# APPENDIX D

## Noise Analysis

# Fort Smith Regional Airport Runway 8-26 Extension
# Environmental Assessment
# Noise Technical Report

HMMH Report No. 312400

October 14, 2021

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# 1. Introduction

For a National Environmental Policy Act (NEPA) noise analysis, the Federal Aviation Administration (FAA) requires the use of the Day-Night Average Sound Level (DNL) metric. The 24-hour analysis period must represent the average annual day (AAD), meaning average daily aircraft operations over a 365-day period. This Noise Technical Report presents the regulatory requirements in section 2, noise modeling approach, input data, and assumptions used in the preparation of DNL contours in section 3. The resulting DNL contour figures and associated noise impact assessments are included as section 4. The final section is an explanation of the acoustical terminology, for the benefit of reviewers who may lack familiarity with the terms.

The noise analysis for the Fort Smith Regional Airport (FSM) Runway 8-26 Extension Environmental Assessment (EA) includes an Existing Conditions scenario and No-Action and Proposed Action scenarios for 2023 and 2028[1], for a total of five modeling scenarios:

1. Existing Conditions (2019)
2. Design year 2023 No-Action Alternative
3. Design year 2023 Proposed Action Alternative
4. Forecast year 2028 No-Action Alternative
5. Forecast year 2028 Proposed Action Alternative

The Proposed Action for this EA is a 1,300-foot extension to the eastern end of Runway 8/26 (formerly known as Runway 7/25), i.e., the endpoint for Runway 26 would be moved eastward by 1,304 feet. The endpoint for Runway 8 would remain in its existing location.

HMMH considered temporary construction noise impacts and mitigation. Because the nearest residences to the construction area are approximately 2,500' from the site, no construction noise modeling is needed for this EA. During construction there would be limited short-term impacts from added vehicle trips to and from the site by construction equipment and construction-related short term noise. Construction equipment is expected to be used intermittently throughout the improvement project's construction phase. Construction work for the project is expected to occur only during daytime hours. Normal flight operations will continue during project construction.

This EA does not include consideration of noise from non-airport related sources, such as commercial activity, highway traffic, or noise from local roadways. Roadway noise from Interstate 540 or Massard Road combined with the aircraft noise documented in this report may result in noise levels higher than indicated by the DNL contours in areas close to the roadway.

[1] The forecast years 2023 and 2028 were approved by FAA at the outset of this EA

## 2. Regulatory Requirements

HMMH conducted the noise analysis for this EA 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 NEPA.

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 65.0 dB DNL within the same timeframe due to the Proposed Action 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 DNL, the metric adopted by FAA and Environmental Protection Agency (EPA) as the most appropriate long-term measure of aircraft noise exposure. 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 nighttime operations. **Nighttime or "night" is defined as 10 pm to 7 am, local time.** A noise terminology appendix will be included with the noise analysis results documentation; it will include 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 the aircraft normally fly over the surrounding communities.

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

- Mapping of land use data, noise contours, and flight tracks for each scenario;
- The number of residences or people residing in areas exposed to DNL between 65 dB and 70 dB, 70 dB and 75 dB and greater than or equal to 75 dB, and the net increase or decrease in the number of people or residences exposed to those levels of noise;
- The location and number of non-residential noise sensitive sites (e.g., schools, hospitals, parks, recreation areas) exposed to 65 DNL or greater;
- Discussion of the noise impact on noise sensitive areas exposed to DNL of at least 65 dB because of the Proposed Action; and

If 1.5 dB DNL increases are predicted at noise sensitive areas with DNL of at least 65 dB, identification of noise sensitive areas exposed to DNL greater than or equal to 60 dB which may experience a DNL increase of 3 dB or more because of the Proposed Action.

The subsequent sections address the noise modeling input data for the FAA's Aviation Environmental Design Tool (AEDT) and the United States Department of Defense (DoD)'s NOISEMAP model. 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 3d.[2] All AEDT modeling conducted for this study adheres to "*Guidance on Using the AEDT to Conduct Environmental Modeling for FAA Actions Subject to NEPA*".[3] Where military aircraft (particularly fighter aircraft) are the dominant noise source at the airport, FAA allows combined use of NOISEMAP (for military aircraft) and AEDT (for civil aircraft) to compute the total cumulative aircraft noise exposure.

In consultation with the FAA, it was agreed[4] that for this project, modeling all the existing military activity in NOISEMAP would be appropriate.[5] The main considerations from an FAA perspective are to ensure that the modeling assumptions (weather/terrain etc.) are made as consistent as possible between the two models and that the final noise results are combined in AEDT with contours are generated using the AEDT algorithm. The models must be used to produce Day-Night Average Sound Level (DNL) contours of 65 dB, 70 dB, and 75 dB, and others as needed. FAA considers a DNL of 65 dB as the threshold below which all land uses are compatible.

[2] Released March 29, 2021 https://aedt.faa.gov/3d_information.aspx

[3] Published October 27, 2017

[4] Email from Dean McMath to Adam White (Garver) and Kelly Oliver-Amy (FAA) sent June 17, 2021

[5] For development of aircraft flight profiles in NOISEMAP, [FAA] approval is not required, however DOD noise modeling best practices should be followed.

# 3. Noise Modeling Methodology and Inputs

AEDT and NOISEMAP inputs are developed under the following categories:

* Physical description of the airport layout
* Aircraft flight operations
* Aircraft noise and performance characteristics
* Runway utilization
* Aircraft maintenance runup activity
* Flight track geometry and usage
* Meteorological conditions
* Terrain data

Sections 3.1 through 3.8 address the noise model inputs for each of these categories, respectively.

## 3.1 Physical Description of the Airport Layout

FSM is located within Sebastian County, approximately four nautical miles southeast of downtown Fort Smith, AR. As shown in **Figure 1**, the airport includes two 150-foot wide runways, one of which is oriented in an east-west direction (Runway 8/26, formerly known as Runway 7/25), and one "crosswind" runway (Runway 2/20, formerly known as Runway 1/19) that intersects the east-west runway in a north-northeast to south-southwest direction. Runway 8/26 is the primary runway and provides FSM with the greatest capacity to accommodate larger aircraft. Runway 2/20 is primarily used by small aircraft.

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. **Table 1** provides the detailed parameters for each runway end, including the extension to Runway 8/26 modeled for the Proposed Action.

**Table 1. Runway Details**

Sources: FAA Form 5010, accessed 6/7/2021, and Garver USA for runway extension specifications

| Runway End | Latitude (dd-mm-ss) | Longitude (dd-mm-ss) | Elevation (feet, MSL) | Displaced Landing Threshold (feet) | Glide Slope (degrees) | Threshold Crossing (feet, AGL) | Magnetic Orientation (degrees) | Length (feet) |
|---|---|---|---|---|---|---|---|---|
| Existing and No-Action Runways | | | | | | | | |
| 2 | 35-19-56.1389N | 094-22-09.5004W | 448.8 | 0 | 3.00 | 50 | 19.7 | 5,001 |
| 20 | 35-20-42.2556N | 094-21-47.6993W | 447.4 | 0 | 3.00 | 40 | 199.7 | |
| 8 | 35-20-00.9809N | 094-22-53.2328W | 469.0 | 0 | 3.00 | 51 | 79.7 | 8,017 |
| 26 | 35-20-13.1057N | 094-21-17.6119W | 443.5 | 0 | 2.96 | 58 | 259.7 | |
| Proposed Runway 8/26 | | | | | | | | |
| 8 | 35-20-00.9809N | 094-22-53.2328W | 469.0 | 0 | 3.00 | 51 | 79.7 | 9,317 |
| 26 | 35-20-15.0648N | 094-21-02.1096W | 447.8 | 0 | 3.00 | 50 | 259.7 | |

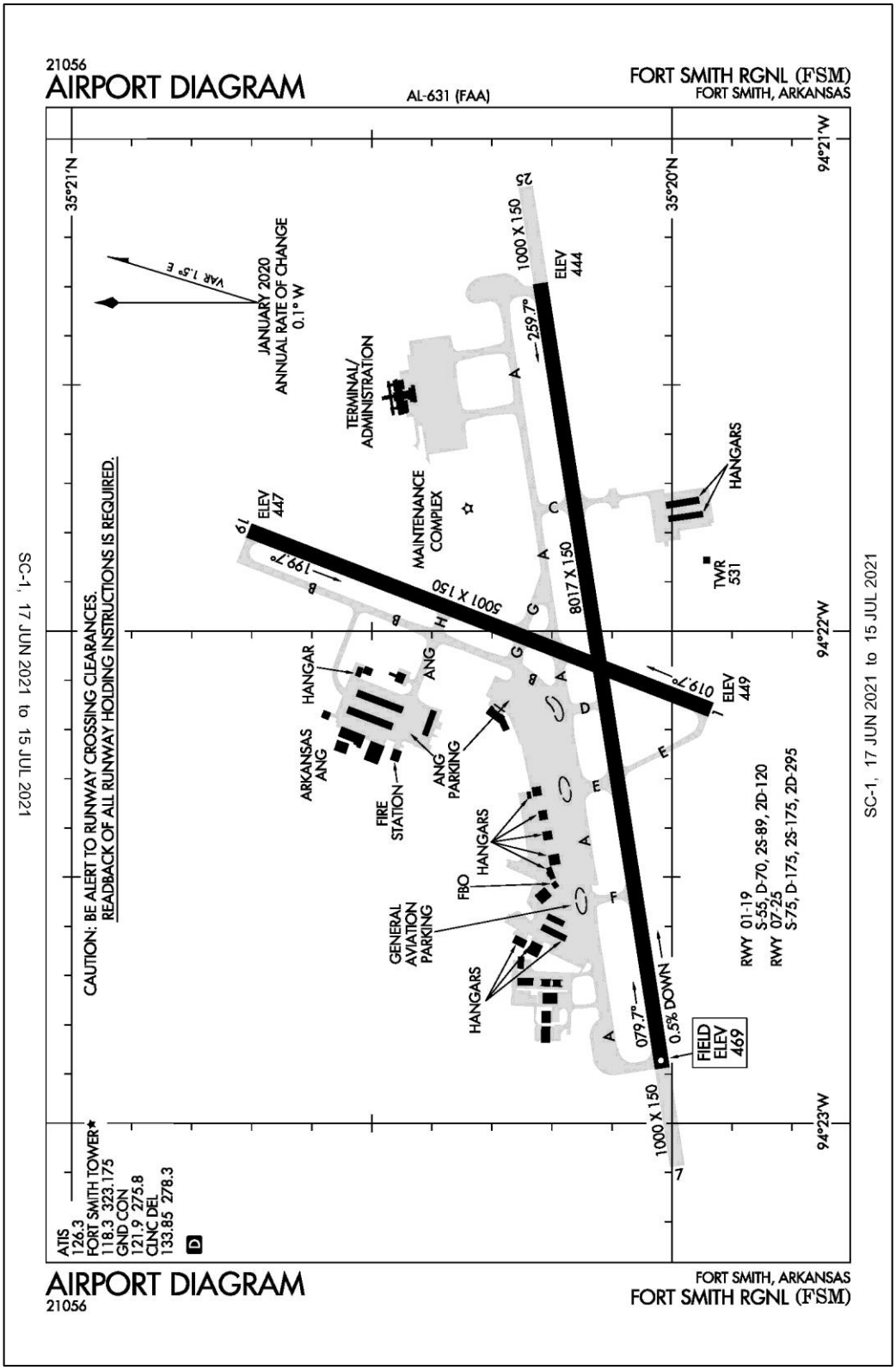



**Figure 1. Existing FSM Airport Layout**

Source: FAA https://aeronav.faa.gov/d-tpp/2106, accessed 7/14/2021

## 3.2 Aircraft Flight Operations

The Existing Conditions scenario in this EA represents calendar year 2019. The forecast No-Action and Proposed Action scenarios represent the design year, 2023, and five years beyond the design year, 2028. **Table 2** presents the annual flight operations modeled for all scenarios. Flight operations totals for all three model years (2019, 2023 and 2028) were interpolated from the FAA-approved 2018 data and 2038 Master Plan forecast prepared by Coffman Engineers, Inc. (Coffman) dated April 2020. It is assumed that the Proposed Action would not induce or cause additional flight operations.

**Table 2. Modeled Annual Aircraft Flight Operations**

Sources: Coffman Master Plan Forecast, 2020; Garver and HMMH, 2021

| Category | Existing Conditions (2019) | Design Year (2023) | 5-Year Forecast (2028) |
|---|---|---|---|
| Scheduled Airlines - Itinerant | 4,077 | 4,115 | 4,158 |
| Non-Scheduled Air Carrier/Air Taxi - Itinerant | 739 | 794 | 865 |
| General Aviation - Itinerant | 12,859 | 13,420 | 14,116 |
| General Aviation - Local | 8,870 | 8,982 | 9,122 |
| Military - Transient, Itinerant | 5,122 | 5,267 | 5,450 |
| Military - Transient, Local | 2,799 | 3,137 | 3,558 |
| **Total Annual Flight Operations** | **34,466** | **35,715** | **37,269** |
| **Average Annual Daily Flight Operations** | **94** | **98** | **102** |

For noise modeling purposes, itinerant operations listed in the Master Plan forecast were divided equally into arrivals and departures, while local operations were represented as closed patterns, or circuits.

The derivative forecast prepared by Coffman for the Master Plan included specific fleet mix assumptions for all categories of aircraft operating at FSM. **Table 3** presents that fleet mix breakdown, applied to the interpolated annual operations data shown in **Table 2**. For noise modeling purposes, each aircraft type is assigned to a surrogate aircraft type for which noise and performance data are contained in either the AEDT or the NOISEMAP databases. The third column of the table indicates general category groupings, used for applying day/night split, runway use, and flight track use percentages in the modeling.

**Table 3. Flight Operations by Aircraft Type and Scenario Year**

Sources: Coffman Master Plan Forecast,2020; Garver and HMMH, 2021

| Specific Aircraft Type | AEDT or NOISEMAP surrogate | Group[1] | Existing Conditions (2019) | Design Year (2023) | 5 Year Forecast (2028) |
|---|---|---|---|---|---|
| E140 | EMB145 | RJ | 272 | 215 | 143 |
| E145 | EMB145 | RJ | 773 | 611 | 407 |
| CRJ7 | CRJ9-ER | RJ | 943 | 1,147 | 1,402 |
| CRJ200 | CRJ9-ER | RJ | 1,062 | 839 | 559 |
| CRJ900 | CRJ9-ER | RJ | 959 | 1,003 | 1,058 |
| E175 | EMB175 | RJ | 68 | 300 | 589 |
| **Scheduled Airlines - Itinerant Subtotal** | | | **4,077** | **4,115** | **4,158** |
| B737 - Boeing 737-700 | 737700 | AC-NBjet | 68 | 73 | 80 |
| B738 - Boeing 737-800 | 737800 | AC-NBjet | 34 | 36 | 40 |
| B739 - Boeing 737-900 | 737800 | AC-NBjet | 12 | 13 | 15 |
| CRJ900 | CRJ9-ER | RJ | 181 | 232 | 297 |
| CRJ200 | CRJ9-ER | RJ | 133 | 105 | 70 |
| E55P - Embraer Phenom 300 | CNA55B | Bizjet | 65 | 70 | 76 |
| C56X - Cessna Excel/XLS | CNA560XL | Bizjet | 59 | 64 | 69 |
| E50P - Embraer Phenom 100 | CNA510 | Bizjet | 44 | 47 | 51 |
| LJ60 - Bombardier Learjet 60 | LEAR35 | Bizjet | 37 | 40 | 43 |
| CL30 - Bombardier Challenger 300 | CL600 | Bizjet | 14 | 15 | 17 |
| B350 - Beech Super King Air 350 | DHC6 | 2ETP | 92 | 99 | 107 |
| **Non-Scheduled Air Carrier/Air Taxi - Itinerant Subtotal** | | | **739** | **794** | **865** |
| C56X - Cessna Excel/XLS | CNA560XL | Bizjet | 1,756 | 1,832 | 1,927 |
| WW24 - IAI 1124 Westwind | HS748A | Bizjet | 750 | 783 | 823 |
| ASTR - IAI Astra 1125 | IA1125 | Bizjet | 691 | 721 | 759 |
| C550 - Cessna Citation II/Bravo | CNA55B | Bizjet | 460 | 480 | 505 |
| LJ40 - Learjet 40; Gates Learjet | LEAR35 | Bizjet | 444 | 463 | 487 |
| GLF4 - Gulfstream IV/G400 | GIV | Bizjet | 27 | 29 | 30 |
| BE9L - Beech King Air 90 | DHC6 | 2ETP | 1,398 | 1,459 | 1,534 |
| BE20 - Beech 200 Super King | DHC6 | 2ETP | 672 | 701 | 738 |
| B350 - Beech Super King Air 350 | DHC6 | 2ETP | 589 | 615 | 647 |
| C414 - Cessna Chancellor 414 | BEC58P | 2ETP | 589 | 615 | 647 |
| AC90 - Gulfstream Commander | DHC6 | 2ETP | 487 | 508 | 535 |
| BE58 - Beech 58 | BEC58P | 2EPP | 558 | 582 | 612 |
| TBM8 - Socata TBM-850 | CNA441 | 1ETP | 417 | 435 | 457 |
| COL4 - Lancair LC-41 Columbia 400 | GASEPV | 1ETP | 408 | 426 | 448 |
| BE36 - Beech Bonanza 36 | GASEPV | 1EPP | 833 | 869 | 914 |
| C182 - Cessna Skylane 182 | CNA182 | 1EPP | 774 | 808 | 850 |
| SR22 - Cirrus SR 22 | COMSEP | 1EPP | 589 | 615 | 647 |
| P28A - Piper Cherokee | GASEPF | 1EPP | 546 | 570 | 599 |
| C172 - Cessna Skyhawk 172/Cutlass | CNA172 | 1EPP | 467 | 487 | 513 |
| M20P - Mooney M-20C Ranger | GASEPV | 1EPP | 404 | 422 | 444 |
| **GA - Itinerant Subtotal** | | | **12,859** | **13,420** | **14,116** |

| Specific Aircraft Type | AEDT or NOISEMAP surrogate | Group[1] | Existing Conditions (2019) | Design Year (2023) | 5 Year Forecast (2028) |
|---|---|---|---|---|---|
| C182 - Cessna Skylane 182 | CNA182 | 1ETP | 2,217 | 2,245 | 2,280 |
| SR22 - Cirrus SR 22 | COMSEP | 1EPP | 2,217 | 2,245 | 2,280 |
| P28A - Piper Cherokee | GASEPF | 1EPP | 2,218 | 2,246 | 2,281 |
| M20P - Mooney M-20C Ranger | GASEPV | 1EPP | 2,218 | 2,246 | 2,281 |
| **GA – Local subtotal** | | | **8,870** | **8,982** | **9,122** |
| F18S - F18 Hornet | FA-18E/F | 2EJ, fighter | 238 | 244 | 253 |
| F15 - Boeing F-15 Eagle | FA-18E/F | 2EJ, fighter | 19 | 20 | 21 |
| T38 - Northrop T-38 Talon | T-38C | 2EJ, trainer | 447 | 460 | 475 |
| HAWK - BAe Systems Hawk | F-16 | 1EJ, trainer | 236 | 242 | 251 |
| F16 - Lockheed F-16 Fighting Falcon | F-16 | 1EJ, fighter | 43 | 45 | 47 |
| A10 - Fairchild A10 | F-16 | 2EJ, attack | 51 | 53 | 55 |
| E6 - Boeing E-6 Mercury | KC-135R | 4ENB | 24 | 25 | 26 |
| B734 - Boeing 737-400 | 737700 | 2ENB | 141 | 145 | 150 |
| P8 - Boeing P-8 Poseidon | 737700 | 2ENB | 29 | 30 | 31 |
| BE40 - Raytheon Beechjet 400/T-1 | T-1A | Bizjet like | 921 | 947 | 979 |
| C560 - Cessna Citation V/Ultra | T-1A | Bizjet like | 39 | 40 | 42 |
| C30J - C-130J Hercules ; Lockheed | C130J | 4ETP | 2,160 | 2,219 | 2,293 |
| TEX2 - Raytheon Texan 2 | T-6 | 1ETP | 498 | 512 | 530 |
| A29 - Embraer 314 Super Tucano | T-6 | 1ETP | 31 | 32 | 34 |
| D328 - Dornier 328 Series | C-12 | 2ETP | 24 | 25 | 26 |
| BE20 - Beech 200 Super King | C-12 | 2ETP | 76 | 78 | 80 |
| B350 - Beech Super King Air 350 | C-12 | 2ETP | 63 | 65 | 68 |
| H60 - Sikorsky SH-60 Seahawk | C-12 | Helo[6] | 43 | 45 | 47 |
| H47 - Boeing CH-47 Chinook | C-12 | Helo | 39 | 40 | 42 |
| **Military Transient, Itinerant Subtotal** | | | **5,122** | **5,267** | **5,450** |
| C30J - C-130J Hercules; Lockheed | C130J | 4ETP | 1,400 | 1,569 | 1,779 |
| T38 - Northrop T-38 Talon | T-38C | 2EJ, trainer | 1,399 | 1,568 | 1,779 |
| **Military Transient, Local Subtotal** | | | **2,799** | **3,137** | **3,558** |
| **Total Annual Flight Operations** | | | **34,466** | **35,715** | **37,269** |

[1] group code definitions:
RJ – regional jet
AC-NBjet – air carrier narrow body jet
Bizjet – business jet
4ETP/2ETP/1ETP – 4-engine/twin/single turboprop
2EPP/1EPP – twin/single piston-engine prop
4ENB/2ENB – 4-engine/2-engine narrow body jet
Helo – helicopter

[6] Helicopters are not included explicitly in the noise modeling; the small number of military helicopter operations listed in the Master Plan are included with the C-12 category. No civilian helicopter operations were listed in the Master Plan, although they do occur at FSM. Helicopter operations would not be affected by the Proposed Action, therefore their noise contribution would not change.

HMMH analyzed 2019 FAA CountOps data[7] to determine percentages of operations in the daytime 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). **Table 4** presents the resulting splits to be modeled for all scenarios. Where day/night percentages were similar, aircraft types were grouped together in the table.

**Table 4. Day/Night Split of Operations Applied to all Noise Modeling Scenarios**

Sources: 2019 FAA CountOps data and HMMH, 2021

| Aircraft group | | Arrivals | | Departures | | Circuits | |
|---|---|---|---|---|---|---|---|
| | | Day | Night | Day | Night | Day | Night |
| Civilian | Jet | 98% | 2% | 92% | 8% | n/a | n/a |
| | Turboprop & Twin | 96% | 4% | 95% | 5% | n/a | n/a |
| | Single Engine Piston | 98% | 2% | 97% | 3% | 100% | |
| Military | Other (military aircraft in Table 3 not specified below) | 100% | | 100% | | n/a | n/a |
| | T-38 | 100% | | 100% | | 100% | |
| | T-1 | 99% | 1% | 99% | 1% | n/a | n/a |
| | C-130 | 92% | 8% | 83% | 17% | 100% | |
| | Single Engine Turboprop | 97% | 3% | 95% | 5% | n/a | n/a |

## 3.3 Aircraft Noise and Performance Characteristics

AEDT and NOISEMAP require detailed noise and performance data for each specific aircraft type included in the modeling. Aircraft-specific noise data for flight operations are specified in the form of Sound Exposure Levels (SEL) as a function of distance and power setting. Performance data include thrust (or power setting) profiles, speed profiles, and altitude profiles for departure (including takeoff roll) and arrival (including landing and braking) operations.

The AEDT database contains standard profiles for thousands of airframe/engine combinations. AEDT automatically accesses the noise and performance data for takeoff and landing operations by the specified 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. Stage length 1 is defined as having trip length of up to 500 nautical miles (nmi); stage length 2 has trip length between 500 and 1000 nmi; and so on. For the civilian aircraft types in the FSM fleet mix identified in **Table 2**, only the largest jets (noted as groups RJ and AC-NBjet) have multiple stage length profiles available in the AEDT database; the smaller aircraft have only a stage length 1 standard departure profile.

HMMH analyzed FSM radar flight data from the FAA's National Offload Program (NOP) for the full 2019 calendar year. The destination airport is indicated in each flight record for scheduled or air taxi departure operations. Of the approximately 2,000 departure operations by the largest civilian jets in the FSM fleet, 67 percent were headed to Dallas/Fort Worth (DFW), which is 198 nmi from FSM. Another 32 percent were headed to Hartsfield-Jackson Atlanta (ATL), which is 502 nmi away,

[7] CountOps is an FAA automated system that utilizes data from National Offload Program (NOP), STARS, and Common ARTS to provide hourly counts of air traffic activity at TRACONs, towers, and airports. The CountOps data for 2019, accessed on June 25, 2021 from https://aspm.faa.gov/ include nearly 24,000 operations.

and the remaining 1 percent were going elsewhere. Therefore, HMMH designated 67 percent of the regional jet or air carrier jet operations as stage length 1 and 33 percent as stage length 2 in the noise model inputs for all the scenarios included in this EA.

NOISEMAP contains standard arrival and departure profiles for most transient military aircraft types. For any aircraft types without standard profiles and for closed patterns (circuits), NOISEMAP requires the user to enter the altitude, speed and power setting profile(s) for each aircraft type and operation. As listed in **Table 5**, flight profiles for this study primarily came from previous NOISEMAP modeling of FSM in 2006 by the DOD. Profile utilization percentages are described in Section 3.6, where applicable.

**Table 5. NOISEMAP Flight Profile Sources**

Source: HMMH analysis

| Modeled Military Aircraft Type in NOISEMAP | Source for Flight Profiles |
|---|---|
| F-18EF | Noise Study for Introduction of F/A-18E/F to the East Coast, Wyle Laboratories, Inc., Wyle Report WR 02-08, July 2002 (Appendix C) |
| T-38C | Previous (2006) DOD modeling for FSM[1] |
| F-16C (PW-229 engine); straight-in arrivals | Burlington International Airport (VT) 14 CFR Part 150 Update |
| F-16C (PW-229 engine); departures and overhead breaks | Previous (2006) DOD modeling for FSM[2] |
| KC135R | NOISEMAP standard (default) transient profiles |
| 737700 (P-8) | DOD modeling in development of Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, WA", US Department of the Navy, September 2018. |
| T-1A | Previous (2006) DOD modeling for FSM |
| C130J | Previous (2013) modeling for Dyess AFB (TX) for EIAP screening analysis supporting CATEX A2.3.11 for increase of C-130J flying hours |
| T-6 | Previous (2007) DOD AICUZ modeling for Randolph AFB (TX) |
| C-12 | NOISEMAP standard (default) transient profiles |

[1] The 2006 work modeled the T-38A with J85-GE-5A engines. This EA models the T-38C with the J-85R-GE-5 engines, without modifications to altitudes, power settings or speeds.

[2] The 2006 work modeled the F-16C with the GE-100 engine. For this EA, the profiles were changed to the PW-229 engine without modifications to altitudes, power settings or speeds.

## 3.4 Runway Utilization

Weather, particularly wind direction and wind speed, is the primary factor affecting runway use at airports. Two additional factors that may affect runway use are the position of a facility (such as a passenger terminal) relative to the runways and temporary runway closures, generally for airfield maintenance and construction.

HMMH calculated runway usage rates by aircraft category, using the 2019 CountOps data as a basis and checking the civilian aircraft categories against the proportions seen in the radar data.

Combining the categories sharing common runway use characteristics, the resulting percentages to be modeled for arrivals and departures are shown in **Table 6** and **Table 7**.

Runway use for modeled circuit operations is shown in **Table 8**. Civilian aircraft circuit operations were identifiable in the radar data, so the percentages were derived from annual counts for each runway. The existing military circuit runway usage shown is an approximate average of the arrival and departure runway use percentages for any given runway.

There is no anticipation of any significant difference in runway use for the foreseeable future, with or without the proposed runway extension. Therefore, the same runway usage was modeled for all scenarios.

**Table 6. Arrival Runway Usage**

Sources: 2019 FAA CountOps data and HMMH, 2021

| Aircraft group | Daytime Arrival Percentages by Runway | | | | | Nighttime Arrival Percentages by Runway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 26 | 2 | 20 | Total | 8 | 26 | 2 | 20 | Total |
| **Civilian** | | | | | | | | | | |
| AC-NBjet | 56.0% | 44.0% | - | - | **100.0%** | 44.8% | 55.2% | - | - | **100.0%** |
| Bizjet & RJ | 55.8% | 43.7% | 0.2% | 0.3% | **100.0%** | 44.8% | 55.2% | - | - | **100.0%** |
| Turboprop & Twin | 56.4% | 39.1% | 1.7% | 2.8% | **100.0%** | 69.1% | 29.1% | - | 1.8% | **100.0%** |
| Single Engine Piston | 50.0% | 40.5% | 2.7% | 6.8% | **100.0%** | 68.6% | 25.5% | - | 5.9% | **100.0%** |
| **Military** | | | | | | | | | | |
| Fighter/ Trainer Jet | 52.9% | 47.1% | - | - | **100.0%** | - | - | - | - | **0.0%** |
| Large Jet | 67.6% | 32.4% | - | - | **100.0%** | - | - | - | - | **0.0%** |
| T-1 | 55.5% | 43.3% | 1.2% | - | **100.0%** | 60.0% | 40.0% | - | - | **100.0%** |
| C-130 | 41.3% | 58.5% | 0.2% | - | **100.0%** | 38.9% | 61.1% | - | - | **100.0%** |
| Twin Engine Turboprop | 56.6% | 42.1% | 1.3% | - | **100.0%** | - | - | - | - | **0.0%** |
| Single Engine Turboprop | 47.8% | 49.0% | 1.6% | 1.6% | **100.0%** | 100.0% | - | - | - | **100.0%** |

**Table 7. Departure Runway Usage**

Sources: 2019 FAA CountOps data and HMMH, 2021

| Aircraft group | Daytime Departure Percentages by Runway | | | | | Nighttime Departure Percentages by Runway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 26 | 2 | 20 | Total | 8 | 26 | 2 | 20 | Total |
| **Civilian** | | | | | | | | | | |
| AC-NBjet | 48.8% | 51.2% | - | - | **100.0%** | 57.9% | 42.1% | - | - | **100.0%** |
| Bizjet & RJ | 49.7% | 50.0% | - | 0.3% | **100.0%** | 58.8% | 41.2% | - | - | **100.0%** |
| Turboprop & Twin | 55.8% | 40.3% | 1.4% | 2.5% | **100.0%** | 71.8% | 28.2% | - | - | **100.0%** |
| Single Engine Piston | 47.0% | 46.7% | 1.9% | 4.4% | **100.0%** | 67.1% | 32.9% | - | - | **100.0%** |
| **Military** | | | | | | | | | | |
| Fighter/ Trainer Jet | 37.6% | 62.4% | - | - | **100.0%** | - | - | - | - | **0.0%** |
| Large Jet | 46.3% | 53.7% | - | - | **100.0%** | - | - | - | - | **0.0%** |
| T-1 | 53.2 | 46.4% | 0.4% | - | **100.0%** | 75.0% | 25.0% | - | - | **100.0%** |
| C-130 | 34.1% | 65.5% | 0.4% | - | **100.0%** | 34.7% | 64.2% | 1.1% | - | **100.0%** |
| Twin Engine Turboprop | 34.9% | 65.1% | - | - | **100.0%** | - | - | - | - | **0.0%** |
| Single Engine Turboprop | 43.4% | 51.2% | 1.8% | 3.6% | **100.0%** | 87.5% | 12.5% | - | - | **100.0%** |

**Table 8. Circuit Flight Runway Usage**

Sources: 2019 FAA CountOps data, 2019 radar data, and HMMH, 2021

| Aircraft group | Daytime Circuit Flight Percentages by Runway | | | | |
|---|---|---|---|---|---|
| | 8 | 26 | 2 | 20 | Total |
| **Civilian** | | | | | |
| Single Engine Piston | 48% | 44% | 2% | 6% | **100%** |
| **Military** | | | | | |
| C-130 | 38% | 62% | - | - | **100%** |
| T-38 | 45% | 55% | - | - | **100%** |

## 3.5 Aircraft Maintenance Runup Activity

Because any maintenance runups would not be affected by the proposed action, maintenance runup noise is not included in this EA.

## 3.6 Flight Track Geometry and Use

The 2019 NOP radar flight track data[8] allowed identification of where the civilian aircraft fly and how often they use different flight corridors in the vicinity of the airport. HMMH defined sets of prototypical flight tracks for noise modeling, and aircraft are assigned to specific model track sets based on analysis of the radar data. The development of model flight tracks entailed separating radar flight tracks for a given aircraft category by operation type, (e.g., arrival or departure) and runway end. HMMH analyzed flight tracks with the same operation type and runway end by aircraft

[8] The data consist of 18,699 individual flight records, only civilian aircraft

category, grouping flights with similar geometry to make radar flight track bundles (corridors) that inform the model track sets. Each general flight corridor is represented by a "backbone" track which follows the corridor's statistical center. An additional track on either side of the backbone accounts for the dispersion within each corridor, and traffic is distributed normally[9] onto each track set to reflect the spreading of aircraft along the corridor. Tracks representing corridors with very low traffic volume do not have the additional dispersion tracks.

As there is no reason to anticipate any significant difference in flight track geometry or usage under the No-Action Alternative, the same flight track inputs were modeled for both future No-Action scenarios. For the Proposed Action Alternative, due to the runway end being 1,300 feet further east, the following modifications were made to the flight tracks: 1) Departure tracks heading west would turn over ground landmarks that are 1,300 ft closer to the airport than where the turns take place for the Existing Conditions/No-Action Alternative. 2) Final turns on arrival tracks coming in from the east would occur 1,300 ft further from the airport than where the turns take place for the Existing Conditions/No-Action Alternative as we expect the final approach fix to be shifted the same distance to the east.

