydrophytic vegetation existed in the stream that would identify it as containing a relatively permanent flow of water (intermittent or perennial). The soils and vegetation in the stream bed and on the stream bank were similar to the surrounding upland areas. The ephemeral stream was not hydrologically connected to any other jurisdictional water. Therefore, PSI considers ES1 to be ephemeral (only flows in direct response to a rain event) and is not considered jurisdictional to the Corps of Engineers or the Tennessee Department of Environment and Conservation (TDEC).

- Ephemeral Stream #2 (ES2) – ES2 started in the south-central portion of the property where ES1 and ES3 merged. It continued southwesterly for approximately 452-feet where it flowed off-site underneath a barbed-wire fence. Total relief for ES2 was approximately 23-feet in elevation. The northern bank of ES2 was flagged with seven (7) flagging tape points and the southern bank was flagged with seven (7) flagging points, for a total of fourteen (14) flags for ES2. ES2 exhibited a defined bed and bank structure, however, no flowing water or OHW mark was observed. Some vegetation was rooted in the stream bed. The stream bed consisted of mostly clay bottom with scattered flat cobble rocks and leaf-litter. PSI determined that besides the stream bank/bed structure, no other hydrologic conditions, hydric soils, or hydrophytic vegetation existed in the stream that would identify it as containing a relatively permanent flow of water (intermittent or perennial). The soils and vegetation in the stream bed and on the stream bank were similar to the surrounding upland areas. The ephemeral stream was not hydrologically connected to any other jurisdictional water. Therefore, PSI considers ES2 to be ephemeral (only flows in direct response to a rain event) and is not considered jurisdictional to the Corps of Engineers or TDEC.

- Ephemeral Stream #3 (ES3) – ES3 started in the southeast-central portion of the property at a concrete culvert that conveys stormwater from the east adjoining property (Nashville International Airport) and Knight Valley Drive onto the subject property. It continued west southwesterly for approximately 530-feet where it merged with ES1/ES2. Total relief for ES3 was approximately 25-feet in elevation. The northern bank of ES3 was flagged with ten (10) flagging tape points and the southern bank was flagged with nine (9) points, for a total of nineteen (19) flags for ES3. ES2 exhibited a defined bed and bank structure, however, no flowing water or OHW mark was observed. PSI observed some areas of puddled, stagnant water in ES3. Some vegetation was rooted in the stream bed. The stream bed consisted of mostly clay bottom with scattered flat cobble rocks and leaf-litter. PSI determined that besides the stream bank/bed structure and puddled water, no other hydrologic conditions, hydric soils, or hydrophytic vegetation existed in the stream that would identify it as containing a relatively permanent flow of water (intermittent or perennial). The soils and vegetation in the stream bed and on the stream bank were similar to the surrounding upland areas. The ephemeral stream was not hydrologically connected to any other jurisdictional water. Therefore, PSI considers ES3 to be ephemeral (only flows in direct response to a rain event) and is not considered jurisdictional to the Corps of Engineers or TDEC.

- Excavation/Depression #1 (SH1) – PSI observed a large depression in the west-central portion of the property, in the general vicinity of the PUBFx water feature identified by the USFWS NWI map discussed earlier in this report and appended. It was located at approximately 36° 6’8.75” N and 86 ° 41’42.26” W (see Figure 2 for a general location). It was approximately 55’ W x 85’ L x 20’ D (~0.07-acres). The edge of the depression was flagged with seven (7) flagging tape points. It did not contain water. PSI did not identify hydric soils, hydrophytic vegetation, or hydrologic indicators indicative of a wetland or water feature at this depressional feature. No excavated soil piles were observed in the vicinity of the depression. It is unknown if this feature is man-made (excavation) or a natural feature (sinkhole). Since it did not exhibit features of a wetland or other water of the United States, it would not be considered jurisdictional to the Corps of Engineers.

The estimated size and locations of the delineated ephemeral streams and depression are shown on Figure 2. The following table summarizes the water(s) identified.

Table 1. Summary of Delineated Waters

Name	Size	Notes
Ephemeral Stream #1 (ES1)	~958 linear feet	Ephemeral Stream (Non-jurisdictional)
Ephemeral Stream #2 (ES2)	~452 linear feet	Ephemeral Stream (Non-jurisdictional)
Ephemeral Stream #3 (ES3)	~530 linear feet	Ephemeral Stream (Non-jurisdictional)
Excavation/Depression #1 (SH1)	~0.07-acres ~55’ W x 85’ L x 20’ D	Not a Water of the US (Non-jurisdictional)

See Appendix A, Figure 2, for an aerial photograph with site observations. See Appendix B for site photographs.

CONCLUSIONS

Two ephemeral stream systems were identified on the subject property, totaling approximately 1,940 linear feet in length. For flagging purposes, they were divided into three distinct stream segments. PSI determined that besides the stream bank/bed structure and some puddled/stagnant water, no other hydrologic conditions, hydric soils, or hydrophytic vegetation existed in the stream that would identify it as containing a relatively permanent flow of water (intermittent or perennial). The ephemeral streams were not hydrologically connected to any other jurisdictional waters. Therefore, the three stream segments were determined to be ephemeral in nature (only flow in direct response to a rain event) and are not considered jurisdictional to the USACE or TDEC.

One large excavation/depression was observed in the west-central portion of the property. It was approximately 55' W x 85' L x 20' D (~0.07-acres). It did not contain water nor was it hydrologically connected to any other water features (therefore isolated). PSI did not identify hydric soils, hydrophytic vegetation, or hydrologic indicators indicative of a wetland or water feature at this depressional feature. Since it did not exhibit features of a wetland or other water of the United States, it would not be considered jurisdictional to the USACE.

Requesting a permit from the federal government (if necessary) automatically triggers the Historic Preservation Act and the Endangered Species Act. Because of this, a cultural resources archeological investigation and an endangered species habitat evaluation may be necessary to be performed on the property in conjunction with an application for a USACE Federal Nationwide or Individual permit. These initial studies may lead to more extensive and more costly surveys regarding specific cultural resources if regulators determine that cultural resources are likely to be found on the property or if the USFWS determines that specific endangered species are likely to inhabit the property. PSI will coordinate with all appropriate parties in the event additional studies beyond those that have already been developed will be required.

Permitting can take between 4 and 12 months to acquire from initial permit submittal depending on the permit needed. The above studies would require completion before the federal permit application is acceptable for submittal. This would likely delay the project and securing the permit requested is never guaranteed.

WARRANTY

The information contained in this report is based upon the information furnished by the Client and observations and research provided by PSI. These observations and results are time dependent, are subject to changing site conditions, and revisions to Federal, State and local regulations. The findings are preliminary in nature, and include site observations conducted by qualified person(s).

PSI only warrants the information in this report to be correct at the time of completion of this report. PSI warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Corps of Engineers Wetland Delineation Manual. These methodologies are described by the manual and represent good commercial and customary practice for conducting a Wetland Assessment of a site for the purpose of identifying recognized wetland conditions. However, these findings and conclusions contain all of the limitations inherent in these methodologies which are referred to in the protocol and some of which are more specifically set forth below.

Regardless of the professional opinion and interpretation of the laws by PSI, the USACE reserves the right to make all final decisions regarding their jurisdiction over any potential wetland. PSI believes that the information obtained from the record reviews and site visits is reliable. However, PSI cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The methodologies of this assessment are not intended to produce all-inclusive or comprehensive results, but

rather to provide the client with information regarding apparent suspicions of existing and potential wetland conditions relating to the study area.

This report was prepared pursuant to the contract PSI has with Metropolitan Nashville Airport Authority. That contractual relationship included an exchange of information about the subject site that was unique and between PSI and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than Metropolitan Nashville Airport Authority, for whom it was prepared, is prohibited and therefore not foreseeable to PSI.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third-party beneficiary to PSI's contract with Metropolitan Nashville Airport Authority. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

No other warranties are implied or expressed.

UNIDENTIFIABLE CONDITIONS

This report is necessarily limited to the conditions observed and to the information available at the time of the work. Due to the nature of the work, there is a possibility that there may exist conditions which could not be identified within the scope of work or which were not apparent at the time of our site work. This report is also limited to information available from the client at the time it was conducted. The report may not represent all conditions at the subject site as it only reflects the information gathered from specific locations.

PSI appreciates the opportunity to have been of service to you. If you have any questions regarding our findings, please do not hesitate to contact us at (770) 424-6200.