**Figures 2 through 11** present the modeled flight track geometry for civilian aircraft arrivals, departures, and circuits. The track naming convention correlates with operation type, runway, and aircraft category. For example, flight track D07J1 identifies that the track is a departure (D, as opposed to A if it were an arrival, or C if it were a circuit) from Runway 8 (previously named Runway 7) flown by jet aircraft (J for jet, as opposed to T for turboprop/twin-engine or P, representing single-engine piston aircraft). The number at the end of the track name differentiates it from others in its group. A table on the side of each figure presents the modeled flight track usage rates by aircraft type category. The usage rates were developed using the 2019 full year sample of radar data that formed the basis of the flight track geometry.

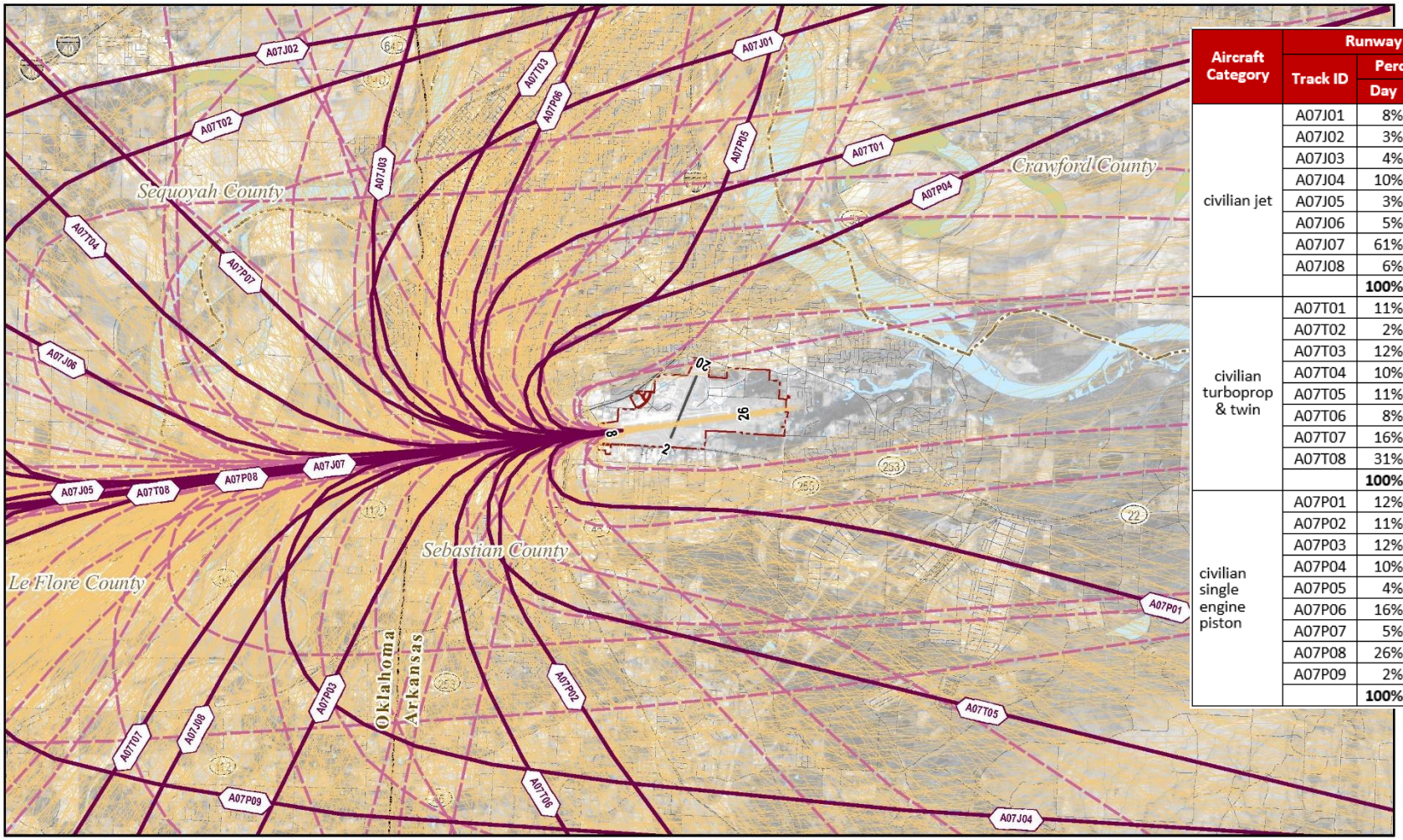
**Figures 12 through 16** present the modeled flight tracks for the existing military operations and the track utilization percentages. Military aircraft flight operations were not included in the radar flight track data provided by the FAA. Modeled flight tracks for the F-16, T-1 and T-38 aircraft mostly came from the 2006 DOD modeling for FSM[10]. For the F-16, ANG personnel indicated that 90 percent of arrival operations perform overhead break approaches (shown on **Figure 13**) and 10 percent perform "straight-in" approaches. For the T-1 and T-38, all arrival operations were modeled performing overhead break approaches, consistent with the 2006 DOD modeling for FSM.[11] Departure operations from Runways 8/26 were distributed over three or four flight tracks, consistent with the 2006 DOD modeling for FSM. All other military aircraft were assumed to only utilize straight-in/straight-out arrival and departure tracks, respectively (one track per type of operation per runway).

All F/A-18 departure profiles were assumed to be "military power" only (no afterburner departures). Conversely, all T-38 departures were assumed to be afterburner departures, consistent with the previous DOD modeling for FSM. For F-16 departures, ANG personnel estimated 95 percent are (and would be) afterburner departures, leaving 5 percent as "military power" departures.

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

[10] The 2006 FSM modeling did not include straight-in arrivals for the F-16 operations.

[11] The exception to this is the small number of T-1 arrivals modeled to Runway 2, which are modeled straight in.



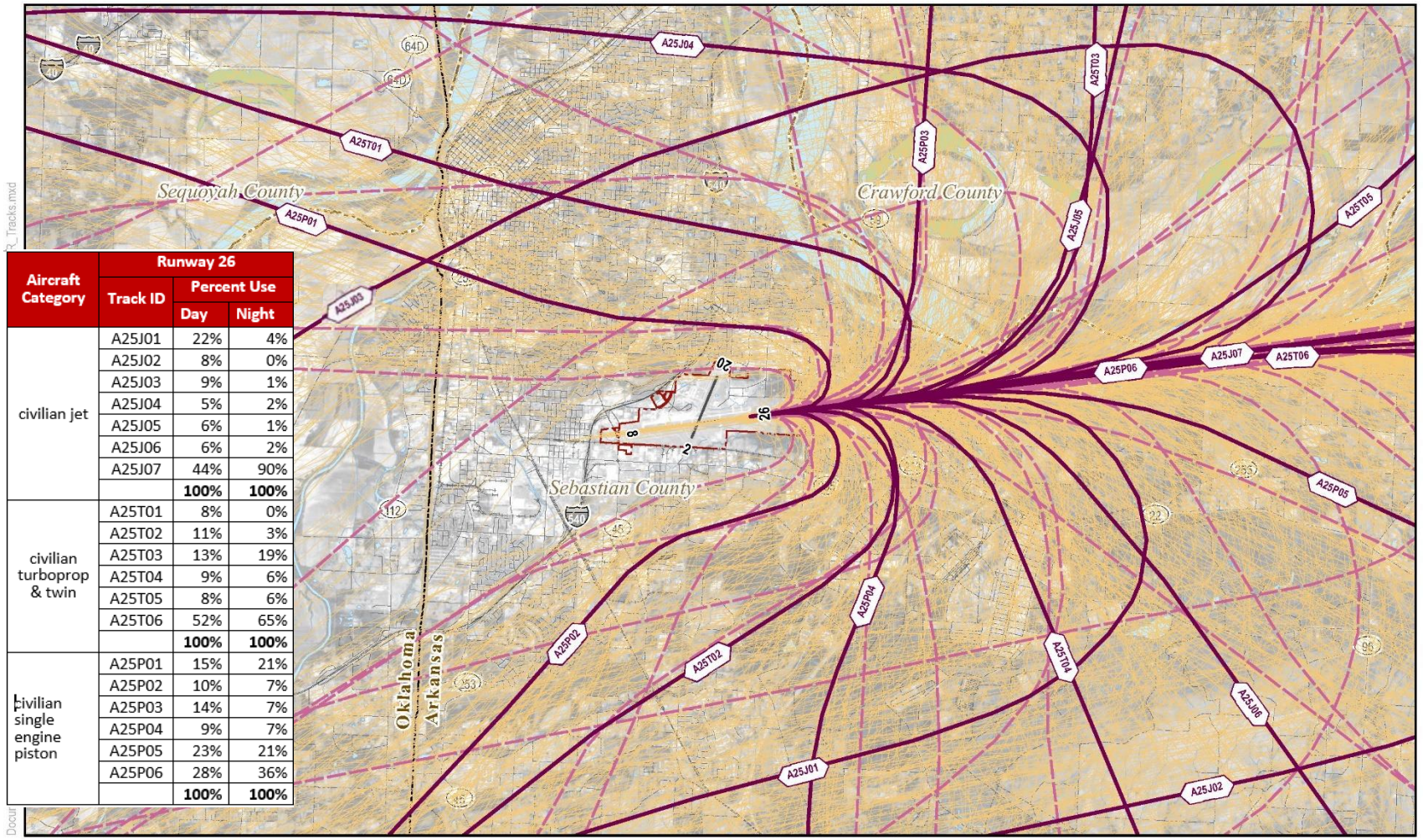

| Aircraft Category | Runway 8 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | A07J01 | 8% | 9% |
| | A07J02 | 3% | 3% |
| | A07J03 | 4% | 0% |
| | A07J04 | 10% | 27% |
| | A07J05 | 3% | 9% |
| | A07J06 | 5% | 3% |
| | A07J07 | 61% | 47% |
| | A07J08 | 6% | 2% |
| | | **100%** | **100%** |
| civilian turboprop & twin | A07T01 | 11% | 3% |
| | A07T02 | 2% | 0% |
| | A07T03 | 12% | 26% |
| | A07T04 | 10% | 11% |
| | A07T05 | 11% | 6% |
| | A07T06 | 8% | 3% |
| | A07T07 | 16% | 9% |
| | A07T08 | 31% | 43% |
| | | **100%** | **100%** |
| civilian single engine piston | A07P01 | 12% | 6% |
| | A07P02 | 11% | 3% |
| | A07P03 | 12% | 0% |
| | A07P04 | 10% | 3% |
| | A07P05 | 4% | 3% |
| | A07P06 | 16% | 41% |
| | A07P07 | 5% | 16% |
| | A07P08 | 26% | 28% |
| | A07P09 | 2% | 0% |
| | | **100%** | **100%** |

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Arrival Track
Modeled Dispersed Arrival Track
Radar Arrival Track

0 2 4 Miles

Figure: 2

**Runway 8 Arrival Flight Tracks**




| Aircraft Category | Runway 26 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | A25J01 | 22% | 4% |
| | A25J02 | 8% | 0% |
| | A25J03 | 9% | 1% |
| | A25J04 | 5% | 2% |
| | A25J05 | 6% | 1% |
| | A25J06 | 6% | 2% |
| | A25J07 | 44% | 90% |
| | | **100%** | **100%** |
| civilian turboprop & twin | A25T01 | 8% | 0% |
| | A25T02 | 11% | 3% |
| | A25T03 | 13% | 19% |
| | A25T04 | 9% | 6% |
| | A25T05 | 8% | 6% |
| | A25T06 | 52% | 65% |
| | | **100%** | **100%** |
| civilian single engine piston | A25P01 | 15% | 21% |
| | A25P02 | 10% | 7% |
| | A25P03 | 14% | 7% |
| | A25P04 | 9% | 7% |
| | A25P05 | 23% | 21% |
| | A25P06 | 28% | 36% |
| | | **100%** | **100%** |

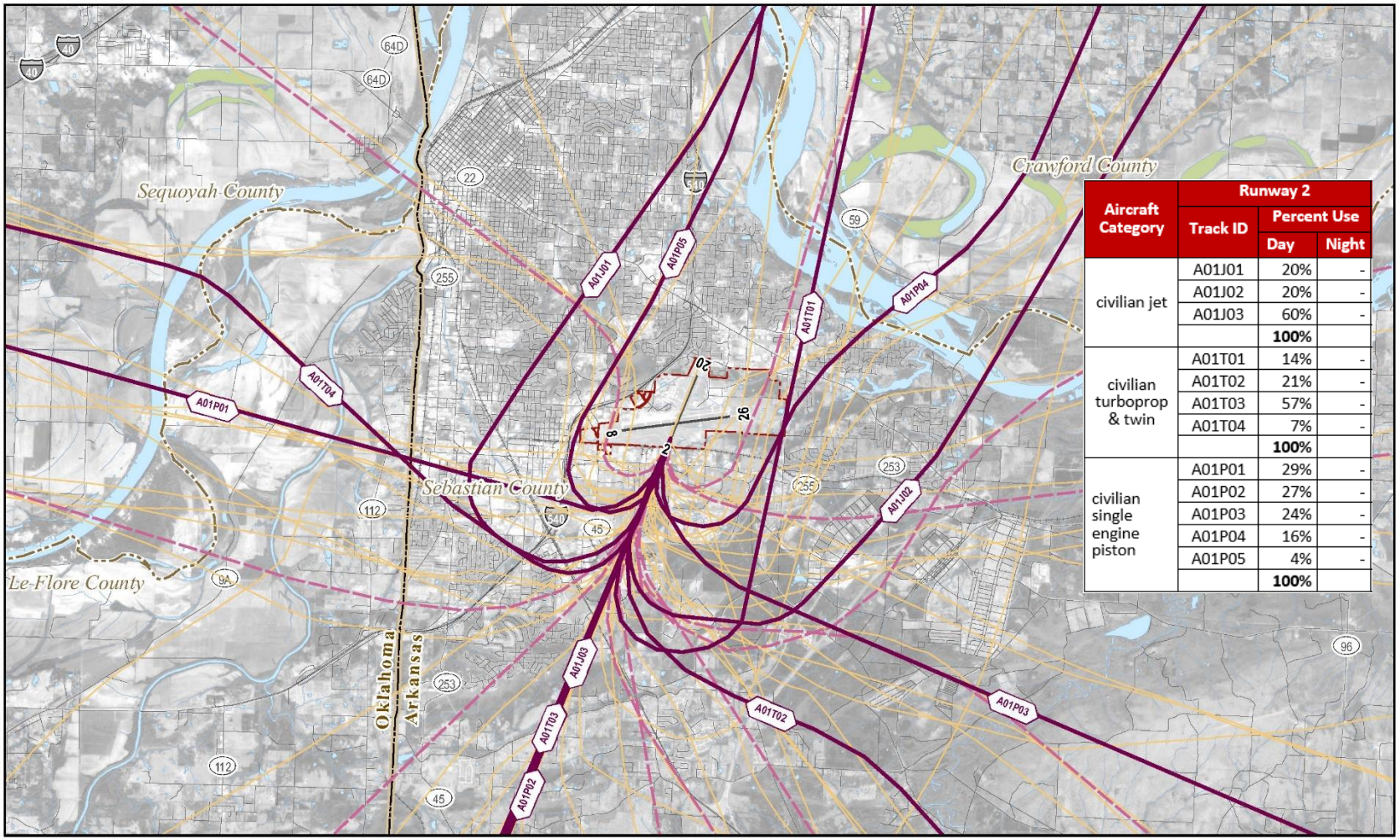
Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Arrival Track
Modeled Dispersed Arrival Track
Radar Arrival Track

0 2 4 Miles

FORT SMITH REGIONAL AIRPORT

Figure: 3

**Runway 26 Arrival Flight Tracks**



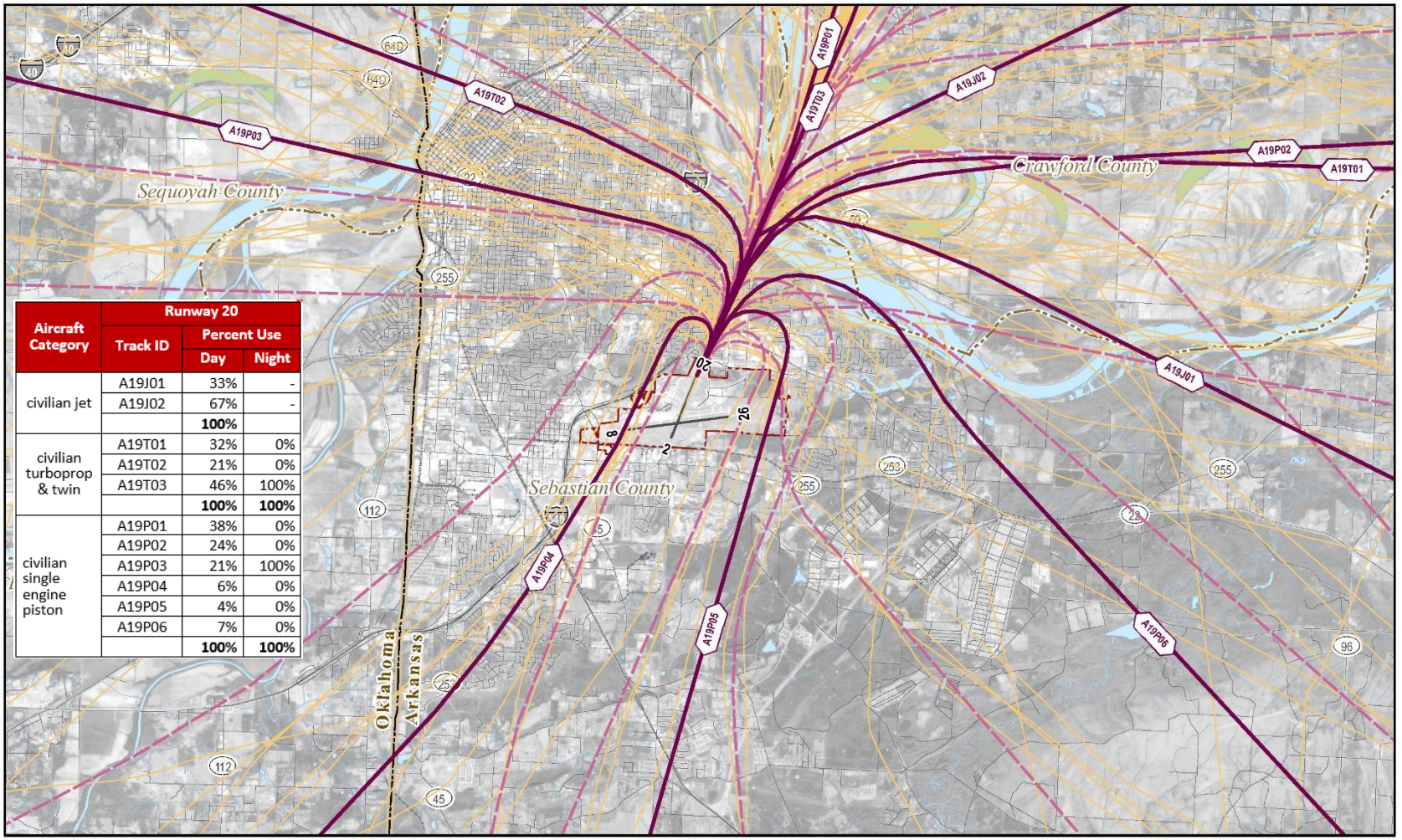

| Aircraft Category | Runway 2 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | A01J01 | 20% | - |
| | A01J02 | 20% | - |
| | A01J03 | 60% | - |
| | | **100%** | |
| civilian turboprop & twin | A01T01 | 14% | - |
| | A01T02 | 21% | - |
| | A01T03 | 57% | - |
| | A01T04 | 7% | - |
| | | **100%** | |
| civilian single engine piston | A01P01 | 29% | - |
| | A01P02 | 27% | - |
| | A01P03 | 24% | - |
| | A01P04 | 16% | - |
| | A01P05 | 4% | - |
| | | **100%** | |

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Arrival Track
Modeled Dispersed Arrival Track
Radar Arrival Track

0 2 4 Miles

Figure: 4

**Runway 2 Arrival Flight Tracks**




| Aircraft Category | Runway 20 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | A19J01 | 33% | - |
| | A19J02 | 67% | - |
| | | **100%** | |
| civilian turboprop & twin | A19T01 | 32% | 0% |
| | A19T02 | 21% | 0% |
| | A19T03 | 46% | 100% |
| | | **100%** | **100%** |
| civilian single engine piston | A19P01 | 38% | 0% |
| | A19P02 | 24% | 0% |
| | A19P03 | 21% | 100% |
| | A19P04 | 6% | 0% |
| | A19P05 | 4% | 0% |
| | A19P06 | 7% | 0% |
| | | **100%** | **100%** |

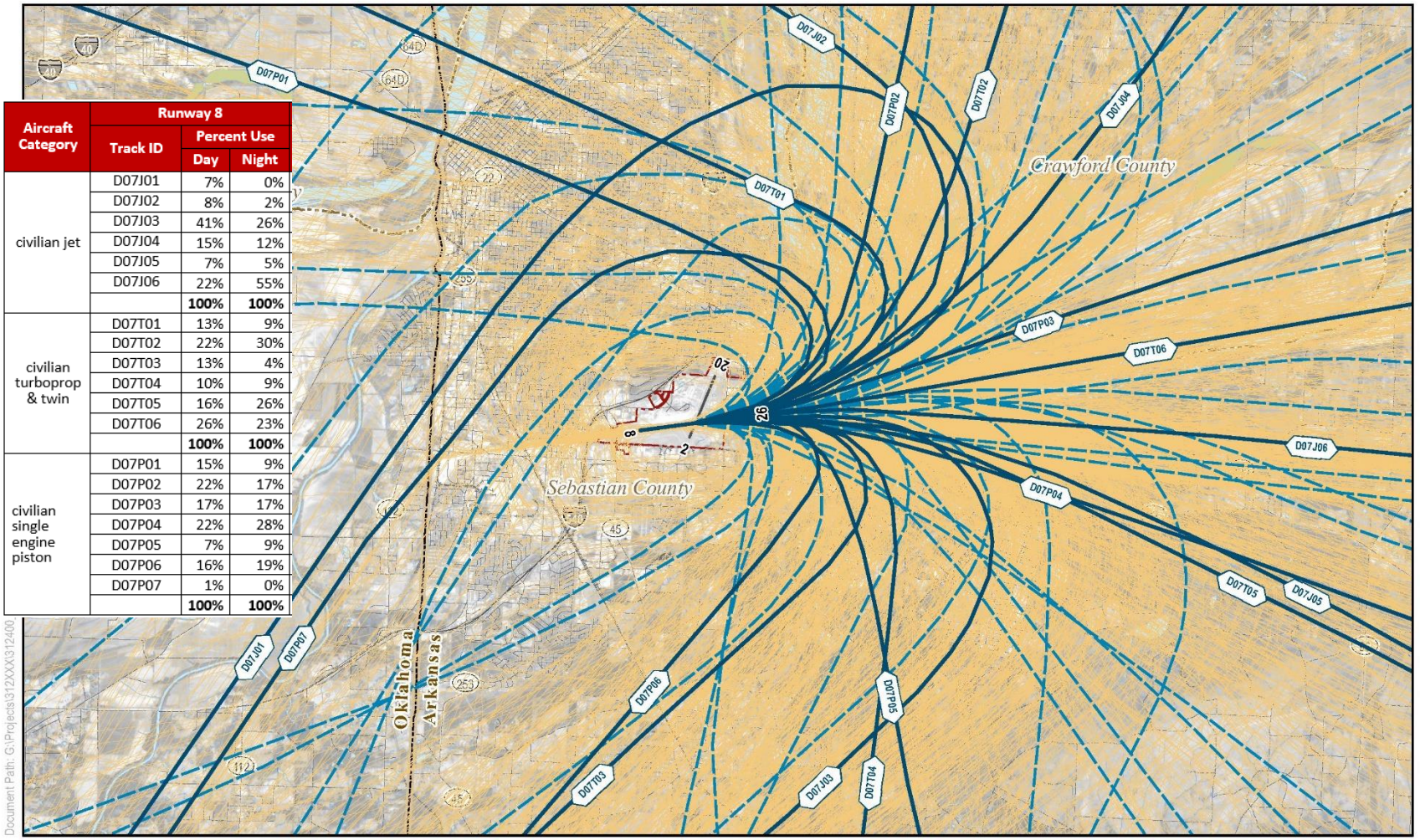
Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Arrival Track
Modeled Dispersed Arrival Track
Radar Arrival Track

0 2 4 Miles

Figure: 5

**Runway 20 Arrival Flight Tracks**

| Aircraft Category | Runway 8 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | D07J01 | 7% | 0% |
| | D07J02 | 8% | 2% |
| | D07J03 | 41% | 26% |
| | D07J04 | 15% | 12% |
| | D07J05 | 7% | 5% |
| | D07J06 | 22% | 55% |
| | | 100% | 100% |
| civilian turboprop & twin | D07T01 | 13% | 9% |
| | D07T02 | 22% | 30% |
| | D07T03 | 13% | 4% |
| | D07T04 | 10% | 9% |
| | D07T05 | 16% | 26% |
| | D07T06 | 26% | 23% |
| | | 100% | 100% |
| civilian single engine piston | D07P01 | 15% | 9% |
| | D07P02 | 22% | 17% |
| | D07P03 | 17% | 17% |
| | D07P04 | 22% | 28% |
| | D07P05 | 7% | 9% |
| | D07P06 | 16% | 19% |
| | D07P07 | 1% | 0% |
| | | 100% | 100% |

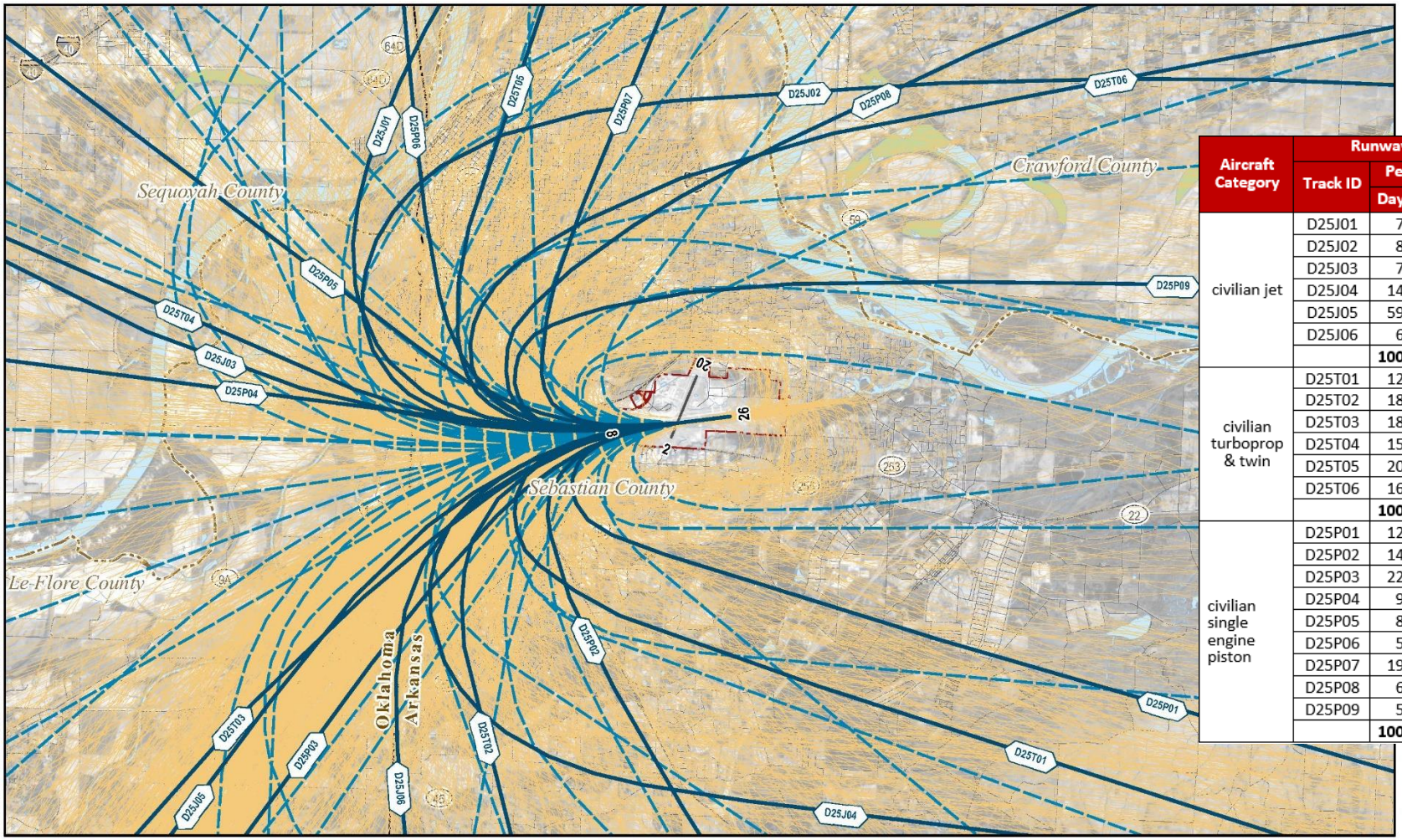



Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Departure Track
Modeled Dispersed Departure Track
Radar Departure Track

0 2 4 Miles

Figure: 6

**Runway 8 Departure Flight Tracks**



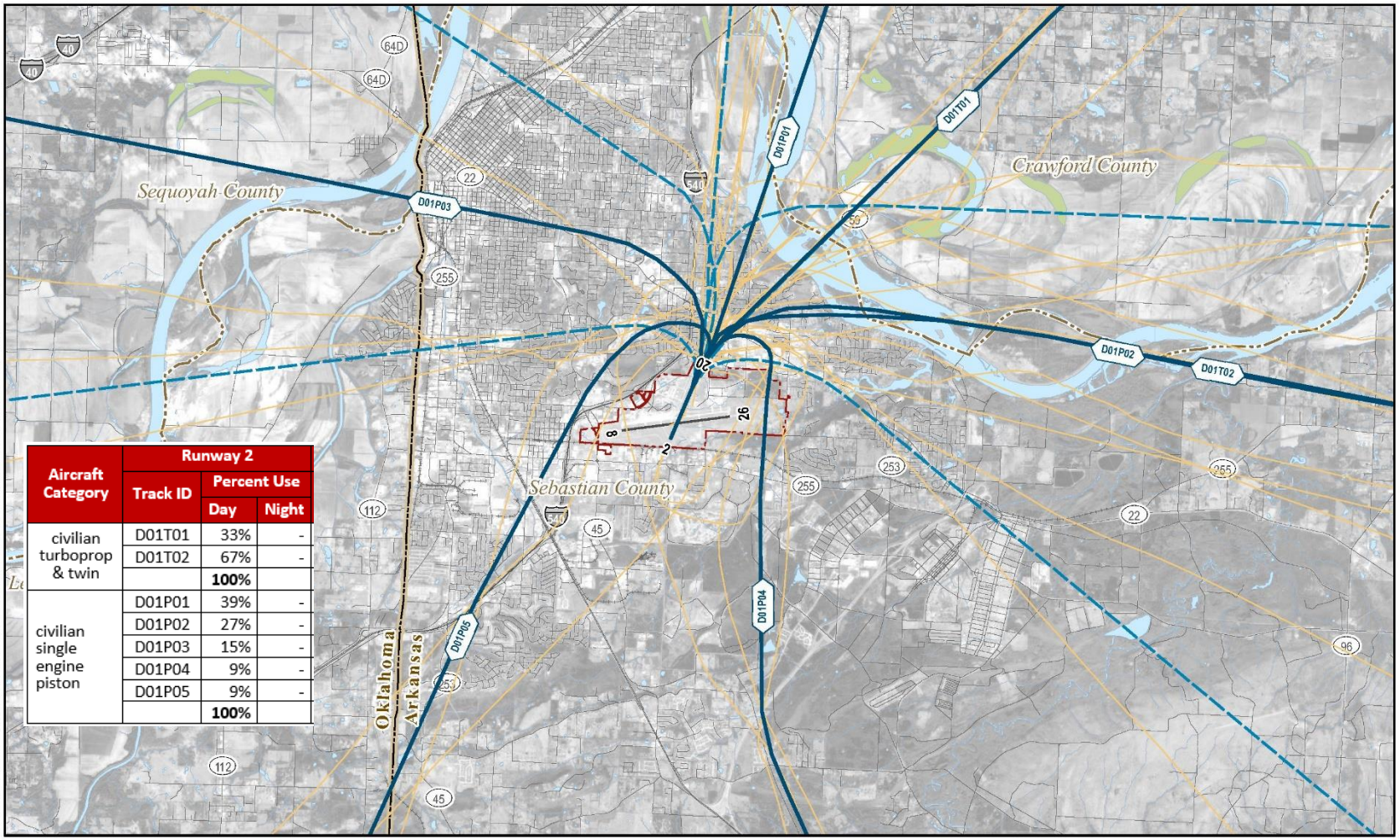

| Aircraft Category | Runway 26 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | D25J01 | 7% | 2% |
| | D25J02 | 8% | 7% |
| | D25J03 | 7% | 1% |
| | D25J04 | 14% | 37% |
| | D25J05 | 59% | 49% |
| | D25J06 | 6% | 4% |
| | | **100%** | **100%** |
| civilian turboprop & twin | D25T01 | 12% | 16% |
| | D25T02 | 18% | 16% |
| | D25T03 | 18% | 16% |
| | D25T04 | 15% | 26% |
| | D25T05 | 20% | 21% |
| | D25T06 | 16% | 5% |
| | | **100%** | **100%** |
| civilian single engine piston | D25P01 | 12% | 19% |
| | D25P02 | 14% | 8% |
| | D25P03 | 22% | 19% |
| | D25P04 | 9% | 12% |
| | D25P05 | 8% | 8% |
| | D25P06 | 5% | 4% |
| | D25P07 | 19% | 19% |
| | D25P08 | 6% | 4% |
| | D25P09 | 5% | 8% |
| | | **100%** | **100%** |

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Departure Track
Modeled Dispersed Departure Track
Radar Departure Track

0 2 4 Miles

Figure: 7

**Runway 26 Departure Flight Tracks**



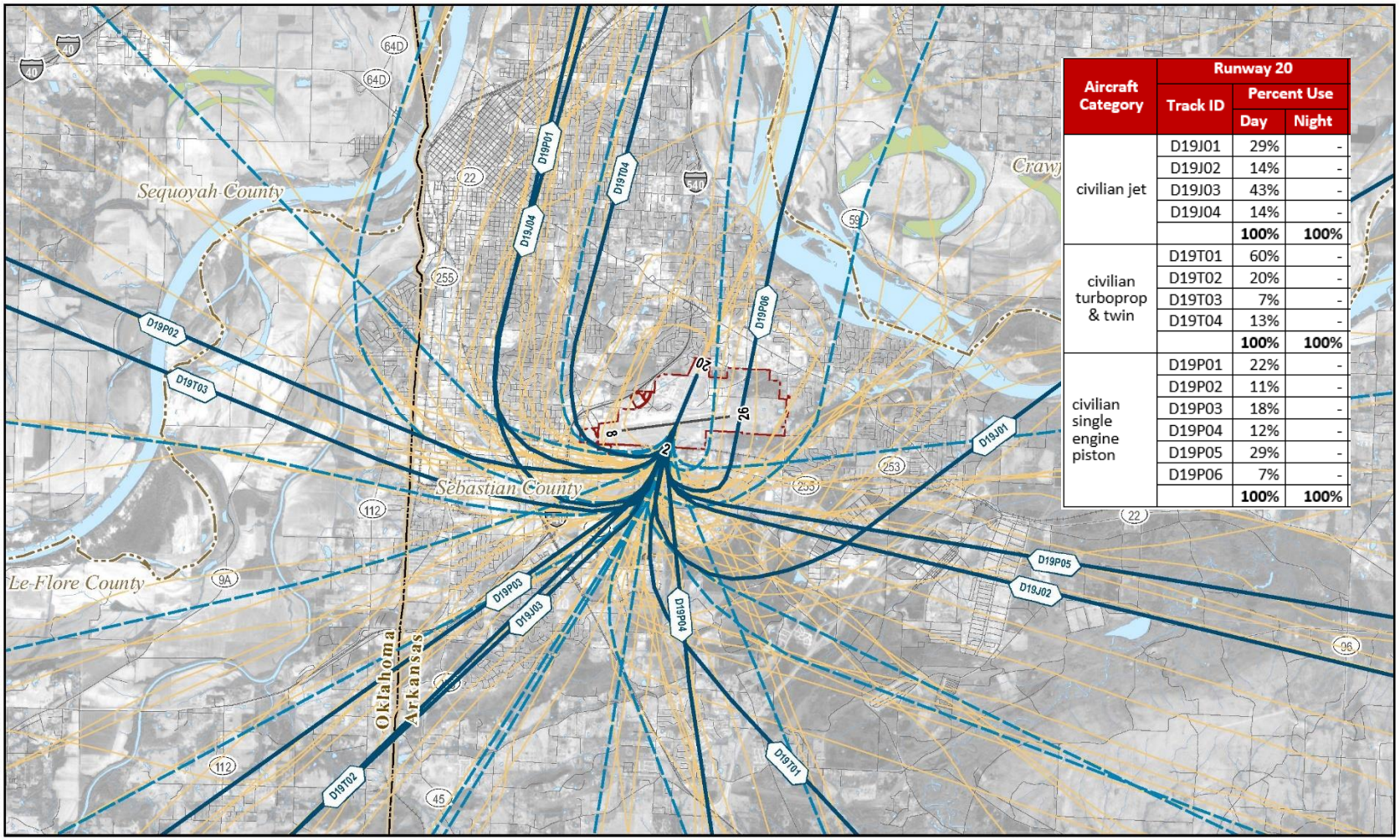

| Aircraft Category | Runway 2 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian turboprop & twin | D01T01 | 33% | - |
| | D01T02 | 67% | - |
| | | **100%** | |
| civilian single engine piston | D01P01 | 39% | - |
| | D01P02 | 27% | - |
| | D01P03 | 15% | - |
| | D01P04 | 9% | - |
| | D01P05 | 9% | - |
| | | **100%** | |

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Departure Track
Modeled Dispersed Departure Track
Radar Departure Track

0 2 4 Miles

Figure: 8

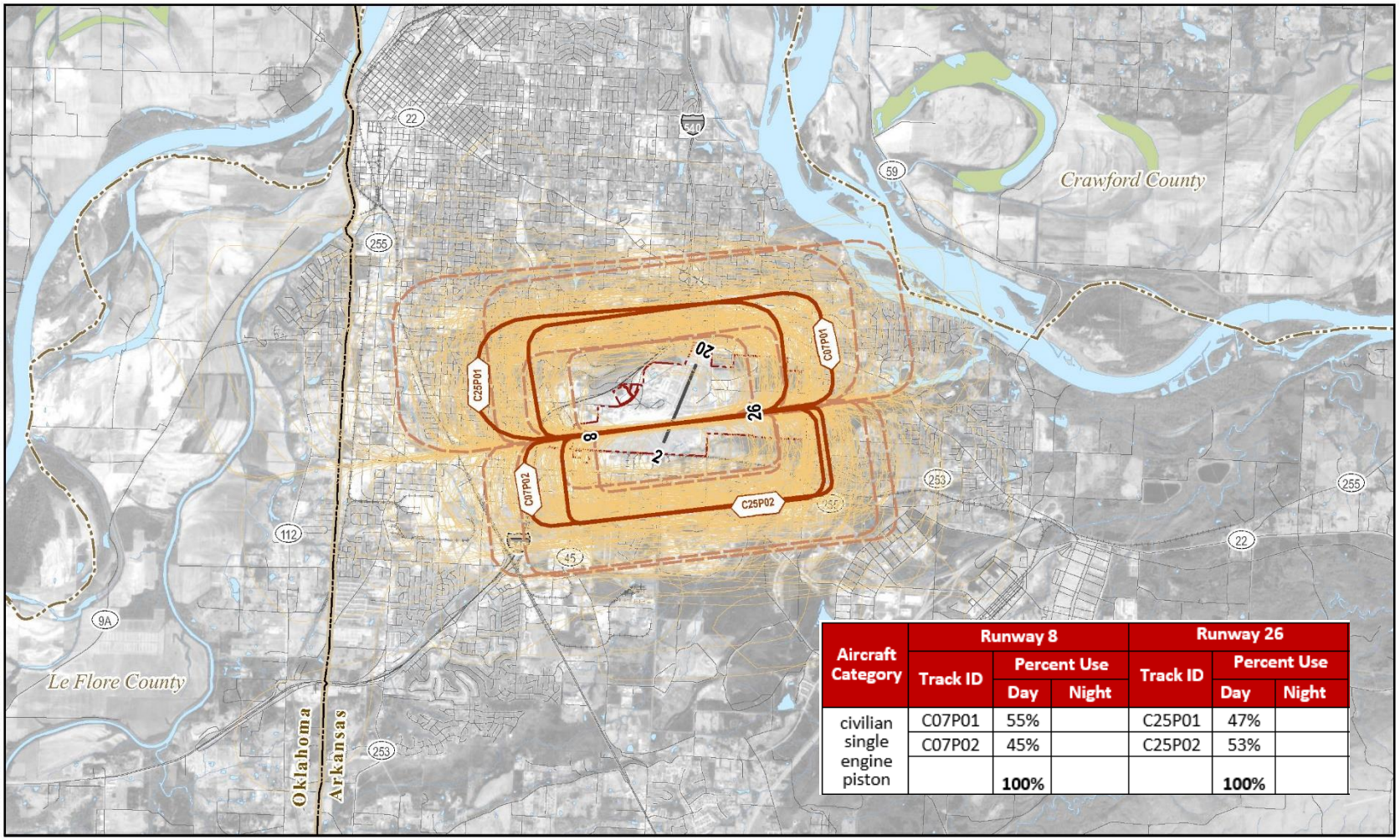
**Runway 2 Departure Flight Tracks**




| Aircraft Category | Runway 20 | | |
|---|---|---|---|
| | Track ID | Percent Use | |
| | | Day | Night |
| civilian jet | D19J01 | 29% | - |
| | D19J02 | 14% | - |
| | D19J03 | 43% | - |
| | D19J04 | 14% | - |
| | | **100%** | **100%** |
| civilian turboprop & twin | D19T01 | 60% | - |
| | D19T02 | 20% | - |
| | D19T03 | 7% | - |
| | D19T04 | 13% | - |
| | | **100%** | **100%** |
| civilian single engine piston | D19P01 | 22% | - |
| | D19P02 | 11% | - |
| | D19P03 | 18% | - |
| | D19P04 | 12% | - |
| | D19P05 | 29% | - |
| | D19P06 | 7% | - |
| | | **100%** | **100%** |

Figure: 9

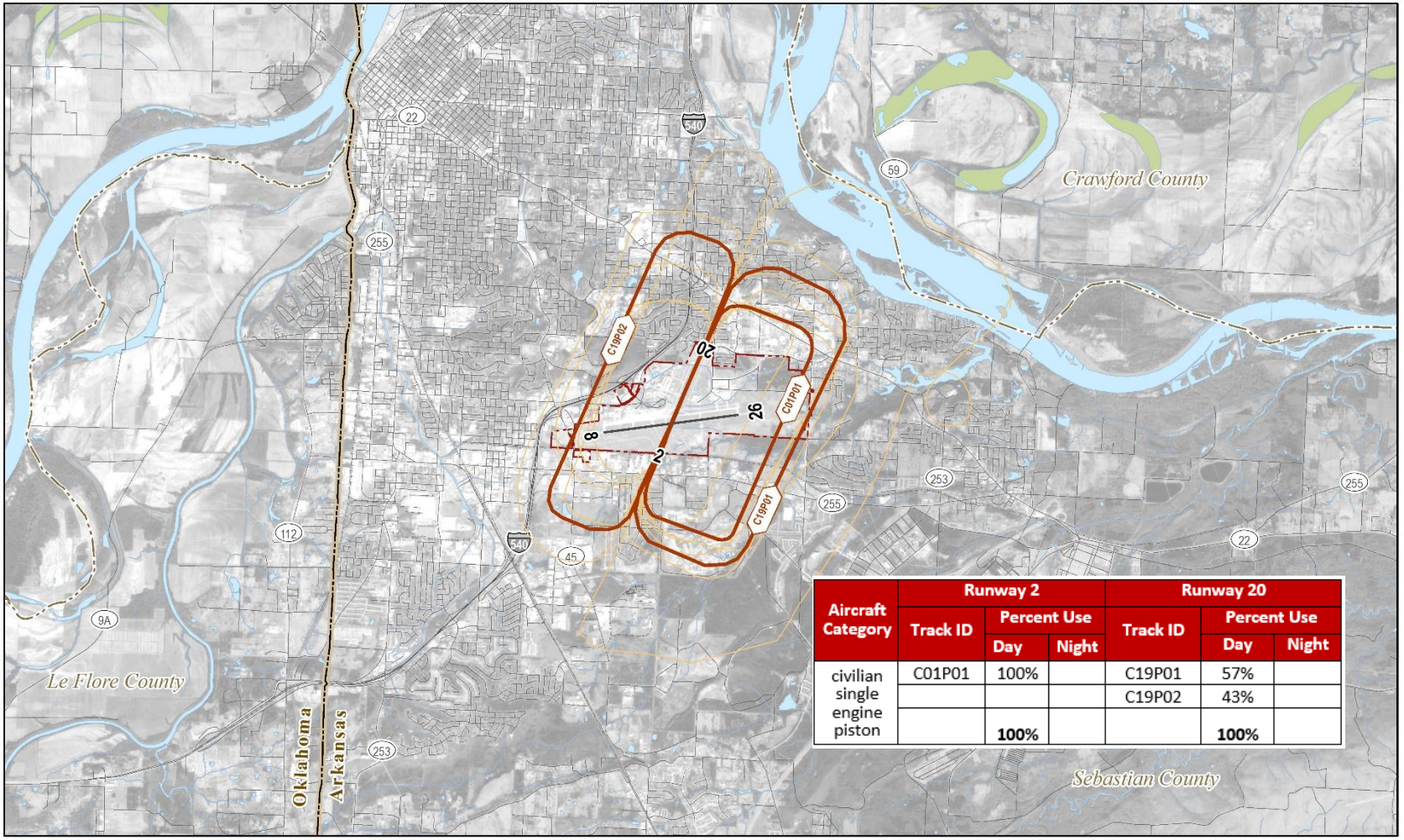
**Runway 20 Departure Flight Tracks**




| Aircraft Category | Runway 8 | | | Runway 26 | | |
|---|---|---|---|---|---|---|
| | Track ID | Percent Use | | Track ID | Percent Use | |
| | | Day | Night | | Day | Night |
| civilian single engine piston | C07P01 | 55% | | C25P01 | 47% | |
| | C07P02 | 45% | | C25P02 | 53% | |
| | | **100%** | | | **100%** | |

Figure: 10

**Runway 8/26 Circuit Flight Tracks**



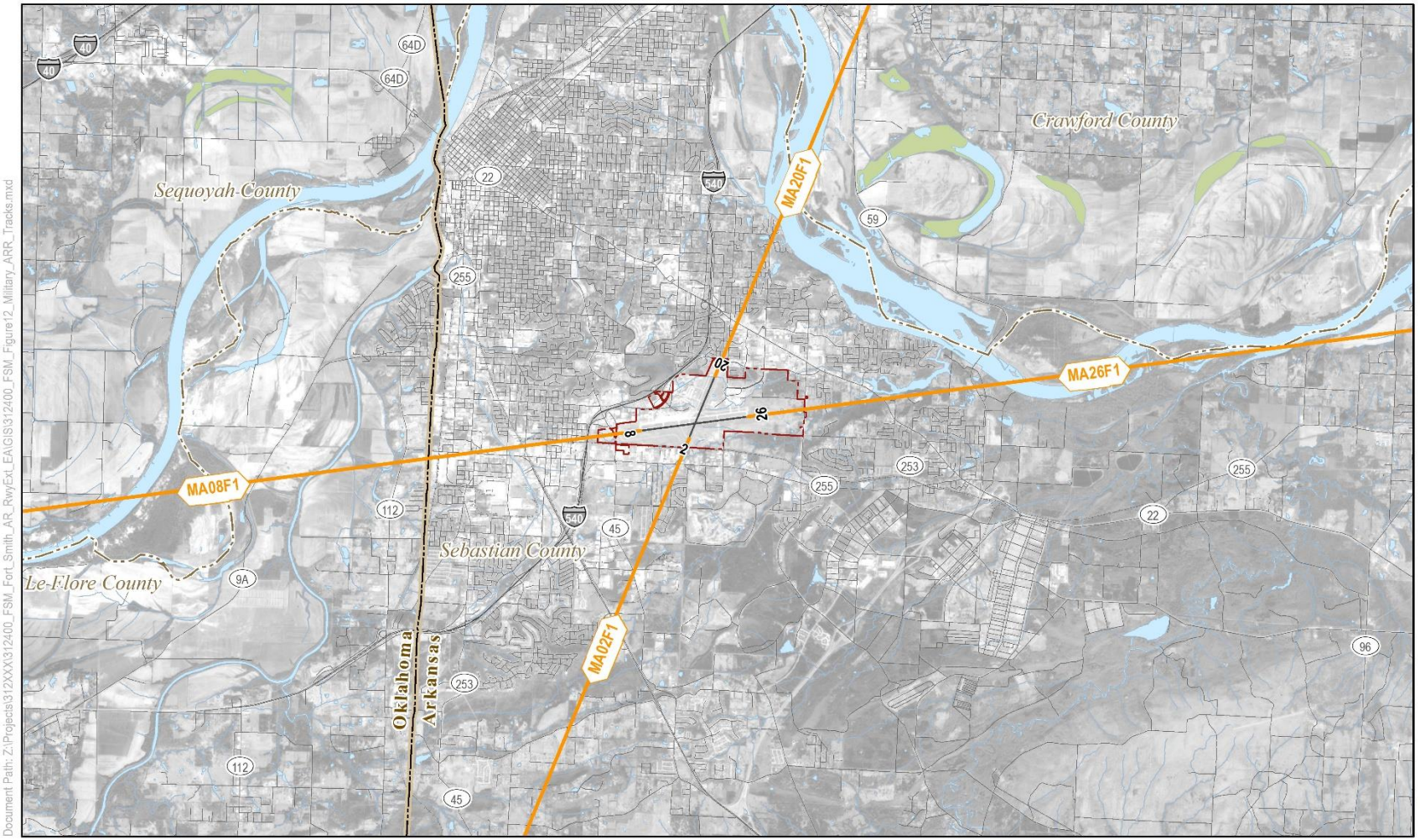

| Aircraft Category | Runway 2 | | | Runway 20 | | |
|---|---|---|---|---|---|---|
| | Track ID | Percent Use | | Track ID | Percent Use | |
| | | Day | Night | | Day | Night |
| civilian single engine piston | C01P01 | 100% | | C19P01 | 57% | |
| | | | | C19P02 | 43% | |
| | | **100%** | | | **100%** | |

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Backbone Circuit Track
Modeled Dispersed Circuit Track
Radar Departure Track

0 2 4 Miles

Figure: 11

**Runway 2/20 Circuit Flight Tracks**



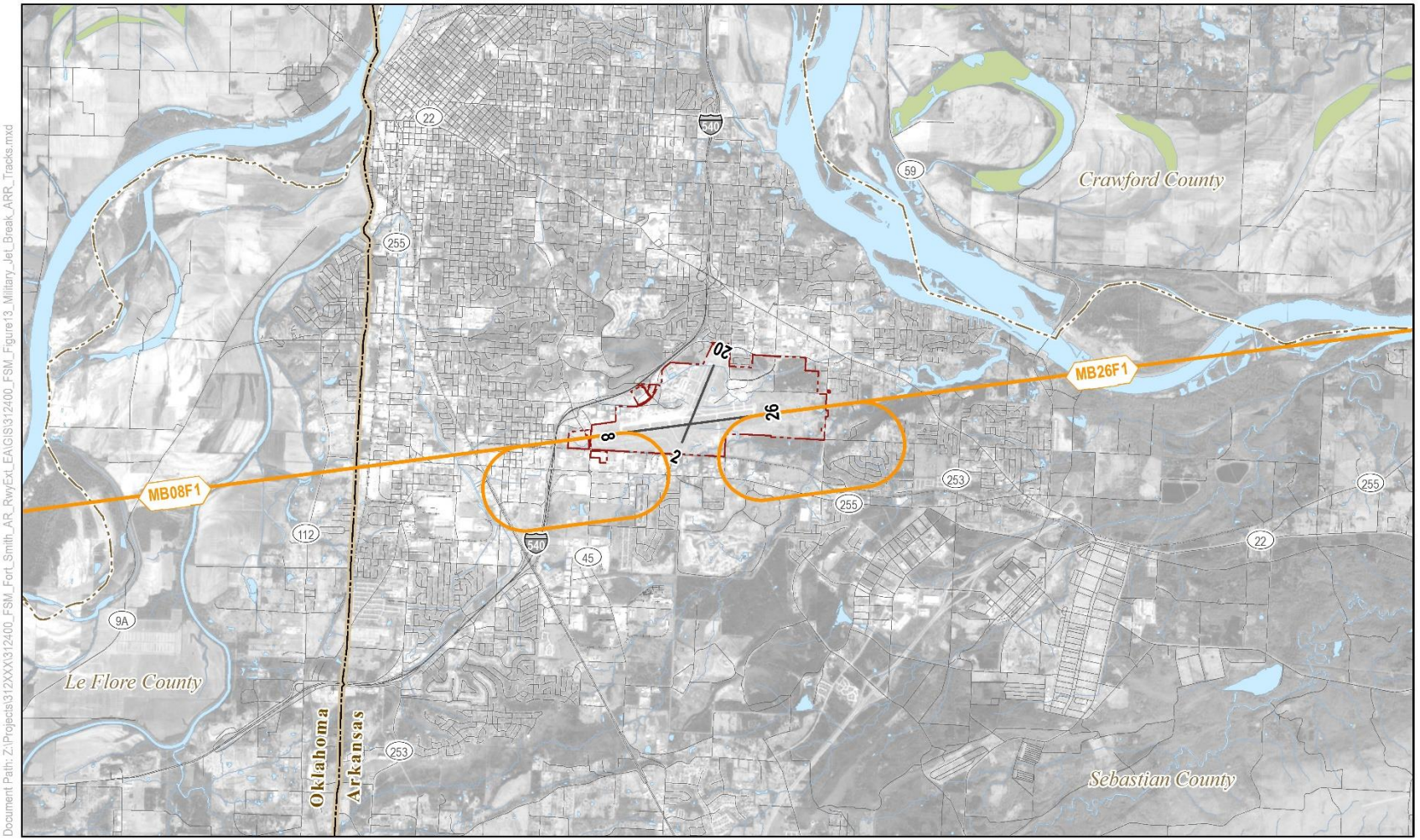

Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Military Arrival Track

0 2 4 Miles

FORT SMITH REGIONAL AIRPORT

Figure: 12

**Military Aircraft Arrival Flight Tracks**




Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Military Arrival Track

0 2 4 Miles

Figure: 13

**Military Jet Break Arrival Flight Tracks to Runway 8/26**

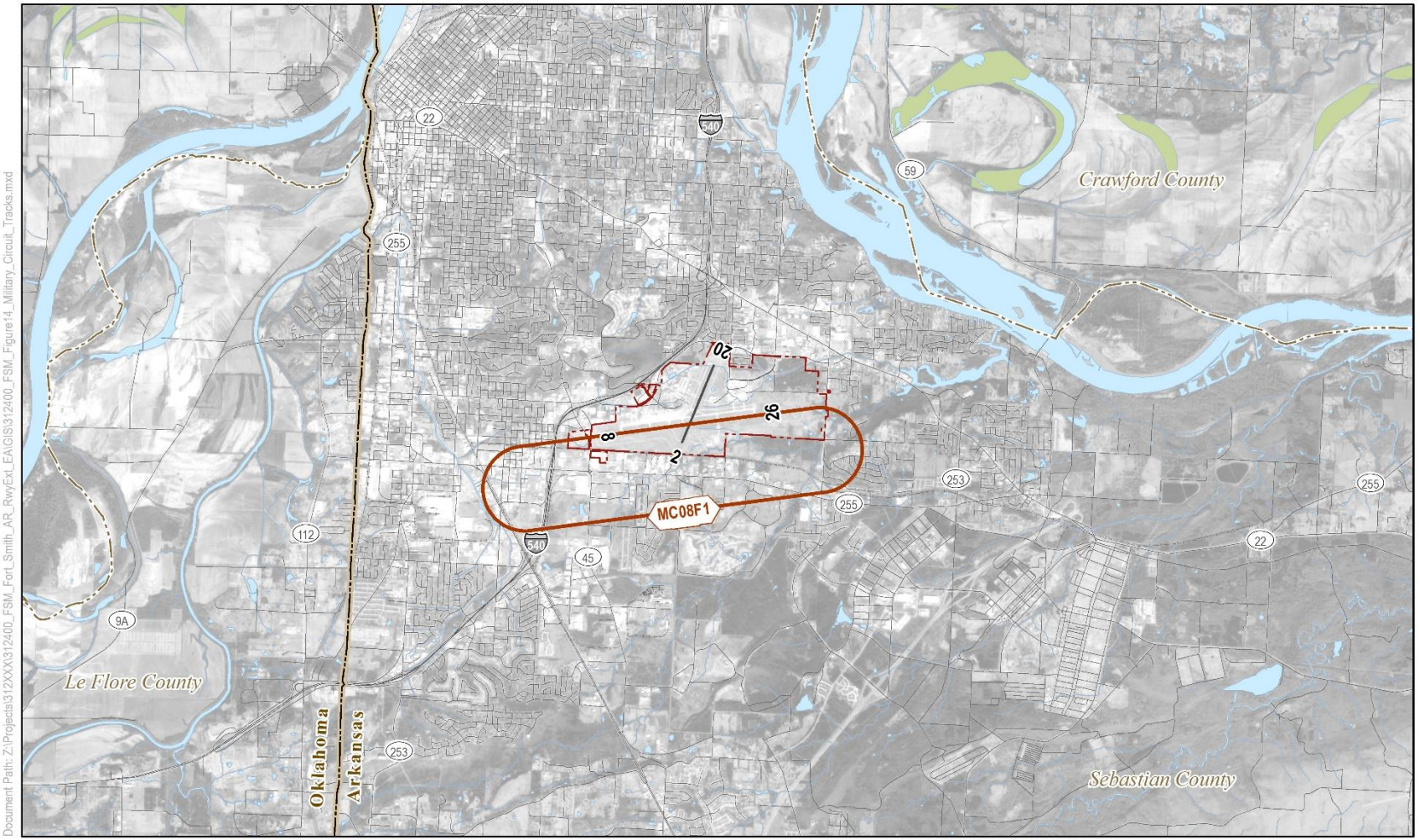
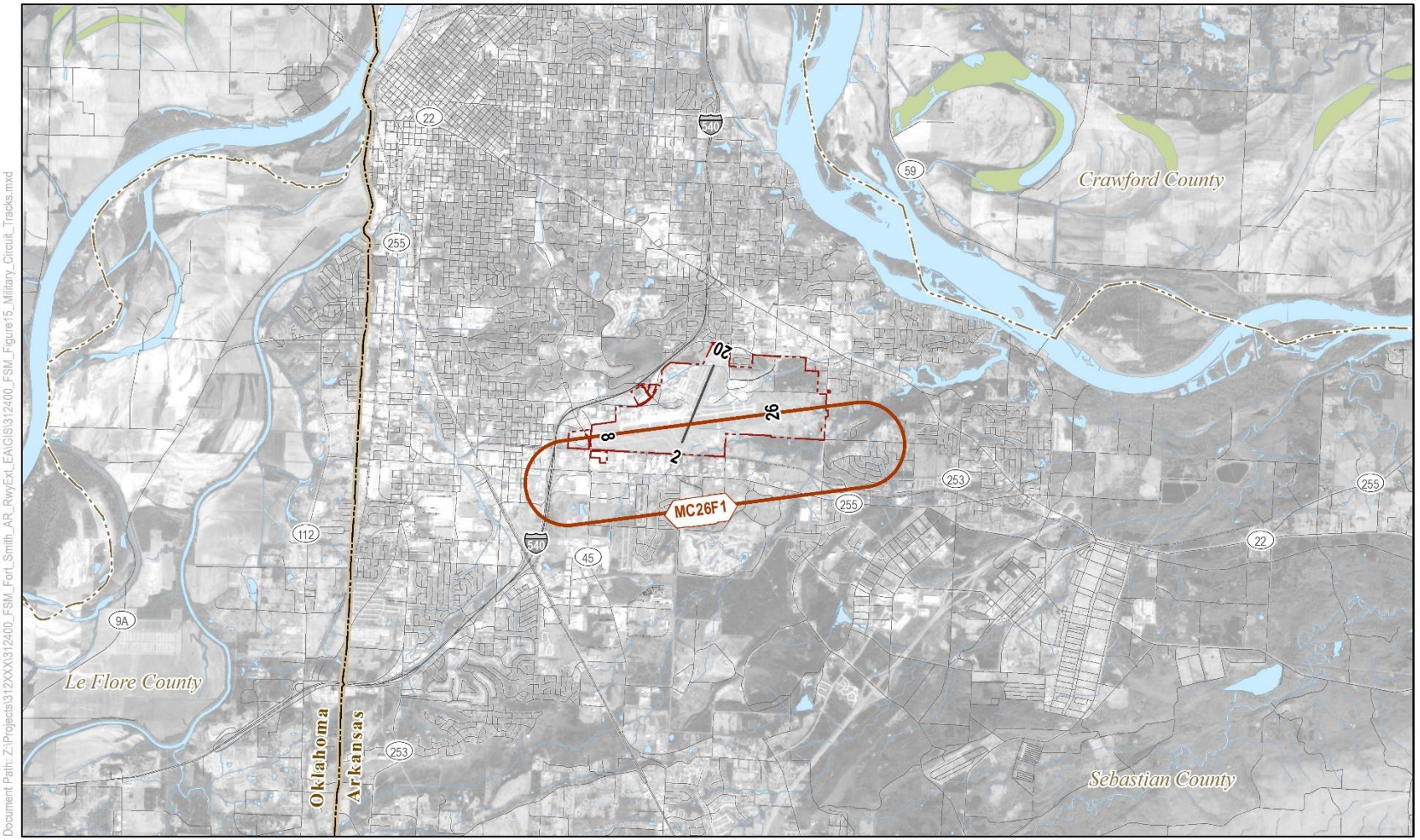



Figure: 14

**Military Aircraft Circuit Flight Track from Runway 8**




Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Military Circuit Track

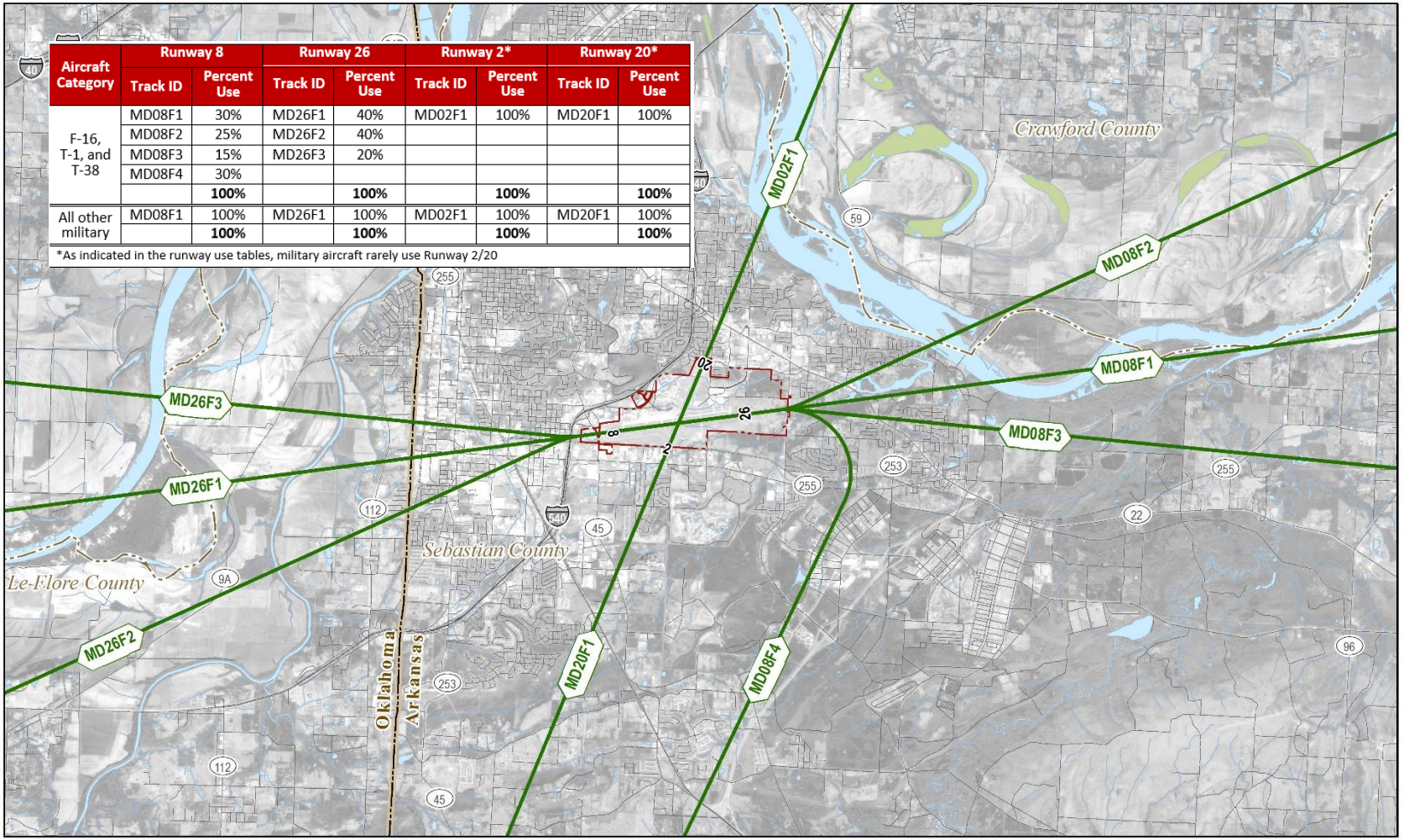
0 2 4 Miles

Figure: 15

**Military Aircraft Circuit Flight Track from Runway 26**

| Aircraft Category | Runway 8 | | Runway 26 | | Runway 2* | | Runway 20* | |
|---|---|---|---|---|---|---|---|---|
| | Track ID | Percent Use | Track ID | Percent Use | Track ID | Percent Use | Track ID | Percent Use |
| F-16, T-1, and T-38 | MD08F1 | 30% | MD26F1 | 40% | MD02F1 | 100% | MD20F1 | 100% |
| | MD08F2 | 25% | MD26F2 | 40% | | | | |
| | MD08F3 | 15% | MD26F3 | 20% | | | | |
| | MD08F4 | 30% | | | | | | |
| | | **100%** | | **100%** | | **100%** | | **100%** |
| All other military | MD08F1 | 100% | MD26F1 | 100% | MD02F1 | 100% | MD20F1 | 100% |
| | | **100%** | | **100%** | | **100%** | | **100%** |

*As indicated in the runway use tables, military aircraft rarely use Runway 2/20




Airport Boundary
Major / Minor Roads
State Boundary
Water / Stream
Runway
Railroad
City Limits
Modeled Military Departure Track

0 2 4 Miles

Figure: 16

**Military Aircraft Departure Flight Tracks**

## 3.7 Meteorological Data

Meteorological settings within the AEDT and NOISEMAP affect their calculation of aircraft performance profiles and sound propagation. These settings include temperature, barometric pressure, relative humidity, and headwind speed for the average annual day. The AEDT contains standard reference climatological data for airports throughout the US, based on recent 10-year averages for each location.