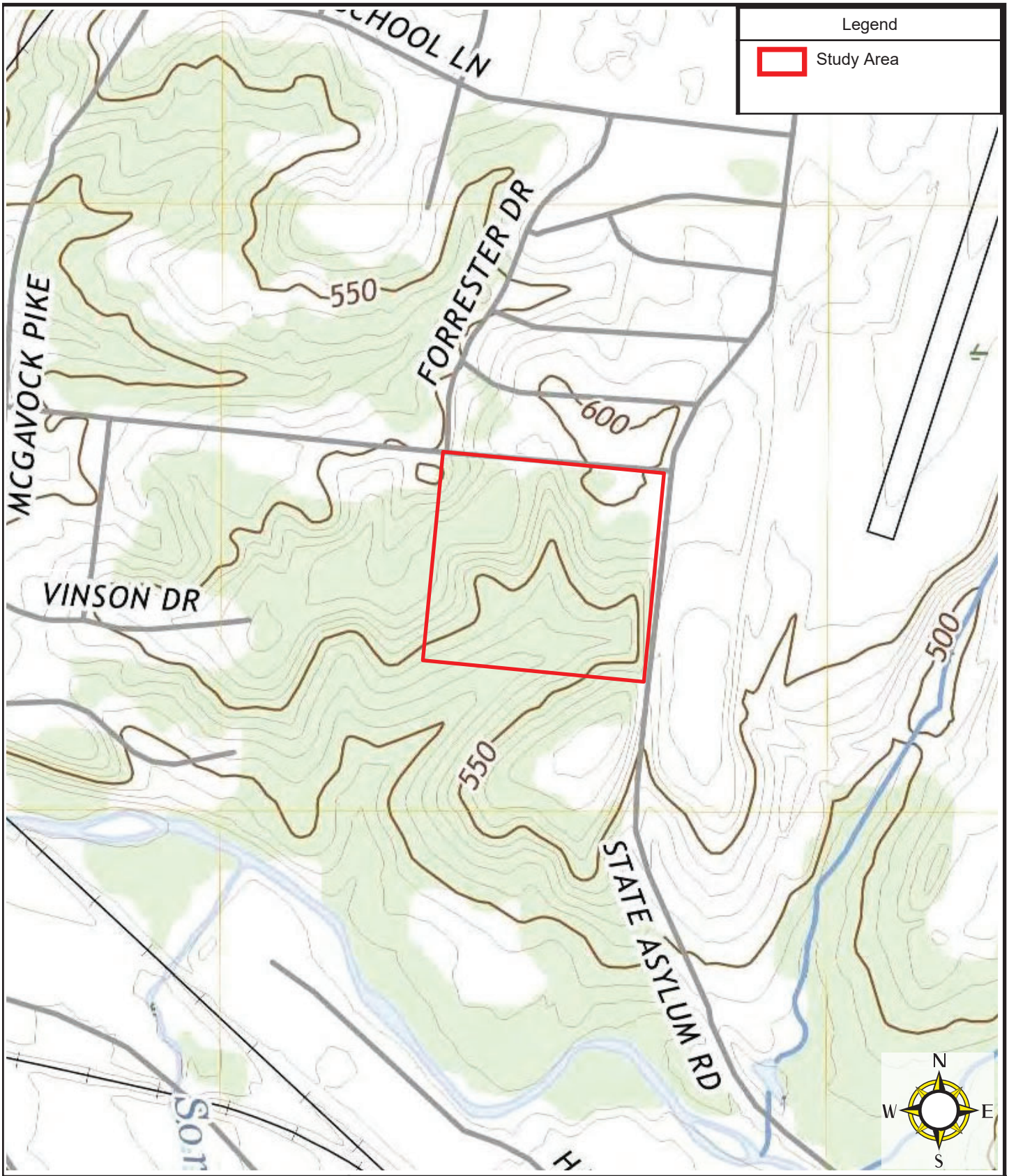
Sincerely,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Eric Lowe
Department Manager

Andrew Peiken
Principal Consultant

Enclosures: Appendices

APPENDIX A - FIGURES



intertek psi
95 Chastain Road, NW
Suite 301
Kennesaw, Georgia
30144
Tel +1 770.424.6200
Fax +1 770.424.0199
intertek.com/building

Topographical Map with Study Area

BNA – Nashville International Airport
Southwest of Currey Road and Knight Valley Drive
Nashville, TN

Project No.: 05171446-1	Date: 11/10/2022
Drawn by: ASP Checked by: EL	Source: USGS 2021 Antioch, TN 7.5-min Topo

Figure 1



intertek psi
95 Chastain Road, NW
Suite 301
Kennesaw, Georgia
30144
Tel +1 770.424.6200
Fax +1 770.424.0199
intertek.com/building

Site Observations – 11/21/2022
BNA – Nashville International Airport
Southwest of Currey Road and Knight Valley Drive
Nashville, TN

Project No.: 05171446-1	Date: 11/22/2022
Drawn by: ASP Checked by: EL	Source: Google Earth 2022

Figure 2

Legend

Study Area

U.S. Fish and Wildlife Service
National Wetlands Inventory

BNA - Nashville International Airport



November 10, 2022

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

N
W E
S

intertek psi
95 Chastain Road, NW
Suite 301
Kennesaw, Georgia
30144
Tel +1 770.424.6200
Fax +1 770.424.0199
intertek.com/building

National Wetland Inventory (NWI)
BNA – Nashville International Airport
Southwest of Currey Road and Knight Valley Drive
Nashville, TN

Project No.: 05171446-1	Date: 11/10/2022
Drawn by: ASP Checked by: EL	Source: USFWS NWI

Figure 3

Figure 4 - Soil Maps and Descriptions

Soil Map—Davidson County, Tennessee
(Nashville International Airport)



Map Scale: 1:2,950 if printed on A landscape (11" x 8.5") sheet.

N

0 40 80 160 240 Meters

0 100 200 400 600 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

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 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 2, 2019—Nov 16, 2019

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
StC	Stiversville loam, 5 to 12 percent slopes, eroded	1.8	6.3%
StD	Stiversville loam, 12 to 25 percent slopes, eroded	12.7	44.6%
SvD	Stiversville-Urban land complex, 3 to 25 percent slopes	7.1	25.0%
TrC	Talbott-Rock outcrop complex, 5 to 15 percent slopes	6.9	24.1%
Totals for Area of Interest		**28.5**	**100.0%**

Davidson County, Tennessee

StC—Stiversville loam, 5 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v5br
Elevation: 420 to 1,030 feet
Mean annual precipitation: 39 to 61 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 180 to 233 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 53 inches: clay loam
Cr - 53 to 63 inches: bedrock

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F123XY001TN - Limestone Uplands

Hydric soil rating: No

Minor Components

Hampshire

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Marsh

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (three-dimensional): Side slope
Hydric soil rating: No

Data Source Information

Soil Survey Area: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Davidson County, Tennessee

StD—Stiversville loam, 12 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v5bq
Elevation: 410 to 1,040 feet
Mean annual precipitation: 39 to 61 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 180 to 233 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 53 inches: clay loam
Cr - 53 to 63 inches: bedrock

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F123XY001TN - Limestone Uplands

Hydric soil rating: No

Minor Components

Hampshire

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Marsh

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (three-dimensional): Side slope
Hydric soil rating: No

Data Source Information

Soil Survey Area: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Davidson County, Tennessee

SvD—Stiversville-Urban land complex, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: kkp7
Elevation: 390 to 740 feet
Mean annual precipitation: 39 to 57 inches
Mean annual air temperature: 48 to 70 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville and similar soils: 60 percent
Urban land: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Ridges
Landform position (three-dimensional): Crest
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 53 inches: clay loam
Cr - 53 to 63 inches: bedrock

Properties and qualities

Slope: 3 to 25 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 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 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F123XY001TN - Limestone Uplands
Hydric soil rating: No

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Minor components

Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Davidson County, Tennessee

TrC—Talbott-Rock outcrop complex, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: kkpc
Elevation: 460 to 4,000 feet
Mean annual precipitation: 8 to 55 inches
Mean annual air temperature: 45 to 63 degrees F
Frost-free period: 110 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Talbott and similar soils: 45 percent
Rock outcrop: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Talbott

Setting

Landform: Hillslopes
Landform position (three-dimensional): Crest
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 32 inches: clay
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 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: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F123XY001TN - Limestone Uplands
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

R - 0 to 10 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Minor components

Percent of map unit: 20 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Hydric Rating by Map Unit—Davidson County, Tennessee
(Nashville International Airport)



Map Scale: 1:2,950 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 40 80 160 240

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

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 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Davidson County, Tennessee
Survey Area Data: Version 20, Sep 15, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 2, 2019—Nov 16, 2019

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.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
StC	Stiversville loam, 5 to 12 percent slopes, eroded	0	1.8	6.3%
StD	Stiversville loam, 12 to 25 percent slopes, eroded	0	12.7	44.6%
SvD	Stiversville-Urban land complex, 3 to 25 percent slopes	0	7.1	25.0%
TrC	Talbott-Rock outcrop complex, 5 to 15 percent slopes	0	6.9	24.1%
Totals for Area of Interest			**28.5**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

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.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

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.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