The noise modeling utilized the following average data for FSM from the AEDT (version 3d) database:

* Temperature: 62.08 °F
* Station Pressure: 999.95 mbar
* Sea Level Pressure: 1016.82 mbar
* Dew point: 50.69 °F
* Relative humidity: 66.43%
* Wind speed: 5.81 knots.

## 3.8 Terrain

Terrain data describes the elevation of the ground surrounding the airport, and on airport property. The AEDT and NOISEMAP use terrain data to adjust the ground level under the flight paths, i.e., the terrain affects the vertical distance between the aircraft and a "receiver" on the ground. NOISEMAP also models terrain's shielding effect, where applicable. The terrain data does not affect the aircraft's performance. The National Elevation Dataset (NED) 1/3 arc second terrain data were obtained from the United States Geological Survey (USGS).[12] The NED data set has a resolution of 10 meters or 33 feet.

NOISEMAP also models the ground's resistivity to sound propagation by classifying the ground as either "soft", e.g., grass-covered ground with a nominal value of 200 MKS rayls, or "hard", e.g., water-covered or paved ground with a value of 10,000 MKS rayls or greater. For this study, all ground was classified as "soft", grass-covered ground. This setting matches AEDT as AEDT assumes a soft ground.

[12] Data downloaded from https://viewer.nationalmap.gov/basic/?howTo=true on 8/24/2021 in 1/3 Arc second GeoTIFF format, readable by AEDT. The same data were converted to GridFloat format for use in NOISEMAP.

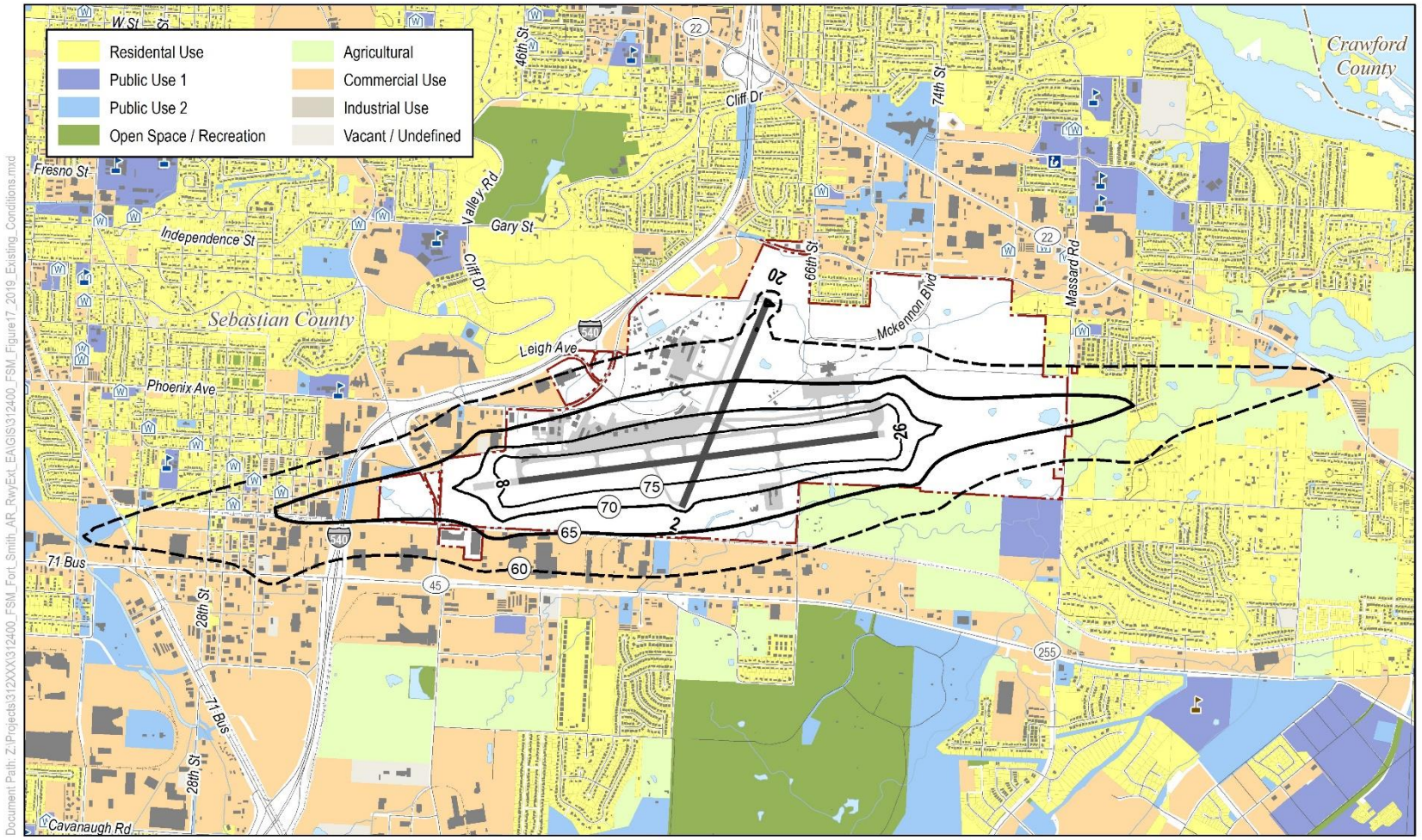
# 4. Noise Analysis Results

DNL contours are the primary mechanism for evaluating airport noise in this EA. A supplemental grid point analysis investigates precisely where and to what extent noise exposure changes would be expected to occur. An inventory of the acreage, population and housing units within the various bands of noise exposure provides additional information.

## 4.1 DNL Contours

As noted in Section 2, all existing military flight activity was modeled with NOISEMAP and all civilian flight activity was modeled with AEDT. Each model produced a grid of DNL values, which were then combined in AEDT, with contours generated using the AEDT algorithm. **Figures 17 through 21** present the required DNL contours of 65 dB, 70 dB, and 75 dB, and for informational purposes only, the 60 dB DNL contour is depicted as a dashed line on each figure. FAA considers a DNL of 65 dB as the threshold below which all land uses are compatible.

**Figure 17** depicts the Existing Conditions noise environment, based on actual 2019 aircraft operations. **Figure 18** presents the No-Action Alternative DNL contours for the forecast design year, 2023. **Figure 19** shows the corresponding Proposed Action Alternative DNL contours for 2023. Likewise, **Figure 20** and **Figure 21** portray the DNL contours for the No-Action Alternative and Proposed Action Alternative, respectively, for 2028, representing the forecast five years beyond the target design year.



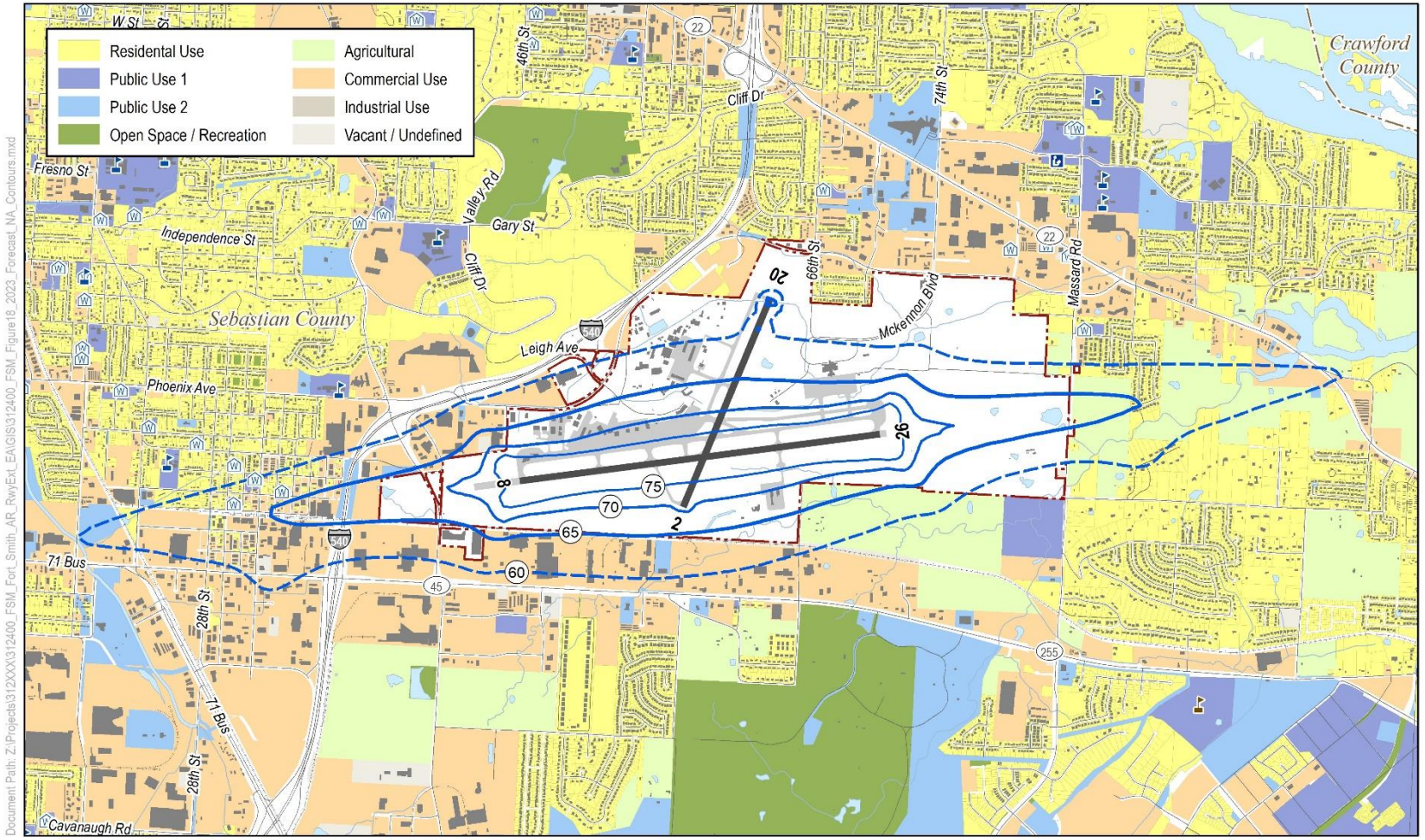

Existing Conditions (2019) DNL Contours
Airport Boundary
Runway / Pavement
Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream
Place of Worship
School
College / University
Library

0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Figure: 17

**Existing Conditions (2019) DNL Contours**




2023 Forecast No-Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream
Place of Worship
School
College / University
Library

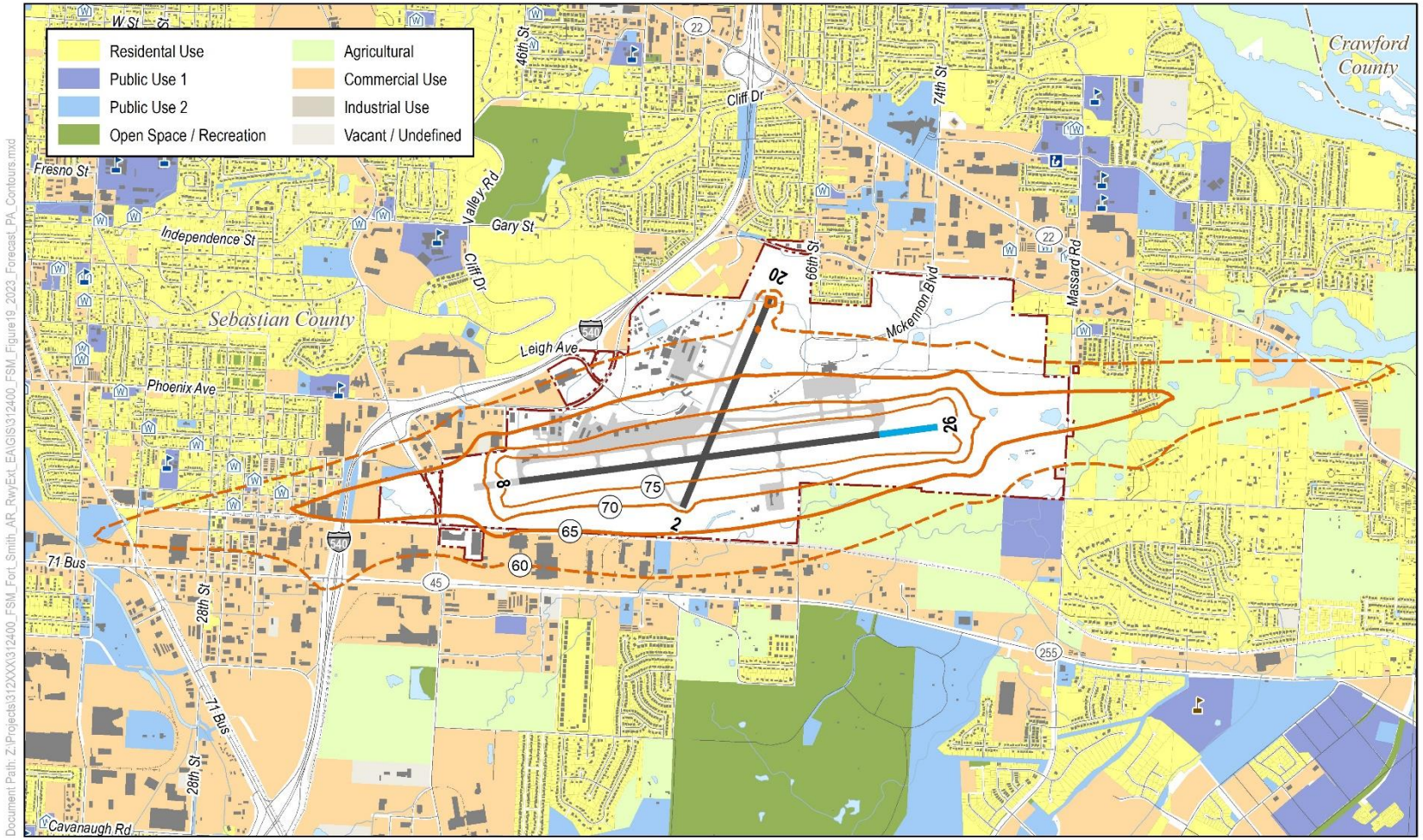
FORT SMITH REGIONAL AIRPORT

Figure: 18

**2023 Forecast No-Action Alternative DNL Contours**

0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only




2023 Forecast Proposed Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Runway Extension
Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream
Place of Worship
School
College / University
Library

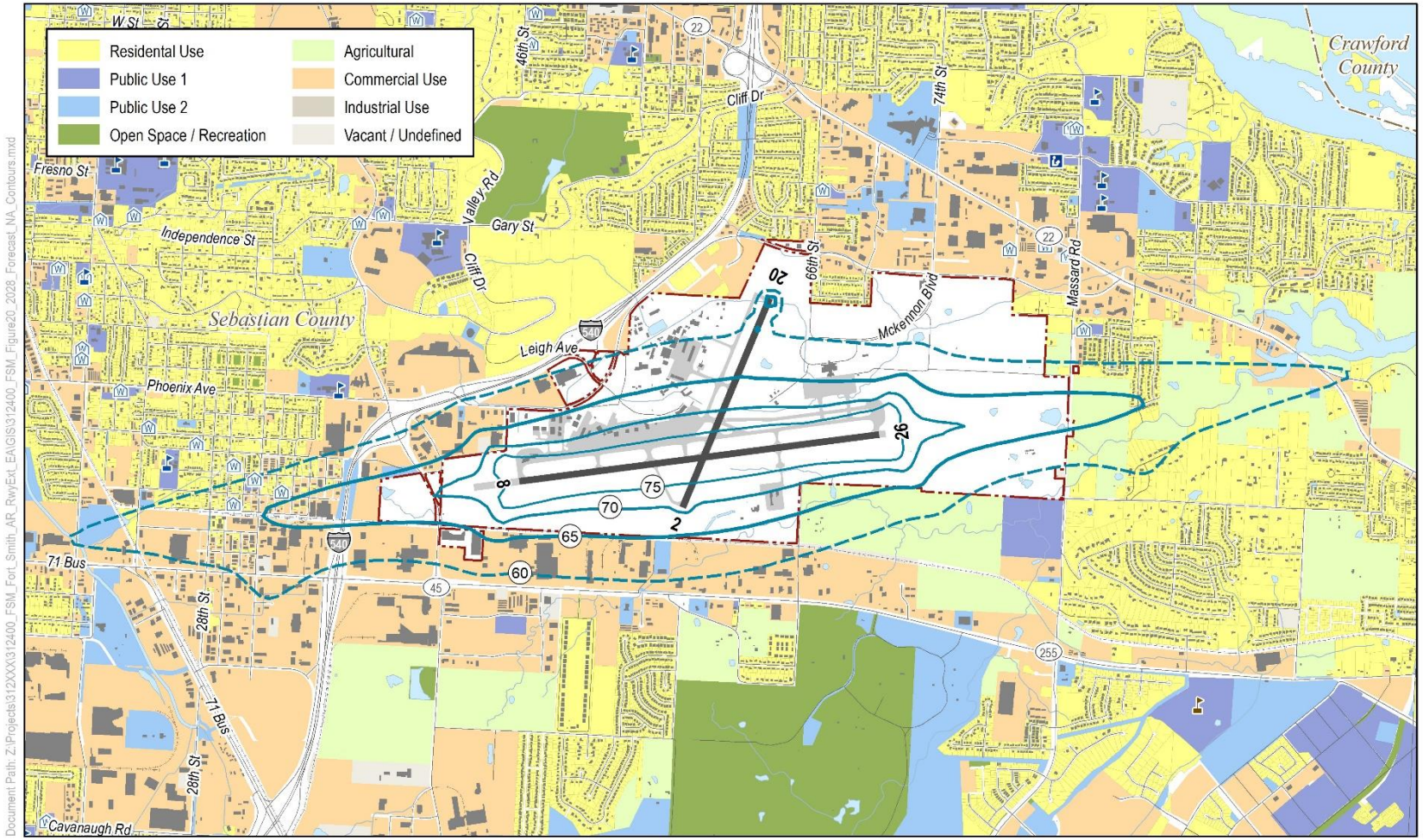
0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Figure: 19

**2023 Forecast Proposed Action Alternative DNL Contours**

Document Path: Z:\Projects\312XXX\312400_FSM_Fort_Smith_AR_RwyExt_EA\GIS\312400_FSM_Figure19_2023_Forecast_PA_Contours.mxd



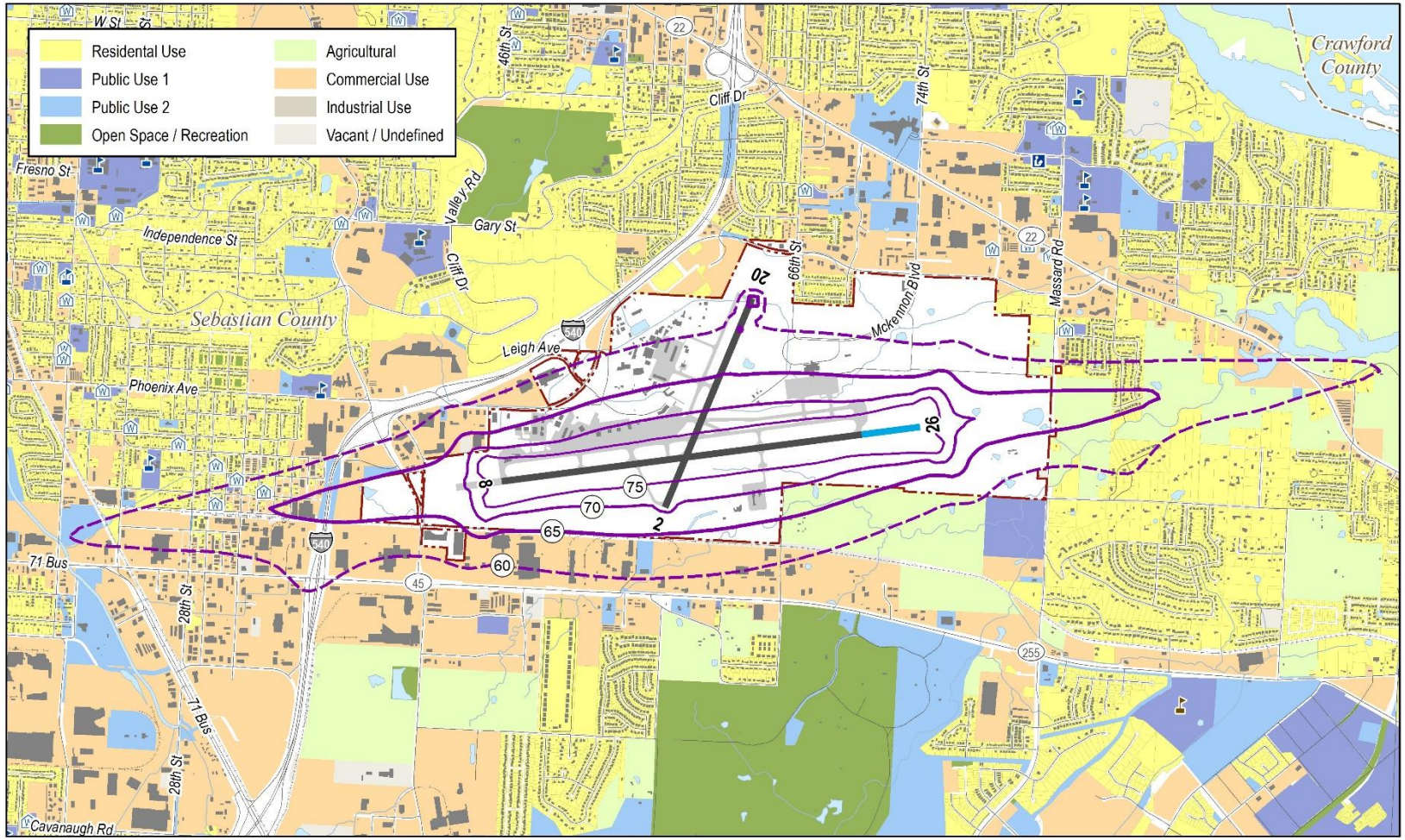

2028 Forecast No-Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream
Place of Worship
School
College / University
Library

0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Figure: 20

**2028 Forecast No-Action Alternative DNL Contours**




2028 Forecast Proposed Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Runway Extension
Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream
Place of Worship
School
College / University
Library

FORT SMITH REGIONAL AIRPORT

Figure: 21

**2028 Forecast Proposed Action Alternative DNL Contours**

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Document Path: Z:\Projects\312XXX\312400_FSM_Fort_Smith_AR_RwyExt_EA\GIS\312400_FSM_Figure21_2028_Forecast_PA_Contours.mxd

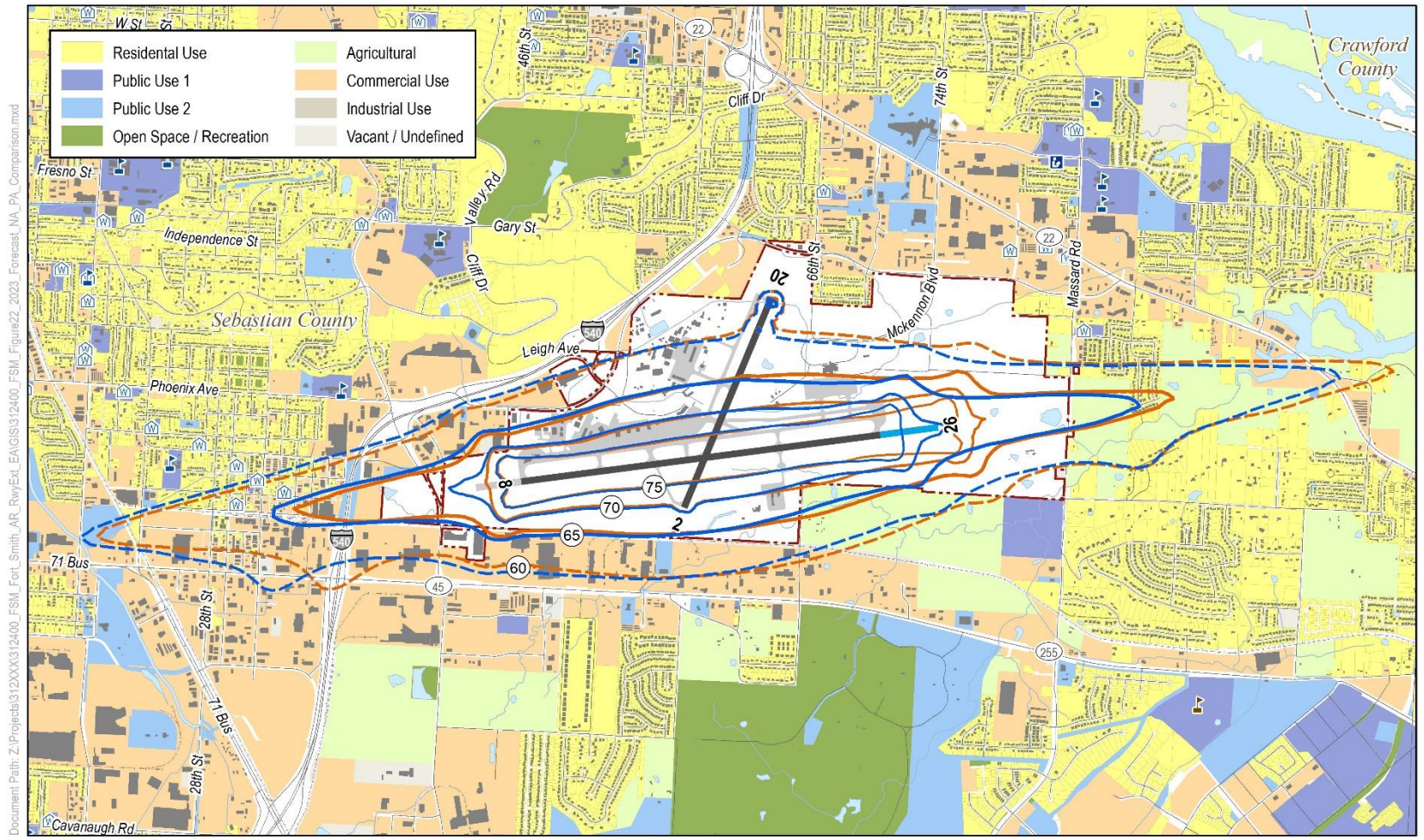
**Figure 22** and **Figure 23** present comparisons of the No-Action and Proposed Action Alternatives for the design year 2023 and forecast year 2028, respectively. The changes in noise exposure due to the proposed eastward extension of Runway 26 are observable on the contour comparison figures on both sides of the airport.

To the east of the airport, the Proposed Action contours would extend further over the Massard Creek area, with the 65 dB DNL contour including more of the S 88th and S 89th street neighborhood. Because the landing threshold for Runway 26 arrivals would be relocated 1,300 feet to the east of its current location, arriving aircraft on the glide slope would be marginally lower as they overfly that area.

Also due to the runway extension, the start-of-takeoff-roll location for aircraft departing Runway 26 would be relocated 1,300 feet to the east of its current location. This is reflected in the Proposed Action contours as an eastward shift of the contour bulges that represent the collective noise behind jet aircraft as they accelerate down the runway. That change in the 65 dB DNL contour (and the higher-level contours) would be fully contained within the airport property.

To the west of the airport, the Proposed Action contours would retract slightly over the area east of Interstate 540 and south of Phoenix Ave, with the 65 dB DNL contour including less of the residential neighborhood there. Under the Proposed Action scenario, departing aircraft would be marginally higher as they overfly that area, assuming no change to climb profiles, because the runway extension would allow the takeoff roll to begin at a point 1,300 feet further east.

The 70 dB DNL contour for the Proposed Action (at the west end of the runway within the airport property line) also reflects the potential reduction in departure noise exposure due to higher overflights.




2023 Forecast No-Action Alternative DNL Contours
2023 Forecast Proposed Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Runway Extension

Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream

Place of Worship
School
College / University
Library

0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Figure: 22

**Comparison of No-Action to Proposed Action DNL contours for Forecast Year 2023**

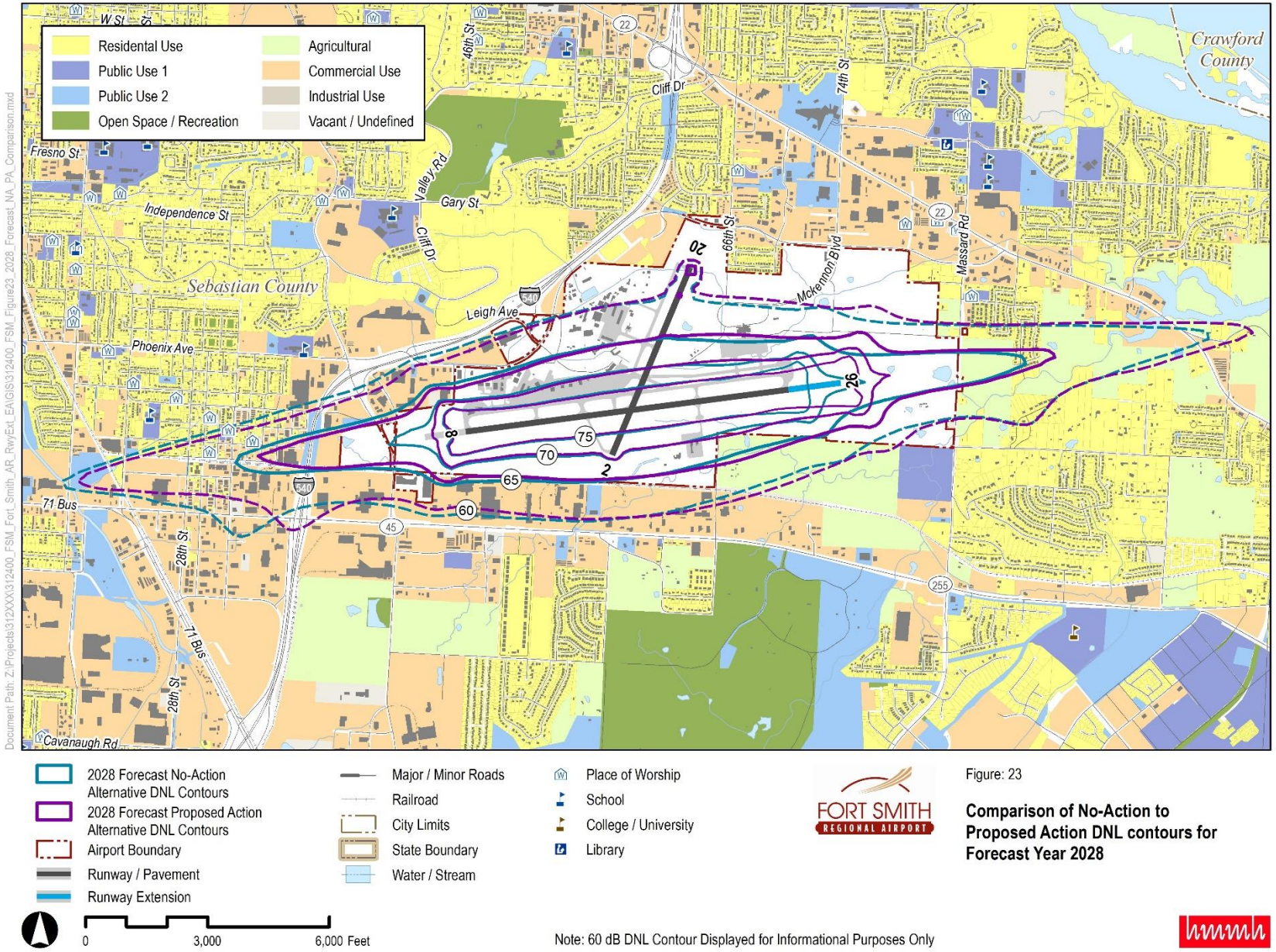



Figure: 23

**Comparison of No-Action to Proposed Action DNL contours for Forecast Year 2028**

## 4.2 Grid Point Analysis

The focus of the grid point analysis is to compare the No-Action and Proposed Action Alternatives, using FAA's thresholds of significance. **Table 9** defines the significance threshold for changes in noise in accordance with FAA Order 1050.1F. When an action (compared to the No-Action alternative for the same timeframe) would cause noise-sensitive areas to have a DNL greater than or equal to 65 dB and experience a noise increase of at least 1.5 dB, the impact is considered significant. **Table 9** also lists FAA-defined reportable changes of noise levels.