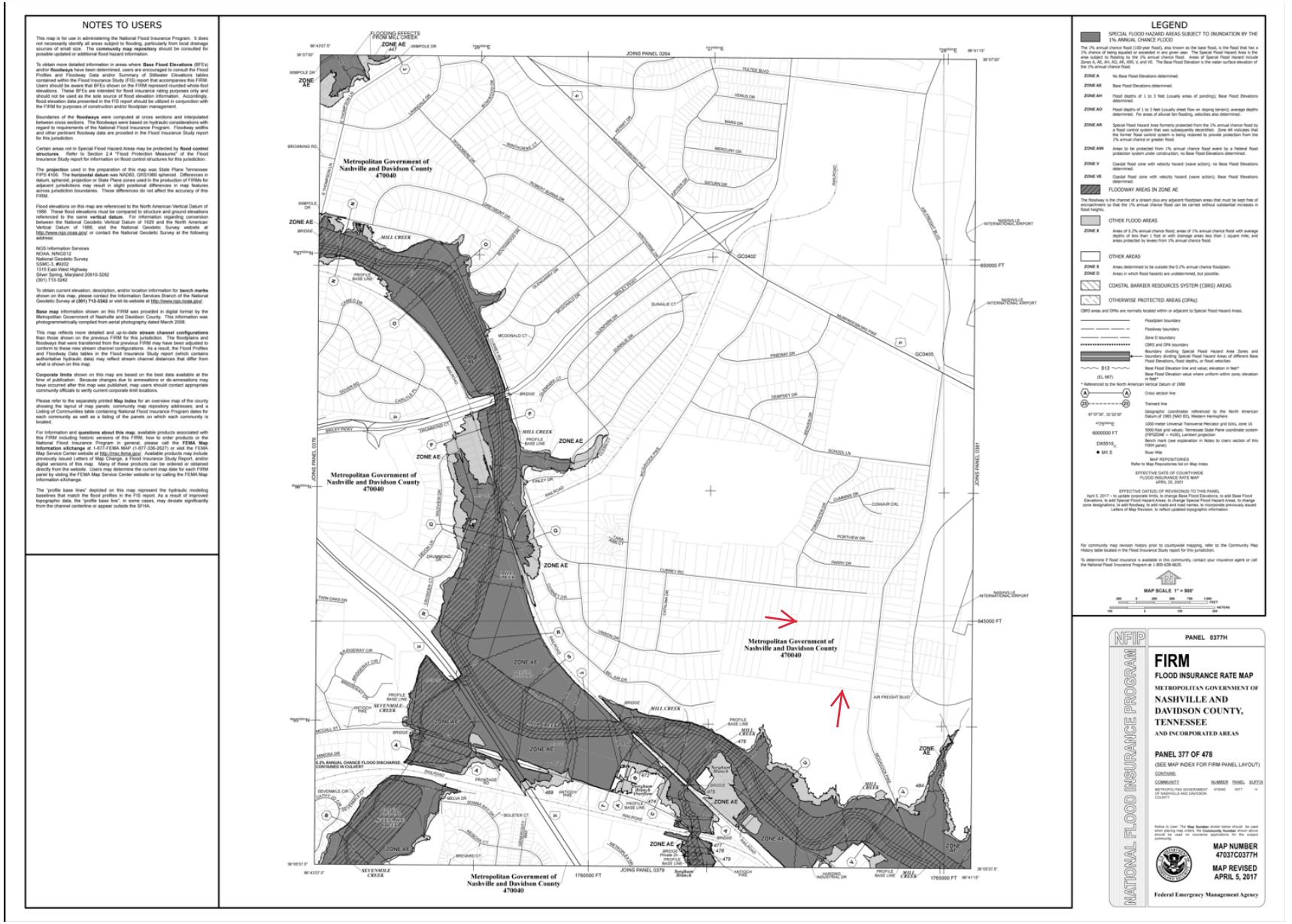
Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Figure 5 - FEMA FIRM Map



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane Tennessee FIPS 4100. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Metropolitan Government of Nashville and Davidson County. This information was photogrammetrically compiled from aerial photography dated March 2008.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and **questions about this map**, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange** at 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov/. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The "profile base lines" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Areas to be protected from 1% annual chance flood event by a federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°00'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4°75'000"E — 1000-meter Universal Transverse Mercator grid ticks, zone 16
- 6000000 FT — 5000-foot grid values: Tennessee State Plane coordinate system (FIPSZONE = 4100), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 20, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
April 5, 2017 – to update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add floodway, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0377H

FIRM

FLOOD INSURANCE RATE MAP

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE
AND INCORPORATED AREAS

PANEL 377 OF 478

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY	470040	0377	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47037C0377H

MAP REVISED
APRIL 5, 2017

Federal Emergency Management Agency

APPENDIX B – PROPERTY PHOTOGRAPHS



Photo 1: Subject property (north boundary)



Photo 2: Subject property (east boundary)



Photo 3: Low area in northwest corner of property (non-wetland)



Photo 4: Typical trash dumped on the subject property



Photo 5: Start of Ephemeral Stream #1 (ES1)



Photo 6: Ephemeral Stream #1 bed/bank structure



Photo 7: Ephemeral Stream #1 soil pit



Photo 8: Ephemeral Stream #1 high value/chroma non-hydric soils



Photo 9: Ephemeral Stream #2 (ES2) bed/bank structure



Photo 10: Roots in Ephemeral Stream #2



Photo 11: End of Ephemeral Stream #2 at fence (Flags ES2-7/ES2-8)



Photo 12: Start of Ephemeral Stream #3 (ES3) at culvert under Knight Valley Dr.
Note: puddle of standing water



Photo 13: Ephemeral Stream #3 bed/bank structure



Photo 14: Ephemeral Stream #3 puddles of water (non-flowing)



Photo 15: Sinkhole #1 (SH1)



Photo 16: Typical upland area



Photo 17: Northwest adjoining residential property across Currey Rd.



Photo 18: North adjoining residential property across Currey Rd.



Photo 19: West adjoining property



Photo 20: East adjoining property (Nashville Airport across Knight Valley Drive)

APPENDIX C – WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Proposed 35-acre Development City/County: Nashville/Davidson Sampling Date: 11/21/22

Applicant/Owner: BNA - Nashville International Airport State: TN Sampling Point: DP-1

Investigator(s): Andrew Peiken Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Ephemeral Stream Local relief (concave, convex, none): Concave Slope (%): 10%

Subregion (LRR or MLRA): LRR N Lat: 36 6' 10.57"N Long: 86 41' 38.99"W Datum:

Soil Map Unit Name: StD: Stiversville Loam, 12-25% slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

DP-1 located in the bed of Ephemeral Stream #1

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Vis ble on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pin Oak (Quercus palustris)	20	Y	FACW
2. Osage Orange (Maclura pomifera)	15	Y	UPL
3.			
4.			
5.			
6.			
7.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		
Sapling/Shrub Stratum (Plot size: 15)			
1. Chinese Privet (Ligustrum sinense)	15	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Herb Stratum (Plot size: 5)			
1. Virginia Creeper (Parthenocissus quinquefolia)	20	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Woody Vine Stratum (Plot size: 5)			
1. None			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

_X_ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-6	10YR 6/6	100					Sandy-Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ☐ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

APPENDIX G

Agency Outreach

G.1 | SAMPLE LETTER

G.2 | AGENCY MAILING LIST

G.2 | AGENCY RESPONSES

G.1 – SAMPLE LETTER

140 BNA Park Drive, Suite 520
Nashville, Tennessee 37214
615-275-1600
flynashville.com

Nashville International Airport

[Recipient]
[Address 1]
[Address 2]
[Address 3]

RE: Agency Scoping for a Supplemental Environmental Assessment for the Concourse and Gate Expansion Project, Nashville International Airport, Metropolitan Nashville Airport Authority

This letter is to inform you that the Metropolitan Nashville Airport Authority (MNAA or the Authority) intends to prepare a Supplemental Environmental Assessment (Supplemental EA) to consider the potential environmental effects associated with the proposed modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport (BNA or the Airport). The proposed modifications would comprise a five-gate extension to the existing Concourse D building and related enabling and ancillary projects at the site of an existing air freight building, ground service equipment (GSE) fueling facility, and waste triturator southeast of the terminals (Proposed Modifications), as shown on **Exhibit 1**. The Federal Aviation Administration (FAA) signed the Final EA for the CAGE project in July 2021 and the issuance of a Finding of No Significant Impacts (FONSI) followed shortly thereafter. Passenger demand has grown more rapidly than anticipated following completion of the CAGE EA; therefore, additional project components have been proposed by the Authority and will be analyzed in the Supplemental EA.

The Supplemental EA will be prepared in accordance with the National Environmental Policy Act (NEPA); the Council on Environmental Quality Regulations (40 Code of Federal Regulations 1500-1509); FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*; and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*.

The CAGE project comprises the redevelopment of Concourse A, construction of a satellite concourse, and completion of terminal and apron improvements to accommodate existing and future passenger, aircraft operations, and aircraft parking demand. In response to rapid increases in passenger demand, the Proposed Modifications are needed to redevelop Concourse A efficiently and maintain commercial passenger operations during construction of the remainder of the CAGE project.

Sample

The Proposed Modifications, as shown in **Exhibit 2**, comprise demolition and site redevelopment and include (1) demolition of an approximately 60,000-square-foot air freight building to accommodate extension of Concourse D; (2) demolition of a waste triturator and fueling and support pad to accommodate aircraft gates at the proposed Concourse D extension; (3) construction of an approximately 75,000-square-foot extension to Concourse D serving six boarding gates (five new gates and replacement of one existing gate); (4) construction of an approximately 70,000-square-foot air freight facility with approximately 25 truck docks and 40 landside parking spaces; and (5) connected and enabling actions, including realignment of airport operation area (AOA) fencing, reconfiguration of exterior lights and site utilities including stormwater management system infrastructure, and the use of an additional construction staging area located on Airport property (see **Exhibit 3**). Construction of the Proposed Modifications would require closure of an existing aircraft gate at the terminus of the existing Concourse D building, resulting in a net increase of five aircraft gates.

Construction of the CAGE project is underway; however, the Authority would begin construction activities associated with the Proposed Modifications in April 2023 and complete construction in late 2025.

This notification is being sent to you as part of the process for determining the scope of issues to be addressed in the Supplemental EA, and specifically to:

1. Advise your agency or organization on the preparation of the Supplemental EA;
2. Request any relevant information that your agency or organization may have regarding BNA's environs; and
3. Solicit early comments regarding potential environmental, social, and economic issues for consideration during preparation of the Supplemental EA.

You may send any information and comments to me at the address provided below. Comments should include your return mailing address and email address so that you can be notified as information about the project becomes available. Written correspondence by [***month day, 2022***] would be appreciated to discuss and address your concerns.

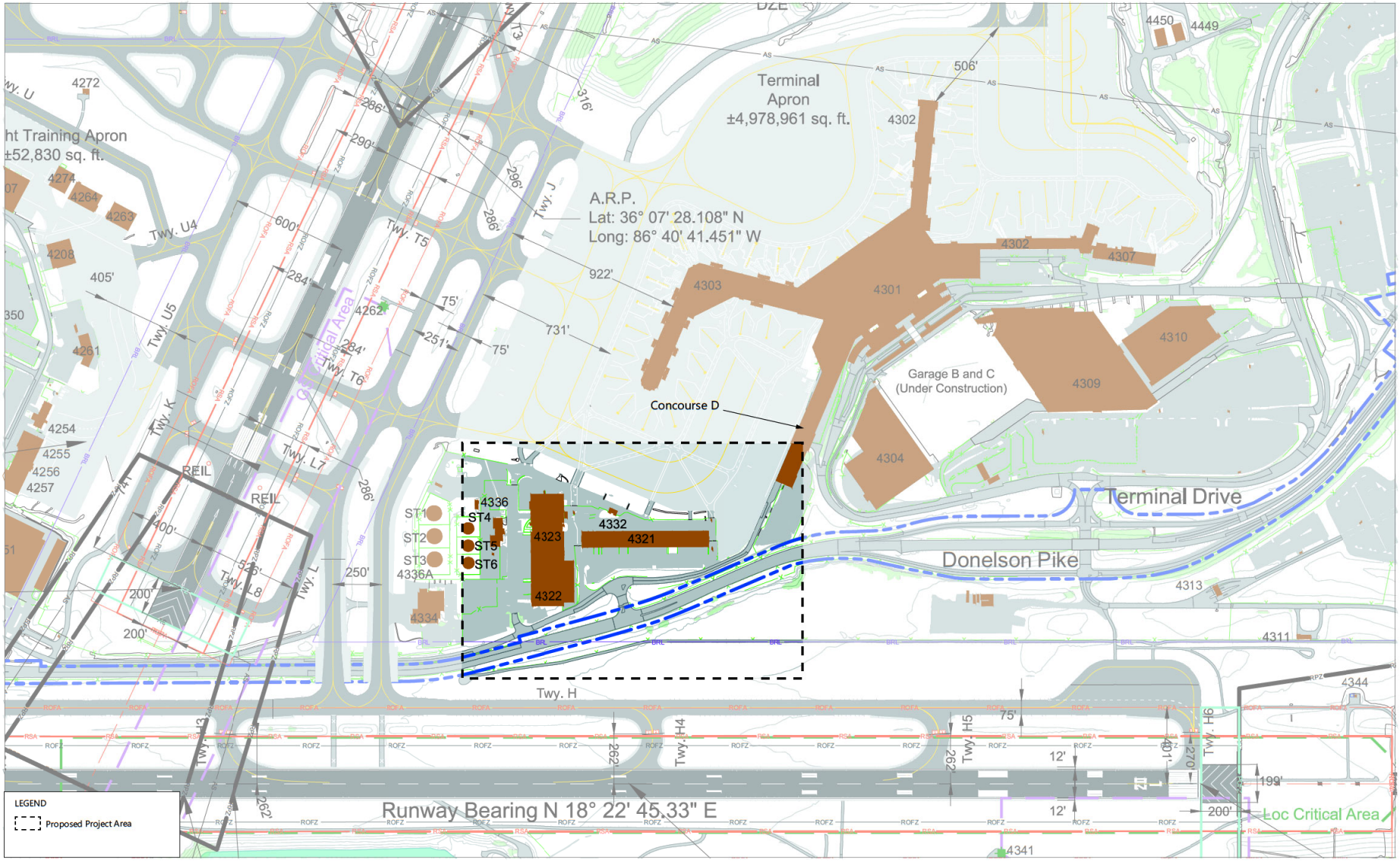
Keith Wilschetz, MSEL
Assistant Vice President
Strategic Planning
Nashville International Airport
140 BNA Park Drive, Suite 520
Nashville, TN 37214
Email: keith.wilschetz@flynashville.com

Sample

Sincerely,

Keith Wilschetz
Assistant Vice President, Strategic Planning
Metropolitan Nashville Airport Authority

Sample

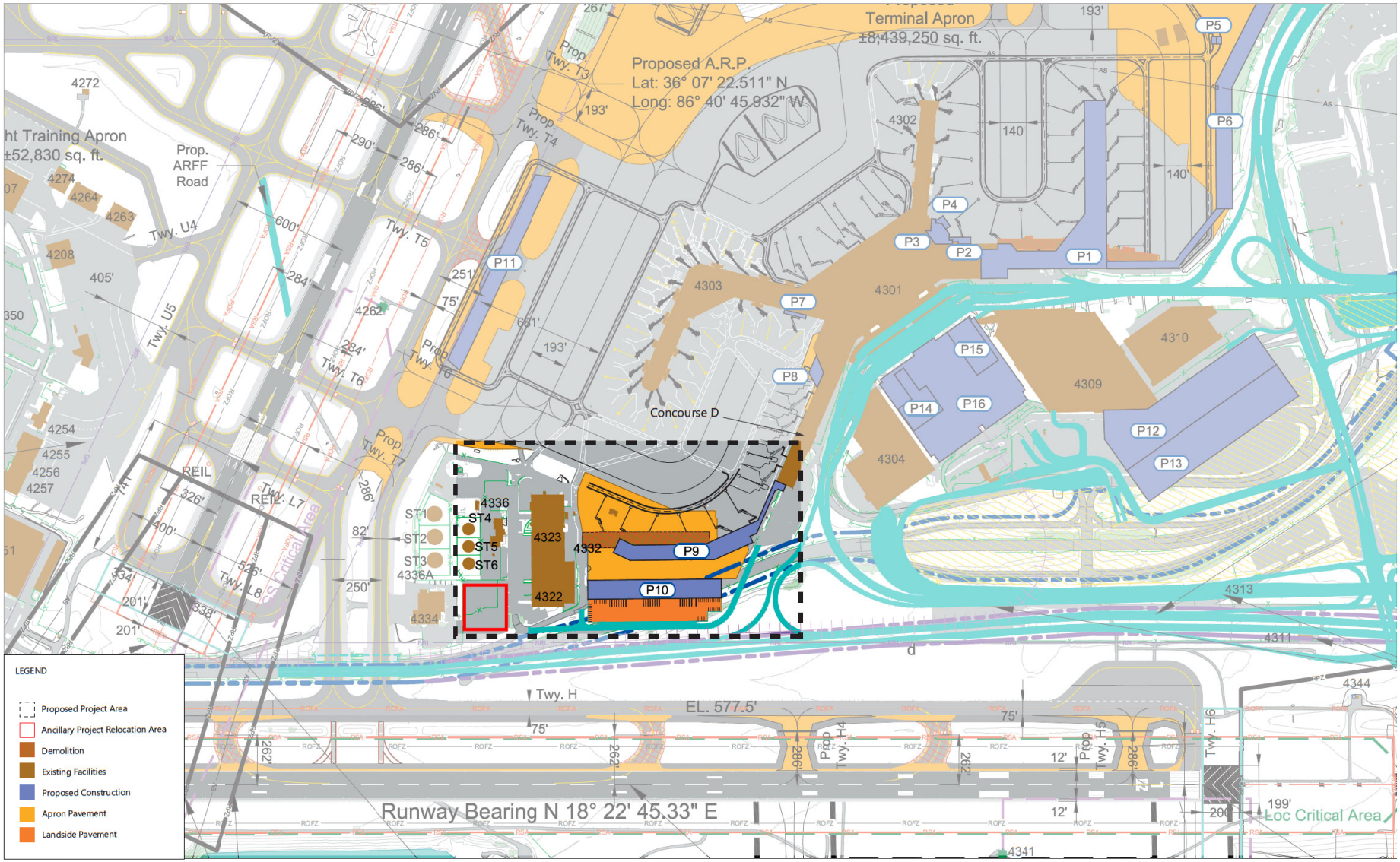


SOURCE: Metropolitan Nashville Airport Authority, Nashville Int'l Airport, Airport Layout Plan, February 22, 2022.

EXHIBIT 1

PROJECT AREA

ricondo:Shared:oDrive:Corporate:Creative Services:01 Projects:01 Client Projects:2022:BNA:MNAA 21141237-9_Concourse_Extension:Concourse_Extension_Exhibits.indd



SOURCE: Metopolitan Nashville Airport Authority, *Nashville Int'l Airport, Proposed Airport Layout Plan*, February 22, 2022.

EXHIBIT 2

NORTH 0 Not To Scale

PROPOSED PROJECT MODIFICATIONS

ricondo:Shared:oDrive:Corporate:Creative Services:01 Projects:01 Client Projects:2022:BNA:MNAA:21141237-9_Concourse_Extension:Concourse_Extension_Exhibits.indd



SOURCES: Nearmap, February 2022 (aerial photography–for visual reference only, may not be to scale); Metropolitan Nashville Airport Authority, February 2022 (Airport property boundary); Metropolitan Nashville Airport Authority, Final Environmental Assessment for the BNA Vision Project, February 2018, and Ricondo & Associates, Inc., August, 2022 (proposed project area, staging areas).