**Table 9. FAA Thresholds for Significant or Reportable Changes in Noise**

Source: FAA Order 1050.1F Desk Reference, Chapter 11

| | 65 DNL or Greater | Greater than or equal to 60 DNL but less than 65 DNL | Greater than or equal to 45 DNL but less than 60 DNL |
|---|---|---|---|
| Minimum Change in DNL with Alternative | 1.5 dB | 3.0 dB | 5.0 dB |
| Level of Impact | Significant | Reportable | Reportable |

To identify any regions meeting the FAA criteria for significant or reportable changes in noise because of the Proposed Action, HMMH compared the underlying noise exposure grids that inform the contours. **Figure 24** and **Figure 25** present the No-Action to Proposed Action contour comparisons again, with grid differences color-coded according to the criteria listed in **Table 9**. All the identified points that would experience a significant or reportable change would be within the airport property boundary. Therefore, the proposed runway extension will not result in a significant or reportable increase in noise over any noise sensitive land use.

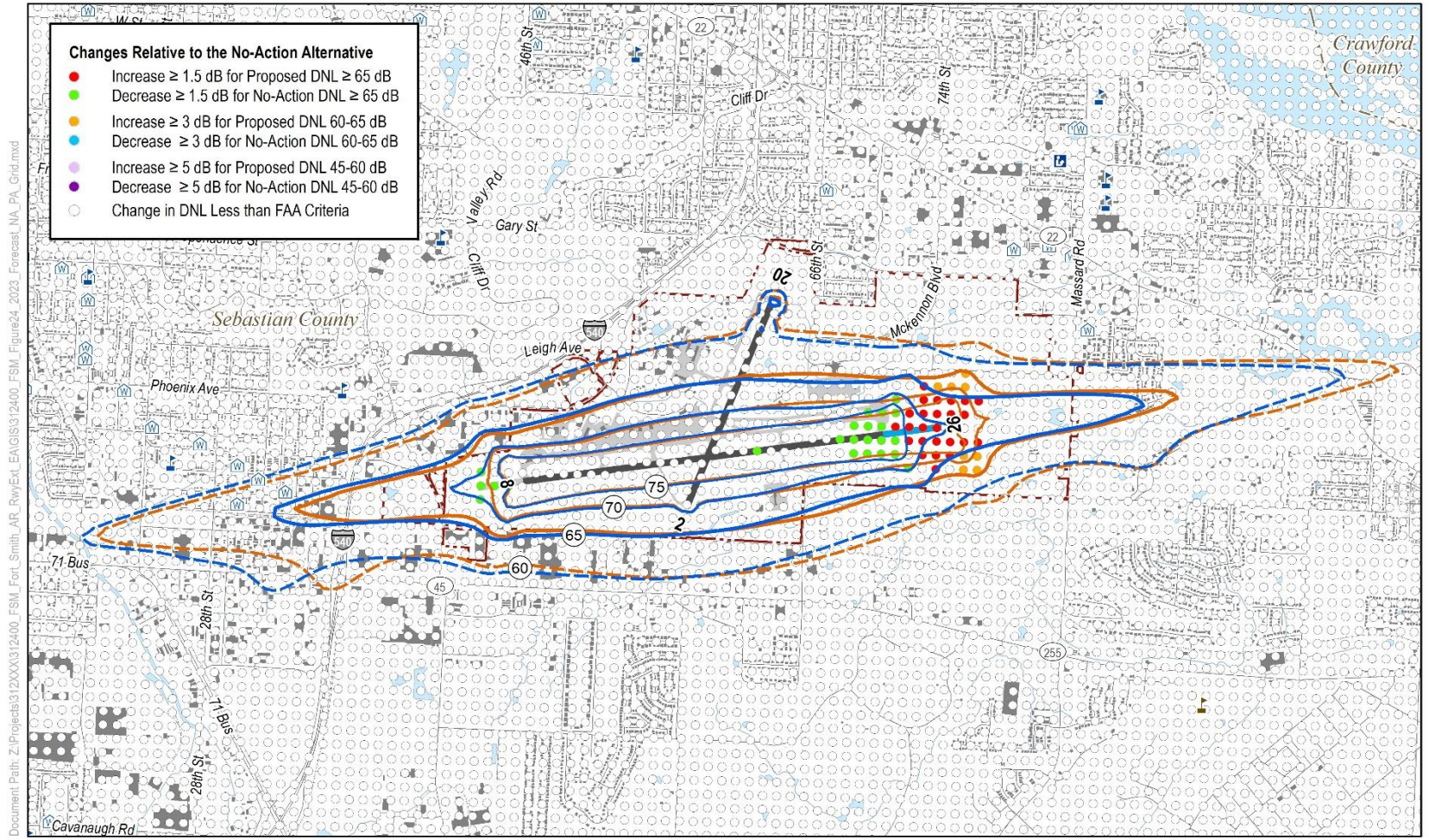



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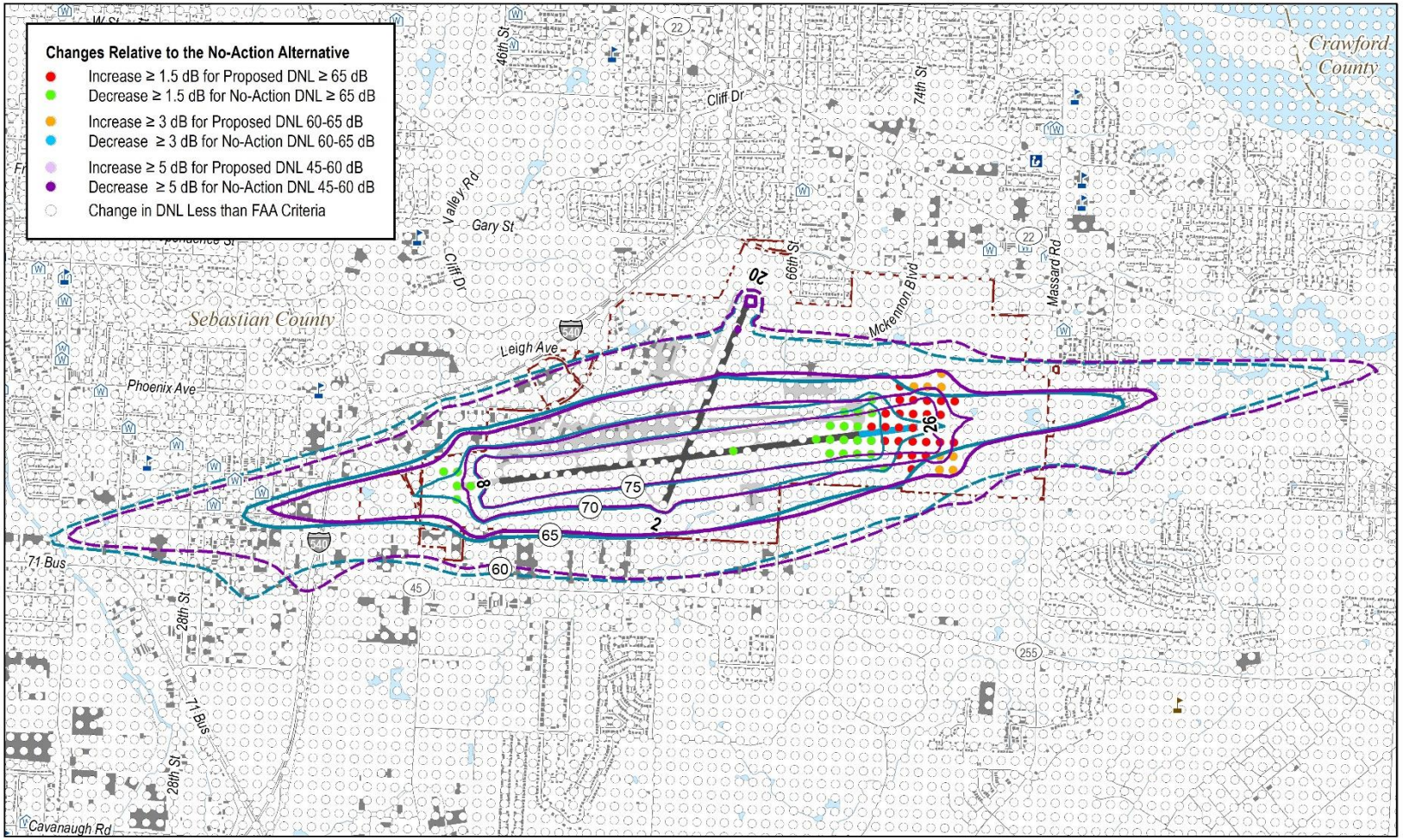
Figure: 24

**Grid Point Differences Between No-Action and Proposed Action for Forecast Year 2023**

Note: 60 dB DNL Contour Displayed for Informational Purposes Only




2028 Forecast No-Action Alternative DNL Contours
2028 Forecast Proposed Action Alternative DNL Contours
Airport Boundary
Runway / Pavement
Runway Extension

Major / Minor Roads
Railroad
City Limits
State Boundary
Water / Stream

Place of Worship
School
College / University
Library

0 3,000 6,000 Feet

Note: 60 dB DNL Contour Displayed for Informational Purposes Only

Figure: 25

**Grid Point Differences Between No-Action and Proposed Action for Forecast Year 2028**

## 4.3 Population Inventory

For each of the five sets of DNL contours prepared for this EA, HMMH prepared an inventory of housing units and population13 in the residential land use areas exposed to 60 dB DNL or higher. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2020 US Census TIGER file maps that depict the smallest census enumeration unit. "Populated Area" data polygons were then created by combining census blocks with the residential land use, concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land. Using Geographic Information Systems (GIS) tools, the noise contours were intersected with the residential census data. The resultant wholly or partially encompassed residential census areas were then identified for each DNL contour interval; the proportion of total residential area was calculated to estimate the residential population and housing unit counts ascribed to that DNL interval.

**Table 10** presents the estimated population, housing, and land area within the given DNL contour intervals. None of the five scenarios would include residential land use at 70 dB DNL or greater. As shown in **Table 10**, for 2023, the Proposed Action would result in a net increase[14] of nine housing units with an estimated increase of twelve people residing in areas exposed to 65 DNL or greater. For 2028, the net change attributable to the Proposed Action would be five additional housing units but no change in population exposed to 65 DNL or greater. While some homes are newly included within the 65 dB DNL and are considered noncompatible with aircraft noise, they are not significantly impacted by the proposed project.

There are three identified non-residential noise sensitive sites, all places of worship, in the 60 to 65 dB DNL interval for all five scenarios:

- Temple Baptist Church, Fort Smith
- Southside Christian Church, Fort Smith
- Vineyard Community Church, Fort Smith

As noted in the introduction to this document, this noise analysis focused exclusively on airport-related noise sources. The Proposed Action is not expected to change non-airport noise sources such as commercial activity, highway traffic, or noise from local roadways. However, ambient noise levels from those sources do contribute to the overall acoustic environment. Residential locations within the aircraft noise 60 DNL or 65 DNL contours that are also in close proximity to busy streets or highways could experience actual DNL values higher than depicted on the contour map.

[13] Population estimates are based on 2020 U. S. census data.

[14] The contours to the west of the airport indicate a noise decrease while the contours to the east of the airport indicate a noise increase; the "net" change combines those counts.

**Table 10. Comparison of Noise Exposure**

Sources: HMMH analysis, 2021

| Noise Exposure Interval | Existing Conditions (2019) | Design Year (2023) | | | 5-Year Forecast (2028) | | |
|---|---|---|---|---|---|---|---|
| | | No-Action Alternative | Proposed Action Alternative | increase (or decrease) | No-Action Alternative | Proposed Action Alternative | increase (or decrease) |
| **Population Inventory** | | | | | | | |
| 70 DNL or greater | 0 | 0 | 0 | - | 0 | 0 | - |
| 65-70 DNL | 8 | 17 | 29 | 12 | 31 | 31 | - |
| 60-65 DNL | 418 | 440 | 386 | (54) | 479 | 411 | (68) |
| **Housing Units Inventory** | | | | | | | |
| 70 DNL or greater | 0 | 0 | 0 | - | 0 | 0 | - |
| 65-70 DNL | 3 | 5 | 14 | 9 | 10 | 15 | 5 |
| 60-65 DNL | 195 | 213 | 176 | (37) | 238 | 182 | (56) |
| **Acreage Inventory** | | | | | | | |
| 75 DNL or greater | 201 | 205 | 224 | 19 | 211 | 227 | 17 |
| 70-75 DNL | 174 | 179 | 188 | 9 | 188 | 192 | 4 |
| 65-70 DNL | 442 | 457 | 452 | (6) | 476 | 463 | (14) |
| **total 65 DNL or greater** | **816** | **842** | **864** | **22** | **875** | **882** | **7** |
| 60-65 DNL | 990 | 1,020 | 1,018 | (2) | 1,058 | 1,042 | (17) |
| Note: acreage estimation includes airport land | | | | | | | |

# 5. Aircraft Noise Terminology

Noise is a complex physical quantity. The properties, measurement, and presentation of noise involve specialized terminology that can be difficult to understand. To provide a basic reference on these technical issues, this section introduces fundamentals of noise terminology, the effects of noise on human activity, and noise propagation.

## 5.1 Introduction to Noise Terminology

Analyses of potential impacts from changes in aircraft noise levels rely largely on a measure of cumulative noise exposure over an entire calendar year, expressed in terms of a metric called the Day-Night Average Sound Level (DNL). However, DNL does not provide an adequate description of noise for many purposes. A variety of measures, which are further described in subsequent sub-sections, are available to address essentially any issue of concern, including:

- Sound Pressure Level, SPL, and the Decibel, dB
- A-Weighted Decibel, dBA
- Maximum A-Weighted Sound Level, $L_{max}$
- Time Above, TA
- Sound Exposure Level, SEL
- Equivalent A-Weighted Sound Level, $L_{eq}$
- Day-Night Average Sound Level, DNL

### *5.1.1 Sound Pressure Level, SPL, and the 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 travels through the air in sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. The ear senses these pressure variations and – with much processing in our brain – translates them into "sound."

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we can hear without pain contain about one million times more energy than the quietest sounds we can detect. To allow us to perceive sound over this very wide range, our ear/brain "auditory system" compresses our response in a complex manner, represented by a term called sound pressure level (SPL), which we express in units called decibels (dB).

Mathematically, SPL is a logarithmic quantity based on the ratio of two sound pressures, the numerator being the pressure of the sound source of interest ($P_{source}$), and the denominator being a reference pressure ($P_{reference}$) [15]

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

The logarithmic conversion of sound pressure to SPL 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

[15] The reference pressure is approximately the quietest sound that a healthy young adult can hear.

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 from about 40 to 100 dB[16].

Because decibels are logarithmic quantities, we cannot use common arithmetic to combine them. For example, if two sound sources each produce 100 dB operating individually, when they operate simultaneously, they produce 103 dB -- not the 200 dB we might expect. Increasing to four equal sources operating simultaneously will add another three decibels of noise, resulting in a total SPL of 106 dB. For every doubling of the number of equal sources, the SPL goes up another three decibels.

If one noise source is much louder than another is, the louder source "masks" the quieter one and the two sources together produce virtually the same SPL as the louder source alone. For example, a 100 dB and 80 dB sources produce approximately 100 dB of noise when operating together.

Two useful “rules of thumb” related to SPL are worth noting: (1) humans generally perceive a six to 10 dB increase in SPL to be about a doubling of loudness,[17] and (2) changes in SPL of less than about three decibels for an particular sound are not readily detectable outside of a laboratory environment.

### 5.1.2 A-Weighted Decibel

An important characteristic of sound is its frequency, or "pitch.” This is the per-second oscillation rate of the sound pressure variation at our ear, expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to consider the “low,” “medium,” and “high” frequency components. This breakdown is important for two reasons:

- Our ear is better equipped to hear mid and high frequencies and is least sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- Engineering solutions to noise problems differ with frequency content. 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. Most 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. “A-weighted decibels” are abbreviated “dBA.” 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

[16] The logarithmic ratio used in its calculation means that SPL changes relatively quickly at low sound pressures and more slowly at high pressures. This relationship matches human detection of changes in pressure. We are much more sensitive to changes in level when the SPL is low (for example, hearing a baby crying in a distant bedroom), than we are to changes in level when the SPL is high (for example, when listening to highly amplified music).

[17] A “10 dB per doubling” rule of thumb is the most often used approximation.

describing environmental and transportation noise. **Figure 26** depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz.

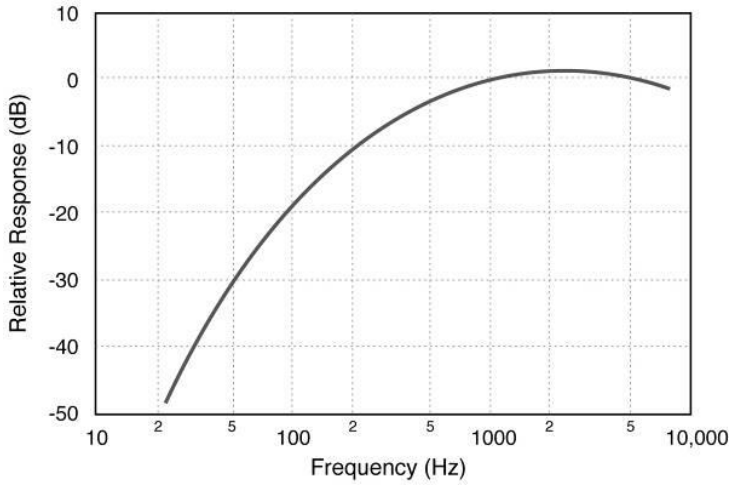



**Figure 26. A-Weighting Frequency Response**
Source: Extract from Harris, Cyril M., Editor, "Handbook of Acoustical Measurements and Control," McGraw-Hill, Inc., 1991, pg. 5.13; HMMH

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. All sound pressure levels presented in this document are A-weighted unless otherwise specified.

**Figure 27** depicts representative A-weighted sound levels for a variety of common sounds.

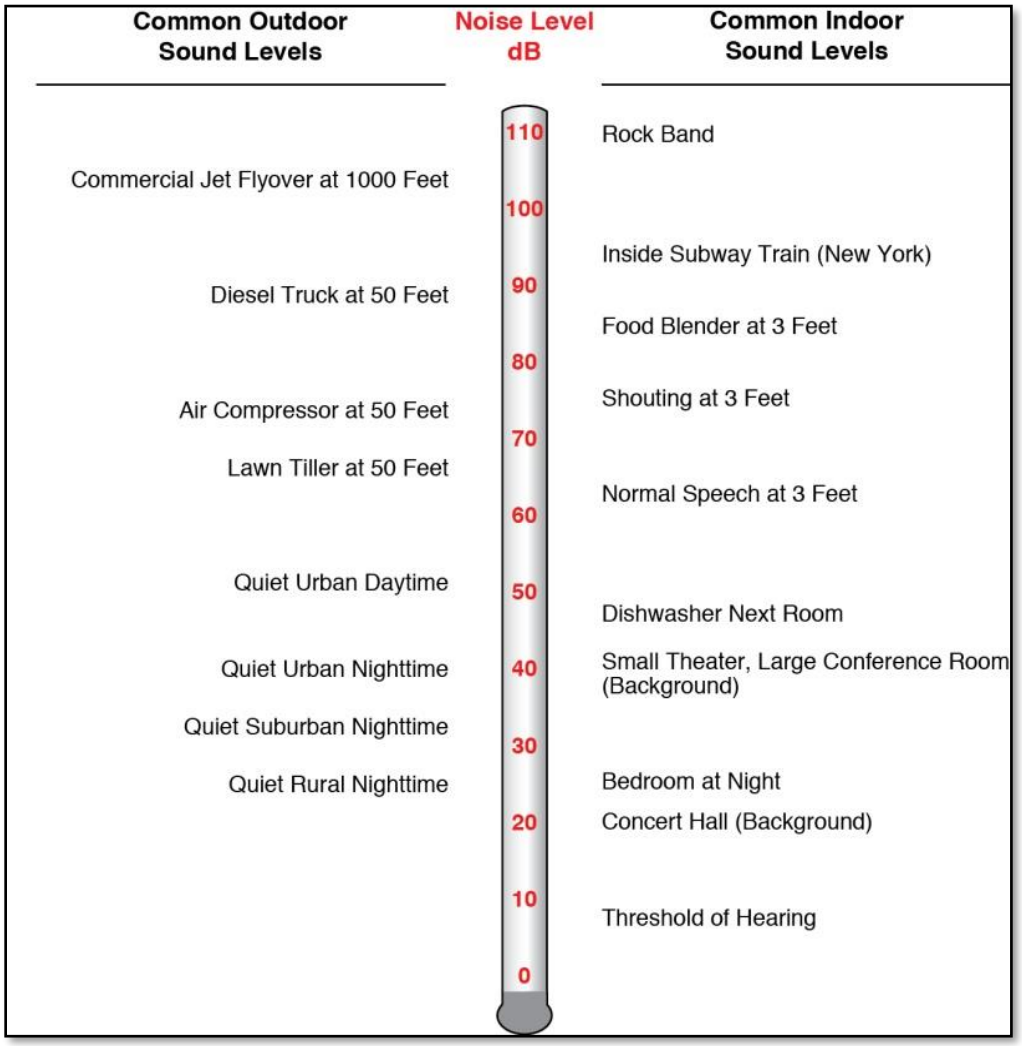



**Figure 27. A-Weighted Sound Levels for Common Sounds**
Source: HMMH

### *5.1.3 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 a car or aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. The background or "ambient" level continues to vary in the absence of a distinctive source, for example due to birds chirping, insects buzzing, leaves rustling, etc. It is often convenient to describe a particular noise "event" (such as a vehicle passing by, a dog barking, etc.) by its maximum sound level, abbreviated as $L_{max}$.

**Figure 28** depicts this general concept, for a hypothetical noise event with an $L_{max}$ of approximately 102 dB.

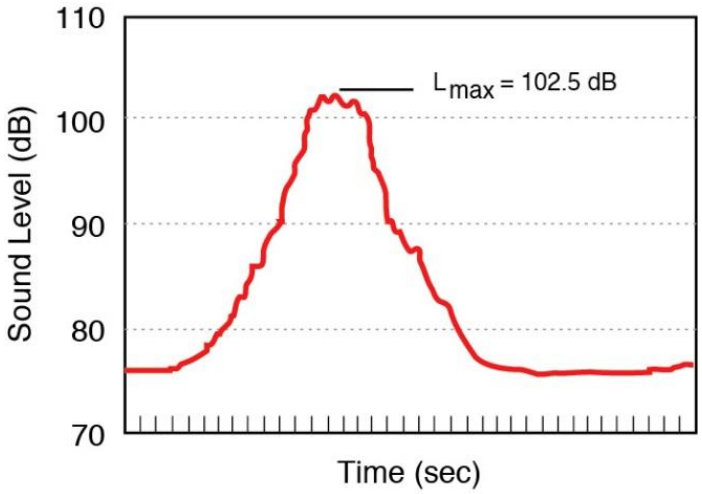



**Figure 28. Variation in A-Weighted Sound Level over Time and Maximum Noise Level**
*Source: HMMH*

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 section introduces a measure that accounts for this concept of a noise "dose," or the cumulative exposure associated with an individual "noise event" such as an aircraft flyover.

### *5.1.4 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.

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. In simple terms, SEL "compresses" the energy for the noise event into a single second. **Figure 29** depicts this compression, for the same hypothetical event shown in **Figure A-3**. Note that the SEL is higher than the $L_{max}$.

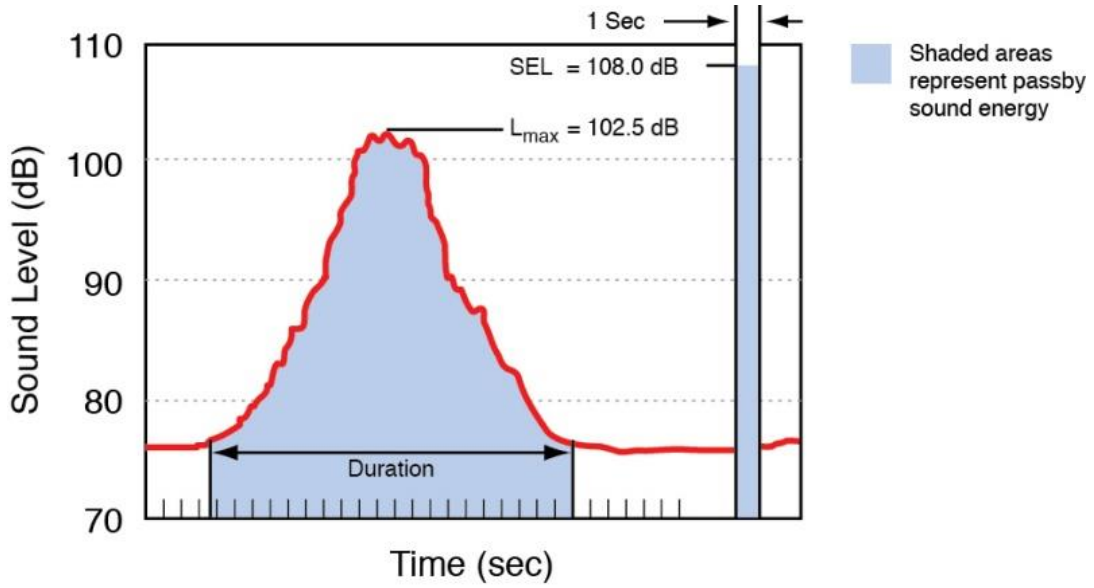



**Figure 29. Graphical Depiction of Sound Exposure Level**
*Source: HMMH*

The "compression" of energy into one second means that a given noise event's SEL will almost always will be a higher value than its $L_{max}$. For most aircraft flyovers, SEL is roughly five to 12 dB higher than $L_{max}$. Adjustment for duration means that relatively slow and quiet propeller aircraft can have the same or higher SEL than faster, louder jets, which produce shorter duration events.

### *5.1.5 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., one hour, an eight-hour school day, nighttime, or a full 24-hour day. $L_{eq}$ plots for consecutive hours can help illustrate how the noise dose rises and falls over a day or how a few loud aircraft significantly affect some hours.

$L_{eq}$ may be thought of as the constant sound level over the period of interest that would contain as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. **Figure 30** illustrates this concept for the same hypothetical event shown in **Figure 28** and **Figure 29**. Note that the $L_{eq}$ is lower than either the $L_{max}$ or SEL.

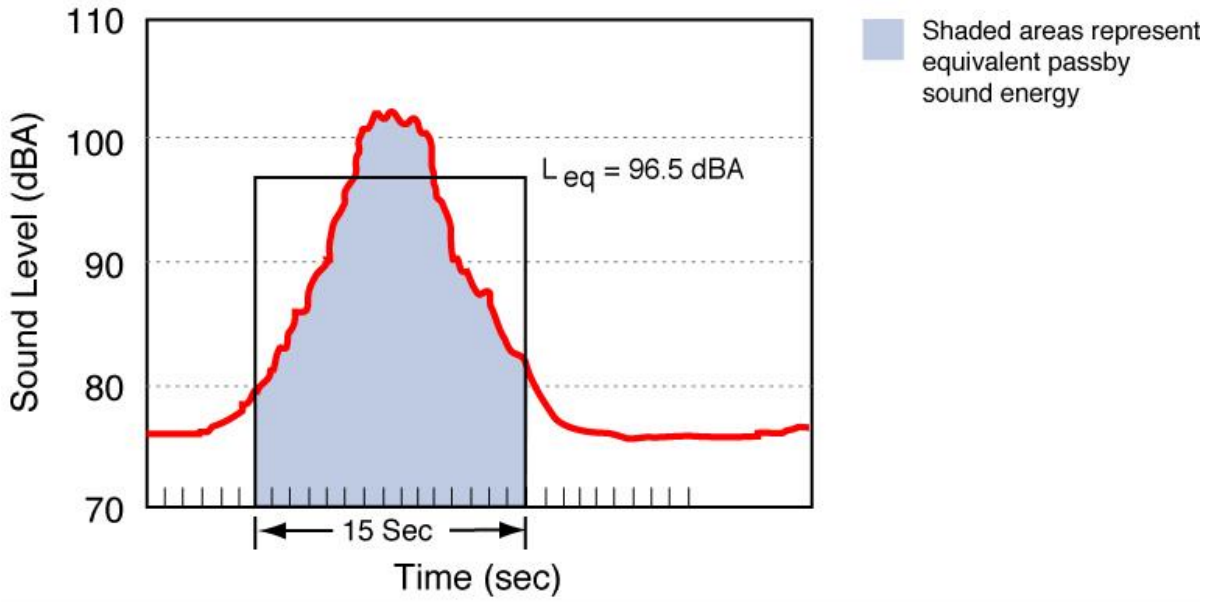



**Figure 30. Example of a 15-Second Equivalent Sound Level**
*Source: HMMH*

### *5.1.6 Day-Night Average Sound Level, DNL or $L_{dn}$*

The FAA requires that airports use a measure of noise exposure that is slightly more complicated than $L_{eq}$ to describe cumulative noise exposure – the Day-Night Average Sound Level, DNL.

The U.S. EPA identified DNL as the most appropriate means of evaluating airport noise based on the following considerations[18].

- The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.
- The measure should correlate well with known effects of the noise environment and on individuals and the public.
- The measure should be simple, practical, and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, should be commercially available.
- The measure should be closely related to existing methods currently in use.
- The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.
- The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

Most federal agencies dealing with noise have formally adopted DNL. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in 1992. The FICON

[18] "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," U. S. EPA Report No. 550/9-74-004, March 1974.

summary report stated: "There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric."

In 2015, the FAA began a multi-year effort to update the scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports.[19] This was the most comprehensive study using a single noise survey ever undertaken in the United States, polling communities surrounding 20 airports nationwide. The FAA Reauthorization Act of 2018 under Section 188 and 173, required FAA to complete the evaluation of alternative metrics to the DNL standard within one year. The Section 188 and 173 Report to Congress was delivered on April 14, 2020[20] and concluded that while no single noise metric can cover all situations, DNL provides the most comprehensive way to consider the range of factors influencing exposure to aircraft noise. In addition, use of supplemental metrics is both encouraged and supported to further disclose and aid in the public understanding of community noise impacts. The full study supporting these reports was released in January 2021. If changes are warranted in the use of DNL, which DNL level to assess or the use of supplemental metrics, FAA will propose revised policy and related guidance and regulations, subject to interagency coordination, as well as public review and comment.

In simple terms, DNL is the 24-hour $L_{eq}$ with one adjustment; all noises occurring at night (defined as 10 p.m. through 7 a.m.) are increased by 10 dB, to reflect the added intrusiveness of nighttime noise events when background noise levels decrease. In calculating aircraft exposure, this 10 dB increase is mathematically identical to counting each nighttime aircraft noise event ten times.

DNL can be measured or estimated. Measurements are practical only for obtaining DNL values for limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short periods. Most airport noise studies use computer-generated DNL estimates depicted as equal-exposure noise contours (much as topographic maps have contours of equal elevation).

The annual DNL is mathematically identical to the DNL for the average annual day; i.e., a day on which the number of operations is equal to the annual total divided by 365 (366 in a leap year). **Figure 31** graphically depicts the manner in which the nighttime adjustment applies in calculating DNL. **Figure 32** presents representative outdoor DNL values measured at various U.S. locations.