EXHIBIT 3

PROJECT LOCATION MAP

P:\GIS\Projects\BNA\APRX\BNA_SupplementalEnvironmentalAssessment_20220928.aprx

G.2 – AGENCY MAILING LIST

TABLE G-1 AGENCY MAILING LIST

AGENCY NAME	CONTACT NAME	ADDRESS
US Fish and Wildlife Service (USFWS)	David Pelren	446 Neal St. Cookeville, TN 38501
Tennessee Wildlife Resource Agency (TWRA)	Robert Todd (via Katie M. Murphy)	5105 Edmondson Pike Nashville, TN 37211
US Army Corps of Engineers (USACE)	Timothy Wilder	3701 Bell Road Nashville, TN 37214
US Environmental Protection Agency (EPA)	Amanetta Somerville	61 Forsyth Street SW. Atlanta, GA 30303
Tennessee Department of Environment and Conservation, Division of Water Resources	Thomas Moss, PE	312 Rosa L. Parks Avenue, 11th Floor Nashville, TN 37243-1102
Tennessee Department of Environment and Conservation, Division of Remediation	Alison Hensley	312 Rosa L. Parks Avenue, 14th Floor Nashville, TN 37243-1102
Tennessee Historical Commission State Historic Preservation Office (SHPO)	E. Patrick McIntyre, Jr.	1216 Foster Ave Cole Building 3 Nashville, TN 37243
Tennessee Valley Authority (TVA)	N/A	One Century Plaza 26 Century Blvd, Suite 100 Nashville, TN 37214
Tennessee Division of Archaeology (DOA)	N/A	1216 Foster Ave Cole Building 3 Nashville, TN 37243
Tenneessee Division of Forestry (TDF)	David Arnold	Ellington Ag Center Bruer Bldg. 406 Hogan Rd. Nashville, TN 37220
Tenneessee Department of Transportation (TDOT)	Erick Hunt-Hawkins	6601 Centennial Blvd. Nashville, TN 37243-0360
US Coast Guard (USCG)	Commander, Eighth Coast Guard District	500 Poydras Street New Orleans, LA 70130
US Forest Service (USFS)	Southern Region (R8)	1720 Peachtree Street, NW Atlanta, GA 30309
Federal Highway Administration (FHWA)	Tennessee Division Office	404 BNA Drive Building 200, Suite 508 Nashville, TN 37217
Federal Emergency Management Agency (FEMA)	FEMA Region IV	3003 Chamblee-Tucker Road Atlanta, GA 30341
National Park Service (NPS)	Alesha Cerny	100 Alabama Street SW 1924 Building, 6th Floor Atlanta, GA 30303
Natural Resources Conservation Service (NRCS)	Sheldon Hightower	801 Broadway, 675 US Courthouse Nashville, TN 37203
Metropolitan Government of Nashville and Davidson County	Lisa Milligan	800 President Ronald Reagan Way 2nd Floor, Metro Planning Department Nashville, TN 37210

Source: Ricondo, Metropolitan Nashville Airport Authority

G.3 – AGENCY RESPONSES



US ENVIRONMENTAL PROTECTION AGENCY

Avant Ramsey

From: Wilschetz, Keith <keith.wilschetz@flynashville.com>
Sent: Thursday, December 22, 2022 8:09 AM
To: Joe Birge; Avant Ramsey; Stephen Culberson
Subject: FW: EPA Comments on the Agency Scoping for a Supplemental Environmental Assessment for the Concourse and Gate Expansion Project, Nashville International Airport, Metropolitan Nashville Airport Authority

Comments from the EPA.

Keith Wilschetz, MSEL
Assistant Vice President
Strategic Planning

Office: 615-275-1643
Cell: 615-483-8820
140 BNA Park Drive, Suite 520
Nashville, Tennessee 37214

BNA Nashville International Airport

From: Somerville, Amanetta <Somerville.Amanetta@epa.gov>
Sent: Wednesday, December 21, 2022 5:20 PM
To: Wilschetz, Keith <keith.wilschetz@flynashville.com>
Cc: Dean, Kenneth <Dean.William-Kenneth@epa.gov>
Subject: RE: EPA Comments on the Agency Scoping for a Supplemental Environmental Assessment for the Concourse and Gate Expansion Project, Nashville International Airport, Metropolitan Nashville Airport Authority

CAUTION: This email originated from outside the Airport Authority's network. Exercise caution when opening attachments or clicking links, especially from unknown senders as it could be a phishing attack or contain malware.

Dear Mr. Wilschetz,

The U. S. Environmental Protection Agency (EPA) has reviewed the scoping document dated November 29, 2022, regarding the gate extension to the Concourse D building at the Nashville International Airport, Nashville, Tennessee, in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). According to the scoping letter, the Metropolitan Nashville Airport Authority (MNAA) proposes to construct a five-gate extension to the existing Concourse D building.

The proposed extension includes the following:

- Demolition of an approximately 60,000-square-foot air freight building to accommodate the extension of Concourse D;
- Demolition of a waste triturator and fueling and support pad to accommodate aircraft gates at the proposed Concourse D extension
- Construction of an approximately 75,000-square foot extension to Concourse D serving six boarding gates (five new gates and replacement of one existing gate);

- Construction of an approximately 70,000-square-foot air freight facility with approximately 25 truck docks and 40 landside parking spaces; and
- Connected and enabling actions:
    a. Realignment of airport operation area fencing,
    b. Reconfiguration of exterior lights and site utilities (stormwater management system infrastructure),
    c. The use of an additional construction staging area located on Airport property

Based on the EPA's preliminary review of the proposed project, the following comments are provided for your consideration in preparing the draft supplemental environmental document:

(1) **Stormwater Management:** Stormwater runoff from construction sites can transport pollutants like sediment, debris, and chemicals to nearby storm sewer systems or directly into rivers, lakes, and streams. According to the EPA's NEPAssist mapping tool (https://www.epa.gov/nepa/nepassist), the proposed project area is located within portions of the Lower Mill Creek Watershed (Hydrologic Unit Code (HUC) 051302020102) and Lower Stones River Watershed (HUC 051302030309). The proposed project area includes three streams that are identified as impaired (i.e., not meeting one or more water quality standards): Finley Branch; Sams Branch; and McCrory Creek. The proposed project has the potential to further degrade these streams and to temporarily degrade the water quality of other streams within the project area during construction. It may also have the potential for long-term impacts during project operations and maintenance. The EPA encourages implementing best management practices during and after construction to minimize stormwater impacts on the streams in the project area and to prevent further degradation of the impaired streams.

Soil disturbance in support of the proposed project may necessitate issuance of a construction stormwater permit before construction can begin. Pursuant to the Clean Water Act, coverage under a statewide National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit will be needed if the project disturbs one acre or more of contiguous land. The EPA recommends that erosion control and sediment control measures be implemented in accordance with the State's NPDES construction general permit requirements, and that the measures be addressed during the design and construction phases of the project. The MNAA should contact the Tennessee Department of Environment and Conservation about the applicable NPDES permit(s) for this project.

The EPA recommends that the environmental document include a detailed explanation of stormwater management to accommodate major storm events and changes in rainfall. Please explain the potential impacts on the water quality of the waterbodies within the project area and identify and discuss the stormwater best management practices that will be implemented to prevent runoff from construction activities.

(2) **Air Quality:** The proposed project area is not within a designated ozone Non-Attainment Area. The EPA recommends that the proposed project follow the applicable State Implementation Plan requirements to ensure compliance with the transportation conformity requirements. We recommend that the environmental document discuss the applicable regulatory air quality requirements, the attainment status, potential impacts of the project on air quality, and proposed measures to avoid or minimize impacts on air quality.

(3) **Environmental Justice:** Executive Order 12898 directs federal agencies to identify and address the disproportionately high and adverse human health on environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The EPA encourages the use of EJScreen (https://www.epa.gov/ejscreen), EPA's nationally consistent environmental justice screening and mapping tool, when conducting environmental justice scoping efforts. The tool provides information on environmental and socioeconomic indicators as well as pollution sources, health disparities, critical service gaps, and climate change data. The tool can help identify potential community vulnerabilities by calculating EJ Indexes and displaying the environmental and socioeconomic information. EJScreen is a useful first step in highlighting locations that may be candidates for further analysis.

The EPA also recommends meaningfully engaging communities with EJ concerns early and throughout the NEPA process. To address potential barriers to meaningful engagement, consider using adaptive and innovative approaches to both public outreach and participation to meet the needs of the local community and businesses (i.e., engage local community leaders and groups in project planning, share project information at community events/meetings, virtual meetings, etc). The Environmental Justice Interagency Working Group's Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices), dated March 2016, provides guiding principles agencies can consider (Promising Practices for EJ Methodologies IN NEPA Reviews).

(4) **Management and Disposal of Wastes/Hazardous Wastes:** The EPA recommends the MNAA ensures that all wastes from the demolition of the structures be properly handled by licensed contractors and that unrecyclable materials be disposed in licensed sanitary landfills for each type of debris in accordance with local, state, and federal requirements. This includes proper handling of hazardous materials removal and disposal (e.g., asbestos, polychlorinated biphenyls, lead from paint). Reuse, recycling, and reclamation should be viewed as ways of managing hazardous wastes which, if properly conducted, can avoid environmental hazards, protect scarce natural resources, and reduce the nation's reliance on raw materials and energy. In addition, construction and operation in support of the project should ensure that Resource Conservation and Recovery Act regulated solid wastes are disposed of in accordance with federal regulations. The appropriate NEPA document should also address potential environmental impacts to passengers and airport workers, to include the hazards of demolishing the older areas of existing terminal buildings, such as lead and asbestos latent materials.

(5) **Sustainability:** Efforts should be made to divert recyclable materials such as concrete, steel, and asphalt away from landfills and repurpose the material instead. Consider sustainable building practices that utilize variable forms of proven renewable energy for the proposed project. For example, solar power for supplemental electricity and lighting for the ramps, aprons, terminals, and any aircraft maintenance hangers, parking lots, or special buildings that may be proposed in the various projects.

The EPA appreciates the opportunity to review and provide scoping comments on the proposed project. We request that future communication regarding NEPA documents be in an electronic format from a downloadable web link or email. The MNAA may continue to mail at least one hard copy of the draft and/or final NEPA documents to the EPA, NEPA Section at 61 Forsyth St., NW, Atlanta, GA 30303. If you have any questions, please contact me by phone at 404-562-9025 or via email at Somerville.Amanetta@epa.gov.

Amanetta Somerville
U.S. Environmental Protection Agency Region 4
61 Forsyth Street SW. Atlanta, Ga 30303
National Environmental Policy Act Section
Strategic Programs Office
Phone: 404-562-9025
E-mail: somerville.amanetta@epa.gov

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 1, 2022 8:49 AM
To: gissentanna.larry@epa.gov
Cc: Somerville, Amanetta <Somerville.Amanetta@epa.gov>; Wilschetz, Keith <keith.wilschetz@flynashville.com>; tommy.dupree@faa.gov; Stephen Culberson <sculberson@ricondo.com>; Stovall, Jamal (FAA) <jamal.stovall@faa.gov>
Subject: Nashville Int'l Airport CAGE Supplemental EA

Mr. Gissentanna,
The Metropolitan Nashville Airport Authority (the Authority) is proposing modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport. Accordingly, the Authority intends to prepare a Supplemental Environmental Assessment (EA) for the project, in accordance with the National Environmental Policy Act. This email is being sent to your agency by Ricondo, consultants to the Authority, as part of the process for determining the scope of issues to be addressed in the Supplemental EA. Attached is a description of the proposed modifications as well as the appropriate Authority contact to whom your agency may direct comments and questions. Thank you in advance for your consideration.

Avant D. Ramsey | Managing Consultant

RICONDO

700 17TH STREET | SUITE 2000 | DENVER, CO 80202
TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.



US FISH AND WILDLIFE SERVICE

Avant Ramsey

From: Pelren, David <david_pelren@fws.gov>
Sent: Friday, January 6, 2023 11:51 AM
To: Avant Ramsey
Cc: Wilschetz, Keith; Tennessee ES, FWS; Sikula, Nicole R
Subject: FWS #2023-0014713 Metro Nashville Airport concourse and gate expansion

Mr./Ms. Avant Ramsey
Managing Consultant
Ricondo

Mr./Ms. Ramsey -

Thank you for coordinating with us about scoping for a Supplemental Environmental Assessment regarding proposed modifications to the concourse and gate expansion at the Nashville International Airport in Nashville, Davidson County, Tennessee (FWS #2023-0014713). This project would include a five-gate extension to the existing Concourse D building and related ancillary activities. In addition to the area of immediate construction within the terminal and airport support building complex, a construction staging area of approximately 35 acres located on airport property would be used to facilitate this action. We understand that clearing of trees at the staging area would be completed outside of bird nesting and migration seasons. Information about federally listed and proposed species that are located in the general vicinity of this site was generated during a search of the Fish and Wildlife Service's Information for Planning and Consultation system. Those species are: gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), Nashville crayfish (*Orconectes shoupi*), Braun's rock-cress (*Arabis perstellata*), Guthrie's ground-plum (*Astragalus bibullatus*), leafy prairie-clover (*Dalea foliosa*), Price's potato-bean (*Apios priceana*), and Short's bladderpod (*Physaria globosa*). You have requested comments relative to the potential for environmental impacts, including those to threatened and endangered species.

Based on the use of conservation measures and lack of close proximity of the project sites to known records of federally listed species, we are not currently aware of any federally listed species that are expected to occupy this project's anticipated areas of impact. As indicated in your materials describing the project proposal, the Nashville crayfish has been documented downstream of the project area. The areas known to be occupied by the species are expected to be adequately protected as long as sediment control measures are appropriately installed and maintained.

The tricolored bat was proposed for federal listing in accordance with sections 3(6) and 4(a)(1) of the Endangered Species Act (ESA) of 1973, as amended, on September 14, 2022. No designated critical habitat has been proposed at this time. While a proposed species is not afforded protection under the ESA, there is a prohibition against jeopardy of its continued existence. The listing decision for this species should be announced within 12 months of the date the proposed rule was published. If the tricolored bat is listed, the prohibition against taking a listed species under section 9 of the ESA becomes effective 30 days later, regardless of a proposed action's stage of completion. At this time, the project proponent should determine if the action is likely to jeopardize the continued existence of this species and confer with our office only if jeopardy may occur. If the proposed action will not be complete should the tricolored bat be listed and it may result in effects to the species after the effective date of the final listing rule, the project proponent would need to coordinate with our office on potential impacts at that time. In any case, tree clearing should be conducted during the period of October 15 through March 31 to the greatest extent feasible in order to minimize impacts to bats in general and birds that may use the project area for nesting.

Feel free to contact me if further coordination regarding this project will be helpful.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

NOTE: This email correspondence and any attachments to and from this sender are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION, DIVISION OF WATER RESOURCES

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

December 1, 2022

Mr. Avant D. Ramsey
Ricondo
700 17th Street, Suite 2000
Denver, CO 80202

re: Agency Scoping for a Supplemental Environmental Assessment for the Concourse and Gate Expansion Project, Metropolitan Nashville Airport Authority
Davidson County, Tennessee

Sent via email to: aramsey@ricondo.com

Dear Mr. Ramsey:

Staff within the Division of Water Resources have reviewed the Scoping Environmental Assessment for the Concourse and Gate Expansion at the Metropolitan Nashville Airport. The Proposed modifications comprise demolition and site redevelopment and include (1) demolition of an approximately 60,000-square-foot air freight building to accommodate extension of Concourse D; (2) demolition of a waste triturator and fueling and support pad to accommodate aircraft gates at the proposed Concourse D extension; (3) construction of an approximately 75,000-squarefoot extension to Concourse D serving six boarding gates (five new gates and replacement of one existing gate); (4) construction of an approximately 70,000-square-foot air freight facility with approximately 25 truck docks and 40 landside parking spaces; and (5) connected and enabling actions, including realignment of airport operation area (AOA) fencing, reconfiguration of exterior lights and site utilities including stormwater management system infrastructure, and the use of an additional construction staging area located on Airport property.

I could not locate an applicable permit coverage for a construction stormwater permit (CGP) and associated Surface Water Pollution Prevention Plan (SWPPP). If such does not exist, one will be required as the activities, including staging areas, will disturb well more than an acre of land. The newly proposed staging area is indicated to have a 0.14 acre pond near the northwest corner. This project will also need to be included under the existing NPDES Tennessee Multi Sector Permit (TMSP). If it will be disturbed an ARAP permit will be required and possibly there will be a need for stream mitigation credits to be purchased.

If you have any further questions, I will be glad to try to assist you. You may reach me at (615) 917-4135 or tom.moss@tn.gov.

Sincerely,



Tom Moss, P.G.
Environmental Review Coordinator
Compliance and Enforcement Unit

cc: Tim Jennette, DWR Manager, Nashville Environmental Field Office
Keith Wilschetz, Metro Airport Authority – via email



NATIONAL PARK SERVICE

Avant Ramsey

From: Jarrett, Jordan E <jordan_jarrett@nps.gov>
Sent: Tuesday, January 10, 2023 10:23 AM
To: Wilschetz, Keith; Avant Ramsey; tommy.dupree@faa.gov; Stephen Culberson; Jamal.Stovall@faa.gov
Cc: Jensen, Jill L
Subject: Re: [EXTERNAL] Nashville Int'l Airport CAGE Supplemental EA
Attachments: Conc D Ext Supplemental EA Agency Letter_NPS.pdf

Hello,

I was notified of this project by way of another NPS department. The Trail of Tears National Historic Trail (NHT) is administered by the National Trails Office of the NPS. In the vicinity of the Nashville International Airport, the Trail of Tears NHT coincides with the Murfreesboro Pike/US41/SR1. Our office does not anticipate adverse effect to the Trail or its resources as a result of the proposed undertaking. Please do not hesitate to reach out regarding future projects or data needs!

Best,
Jordan Jarrett

Jordan Jarrett (she/her)
Archeologist
National Park Service
National Trails Office
1100 Old Santa Fe Trail
Santa Fe, NM 87505
(505) 470-0426

Working with you to protect, develop, and promote National Historic Trails.
http://www.nps.gov/ntir/



From: Cerny, Alesha K <alesha_cerny@nps.gov>
Sent: Thursday, December 29, 2022 11:46 AM
To: keith.wilschetz@flynashville.com <keith.wilschetz@flynashville.com>; aramsey@ricondo.com <aramsey@ricondo.com>
Cc: Jarrett, Jordan E <jordan_jarrett@nps.gov>; NPS SER National Historic Landmarks <SER_NHL@nps.gov>
Subject: Fw: [EXTERNAL] Nashville Int'l Airport CAGE Supplemental EA

Mr. Wilschetz,

The National Historic Landmarks Program was notified of the supplemental EA for the concourse and gate expansion project at Nashville International Airport. Our office has no comments as there are no National Historic Landmarks within or near the proposed project area. However, a section of the Trail of Tears National Historic Trail is within or near the project area. Consultation with the National Historic Landmarks Program does not constitute consultation with the National Historic Trail. Jordan Jarrett, archeologist with the NPS National Trails Office, is copied for awareness.

For future reference, please send all NHL Section 106 correspondence to this monitored inbox: ser_nhl@nps.gov.