[19] Federal Aviation Administration. Press Release – FAA To Re-Evaluate Method for Measuring Effects of Aircraft Noise. https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18774

[20] Federal Aviation Administration. Report to Congress on an evaluation of alternative noise metrics. https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf

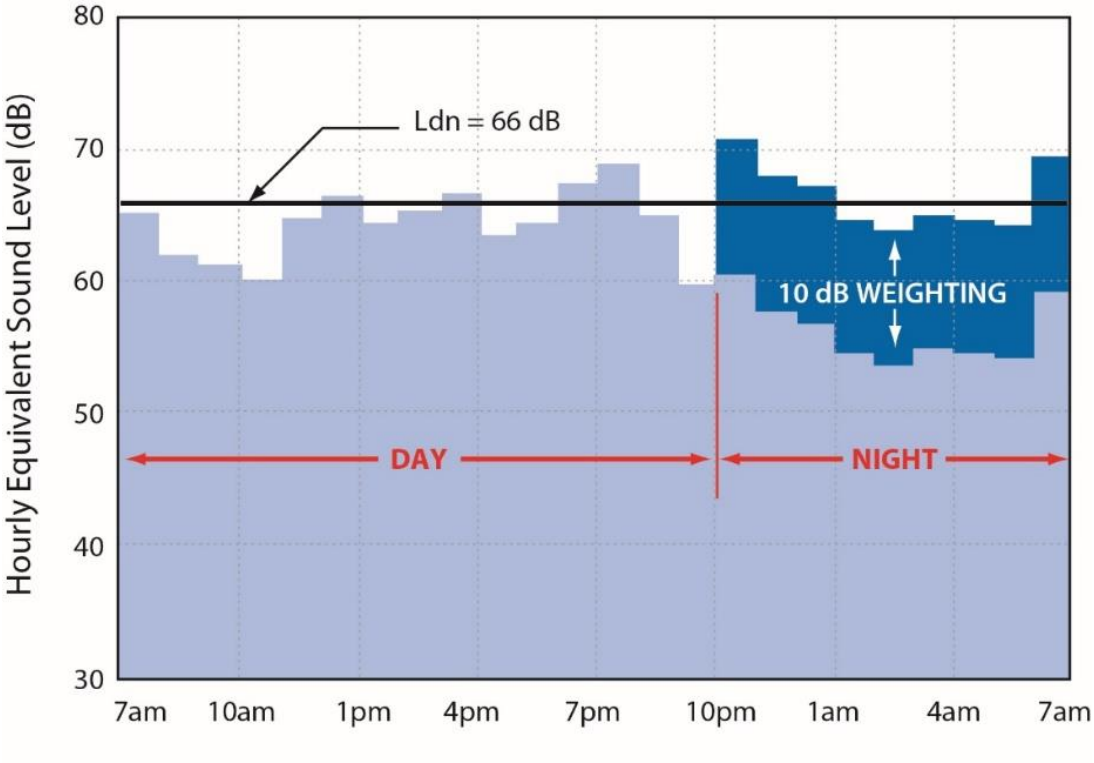



**Figure 31. Example of a Day-Night Average Sound Level Calculation**
*Source: HMMH*

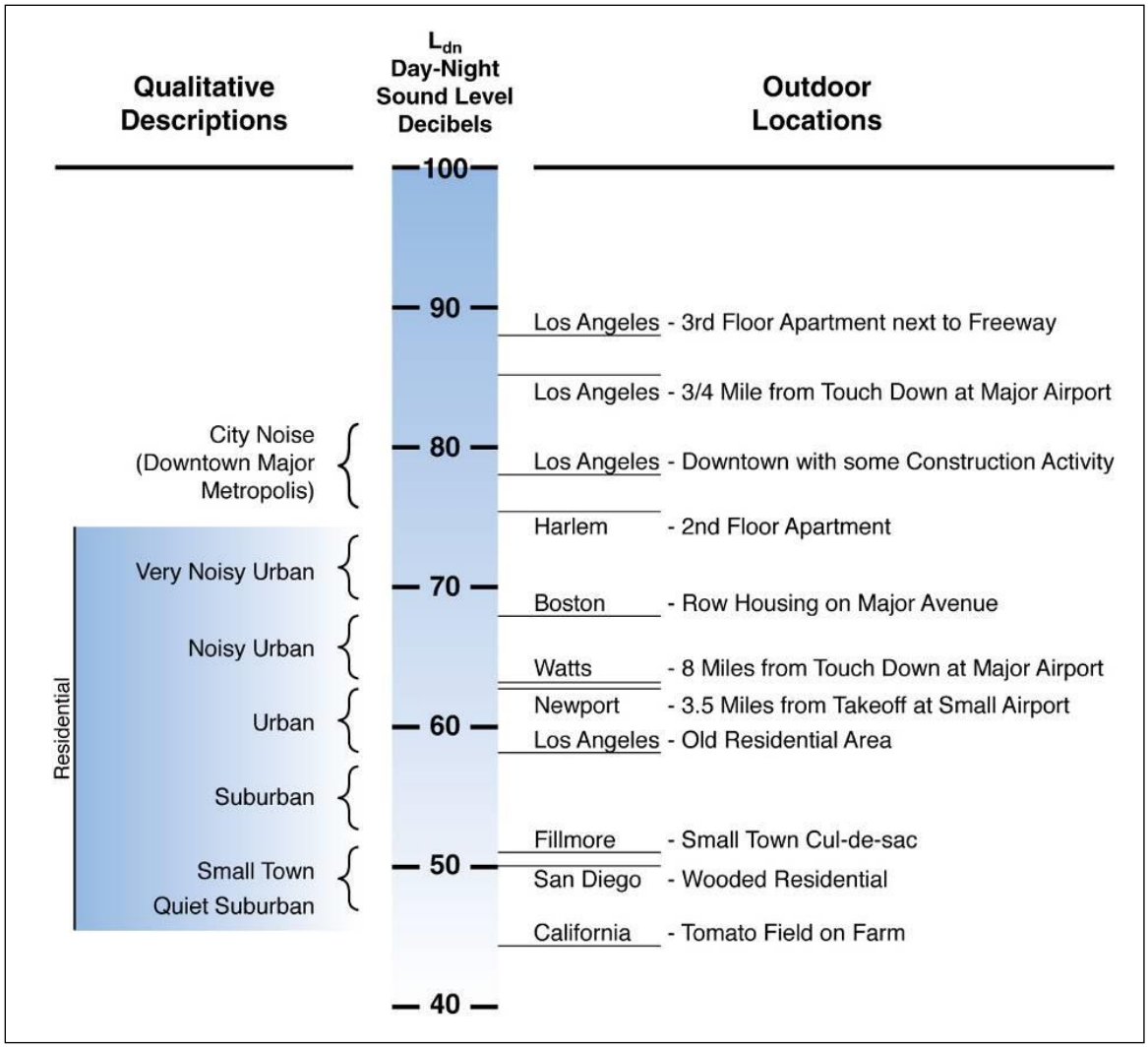



**Figure 32. Examples of Measured Day-Night Average Sound Levels, DNL**
*Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974, p.14.*

## 5.2 Aircraft Noise Effects on Human Activity

Aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, disrupt classroom activities in schools, and disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their environment.

### *5.2.1 Speech Interference*

One potential effect of aircraft noise is its tendency to "mask" speech, making it difficult to carry on a normal conversation. The sound level of speech decreases as the distance between a talker and listener increases. As the background sound level increases, it becomes harder to hear speech.

Figure 33 presents typical distances between talker and listener for satisfactory outdoor conversations, in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed voice effort. As the background level increases, the talker must raise his/her voice, or the individuals must get closer together to continue talking.

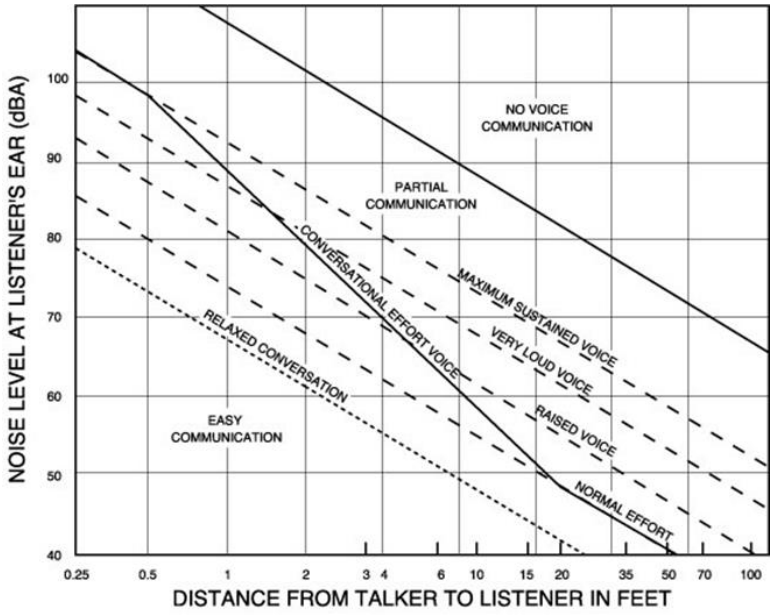



**Figure 33. Outdoor Speech Intelligibility**

*Source: U.S. EPA, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974, p.D-5.*

Satisfactory conversation does not always require hearing every word; 95% intelligibility is acceptable for many conversations. In relaxed conversation, however, we have higher expectations of hearing speech and generally require closer to 100% intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in the figure (which roughly represents the upper boundary of 100% intelligibility) represents an ideal environment for outdoor speech communication. Indoor communication is generally acceptable in this region as well.

One implication of the relationships in **Figure 33** is that for typical communication distances of three or four feet, acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dB. If the noise exceeds this level, as might occur when an aircraft passes overhead, intelligibility would be lost unless vocal effort were increased or communication distance were decreased.

Indoors, typical distances, voice levels, and intelligibility expectations generally require a background level less than 45 dB. With windows partly open, housing generally provides about 10 to 15 dB of interior-to-exterior noise level reduction. Thus, if the outdoor sound level is 60 dB or less, there is a reasonable chance that the resulting indoor sound level will afford acceptable interior conversation. With windows closed, 24 dB of attenuation is typical.

### 5.2.2 Sleep Interference

Research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without awakening, (2) the deeper the sleep the more noise it takes to cause arousal, (3) the tendency to awaken increases with age, and other factors. Figure 34 shows a summary of findings on the topic.

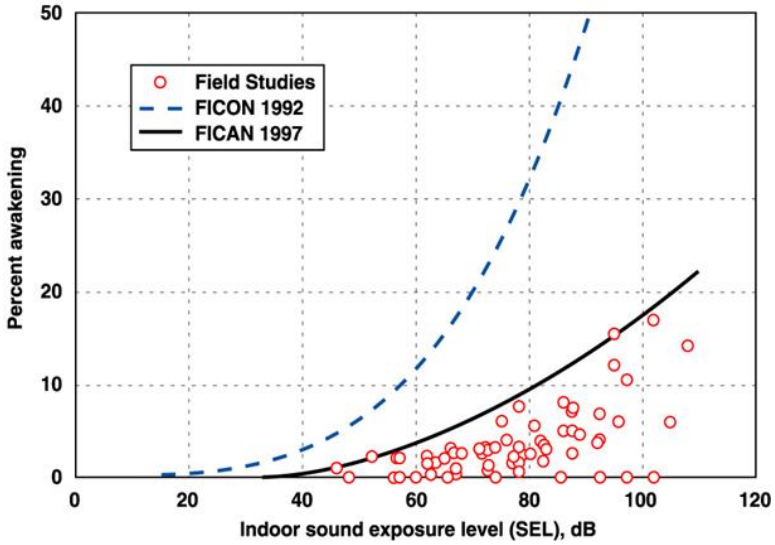



**Figure 34. Sleep Interference**
*Source: Federal Interagency Committee on Aircraft Noise (FICAN), "Effects of Aviation Noise on Awakenings from Sleep," June 1997, pg. 6*

**Figure 34** uses indoor SEL as the measure of noise exposure; current research supports the use of this metric in assessing sleep disruption. An indoor SEL of 80 dBA results in a maximum of 10% awakening.[21]

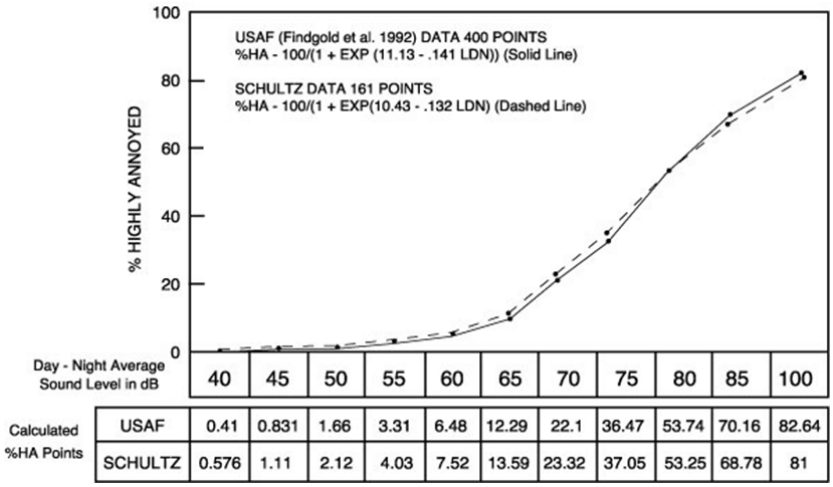
### 5.2.3 Community Annoyance

Numerous psychoacoustic surveys provide substantial evidence that individual reactions to noise vary widely with noise exposure level. Since the early 1970s, researchers have determined (and subsequently confirmed) that aggregate community response is generally predictable and relates reasonably well to cumulative noise exposure such as DNL. **Figure 35** depicts the widely recognized relationship between environmental noise and the percentage of people "highly annoyed," with annoyance being the key indicator of community response usually cited in this body of research. Separate work by the EPA showed that overall community reaction to a noise environment was also correlated with DNL. **Figure 36** depicts this relationship.

As noted above in the discussion of DNL, the full report on the FAA's recent research, polling communities surrounding 20 airports nationwide, was released in January 2021. At the time of

[21] The awakening data presented in Figure A-9 apply only to individual noise events. The American National Standards Institute (ANSI) has published a standard that provides a method for estimating the number of people awakened at least once from a full night of noise events: ANSI/ASA S12.9-2008 / Part 6, "Quantities and Procedures for Description and Measurement of Environmental Sound – Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes." This method can use the information on single events computed by a program such as the FAA's AEDT, to compute awakenings.

this reporting, the public review and comment period on that research had ended but FAA had not yet issued new guidance.




| Day - Night Average Sound Level in dB | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calculated %HA Points USAF | 0.41 | 0.831 | 1.66 | 3.31 | 6.48 | 12.29 | 22.1 | 36.47 | 53.74 | 70.16 | 82.64 |
| SCHULTZ | 0.576 | 1.11 | 2.12 | 4.03 | 7.52 | 13.59 | 23.32 | 37.05 | 53.25 | 68.78 | 81 |

**Figure 35. Percentage of People Highly Annoyed**
*Source: FICON, "Federal Agency Review of Selected Airport Noise Analysis Issues," September 1992*

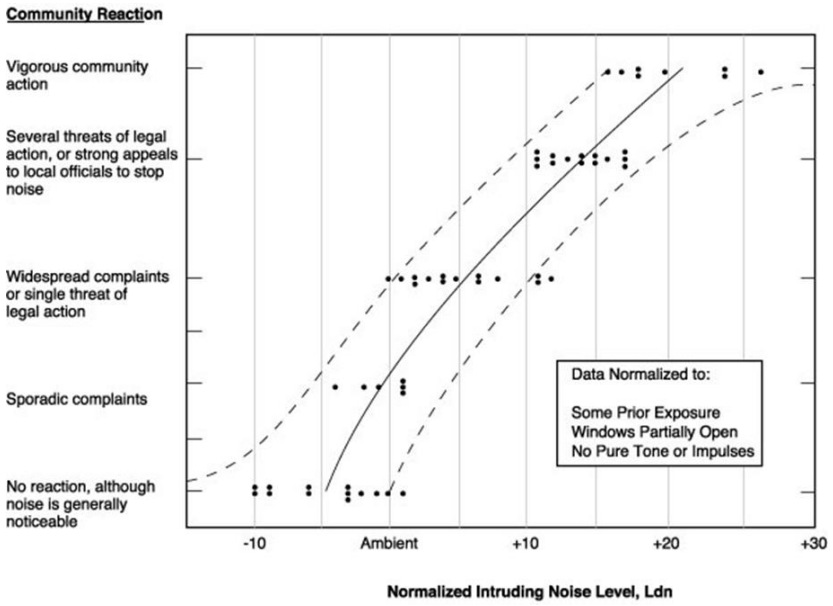



**Figure 36. Community Reaction as a Function of Outdoor DNL**
*Source: Wyle Laboratories, Community Noise, prepared for the U.S. EPA, Office of Noise Abatement and Control, Washington, D.C., December 1971, pg. 63*

Data summarized in the figure suggest that little reaction would be expected for intrusive noise levels five decibels below the ambient, while widespread complaints can be expected as

intruding noise exceeds background levels by about five decibels. Vigorous action is likely when levels exceed the background by 20 dB.

## 5.3 Noise Propagation

This section presents information sound-propagation effect due to weather, source-to-listener distance, and vegetation.

### *5.3.1 Weather-Related Effects*

Weather (or atmospheric) conditions that can influence the propagation of sound include humidity, precipitation, temperature, wind, and turbulence (or gustiness). The effect of wind – turbulence in particular – is generally more important than the effects of other factors. Under calm-wind conditions, the importance of temperature (in particular vertical "gradients") can increase, sometimes to very significant levels. Humidity generally has little significance relative to the other effects.

### *5.3.2 Influence of Humidity and Precipitation*

Humidity and precipitation rarely effect sound propagation in a significant manner. Humidity can reduce propagation of high-frequency noise under calm-wind conditions. This is called "Atmospheric absorption." In very cold conditions, listeners often observe that aircraft sound "tinny," because the dry air increases the propagation of high-frequency sound. Rain, snow, and fog also have little, if any noticeable effect on sound propagation. A substantial body of empirical data supports these conclusions.[22]

### *5.3.3 Influence of Temperature*

The velocity of sound in the atmosphere is dependent on the air temperature. [23] As a result, if the temperature varies at different heights above the ground, sound will travel in curved paths rather than straight lines. During the day, temperature normally decreases with increasing height. Under such "temperature lapse" conditions, the atmosphere refracts ("bends") sound waves upwards and an acoustical shadow zone may exist at some distance from the noise source.

Under some weather conditions, an upper level of warmer air may trap a lower layer of cool air. Such a "temperature inversion" is most common in the evening, at night, and early in the morning when heat absorbed by the ground during the day radiates into the atmosphere. [24] The effect of an inversion is just the opposite of lapse conditions. It causes sound propagating through the atmosphere to refract downward.

The downward refraction caused by temperature inversions often allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects, increasing noise levels at greater distances. This type of effect is most prevalent at night, when temperature

[22]Ingard, Uno. "A Review of the Influence of Meteorological Conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May 1953, p. 407.

[23]In dry air, the approximate velocity of sound can be obtained from the relationship:

$c = 331 + 0.6T_c$ (c in meters per second, $T_c$ in degrees Celsius). Pierce, Allan D., *Acoustics: An Introduction to its Physical Principles and Applications.* McGraw-Hill. 1981. p. 29.

[24]Embleton, T.F.W., G.J. Thiessen, and J.E. Piercy, "Propagation in an inversion and reflections at the ground," *Journal of the Acoustical Society of America*, Vol. 59, No. 2, February 1976, p. 278.

inversions are most common and when wind levels often are very low, limiting any confounding factors. [25] Under extreme conditions, one study found that noise from ground-borne aircraft might be amplified 15 to 20 dB by a temperature inversion. In a similar study, noise caused by an aircraft on the ground registered a higher level at an observer location 1.8 miles away than at a second observer location only 0.2 miles from the aircraft. [26]

### 5.3.4 Influence of Wind

Wind has a strong directional component that can lead to significant variation in propagation. In general, receivers that are downwind of a source will experience higher sound levels, and those that are upwind will experience lower sound levels. Wind perpendicular to the source-to-receiver path has no significant effect.

The refraction caused by wind direction and temperature gradients is additive. [27] One study suggests that for frequencies greater than 500 Hz, the combined effects of these two factors tends towards two extreme values: approximately 0 dB in conditions of downward refraction (temperature inversion or downwind propagation) and -20 dB in upward refraction conditions (temperature lapse or upwind propagation). At lower frequencies, the effects of refraction due to wind and temperature gradients are less pronounced. [28]

Wind turbulence (or "gustiness") can also affect sound propagation. Sound levels heard at remote receiver locations will fluctuate with gustiness. In addition, gustiness can cause considerable attenuation of sound due to effects of eddies traveling with the wind. Attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can mask the refractive effects discussed above. [29]

### 5.3.5 Distance-Related Effects

People often ask how distance from an aircraft to a listener affects sound levels. Changes in distance may be associated with varying terrain, offsets to the side of a flight path, or aircraft altitude. The answer is a bit complex, because distance affects the propagation of sound in several ways.

The principal effect results from the fact that any emitted sound expands in a spherical fashion – like a balloon – as the distance from the source increases, resulting in the sound energy being spread out over a larger volume. With each doubling of distance, spherical spreading reduces instantaneous or maximum level by approximately six decibels and SEL by approximately three decibels.

[25] Ingard, p. 407.

[26] Dickinson, P.J., "Temperature Inversion Effects on Aircraft Noise Propagation," (Letters to the Editor) *Journal of Sound and Vibration.* Vol. 47, No. 3, 1976, p. 442.

[27] Piercy and Embleton, p. 1412. Note, in addition, that as a result of the scalar nature of temperature and the vector nature of wind, the following is true: under lapse conditions, the refractive effects of wind and temperature add in the upwind direction and cancel each other in the downwind direction. Under inversion conditions, the opposite is true.

[28] Piercy and Embleton, p. 1413.

[29] Ingard, pp. 409-410.

### 5.3.6 Vegetation-Related Effects

Sound can be scattered and absorbed as it travels through vegetation. This results in a decrease in sound levels. The literature on the effect of vegetation on sound propagation contains several approaches to calculating its effect. Though these approaches differ in some aspects, they agree on the following:

- The vegetation must be dense and deep enough to block the line of sight
- The noise reduction is greatest at high frequencies and least at low frequencies

The International Standard ISO 9613-2[30] provides a useful example of the types of calculations employed in these methods. Originally developed for industrial noise sources, ISO 9613-2 is well-suited for the evaluation of ground-based aircraft noise sources under favorable meteorological conditions for sound propagation. ISO 9613-2's methodology for calculating sound propagation includes geometric dispersion from acoustical point sources, atmospheric absorption, the effects of areas of hard and soft ground, screening due to barriers, and reflections. The attenuation provided by dense foliage varies by octave band and by distance as shown in **Table 11**.

For propagation through less than 10 m of dense foliage, no attenuation is assumed. For propagation through 10 m to 20 m of dense foliage, the total attenuation is shown in the first row of **Table 11.** For distances between 20 m and 200 m, the total attenuation is computed by multiplying the distance of propagation through dense foliage by the dB/m values shown in the second row of **Table 11.**

**Table 11. Dense Foliage Noise Attenuation**

Source: ISO 9613-2, Table A.1

| Propagation Distance | Nominal Midband Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1,000 | 2,000 | 4,000 | 8,000 |
| 10 m to 20 m (dB Attenuation) | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 3 |
| 20 m to 200 m (dB/m Attenuation) | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.09 | 0.12 |

ISO 9613-2 assumes a moderate downwind condition. The equations in the ISO Standard also hold, equivalently, for average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights. In either case, the sound is refracted downward. The radius of this curved path is assumed to be 5 km. With this curved sound path, only portions of the sound path may travel through the dense foliage, as illustrated by **Figure 37**. Thus, the relative locations of the source and receiver, the dimensions of the volume of dense foliage, and the contours of the intervening terrain are essential to the estimation of the noise attenuation.

[30] International Organization for Standardization, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of calculation, International Standard ISO9613-2, Geneva, Switzerland (15 December 1996).

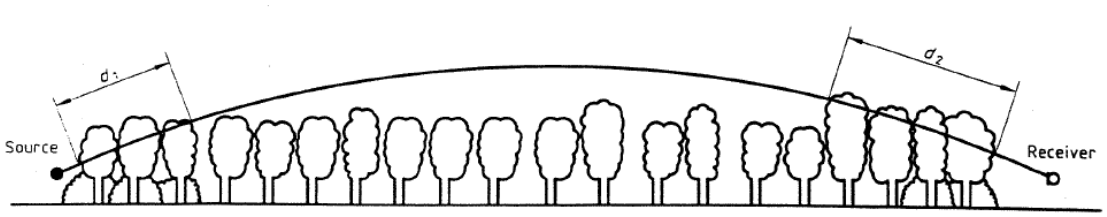



**Figure 37. Downward Refracting Sound Path**
source: ISO 9613-2

As illustrated in **Figure 37**, the foliage only provides attenuation if the sound path passes through the foliage. For aircraft in the air, the sound will pass through little, if any foliage. Additionally, either the noise source or receiver must be near the foliage for it to have an effect.

# APPENDIX E

## Stream and Wetland Assessment

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August 30, 2021

Sarah Chitwood, Regulatory Division Chief
U.S. Army Corps of Engineers
ATTN: CESWL-RD, Rm 6323
PO Box 867
Little Rock, AR 72203
ceswl-regulatory@usace.army.mil

Re: Fort Smith Regional Airport, Runway 26 Extension
Fort Smith, Sebastian County, Arkansas
Wetland Delineation Report & AJD Request

Ms. Chitwood:

The Fort Smith Regional Airport (FSM or Airport) is a public use airport that is owned and operated by the Fort Smith Regional Airport Commission and serves general aviation and major commercial airlines. The Airport is located on the east side of Fort Smith, Arkansas and situated between Interstate 540 (I-540), Rogers Avenue, and Zero Street. A general location map of the Airport in relation to the city is shown in **Figure 1**. The Airport covers approximately 1,403 acres, has one primary use runway and a secondary runway, full parallel taxiways, ground support equipment, and one active concourse with three gates.

The Fort Smith Regional Airport desires to construct a 1,300-foot extension of Runway 8-26 to the east with an associated taxiway extension. Navigational aids and the runway safety area will be relocated as a result of the runway extension, which is entirely on airport property.

FSM has retained Garver, LLC to conduct a wetland delineation and prepare the Section 404 permit application. This report summarizes our findings and requests issuance of an Approved Jurisdictional Determination (AJD) for the proposed project at FSM.

## Wetland Delineation Summary

The study area is approximately 147 acres (See **Figure 2**). Two ephemeral streams were located within the study area, but numerous wetlands were identified. Land use in the project vicinity is primarily airport property that is mowed and maintained on the west side and rural agriculture to the eastern part of the study area. A description of each aquatic feature is provided in the following sections.

A wetland delineation of the study area was conducted June 4, 2021. According to the closest weather station in Fort Smith[1], the area received 4.89 inches of rainfall two weeks before the site visit (between May 21 and June 4), with a 0.97 inches of the total falling 4 days prior to the site visit. Conditions on site appeared

[1] Columbia Lock Station USC00161979, as identified by the National Centers for Environmental Information, National Oceanic and Atmospheric Administration. Available online at: https://www.ncdc.noaa.gov/cdo-web/

to be normal. According to the NRCS Web Soil Survey (See Attached **Figure 3)**, hydric soils are present within the study area. FEMA maps indicate the study area is not located within a floodplain (see attached **Figure 3**). **Figure 3** also shows the location of potential wetlands identified by the USFWS National Wetlands Inventory (NWI). As shown in **Figures 4A and 4B**, ten wetlands (W), two ponds (P), and two other waters (OW) were delineated within the study area. No other aquatic features were located in the study area. Upland and wetland data points (DP) were recorded at 11 locations (data forms for DP 1 through DP 11 attached). Observation points were also collected within the study area. A description of each aquatic feature delineated within the study area is provided below. **Table 1** provides a summary of the aquatic features determined to be likely jurisdictional.

**Wetland 1a ►**

Wetland 1a extends from the northern end of Runway 26 and curves south as it passes the east side of the runway end. Wetland 1a is classified as palustrine, emergent, persistent, seasonally flooded/saturated, wetland (PEM1C) wetland, is approximately 0.77 acres in size, and regularly mowed. It appears to be isolated and is connected hydrologically to a man-made ditch. Wetland 1a is not likely subject to regulation by the USACE.

*View of Wetland 1a looking west.*

*View of Wetland 1b looking south.*

**Wetland 1b ◄**

Wetland 1b is located approximately 410 feet northeast of Wetland 1a. Wetland 1b is classified as PEM1C wetland, is approximately 0.47 acres in size, and is regularly mowed. The wetland is a depression that is likely isolated until seasonal precipitation causes it to overflow. Due to the isolation, Wetland 1b is not likely subject to regulation by the USACE.

**Wetland 1c**

Wetland 1c is located on the northern part of the study area, northeast of Wetland 1b and is classified as PEM1C wetland, is approximately 0.36 acres in size, and regularly mowed. The wetland is a depression and considered isolated. Wetland 1c is not likely subject to regulation by the USACE.

**Wetland 1d**

Wetland 1d is also located in the northern part of the study area, northeast of Wetland 1c and classified as PEM1C wetland, is approximately 0.29 acres in size, isolated, and also regularly mowed. Wetland 1d is not likely subject to regulation by the USACE.

**Wetland 1e►**
Wetland 1e is a linear wetland located adjacent to the airport perimeter road that extends to the west. Wetland 1e is approximately 0.15 acre in size, regularly mowed, isolated, and classified as PEM1C wetland. Wetland 1e is not likely subject to regulation by the USACE.


*View of Wetland 1e looking northeast.*

**Wetland 2 ▼**
Wetland 2 is located southeast of Runway 26, is approximately 8.55 acres in size, and is classified as a PEM1C wetland. Wetland 2 has six small, elevated upland areas that are located within the wetland. This wetland is regularly mowed, and appears to be hydrologically connected to OW-2 that would flow off-site, but does not have a discernable surface connection to Massard Creek. Wetland hydrology observed included surface water, high water table, saturation, and algal mat or crust. Dominant vegetation included fox sedge (*Carex vulpinoidea*), Sedge sp. (*Carex sp.*), and spike rush (*Eleocharis palustris*). Hydric soils were silty clay loam with depleted matrix. Wetland 2 could be subject to regulation by the USACE; however, an obvious off-site surface water connection to Massard Creek and a tributary to Massard Creek located downstream was not observed.


*View of Wetland 2 looking west.*


*View of Wetland 2 looking northwest.*

**Wetland 3a ▼**
Wetland 3a is a large emergent wetland located between the airport perimeter road and forested wetlands to the east. Wetland 3a is approximately 9.25 acres in size, regularly mowed, and is classified as a PEM1C wetland. One small upland area is located within it. This wetland has a surface hydrology connection to Ponds 1 and 2, which appear to have a surface connection to Massard Creek.

Wetland 3a exhibited wetland hydrology indicators of surface water, saturation, and redoximorphic features within the soil profile. Dominant vegetation included Sedge sp. and needle-pod rush (*Juncus scirpoides*). Soils were silty loam with depleted matrix. Wetland 3a is likely subject to regulation by the USACE due to its connection to Massard Creek.

*Hydric soils from Wetland 3a*

*View of Wetland 3a looking west.*

**Wetland 3b ▼**

Wetland 3b is forested wetland adjacent to Pond 1 and Pond 2. It encompasses approximately 3.0 acres and is classified as palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C). Hydrology indicators observed within Wetland 3b included moss trim lines, saturation, and inundation. Wetland vegetation observed included slippery elm (*Ulmus rubra*) and green ash (*Fraxinus pennsylvanica*). Soils were a silty loam with depleted matrix. Wetland 3b is likely subject to regulation by the USACE due to its surface hydrology connection to Massard Creek.

*View of Wetland 3b.*

*Soils from Wetland 3b.*

**Wetland 4a ►**

Wetland 4a is an emergent wetland that appears to be to have been constructed for farming purposes in the past. The wetland extends along excavated swales that form horizontal wet areas evenly spaced from each other. Wetland 4a is classified as palustrine, emergent, persistent, seasonally flooded/saturated, partially drained/ditched wetland (PEM1Ed). This wetland is approximately 0.61 acres and will not likely subject to regulation by the USACE due to it being created for farming.

*View of Wetland 4a looking west.*

**Wetland 4b**

Wetland 4a is located northeast of Wetland 4a and is approximately 0.37 acres in size. Wetland 4b is also classified as PEM1Ed, has the same characteristics as Wetland 4b as it appears to have been constructed for farming applications, and is not likely subject to regulation by the USACE.

**Drainage Ditch 1►**

An ephemeral unnamed drainage feature, OW-1, that would flow south from the perimeter road was identified during the field visit as a small drainage feature that was likely created by the airport to divert rainwater flow from the runway. OW-1 drains to Wetland 1a. Due to its lack of connection and hydrologic characteristics, this feature is not likely be subject to regulation by the USACE.

*View of OW-1 looking south.*

**Drainage Ditch 2►**

A second ephemeral unnamed drainage feature, OW-2, would flow southeast from the southern edge of the perimeter road. OW-2 is a small drainage feature located southeast of Wetland 2 and is located between two roadways. It does not appear to drain to any nearby waterbody. It is likely a depressional area that holds water after precipitation. Due to its perceived lack of surface water connectionto downstream waters of the US, this feature is not likely be subject to regulation by the USACE.

*View of Drainage Ditch 2 looking downstream to the southeast.*

**Pond 1 ▼**

Pond 1 is located on the eastern side of the project area, adjacent to Wetland 3b. Pond 1 is approximately 3.33 acres and is classified as palustrine unconsolidated bottom, permanently flooded, diked/impounded (PUBHh). Pond 1 receives drainage from upgradient areas including portions of Wetland 3b. Due to the hydrologic connection to Massard Creek, this pond is likely regulated by the USACE.

*View of Pond 1 looking east.*

**Pond 2**

Pond 2 is located on the eastern side of the project area, adjacent to Wetland 3b and Pond 1. Pond 2 is approximately 0.38 acres and is classified as palustrine unconsolidated bottom, permanently flooded, diked/impounded (PUBHh). Pond 2 receives drainage from Pond 1 and Wetland 3b. Due to the hydrologic connection to Massard Creek, this pond is likely regulated by the USACE. No impacts to Pond 2 are anticipated by the proposed project.

**Table 1: Potentially Jurisdictional Wetlands and Ponds**

| Feature No. | Cowardin Classification | Jurisdictional Status* | Acreage within Study Area |
|---|---|---|---|
| W-3a | PEM1C | Likely | 9.25 acres |
| W-3b | PFO1C | Likely | 3.0 acres |
| P-1 | PUBHh | Likely | 3.33 acres |
| P-2 | PUBHh | Likely | 0.38 acre |
| | | **TOTALS:** | **15.96 acres** |

*Only those features considered likely to be jurisdictional are identified in this table.

**Conclusion**

As described in this report, a total of 12.25 acres of wetlands and 3.71 acres are ponds were identified as potentially jurisdictional features within the study area. Enclosed with this wetland report are several attachments listed below to aid in your review. Design plans have not been completed at this time; however, anticipated Section 404 permitting will be coordinated with your office when impacts have been determined.

On behalf of FSM, we respectfully request an AJD. Please call me at #479-287-4628 or email me at RCMountain@GarverUSA.com if you have any questions.