Happy Holidays,

Alesha Cerny
Architectural Historian / Archeological and Historic Preservation Partnerships
National Park Service / Interior Region 2 (Legacy Southeast Region)
Cell: (404) 276-5092 / www.nps.gov/nhl

I am a proud graduate of the GOAL Leadership Academy. Ask me about the program!

Follow the NHL Program!

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 1, 2022 7:52 AM
To: Cerny, Alesha K <alesha_cerny@nps.gov>
Cc: Rankin, Ellen E <Gwilym_Rankin@nps.gov>; Wilschetz, Keith <keith.wilschetz@flynashville.com>; tommy.dupree@faa.gov <tommy.dupree@faa.gov>; Stephen Culberson <sculberson@ricondo.com>; Jamal.Stovall@faa.gov <Jamal.Stovall@faa.gov>
Subject: [EXTERNAL] Nashville Int'l Airport CAGE Supplemental EA

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

Ms. Cerny
The Metropolitan Nashville Airport Authority (the Authority) is proposing modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport. Accordingly, the Authority intends to prepare a Supplemental Environmental Assessment (EA) for the project, in accordance with the National Environmental Policy Act. This email is being sent to your agency by Ricondo, consultants to the Authority, as part of the process for determining the scope of issues to be addressed in the Supplemental EA. Attached is a description of the proposed modifications as well as the appropriate Authority contact to whom your agency may direct comments and questions. Thank you in advance for your consideration.

Avant D. Ramsey | Managing Consultant

RICONDO
700 17TH STREET | SUITE 2000 | DENVER, CO 80202
TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.

TENNESSEE DIVISION OF FORESTRY

From: David Arnold
To: Avant Ramsey
Cc: Wilschetz, Keith; tommy.dupree@faa.gov; Stephen Culberson; Jamal.Stovall@faa.gov
Subject: RE: Nashville Int"l Airport CAGE Supplemental EA
Date: Thursday, December 1, 2022 8:40:58 AM
Attachments: image001.png

Mr. Ramsey;

I have no environmental concerns about this project.

THANKS!

TN Department of Agriculture | Forestry
DAVID ARNOLD | STATE FORESTER/ASST COMMISSIONER
Department of Agriculture
Ellington Agricultural Center, Bruer Bldg.
406 Hogan Rd., Nashville, TN 37220
p. 615-837-5411 c. 615-351- 4778 f. 615-837-5003
david.arnold@tn.gov
www.tn.gov/agriculture

All emails and attachments sent and received from this email address related to the official business of the Tennessee Department of Agriculture are subject to the Tennessee Public Records Act. Unless the content of an email or attachment is subject to a specific exception in the public records act, emails and attachments sent to and from this agency should be presumed to be open to public inspection and maintained pursuant to applicable retention requirements.

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 1, 2022 7:53 AM
To: David Arnold <David.Arnold@tn.gov>
Cc: Wilschetz, Keith <keith.wilschetz@flynashville.com>; tommy.dupree@faa.gov; Stephen Culberson <sculberson@ricondo.com>; Jamal.Stovall@faa.gov
Subject: [EXTERNAL] Nashville Int'l Airport CAGE Supplemental EA

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Mr. Arnold
The Metropolitan Nashville Airport Authority (the Authority) is proposing modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport. Accordingly, the Authority intends to prepare a Supplemental Environmental Assessment (EA) for the project, in accordance with the National Environmental Policy Act. This email is being sent to your agency by Ricondo, consultants to the Authority, as part of the process for determining the scope of issues to be addressed in the Supplemental EA. Attached is a description of the proposed modifications as well as the appropriate Authority contact to whom your agency may direct comments and questions. Thank you in advance for your consideration.

Avant D. Ramsey | Managing Consultant

RICONDO

700 17TH STREET | SUITE 2000 | DENVER, CO 80202

TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION, DIVISON OF REMEDIATION

Avant Ramsey

From: Alison Hensley <Alison.Hensley@tn.gov>
Sent: Thursday, December 1, 2022 2:07 PM
To: Avant Ramsey
Cc: Wilschetz, Keith; tommy.dupree@faa.gov; Stephen Culberson; Jamal.Stovall@faa.gov
Subject: RE: Nashville Int'l Airport CAGE Supplemental EA
Attachments: TDEC-DOR_Sites.pdf

The TN Dept of Environment and Conservation Division of Remediation (TDEC-DOR) has several TDEC-DOR sites associated with the Nashville International Airport. However, two sites (SRS190349 and SRS190793) appear to be located in the immediate area of your project plus an additional one southwest from these but on the other side of the runway. Both of these site statuses are listed closed within TDEC-DOR. I am providing a link below to download the files for these two sites. I am also attaching a map of the TDEC-DOR sites in the airport area should you decide you need information on the other surrounding sites associated with the airport.

The Division of Remediation files have been uploaded to the following link. This link requires two step authentication and is only open to those with access to aramsey@ricondo.com. This link will be removed on 12/6/2022. **Please let me know when you have downloaded the files so I can free up the space sooner as storage is very limited.**

https://tennessee-my.sharepoint.com/:f:/g/personal/bg29015_tn_gov/Egqbgyk_1ltGof2pzr5G9rcBIYSpfq1sv7XJi7yLk3tzVg?email=aramsey%40ricondo.com&e=httQc9

*Let me know if I met your expectations by completing the **TDEC Customer Survey***

TN Department of Environment & Conservation

Alison Hensley | Environmental Manager
Division of Remediation
William R. Snodgrass TN Tower, 14th Floor
312 Rosa L. Parks Ave, Nashville, TN 37243
p. 615-532-0932 f. 615-741-1115
Alison.Hensley@TN.gov
tn.gov/environment/program-areas/rem-remediation.html
Request files from TDEC using the TDEC Information Request Form

---

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 1, 2022 7:52 AM
To: Alison Hensley <Alison.Hensley@tn.gov>
Cc: Wilschetz, Keith <keith.wilschetz@flynashville.com>; tommy.dupree@faa.gov; Stephen Culberson <sculberson@ricondo.com>; Jamal.Stovall@faa.gov; Andy.Binford@tn.gov
Subject: [EXTERNAL] Nashville Int'l Airport CAGE Supplemental EA

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

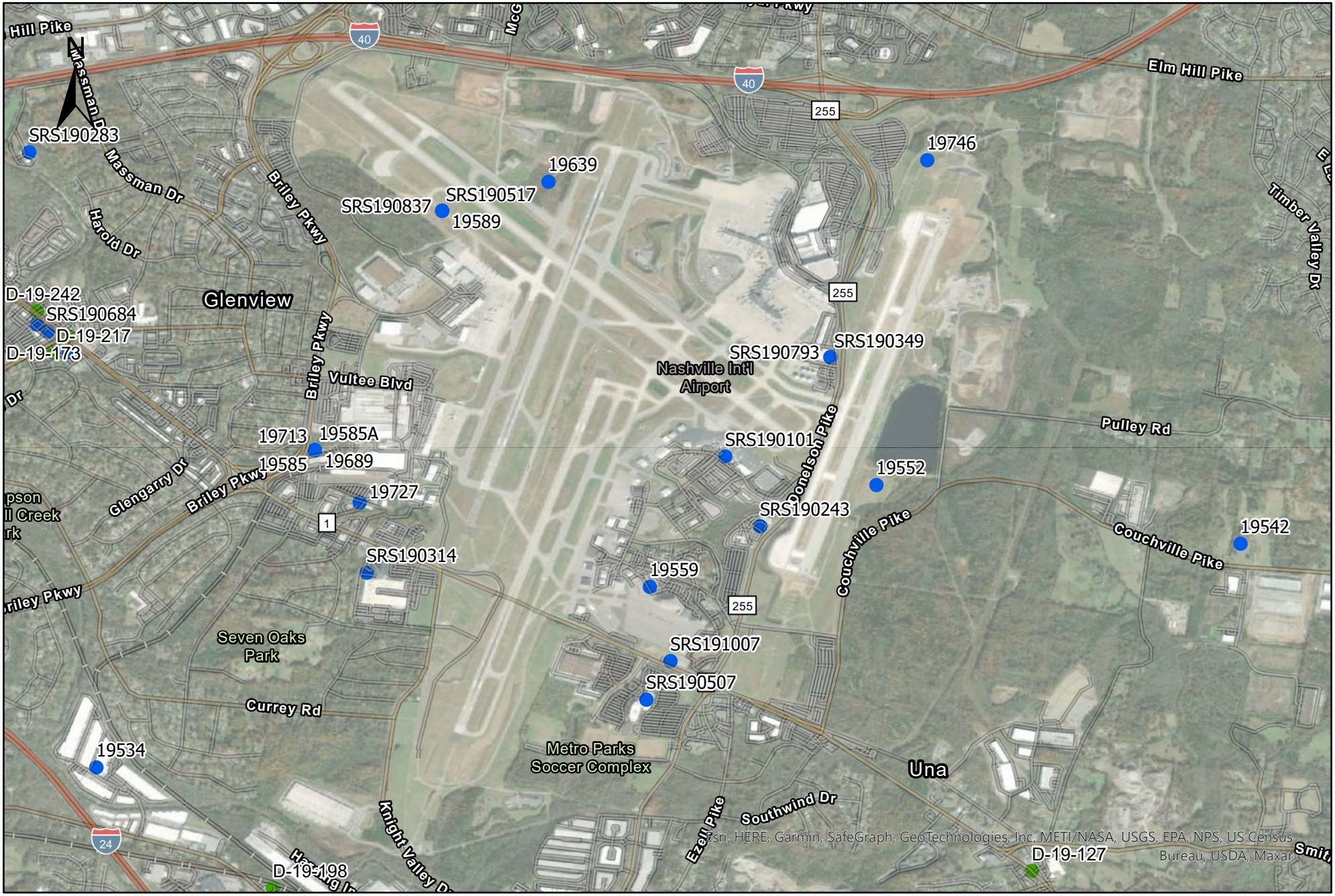
Ms. Hensley,
The Metropolitan Nashville Airport Authority (the Authority) is proposing modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport. Accordingly, the Authority intends to prepare a Supplemental Environmental Assessment (EA) for the project, in accordance with the National Environmental Policy Act. This email is being sent to your agency by Ricondo, consultants to the Authority, as part of the process for determining the scope of issues to be addressed in the Supplemental EA. Attached is a description of the proposed modifications as well as the appropriate Authority contact to whom your agency may direct comments and questions. Thank you in advance for your consideration.