Sincerely,

GARVER

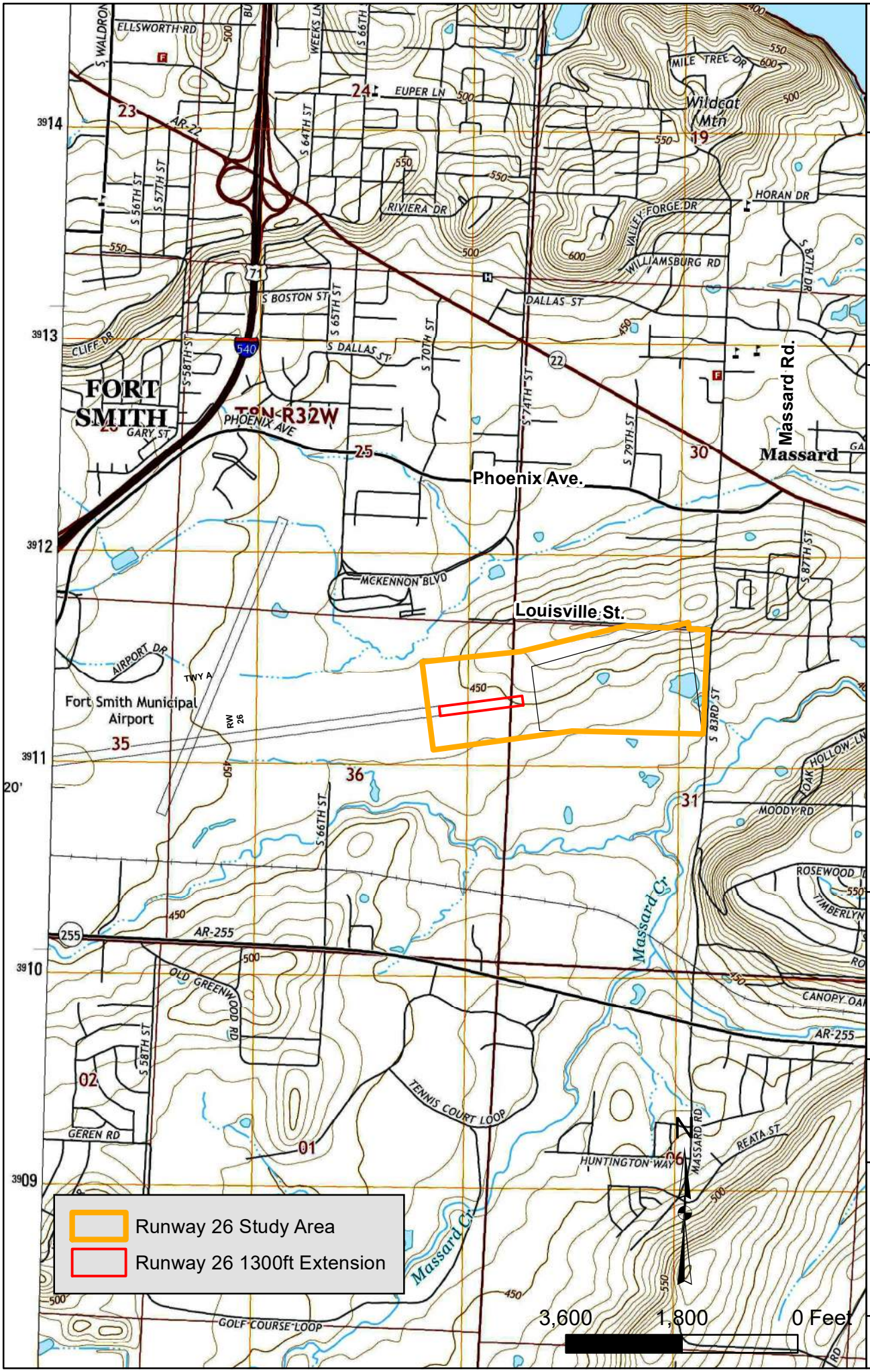
Ryan Mountain

Ryan Mountain, PWS

cc: Adam White, PE – Garver
Brian Maurer, PE – Morrison-Shipley

Attachments:

Figure 1 - Site Location Map
Figure 2 – Study Area
Figure 3 – NWI, NRCS, and FEMA Map
Figure 4A - Wetland Delineation
Figure 4B - Wetland Delineation
Wetland Data Forms
Weather Data




ESRI World Street Map

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4300 South J.B. Hunt Drive
Suite 240
Rogers, AR 72758
(479) 257-9188

# FORT SMITH REGIONAL AIRPORT (FSM)
FORT SMITH, AR
RUNWAY 26 EXTENSION - DIRECT STUDY AREA

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

JOB NO.:
DATE: MAY 2021
DESIGNED BY: RCM
DRAWN BY: RCM

SITE LOCATION MAP

FIGURE: 1

Document Path: \\garverinc.local\gdata\Projects\2021\21A13171 - FSM Runway 25 Extension\GIS\Maps\Environmental\For Wetland Report\FSM_Pre

User Name: JCMarshall


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# FORT SMITH REGIONAL AIRPORT (FSM)
FORT SMITH, AR
RUNWAY 26 EXTENSION

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

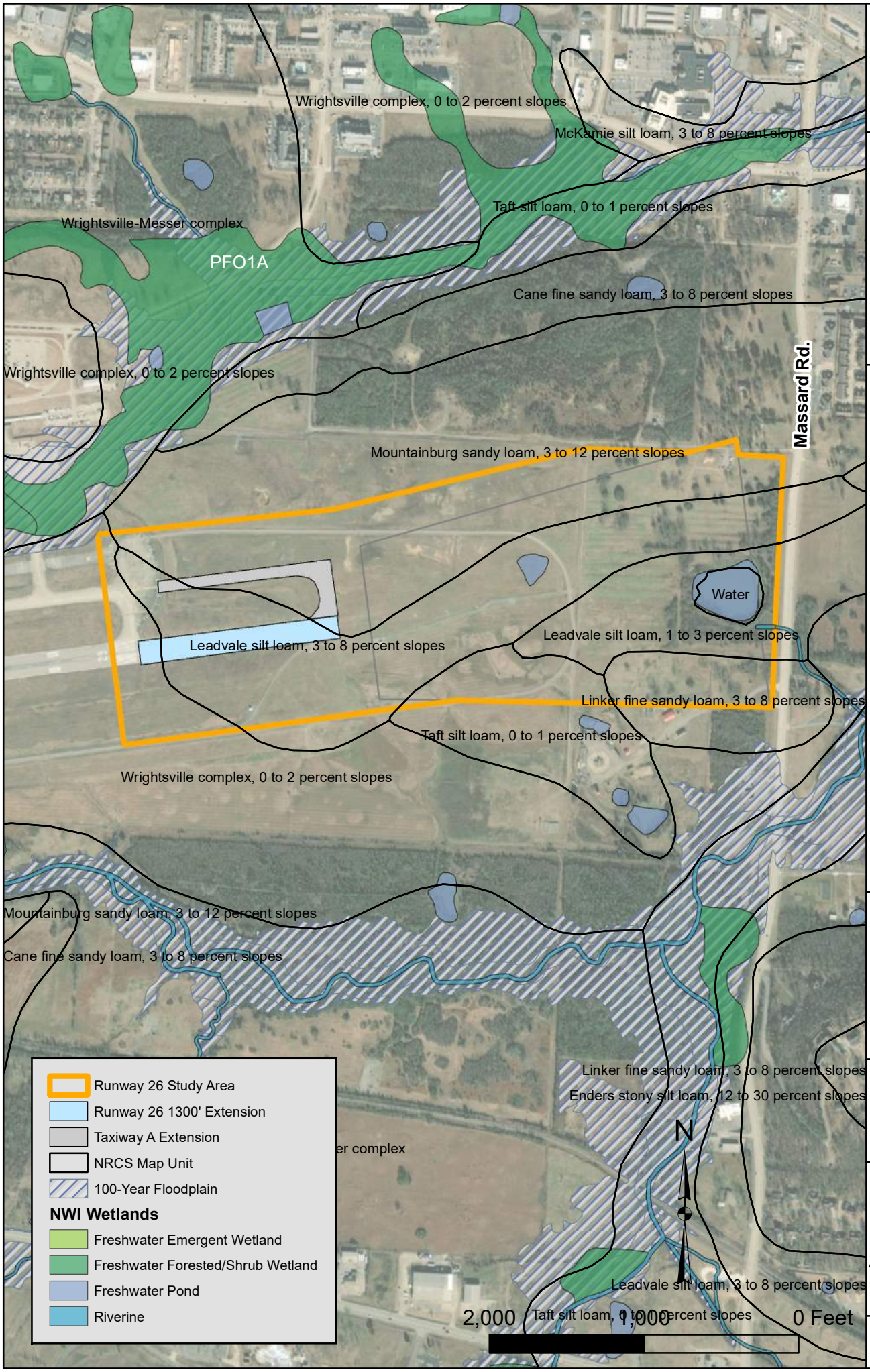
JOB NO.: 21A13171
DATE: MAY 2021
DESIGNED BY: RCM
DRAWN BY: RCM

STUDY AREA

FIGURE: 2

Document Path: \\garverinc.local\gdata\Projects\2021\21A13171 - FSM Runway 25 Extension\GIS\Maps\Environmental\For Wetland Report\FSM_RW26_Study_Area.mxd 5/22/2021 2:13:16 PM User Name: JCMarshall

ESRI World Street Map

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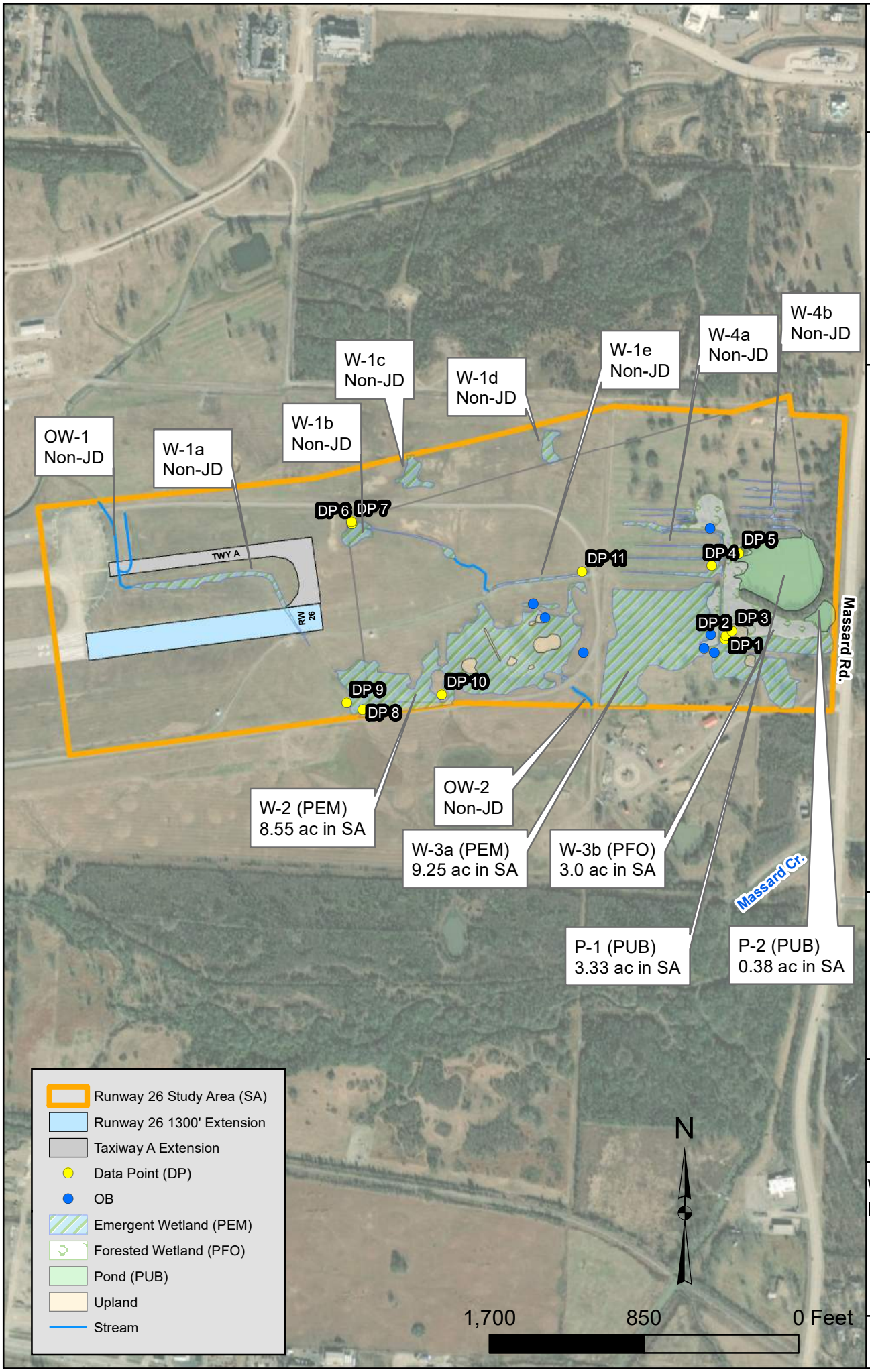
# FORT SMITH REGIONAL AIRPORT (FSM)
FORT SMITH, AR
RUNWAY 26 EXTENSION

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

JOB NO.: 21A13171
DATE: JUNE 2021
DESIGNED BY: RCM
DRAWN BY: RCM

NRCS SOILS, FEMA FLOODPLAIN, AND USFWS NWI MAP

FIGURE: 3

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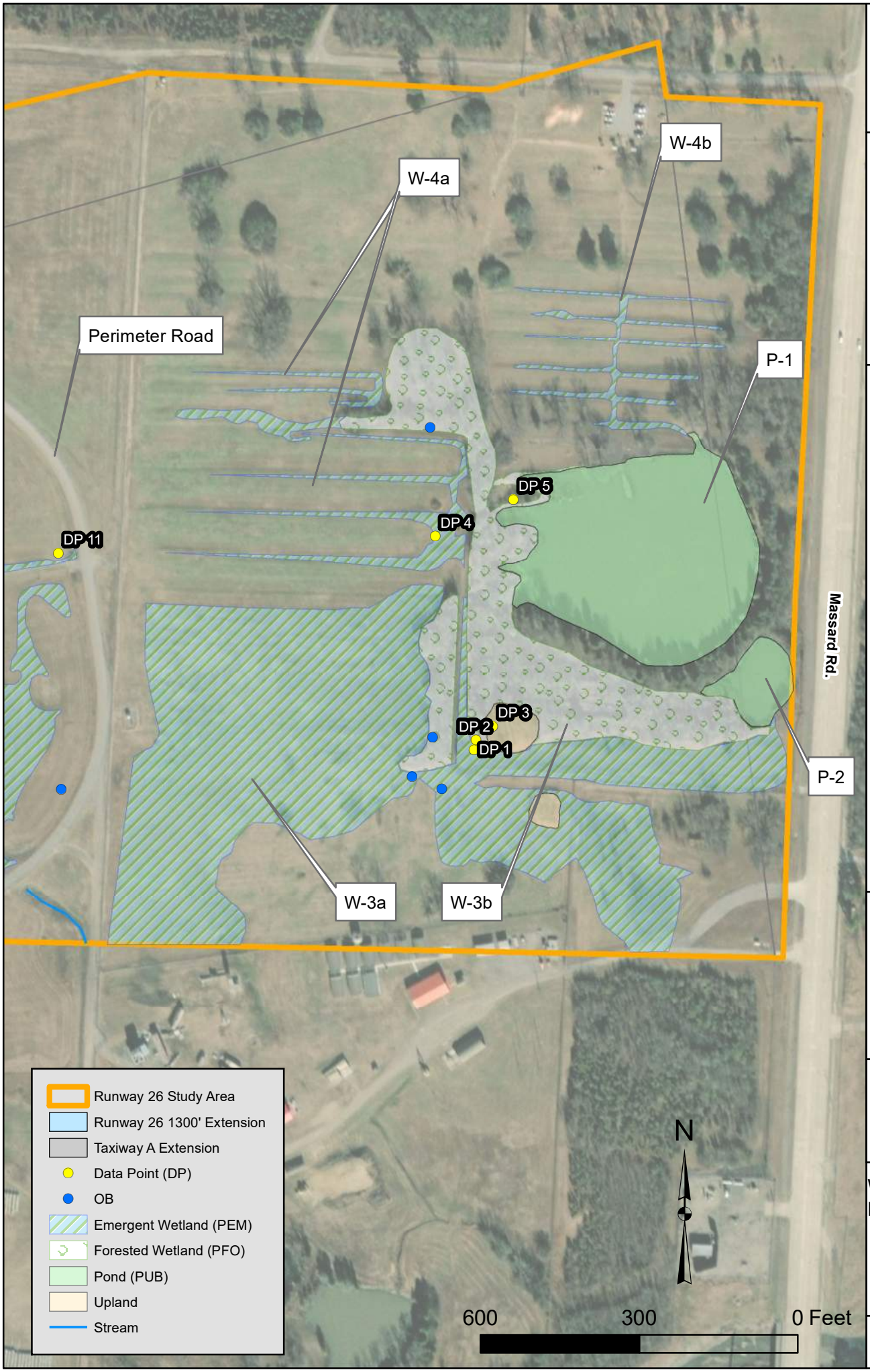
# FORT SMITH REGIONAL AIRPORT (FSM)
FORT SMITH, AR
RUNWAY 26 EXTENSION

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

JOB NO.: 21A13171
DATE: JUNE 2021
DESIGNED BY: RCM
DRAWN BY: RCM

WETLAND DELINEATION

FIGURE: **4A**

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# FORT SMITH REGIONAL AIRPORT (FSM)
FORT SMITH, AR
RUNWAY 26 EXTENSION

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

JOB NO.: 21A13171
DATE: JUNE 2021
DESIGNED BY: RCM
DRAWN BY: RCM

WETLAND DELINEATION

FIGURE: **4B**

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM RW26 City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 1

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Field edge Local relief (concave, convex, none): Level Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.337306° Long: -94.343158° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 1 to 3 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X | No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X | No _____ | |
| Wetland Hydrology Present? | Yes X | No _____ | |

Remarks:

Meets all wetland criteria.

### 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 Visible 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 X | No _____ | Depth (inches): 0-1" |
| Water Table Present? | Yes X | No _____ | Depth (inches): 6" |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): 0" |

**Wetland Hydrology Present?** Yes X No _____

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

Remarks:

Meets hydrology criteria.

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

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Sapling/Shrub Stratum (Plot size: ---------) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Herb Stratum (Plot size: 25') | | | |
|---|---|---|---|
| 1. *Sedge sp. (Carex sp.) | 25 | Y | OBL |
| 2. Fox sedge (Carex vulpinoidea) | 10 | N | FACW |
| 3. **Rosette grass sp. (Dichanthelium sp.) | 10 | N | FACU |
| 4. Perennial Ryegrass (Lolium perenne) | 10 | N | FACU |
| 5. Needle-Pod Rush (Juncus scirpoides) | 25 | Y | FACW |
| 6. Common Selfheal (Prunella vulgaris) | 10 | N | FACU |
| 7. ***Rush sp. (Juncus sp.) | 10 | N | FACW |
| 8. Bottlebrush Sedge (Carex comosa) | 5 | N | OBL |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 105 = Total Cover | | |
| 50% of total cover: 52.5 | 20% of total cover: 21 | | |

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 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: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (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

___ 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 X No ____

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

Meets hydrophytic vegetation criteria.

*Of the 92 species of Carex listed on the 2018 USACE Wetlands Plant List for EMP in AR, 82% are FAC or wetter with the majority of being OBL.

**Of the 15 species of Dichanthelium listed on the 2018 USACE Wetlands Plant List for EMP in AR, 40% are FAC or wetter with the majority of being FACU.

***Of the 23 species of Juncus listed on the 2018 USACE Wetlands Plant List for EMP in AR, 87% are FAC or wetter with the majority of being FACW.

**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) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10 YR 5/2 | 94 | 10 YR 5/6 | 6 | C | M | | Clay loam silty |
| 5-8 | 10 YR 4/1 | 90 | 10 YR 5/6 | 10 | C | PL | | Clay loam silty |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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** X **No** _____

Remarks:

Meets F3 hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 2

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Field edge Local relief (concave, convex, none): Level Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.337358° Long: -94.343145° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 1 to 3 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

Meets all wetland criteria.

### 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 Visible 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 X | No _____ | Depth (inches): 0-1 |
| Water Table Present? | Yes X | No _____ | Depth (inches): 10 |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes X No _____

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

Remarks:

Meets hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 2

| Tree Stratum (Plot size: 25' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Slippery Elm (Ulmus rubra) | 20 | Y | FAC |
| 2. Green Ash (Fraxinus pennsylvanica) | 15 | Y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | 35 = Total Cover | | |
| 50% of total cover: 17.5 | 20% of total cover: 7 | | |
| **Sapling/Shrub Stratum** (Plot size: 25' ) | | | |
| 1. Winged Elm (Ulmus alata) | 20 | Y | FACU |
| 2. Slippery Elm (Ulmus rubra) | 20 | Y | FAC |
| 3. Green Ash (Fraxinus pennsylvanica) | 5 | N | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | 45 = Total Cover | | |
| 50% of total cover: 22.5 | 20% of total cover: 9 | | |
| **Herb Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (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

___ 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 X No ___

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

Meets hydrophytic vegetation criteria.

**SOIL** Sampling Point: DP 2

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 10 YR 5/2 | 94 | 10 YR 5/8 | 6 | C | M | | Silt loam |
| 1-10 | 10 YR 5/1 | 94 | 10 YR 5/8 | 6 | C | M | | Silt loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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** X **No** _____

Remarks:

Meets F3 hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastain Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 3

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Wooded upland Local relief (concave, convex, none): Convex Slope (%): 2 %

Subregion (LRR or MLRA): LRR N Lat: 35.337433° Long: -94.343041° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 1 to 3 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X | No _____ | |

Remarks:

Does not meet all wetland criteria.

### 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 Visible 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): 12 |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes X No _____

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

Remarks:

Meets hydrology criteria. Saturation likely due to recent rain events.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 3

| Tree Stratum (Plot size: 25' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Bradford Pear (Pyrus calleryana) | 20 | Y | NL |
| 2. Winged Elm (Ulmus alata) | 20 | Y | FACU |
| 3. Water Oak (Quercus nigra) | 15 | N | FAC |
| 4. Black Cherry (Prunus serotina) | 25 | Y | FACU |
| 5. Southern Catalpa (Catalpa bignonioides) | 20 | Y | FACU |
| 6. | | | |
| 7. | | | |

100 = Total Cover

50% of total cover: 50 20% of total cover: 20

| Sapling/Shrub Stratum (Plot size: 25' ) | | | |
|---|---|---|---|
| 1. Chinese Privet (Ligustrum sinense) | 15 | Y | FACU |
| 2. Black Cherry (Prunus serotina) | 25 | Y | FACU |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |

40 = Total Cover

50% of total cover: 20 20% of total cover: 8

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |

= Total Cover

50% of total cover: 20% of total cover:

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 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: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (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

___ 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.)

Does not meet hydrophytic vegetation criteria.

**SOIL** Sampling Point: DP 3

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 10 YR 3/2 | 100 | | | | | | Silt loam |
| 1-10 | 10 YR 4/3 | 100 | | | | | | Silt loam |
| 10-12 | 10 YR 5/4 | 100 | | | | | | Silt loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:

Does not meet hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastain Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 4

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Field swale Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): LRR N Lat: 35.338414° Long: -94.343435° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 1 to 3 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

Meets all wetland criteria.

### 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 Visible 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 X No _____ Depth (inches): 0-1

Water Table Present? Yes X No _____ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

**Wetland Hydrology Present?** Yes X No _____

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

Remarks:

Meets hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 4

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. Hairy Buttercup (Ranunculus sardous) | 30 | Y | FAC |
| 2. Panicum virgatum | 10 | N | FAC |
| 3. Bottlebrush Sedge (Carex comosa) | 15 | N | OBL |
| 4. Needle-Pod Rush (Juncus scirpoides) | 5 | N | FACW |
| 5. Soft Rush (Juncus effusus) | 10 | N | FACW |
| 6. *Sedge sp. (Carex sp.) | 15 | N | FACW |
| 7. **Flatsedge sp. (Cyperus sp.) | 15 | N | FACW |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 100 = Total Cover | | |
| 50% of total cover: 50 | 20% of total cover: 20 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (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

___ 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 X No ___

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

Meets hydrophytic vegetation criteria.

*Of the 92 species of Carex listed on the 2018 USACE Wetlands Plant List for EMP in AR, 82% are FAC or wetter with the majority of being OBL.

**Of the 30 species of Cyperus listed on the 2018 USACE Wetlands Plant List for EMP in AR, 77% are FAC or wetter with the majority of being FACW.

**SOIL** Sampling Point: DP 4

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 10 YR 4/2 | 100 | | | | | | Silty loam |
| 1-5 | 10 YR 5/2 | 94 | 10 YR 5/8 | 6 | C | PL | | Gravelly loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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** X **No** _____

Remarks:

Meets F3 hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 5

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Pond edge Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: 35.338613° Long: -94.342946° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 1 to 3 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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:

### 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 Visible 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 X | No _____ | Depth (inches): 14 |

**Wetland Hydrology Present?** Yes _____ No X

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

Remarks:

Saturation at 14 inches.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 5

| Tree Stratum (Plot size: 25' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Winged elm (Ulmus alata) | 20 | Y | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |
| **Sapling/Shrub Stratum** (Plot size: 25' ) | | | |
| 1. Eastern Red Cedar (Juniperus virginiana) | 10 | Y | FACU |
| 2. Common Persimmon (Diospyros virginiana) | 10 | Y | FAC |
| 3. Bradford Pear (Pyrus calleryana) | 5 | N | NL |
| 4. Winged elm (Ulmus alata) | 5 | N | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |
| **Herb Stratum** (Plot size: 25' ) | | | |
| 1. *Goldenrod (Solidago spp) | 30 | Y | FACU |
| 2. **Blackberry (Rubus spp) | 25 | Y | FACU |
| 3. Trumpet vine (Campsis radicans) | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 75 = Total Cover | | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |
| **Woody Vine Stratum** (Plot size: 25' ) | | | |
| 1. Japanese Honeysuckle (Lonicera japonica) | 30 | Y | FACU |
| 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: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (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

___ 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.)

Meets hydrophytic vegetation criteria.

*Of the 9 species of Solidago listed on the 2018 USACE Wetlands Plant List for EMP in AR, 44% are FAC or wetter with the majority of being FACU.

**Of the 11 species of Rubus listed on the 2018 USACE Wetlands Plant List for EMP in AR, 36% are FAC or wetter with the majority of being FACU.

**SOIL**

Sampling Point: DP 5

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10 YR 4/3 | 100 | | | | | | Silty Loam |
| 6-10 | 10 YR 5/3 | 94 | 10 YR 5/6 | 6 | C | M | | Silty Loam |
| 10-14 | 10 YR 5/3 | 90 | 10 YR 5/6 | 10 | C | M | | Silty Loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:

Does not meet hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 6

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.338917° Long: -94.350092° Datum: WGS 84

Soil Map Unit Name: Mountainburg sandy loam, 3 to 12 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X | No _____ | **Is the Sampled Area within a Wetland?** **Yes** X **No** _____ |
| Hydric Soil Present? | Yes X | No _____ | |
| Wetland Hydrology Present? | Yes X | No _____ | |

Remarks:

Meets all wetland criteria. Closed depression.

### 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 Visible 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 X | No _____ | Depth (inches): 0-1 |
| Water Table Present? | Yes _____ | No X | Depth (inches): >10 |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): Surface |

**Wetland Hydrology Present?** **Yes** X **No** _____

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

Remarks:

Meets hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 6

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. *Sedge (Carex sp.) | 40 | Y | OBL |
| 2. Fox sedge (Carex vulpinoidea) | 40 | Y | OBL |
| 3. Petticoat-Climber (Eragrostis spectabilis) | 10 | N | UPL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 90 = Total Cover | | |
| 50% of total cover: 45 | 20% of total cover: 18 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (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

___ 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 X No ___

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

Meets hydric vegetation criteria.

*Of the 92 species of Carex listed on the 2018 USACE Wetlands Plant List for EMP in AR, 82% are FAC or wetter with the majority of being OBL.

**SOIL** Sampling Point: DP 6

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-2 | 10 YR 3/3 | 100 | | | | | | Silty Loam |
| 2-4 | 10 YR 5/1 | 90 | 10 YR 5/8 | 10 | C | M | | Silty Loam |
| 4-8 | 10 YR 5/1 | 60 | 10 YR 5/8 | 10 | C | M | | Silty Loam |
| | 10 YR 4/3 | 30 | 10 YR 5/8 | 10 | C | M | | Silty Loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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** X **No** _____

Remarks:

Meets F3 hydric soil critera.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 7

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): Level Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: 35.338952° Long: -94.350100° Datum: WGS 84

Soil Map Unit Name: Mountainburg sandy loam, 3 to 12 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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:

Does not meet wetland criteria.

### 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 Visible 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:

Does not meet hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 7

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. Chinese bushclover (Lespedeza cuneata) | 60 | Y | FACU |
| 2. Daisy fleabane (Erigeron strigosus) | 10 | N | FACU |
| 3. Buffalo grass (Bouteloua dactyloides) | 40 | Y | FACU |
| 4. Plantago aristata | 10 | N | NL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 120 = Total Cover | | |
| 50% of total cover: 60 | 20% of total cover: 24 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: _____ (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (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

___ 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.)

Does not meet hydrophytic vegetation criteria.

**SOIL**

Sampling Point: DP 7

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-12 | 10 YR 4/3 | 90 | 10 YR 6/1 | 10 | D | M | | Clay loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:

Does not meet hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 8

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: 35.336109° Long: -94.349812° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 3 to 8 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

Meets all wetland criteria.

### 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 Visible 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 x | No _____ | Depth (inches): 0-1 |
| Water Table Present? | Yes x | No _____ | Depth (inches): 2 |
| Saturation Present? (includes capillary fringe) | Yes x | No _____ | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes X No _____

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

Remarks:

Meets hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 8

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. Hairy Buttercup (Ranunculus sardous) | 5 | N | FAC |
| 2. Fox sedge (Carex vulpinoidea) | 50 | Y | FACW |
| 3. *Sedge (Carex sp.) | 40 | Y | FACW |
| 4. Spike Rush (Eleocharis palustris) | 50 | Y | FACW |
| 5. **Beardtounge sp. (Penstemon sp.) | 5 | N | FAC |
| 6. Petticoat-Climber (Eragrostis spectabilis) | 10 | N | UPL |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 160 = Total Cover | | |
| 50% of total cover: 80 | 20% of total cover: 32 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (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

___ 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 X No ___

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

Meets hydrophytic vegetation criteria.

*Of the 92 species of Carex listed on the 2018 USACE Wetlands Plant List for EMP in AR, 82% are FAC or wetter with the majority of being OBL.

**Of the 6 species of Penstemon listed on the 2018 USACE Wetlands Plant List for EMP in AR, 67% are FAC or wetter.

**SOIL** Sampling Point: DP 8

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10 YR 5/1 | 92 | 10 YR 5/8 | 8 | C | PL | | Silty clay loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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** X **No** _____

Remarks:

Meets F3 hydric soil critera.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 9

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.336212° Long: -94.350107° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 3 to 8 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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:

Does not meet all wetland criteria.

### 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 Visible 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:

Does not meet hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 9

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. Field brome (Bromus arvensis) | 15 | N | FACU |
| 2. *Fescue sp. (Festuca arundinacea) | 25 | Y | FACU |
| 3. Johnsongrass (Sorghum halepense) | 5 | N | FACU |
| 4. **Blackberry (Rubus sp) | 30 | Y | FACU |
| 5. ***Goldenrod (Solidgo sp) | 20 | N | FACU |
| 6. Chinese bushclover (Lespedeza cuneata) | 10 | N | FACU |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 105 = Total Cover | | |
| 50% of total cover: 52.5 | 20% of total cover: 21 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (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

___ 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.)

Does not meet hydrophytic vegetation criteria.

*Of the 3 species of Festuca listed on the 2018 USACE Wetlands Plant List for EMP in AR, 33% are FAC or wetter with the majority of being FACU.

**Of the 11 species of Rubus listed on the 2018 USACE Wetlands Plant List for EMP in AR, 36% are FAC or wetter with the majority of being FACU.

***Of the 9 species of Solidago listed on the 2018 USACE Wetlands Plant List for EMP in AR, 44% are FAC or wetter with the majority of being FACU.

**SOIL** Sampling Point: DP 9

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10 YR 4/3 | 100 | | | | | | Clay Loam |
| 3-12 | 10 YR 4/3 | 90 | | | | | | Sandstone Clay Mix |
| | 5 YR 5/8 | 10 | | | | | | Clay Fill |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:

Does not meet hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 10

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): Knoll Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.336366° Long: -94.348363° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 3 to 8 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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:

Does not meet any wetland criteria.

### 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 Visible 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): > 12 |

**Wetland Hydrology Present?** Yes _____ No x

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

Remarks:

Does not meet hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP 10

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25') | | | |
| 1. *Beardtounge sp. (Penstemon sp.) | 2 | N | FAC |
| 2. Coreopsis lanceolata | 5 | N | FACU |
| 3. Blackberry (Rubus spp.) | 10 | N | FAC |
| 4. Fescue (Festuca spp.) | 10 | N | FACU |
| 5. Rosette grass (Dichanthelium sp.) | 10 | N | FACU |
| 6. **Panicum sp. | 25 | Y | FAC |
| 7. Daisy fleabane (Erigeron strigosus) | 10 | N | FACU |
| 8. Pale-spike lobelia (Lobelia spicata) | 5 | N | FAC |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 77 = Total Cover | | |
| 50% of total cover: 38.5 | 20% of total cover: 15.4 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (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

___ 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.)

Does not meet hydric vegetation criteria.