Avant D. Ramsey | Managing Consultant

RICONDO

700 17TH STREET | SUITE 2000 | DENVER, CO 80202
TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.



TN Department of Environment & Conservation

Date: 12/1/2022
Author: AMH

Division of Remediation Sites

0 0.25 0.5 1 1.5 2 Miles

- DOR Sites
- DCERP Known Drycleaners

TENNESSEE WILDLIFE RESOURCE AGENCY

Avant Ramsey

From: Katie M. Murphy <Katie.M.Murphy@tn.gov>
Sent: Monday, December 12, 2022 6:27 AM
To: Avant Ramsey
Subject: MNAA Supplemental EA TWRA Consultation

Good Morning,

The Tennessee Wildlife Resources Agency has reviewed the information that you provided. Metropolitan Nashville Airport Authority (MNAA) has requested an endangered species review on a Supplemental Environmental Assessment (Supplemental EA) with regards to the Concourse and Gate Expansion project at Nashville International Airport, Nashville, Davidson County, TN. It is my understanding that the project comprises of a five-gate extension to Concourse D and related enabling and ancillary projects, including the use of an undeveloped additional construction staging area on Airport Property.

Since we share authority with the U.S. Fish and Wildlife Service (USFWS) on the Nashville Crayfish (*Orconectes shoupi*), we request that you consult with the USFWS Cookeville, Tennessee Field Office regarding potential impacts to these listed species; and will defer to the opinion of the U.S. Fish and Wildlife Service's Cookeville Field Office regarding potential impacts to the state and federally endangered species due to the proposed project.

Otherwise, we do not anticipate adverse impacts to state listed species under our authority due to the proposed construction; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities. Thank you for the opportunity to review and comment on this proposed project. If I may be of further assistance, please contact me at katie.m.murphy@tn.gov.

Thank you,

Katie M. Murphy
Region 2 Aquatic Habitat Biologist
Tennessee Wildlife Resources Agency
5105 Edmondson Pike, Nashville, TN 37211
615-934-6213



US ARMY CORPS OF ENGINEERS

Avant Ramsey

From: Wilder, Timothy C CIV USARMY CELRN (USA) <Timothy.C.Wilder@usace.army.mil>
Sent: Friday, December 9, 2022 10:47 AM
To: Avant Ramsey; Wilschetz, Keith
Cc: Wilschetz, Keith; Dupree, Tommy; Stovall, Jamal (FAA); Stephen Culberson; traci.holton@flynashville.com
Subject: RE: Concourse and Gate Expansion (CAGE) Project: Nashville International Airport
Attachments: 20221209_BNA-CAGE-scoping-package.pdf

Mr Wilschetz,

I retrieved the attached scoping package I received this morning.

I looked it over and have some initial comments.

First, I recommend that we (Corps of Engineers) complete a field review of the site to confirm the status of water features that may be within your project footprint.

The scoping package contains a "Wetland Delineation Report" by Intertek PSI (Attachment C). In it water features identified during a site visit on November 21, 2022 are described as ephemeral streams (termed: Ephemeral Stream #1 (ES1), Ephemeral Stream #2 (ES2), and Ephemeral Stream #3 (ES3). The report states these features are not jurisdictional, and the scoping package cover letter points to these statements.

However, ES1, ES2, and ES3 may actually be waters of the United States, as many ephemeral streams are waters of the United States.

I recommend you assume ES1, ES2, and ES3 are waters of the United States, and that other jurisdictional waters might be present, until we can visit the site and provide you with a definitive answer as to the jurisdictional status of all waters present at the site. The delineation report attached to the scoping package does not seem to be complete, as it refers to data sheets, maps, and photos that were not included. In advance of our site visit, we would ask for the complete delineation report with supporting information.

I was very interested to see that the Intertek PSI report identified American Chestnut (*Castanea dentata*) as one of 3 dominant trees in the forest overstory at the site. A population of mature American Chestnut trees would be a very remarkable find.

We will be happy to review the site at our soonest opportunity and confirm the jurisdictional status of any water features that may be present.

Respectfully,

Tim

Tim Wilder
Chief, West Branch
Regulatory Division
U.S. Army Corps of Engineers
Nashville District
3701 Bell Road

Nashville, TN 37214

Office: (615) 369-7502

Internet: http://www.lrn.usace.army.mil/Missions/Regulatory.aspx

The Nashville District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at https://regulatory.ops.usace.army.mil/customer-service-survey/

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 8, 2022 5:21 PM
To: Wilder, Timothy C CIV USARMY CELRN (USA) <Timothy.C.Wilder@usace.army.mil>
Cc: Wilschetz, Keith <keith.wilschetz@flynashville.com>; Dupree, Tommy <tommy.dupree@faa.gov>; Stovall, Jamal (FAA) <Jamal.Stovall@faa.gov>; Stephen Culberson <sculberson@ricondo.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Concourse and Gate Expansion (CAGE) Project: Nashville International Airport

Thank you Mr. Wilder. The document was updated to the DOD SAFE site.

Avant D. Ramsey | Managing Consultant

RICONDO

700 17TH STREET | SUITE 2000 | DENVER, CO 80202
TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.

From: Wilder, Timothy C CIV USARMY CELRN (USA) <Timothy.C.Wilder@usace.army.mil>
Sent: Thursday, December 8, 2022 3:48 PM
To: Avant Ramsey <aramsey@ricondo.com>
Cc: Wilschetz, Keith <keith.wilschetz@flynashville.com>; Dupree, Tommy <tommy.dupree@faa.gov>; Stovall, Jamal (FAA) <Jamal.Stovall@faa.gov>; Stephen Culberson <sculberson@ricondo.com>
Subject: RE: Concourse and Gate Expansion (CAGE) Project: Nashville International Airport

Thank you.

Unfortunately, our IT security protocols prevent us from downloading files from an external source. Files too big to send by email can be uploaded to our file transfer site, DOD SAFE. I've sent a request to you for these files though that system. You should receive an email from it shortly.

Respectfully,

Tim

Tim Wilder
Chief, West Branch
Regulatory Division
U.S. Army Corps of Engineers
Nashville District
3701 Bell Road
Nashville, TN 37214

Office: (615) 369-7502

Internet: http://www.lrn.usace.army.mil/Missions/Regulatory.aspx

The Nashville District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at https://regulatory.ops.usace.army.mil/customer-service-survey/

From: Avant Ramsey <aramsey@ricondo.com>
Sent: Thursday, December 8, 2022 2:22 PM
To: Wilder, Timothy C CIV USARMY CELRN (USA) <Timothy.C.Wilder@usace.army.mil>
Cc: Wilschetz, Keith <keith.wilschetz@flynashville.com>; Dupree, Tommy <tommy.dupree@faa.gov>; Stovall, Jamal (FAA) <Jamal.Stovall@faa.gov>; Stephen Culberson <sculberson@ricondo.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] Concourse and Gate Expansion (CAGE) Project: Nashville International Airport

Mr. Wilder,
The Metropolitan Nashville Airport Authority (the Authority) is proposing modifications to the Concourse and Gate Expansion (CAGE) project at Nashville International Airport. The Authority intends to prepare a Supplemental Environmental Assessment (EA) for the project in accordance with the National Environmental Policy Act. This email is being sent to your agency by Ricondo, consultants to the Authority, as part of the process for determining the scope of issues to be addressed in the Supplemental EA. The link below provides a letter with a description of the proposed modifications, the Authority contract to whom your agency may direct comments and questions, and supporting documentation prepared by the Authority. Thank you in advance for your consideration.

https://ricondo.sharefile.com/d-s93ea9aafa2394480a4117a5272c70fbd

Avant D. Ramsey | Managing Consultant

RICONDO

700 17TH STREET | SUITE 2000 | DENVER, CO 80202
TEL +1 720-259-5592 x562 | **DIRECT** +1 720-330-9308 | **MOBILE** +1 720-560-1352

This communication may contain privileged and/or confidential information and is intended for the sole use of addressee. If you are not the addressee you are hereby notified that any dissemination of this communication is strictly prohibited. Please promptly notify the sender by reply email and immediately delete this message from your system. Ricondo & Associates, Inc. ("Ricondo") does not accept responsibility for the content of any email transmitted for reasons other than approved business purposes. Regarding services for U.S. clients: Ricondo is not registered as a "municipal advisor" under Section 15B of the Securities Exchange Act of 1934 ("Section 15B") and Ricondo is not acting as a municipal advisor. This communication and any opinions, assumptions, views or information contained herein or in any attachment to this communication are not intended to be, and do not constitute, "advice" within the meaning of Section 15B.