*Of the 6 species of Penstemon listed on the 2018 USACE Wetlands Plant List for EMP in AR, 67% are FAC or wetter.

**Of the 15 species of Dichanthelium listed on the 2018 USACE Wetlands Plant List for EMP in AR, 40% are FAC or wetter with the majority of being FACU.

***Of the 10 species of Panicum listed on the 2018 USACE Wetlands Plant List for EMP in AR, 90% are FAC or wetter with the majority of being FAC.

**SOIL** Sampling Point: DP 10

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10 YR 4/3 | 100 | | | | | | Silty clay loam |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:

Does not meet hydric soil criteria.

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: FSM City/County: Sebastian Sampling Date: 6/4/21

Applicant/Owner: FSM State: AR Sampling Point: DP 11

Investigator(s): RCM and JCM Section, Township, Range: S31 T8N R31W

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 35.338278° Long: -94.345824° Datum: WGS 84

Soil Map Unit Name: Leadvale silt loam, 3 to 8 percent NWI classification: NA

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ 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:

Does not meet all wetland criteria.

### 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 Visible 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:

Does not meet hydrology criteria.

**VEGETATION (Four Strata) – Use scientific names of plants.** Sampling Point: DP11

| Tree Stratum (Plot size: ---------) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: ---------) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 25' ) | | | |
| 1. Daisy fleabane (Erigeron strigosus) | 10 | N | FACU |
| 2. Buffalo grass (Bouteloua dactyloides) | 80 | Y | FACU |
| 3. Trumpet vine (Campsis radicans) | 10 | N | FAC |
| 4. Yellow Rocket (Barbarea vulgaris) | 1 | N | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 100 = Total Cover | | |
| 50% of total cover: 50 | 20% of total cover: 20 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 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: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (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

___ 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.)

Does not meet hydrophytic vegetation criteria.

**SOIL** Sampling Point: DP 11

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 10 YR 4/3 | 100 | | | | | | Silty loam |
| 1-8 | 10 YR 4/4 | 95 | | | | | | Silty loam |
| | 5 YR 5/8 | 5 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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)
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- ☐ 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:

Does not meet hydric soil criteria. Slate pieces.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 449 ft. Lat: 35.3330° N Lon: -94.3625° W
Station: **FORT SMITH REGIONAL AIRPORT, AR US USW00013964**

# Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 08/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: Unknown Observation Time Precipitation: 2400

| Year | Month | Day | Temperature (F) | | | Precipitation | | | | | Evaporation | | Soil Temperature (F) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 24 Hrs. Ending at Observation Time | | At Obs. | 24 Hour Amounts Ending at Observation Time | | | | At Obs. Time | 24 Hour Wind Movement (mi) | Amount of Evap. (in) | 4 in. Depth | | | 8 in. Depth | | |
| | | | Max. | Min. | | Rain, Melted Snow, Etc. (in) | Flag | Snow, Ice Pellets, Hail (in) | Flag | Snow, Ice Pellets, Hail, Ice on Ground (in) | | | Ground Cover (see *) | Max. | Min. | Ground Cover (see *) | Max. | Min. |
| 2021 | 05 | 01 | 78 | 54 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 02 | 71 | 61 | | 0.09 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 03 | 86 | 62 | | 0.60 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 04 | 73 | 50 | | T | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 05 | 74 | 45 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 06 | 80 | 51 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 07 | 73 | 48 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 08 | 85 | 55 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 09 | 80 | 57 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 10 | 63 | 55 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 11 | 60 | 54 | | 0.53 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 12 | 70 | 53 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 13 | 74 | 53 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 14 | 77 | 52 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 15 | 81 | 56 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 16 | 81 | 60 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 17 | 79 | 66 | | 0.06 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 18 | 82 | 63 | | 0.72 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 19 | 75 | 65 | | 0.43 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 20 | 77 | 68 | | 0.39 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 21 | 72 | 68 | | 1.26 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 22 | 83 | 68 | | 0.07 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 23 | 86 | 66 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 24 | 82 | 66 | | T | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 25 | 72 | 67 | | 1.50 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 26 | 88 | 66 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 27 | 88 | 66 | | 1.04 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 28 | 79 | 62 | | T | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 29 | 74 | 55 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 30 | 73 | 52 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 05 | 31 | 72 | 56 | | 0.05 | | 0.0 | | 0.0 | | | | | | | | |
| Summary | | | 77 | 59 | | 6.74 | | 0.0 | | | | | | | | | | |

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

# Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 08/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 449 ft. Lat: 35.3330° N Lon: -94.3625° W

Station: **FORT SMITH REGIONAL AIRPORT, AR US USW00013964**

Observation Time Temperature: Unknown Observation Time Precipitation: 2400

| Year | Month | Day | Temperature (F) | | | Precipitation | | | | | Evaporation | | Soil Temperature (F) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 24 Hrs. Ending at Observation Time | | At Obs. | 24 Hour Amounts Ending at Observation Time | | | | At Obs. Time | 24 Hour Wind Movement (mi) | Amount of Evap. (in) | 4 in. Depth | | | 8 in. Depth | | |
| | | | Max. | Min. | | Rain, Melted Snow, Etc. (in) | Flag | Snow, Ice Pellets, Hail (in) | Flag | Snow, Ice Pellets, Hail, Ice on Ground (in) | | | Ground Cover (see *) | Max. | Min. | Ground Cover (see *) | Max. | Min. |
| 2021 | 06 | 01 | 69 | 61 | | 0.97 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 02 | 71 | 60 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 03 | 84 | 57 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 04 | 86 | 62 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 05 | 79 | 64 | | 0.05 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 06 | 80 | 67 | | 0.35 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 07 | 78 | 68 | | 0.49 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 08 | 83 | 68 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 09 | 90 | 72 | | T | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 10 | 94 | 74 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 11 | 92 | 73 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 12 | 98 | 76 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 13 | 96 | 76 | | 0.00 | | 0.0 | | | | | | | | | | |
| 2021 | 06 | 14 | 94 | 70 | | 0.00 | | 0.0 | | | | | | | | | | |
| 2021 | 06 | 15 | 97 | 69 | | 0.00 | | 0.0 | | | | | | | | | | |
| 2021 | 06 | 16 | 96 | 72 | | 0.00 | | 0.0 | | | | | | | | | | |
| 2021 | 06 | 17 | 98 | 75 | | 0.00 | | | | | | | | | | | | |
| 2021 | 06 | 18 | 95 | 75 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 19 | 92 | 70 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 20 | 95 | 70 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 21 | 85 | 63 | | 0.74 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 22 | 83 | 58 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 23 | 89 | 60 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 24 | 94 | 73 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 25 | 93 | 76 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 26 | 93 | 77 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 27 | 89 | 73 | | 0.39 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 28 | 90 | 73 | | 0.05 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 29 | 91 | 72 | | 0.00 | | 0.0 | | 0.0 | | | | | | | | |
| 2021 | 06 | 30 | 91 | 74 | | 0.01 | | 0.0 | | 0.0 | | | | | | | | |
| | | Summary | 89 | 69 | | 3.05 | | 0.0 | | | | | | | | | | |

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

# APPENDIX F

## Public Involvement, Comments, and Responses

# Public Involvement Synopsis

**Fort Smith Regional Airport**
**Runway 8-26 Extension Project**
**Comment Period: February 6, 2022 - March 8, 2022**
**In-Person Public Meeting: February 24, 2022**

A Virtual Public Meeting was held to present the proposed action to extend the Fort Smith Regional Airport Runway 8-26.

The virtual meeting was held at FSMRW8-26.AirportPlans.com from February 6, 2022 through March 8, 2022. An in-person public meeting was held in the Rose Room at the Creekmoore Park Community Center located at 3301 South "M" Street, Fort Smith, AR from 5:30 p.m. to 7:30 p.m. on February 24, 2022. Special efforts to involve the public in the meeting included the following:

- Display advertisement placed in the *Southwest Times Record* newspaper on Sunday, February 6, 2022.
- Advertised on the airport's website.

The following information was available for inspection and comment at the In-Person Public Meeting:

- Three 20x34 displays including major project components
- 5 copies of the Draft Environmental Assessment

Table 1 describes the results of the public participation at the In-Person Public Meeting.

**Table 1**

| **Public Participation** | **Totals** |
|---|---|
| Attendance at Public Officials Meeting (including staff) | 25 |
| Comment forms received | 18 |

Table 2 describes the results of the public participation at the Virtual Public Meeting.

| Table 2 | |
|---|---|
| **Virtual Public Involvement Meeting (February 6 – March 8)** | **Totals** |
| Unique Visitors (New Users) | 30 |
| Visits to the Website (Sessions) | 64 |
| Number of Website Pages Viewed (Pageviews) | 175 |
| Percent of Total Users Interacting with Mobile Devices/Tablets | 17% |
| Comment Forms, emails, or Letters Received | 1 |
| Phone calls | 1 |
| Attendees who Signed Electronic Sign-in Sheet | 1 |

Table 3 identifies the information available on the Virtual Public Meeting website and each page's number of views.

| Table 3 | |
|---|---|
| **Website Page** | **Pageviews (175)** |
| Homepage<br>• Text: Information on the meeting's purpose, virtual meeting dates, a phone number for anyone with limited internet access or general questions or comments, submitting written comments, and guidance for special accommodations | 37%<br>(65) |
| Meeting Registration<br>• Electronic sign-in sheet | 5%<br>(9) |
| Project Documents<br>• Draft Environmental Assessment | 39%<br>(68) |
| Live Event Information<br>• Text: Instructions to attend the in-person public meeting<br>• Google maps link to in-person meeting location | 14%<br>(24) |
| Submit a Comment<br>• Print and electronic versions of the comment form | 5%<br>(7) |

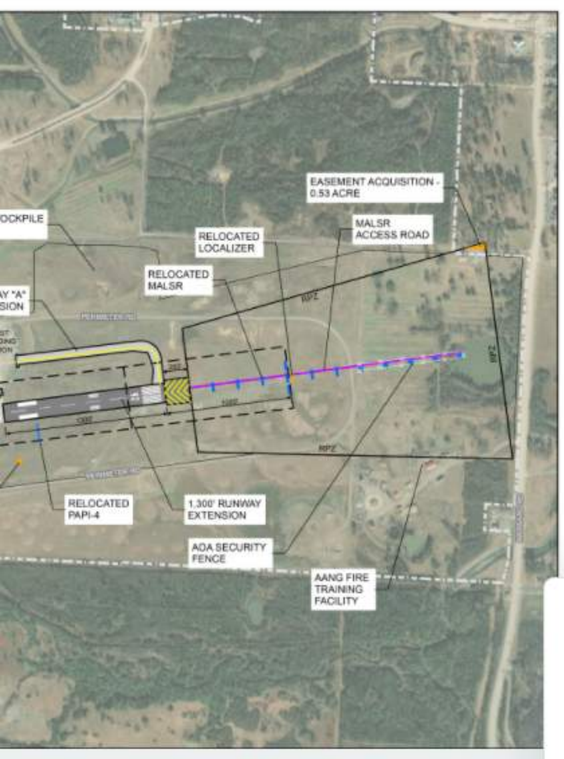
*Garver staff reviewed all comments received and evaluated their contents. The summary of comments listed below reflects the personal perception or opinion of the person or organization making the statement. The sequencing of the comments is random and is not intended to reflect importance or numerical values. Some of the comments were combined and/or paraphrased to simplify the synopsis process. Comments received either did not specify or were follow up comments/inquiries.*

**Summarized Comments**

- Of the 19 comments received, 18 are in favor of the project.
- 1 comment inquired about the plan for addressing the issue of increased noise in the project area.

Attachments:

- Screenshots of virtual public meeting site
- Website analytics report
- Copies of sign-in sheets and submitted comment forms
- Outreach documents





Sign In

Learn More

Live Event

February 24, 2022

Learn More

Project Documents

Learn More

Submit a Comment

Learn More

## Project Overview

The purpose of the Proposed Action is to extend Runway 8-26 by 1,300 feet to meet the Fort Smith Regional Airport Commission's forecasted commercial air carrier and general aviation needs by providing a 9,300-foot runway per Advisory Circular (AC) 150/5325-4B. The Proposed Action and connected actions would be designed to be compatible with all aircraft using the airport.

## Public Meeting Overview

This project website provides documents explaining the proposed project, the ability to view and download meeting materials, a place to submit online comments, and information about the in-person public meeting. The in-person public meeting will be held on February 24, 2022 at the Creekmore Park Community Center. Visit this page to learn more about the in-person public meeting details.

## Public Meeting Comment Period: February 6 - March 8, 2022

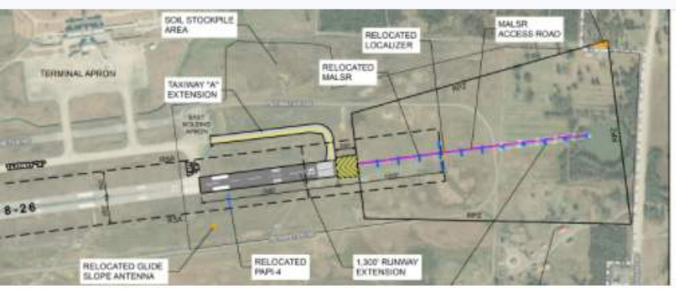
This Virtual Public Meeting will be a web-based format, with an in-person meeting opportunity. The information will be available beginning February 6, 2022 and comments are requested by March 8, 2022.

## Comments

Comments on this project can be submitted in several ways, including but not limited to mail, email, and the online form. Additionally, oral comments can be submitted by calling (501) 823-0730. All comments must be received on or before Tuesday, March 8, 2022.

## Accommodations

Anyone needing project information or special accommodations under the Americans with Disabilities Act (ADA) is encouraged to write to Lindi Miller, 4701 Northshore Drive, North Little Rock, AR 72118, call (501) 823-0730, or email PublicInvolvement@GarverUSA.com. Hearing or speech impaired, please contact the Arkansas Relay System at (Voice/TTY 711). Requests should be made at least four days prior to the of the virtual public meeting date.





SIGN-IN

# Sign-In

◀ Homepage

Live Event Information ▶

Thank you for attending this Public Meeting. Please take a moment to register for the meeting.

## Registration form

Scroll down to answer form fields and then click ***Submit.***

### Fort Smith Regional Airport Runway 8-26 Extension Project Registration Form

The Fort Smith Regional Airport in coordination with the Federal Aviation Administration (FAA), is conducting an online virtual public meeting for the Airport Runway Extension Project.

...

1. Name

Enter your answer

2. Address - City, State, Zip

Enter your answer

3. Email Address

Enter your answer

4. Phone Number

Enter your answer

5. How did you hear about the meeting?

Enter your answer

6. I will be attending the in-person public meeting on February 24, 2022.

- ◯ Yes
- ◯ No

Submit

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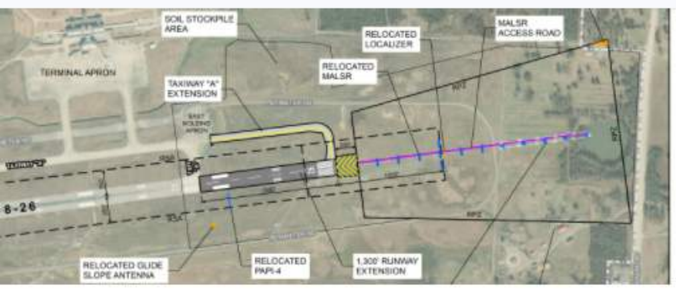




INFO

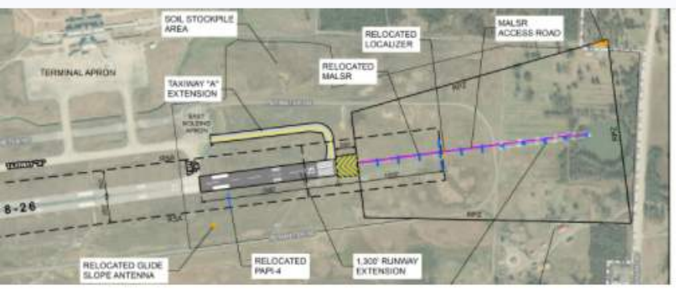
# Live Event Information

◀ Homepage Project Documents ▶

Thank you for your interest in the in-person Public Meeting. Please see the in-person public meeting time and location below.

Location:
Creekmore Park Community Center
Rose Room
3301 South "M" Street
Fort Smith, AR 72903
Time: 5:30 p.m. - 7:30 p.m.

You may also click the graphic below to open the meeting location in Google Maps.



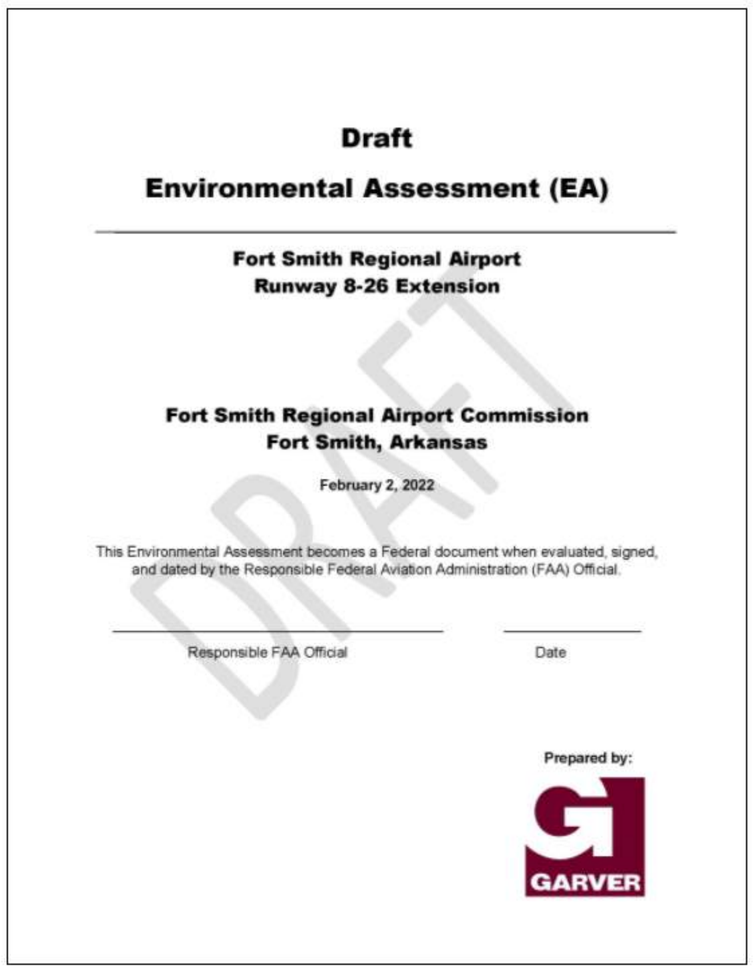


# Project Documents

◀ Homepage

Submit a Comment ▶

Please take a moment to review the Draft Environmental Assessment.



**Draft**

**Environmental Assessment (EA)**

**Fort Smith Regional Airport**
**Runway 8-26 Extension**

**Fort Smith Regional Airport Commission**
**Fort Smith, Arkansas**

**February 2, 2022**

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

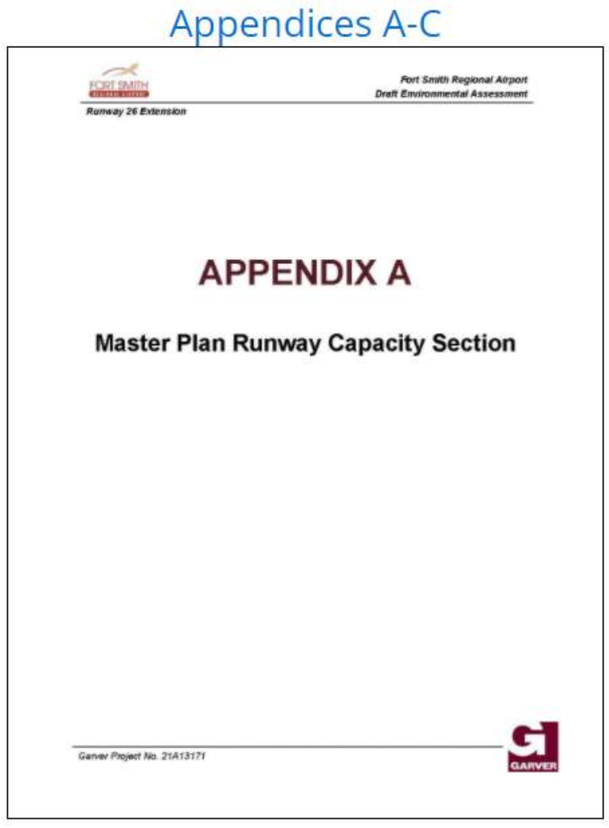
Responsible FAA Official _____ Date _____

**Prepared by:**

GARVER

DRAFT

## Appendices A-C



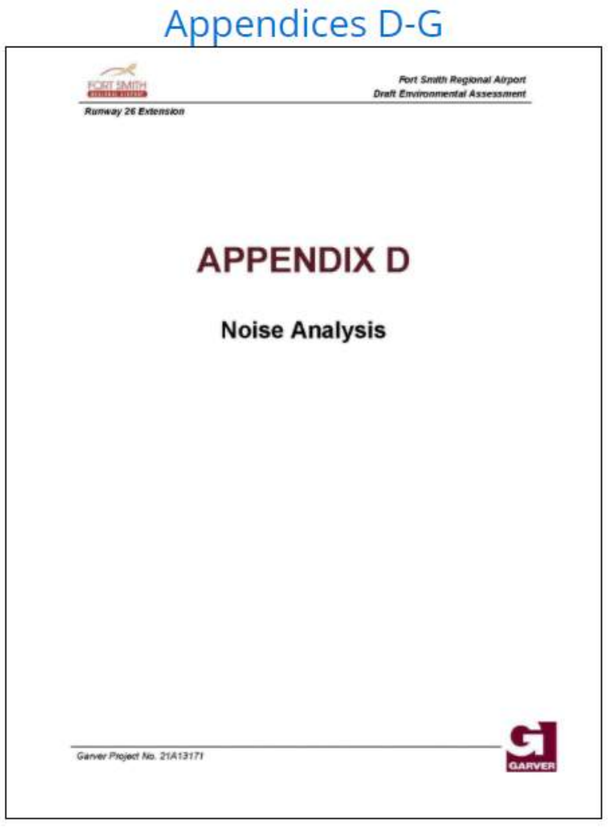
Fort Smith Regional Airport
Draft Environmental Assessment
Runway 26 Extension

**APPENDIX A**

**Master Plan Runway Capacity Section**

Garver Project No. 21A13171

## Appendices D-G



Fort Smith Regional Airport
Draft Environmental Assessment
Runway 26 Extension

**APPENDIX D**

**Noise Analysis**

Garver Project No. 21A13171


# Submit a Comment

◀ Homepage

Thank you for participating in this Public Meeting. Comments on this project can be submitted in several ways, including but not limited to mail, email, and the online form.

All comments must be received on or before March 8, 2022.

Please take a moment to fill out the comment form found below. Mobile users may click on the icon to participate.

## Comment form (online)

Scroll down to answer form fields and then click ***Submit.***

### Fort Smith Regional Airport Runway 8-26 Extension Project Comment Form

Thank you for your interest in this project and taking the time to provide us with your written comments. Putting your comments in writing is one of the most effective ways to have your concerns addressed.

1. Name

Enter your answer

2. Address, City, State, Zip Code

Enter your answer

3. Phone Number

Enter your answer

4. Email Address

Enter your answer

5. Do you have any comments on the proposed Fort Smith Regional Airport Runway 25 Extension project?

Enter your answer

Submit

Never give out your password. Report abuse

This content is created by the owner of the form. The data you submit will be sent to the form owner. Microsoft is not responsible for the privacy or security practices of its customers, including those of this form owner. Never give out your password.

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## Comment Form (PDF)

You may email or mail to the addresses provided below.

PublicInvolvement@Garverusa.com
Garver
Attn: Lindi Miller
4701 Northshore Drive
North Little Rock, AR 72118

# Fort Smith Regional Airport Runway 8-26 Extension

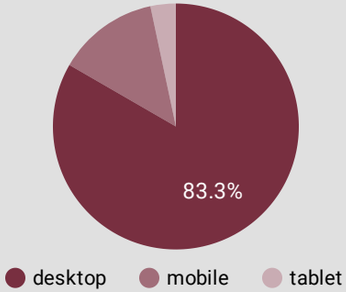
*Public Meeting Website Analytics*

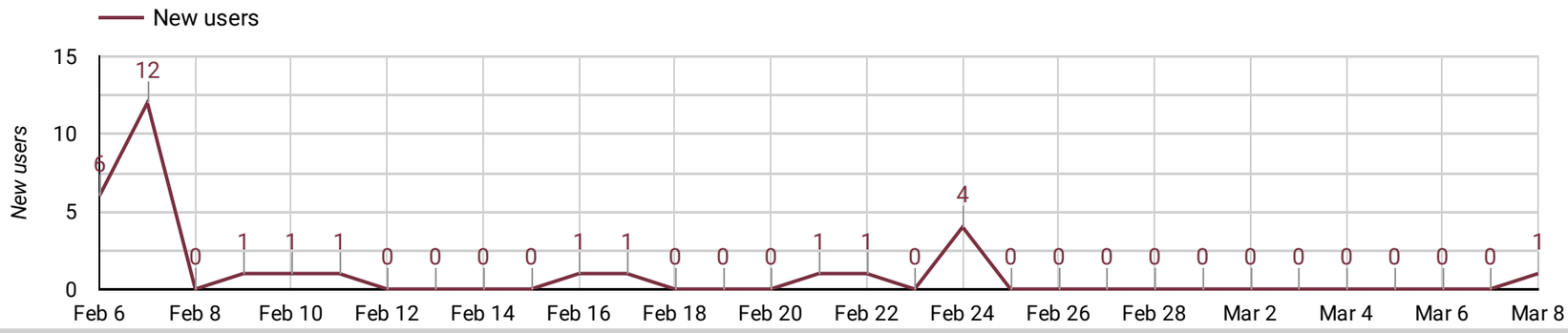
Feb 6, 2022 - Mar 8, 2022

## Attendee Participation

| | |
|---|---|
| New users | 30 |
| Views | 175 |
| Sessions | 64 |
| Sessions per user | 1.94 |
| User engagement | 50:52 |

## Devices

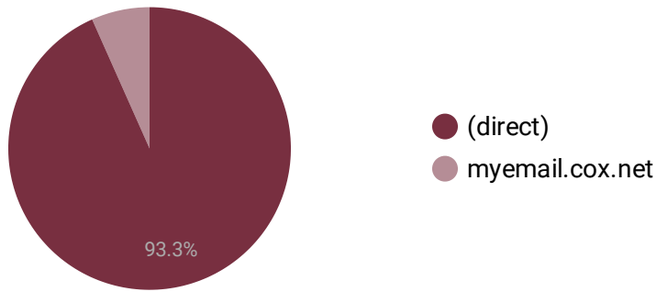



## Top Pages

| | Page | Views ▼ | Views | Time Spent |
|---|---|---|---|---|
| 1. | Project Documents - FSMRW8-26 | 68 | 38.86% | 00:18:25 |
| 2. | Fort Smith Regional Airport - FSMRW8-26 | 65 | 37.14% | 00:19:42 |
| 3. | Live Event Information - FSMRW8-26 | 24 | 13.71% | 00:05:13 |
| 4. | Sign-In - FSMRW8-26 | 9 | 5.14% | 00:05:06 |
| 5. | Submit a Comment - FSMRW8-26 | 8 | 4.57% | 00:02:26 |
| 6. | (not set) | 1 | 0.57% | 00:00:00 |
| | **Grand total** | **175** | **100%** | **00:50:52** |

## User Acquisition




## Engagement by City

(IP Address)

| | City | New users ▼ |
|---|---|---|
| 1. | Fort Smith | 7 |
| 2. | Reston | 4 |
| 3. | Oklahoma City | 3 |
| 4. | Ashburn | 2 |
| 5. | (not set) | 1 |
| 6. | Asheville | 1 |
| 7. | Bentonville | 1 |
| 8. | Concord | 1 |
| 9. | Des Moines | 1 |
| 10. | Egg Harbor Township | 1 |
| 11. | Greenwood | 1 |
| 12. | Hialeah Gardens | 1 |
| 13. | Mount Hood Village | 1 |
| | **Grand total** | **30** |

Project: Fort Smith Regional Airport Runway 8-26 Extension Project

Date: February 24, 2022

Location: Rose Room, Creekmoore Park Community Center, 3301 South "M" Street, Fort Smith, AR 72903

# SIGN-IN SHEET

| Name | Address | Email |
|---|---|---|
| Adam White | 2049 E Joyce Blvd Fayetteville, AR 72703 | AWhite@GarverUSA.com |
| Ryan Mountain | 4300 S. JB Hunt Drive, Rogers, AR 72758 | rmountain@GarverUSA.com |
| Tim Allen | 612 Garrison Ave, FS, AR 72901 | |
| Brian Maurer | 9712 Broadwell Rd, FS, AR 72908 | BMAURER@HALFF.com |
| Aaron Littlefield | 7107 Highland Park Dr FS, AR 72916 | aaronL@littlefieldoil.com |
| Jeff McKinley | HOME 3224 Butterfield Est. Ln. B 72956 | jmckinley@RandallFord.a |
| Mike Pate | 16 Berry Hill Rd FS AR 72903 | mrpate@mynewroads.com |
| Curtis Ralston | 8011 Dover Circle FS, AR 72903 | curtisralston262@hotmail.com |
| Michael Poffenbarger | 7306 S.U. Stat FS, AR 72903 | M.chael.poffenbarger@effen.com |
| Stuart Glen | 5831 Eyper Lane FS, AR 72903 | stuart@glencooper.com |
| Mike Barr | 4420 S 35th Street FS, AR 72903 | mike@weatherbarr.com |

Project: Fort Smith Regional Airport Runway 8-26 Extension Project

Date: February 24, 2022

Location: Rose Room, Creekmoore Park Community Center, 3301 South "M" Street, Fort Smith, AR 72903

## SIGN-IN SHEET

| Name | Address | Email |
|---|---|---|
| Jim Cseels | 2017 S068 Ft. Smith, AR 72903 | jmg@littlefieldoil.com |
| Keith Law | 5701 Free Ferry Ft. Smith 72903 | Keithlaw45@gmail.com |
| Brandon Wall | 410 May Ave, Fort Smith, 72901 | BRANDONWALL325@GMAIL.COM |
| Mike Jacimore | 9221 R.A. Young Dr, Fortsmith, AR 72916 | mjacimore@arvest.com |
| Bob Ratley | 2105 S. 88th St. Fort Smith AR 72903 | robratley62@gmail.com |
| Kenny Kaelin | 3100 Park Ave Ft. Smith, Ar | KennethKaelin@Gmail.com |
| Bob Cooper | 461 Rogers Ave | Bob@GHanCooper.com |
| Roger Holroyd | 8511 Silverstone Ct F.S. AR | rholroyd@arvest.com |
| Bonita Holroyd | 8511 Silverstone Ct F.S. AR | rholroyd@centurytel.net |
| Mike Smith | 1002 S. 26th F.S. AR | mikesmith5@sbcglobal.net |

Project: Fort Smith Regional Airport Runway 8-26 Extension Project

Date: February 24, 2022

Location: Rose Room, Creekmoore Park Community Center, 3301 South "M" Street, Fort Smith, AR 72903

# SIGN-IN SHEET

| Name | Address | Email |
|---|---|---|
| George McGill | P.O. Box 8081 Fort Smith, AR 72902 | georgemcgill@sbcglobal.net |
| Rodney Shepard | 6400 Park Avenue Fort Smith, AR 72903 | Rshepard@Arvest.com |
| David Bednar | P.O. Box 5446 Fort Smith 72913 | |
| Sam Sicard | 3516 Old Oaks Ln Ft Smith, AR 72903 | sam@fnbfs.com |
| | | |
| | | |
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| | | |
| | | |
| | | |

4701 Northshore Drive
North Little Rock, AR 72118

TEL 501.376.3633
FAX 501.372.8042

www.GarverUSA.com

Thursday, February 3, 2022

Southwest Times Record
5111 Rogers Ave Suite 471
Fort Smith, AR 72903
Attn: Anna Hernandez
Email: ahernandez@localiq.com

Re: Legal Ad – Notice of Public Meeting

Greetings:

Please publish the enclosed "**Notice of Public Meeting**" on the following date:

Sunday, February 6, 2022

**Send one copy of the proof of publication with invoice for payment to:**

Garver
**Attn: Lindi Miller – 21A13171**
4701 Northshore Drive
North Little Rock, AR 72118
Email: LKMiller@garverusa.com

If you have questions regarding the written announcement or need additional information, please contact me at 501-823-0758 or LKMiller@GarverUSA.com.

Sincerely,
GARVER

Lindi Miller
Communications Specialist

Enclosure

**NOTICE OF PUBLIC MEETING**

**Fort Smith Regional Airport Runway Extension**
**Fort Smith, Arkansas**

The Fort Smith Regional Airport (FSM), in coordination with the Federal Aviation Administration (FAA), will conduct an in-person Public Meeting to present and discuss the proposed FSM Runway 8-26 Extension project. Information will also be available online, and comments will be accepted February 6, 2022 through March 8, 2022. The public meeting will be held on Thursday, February 24, 2022 in the Rose Room at the Creekmoore Park Community Center located at 3301 South "M" Street, Fort Smith, AR 72903 from 5:30 p.m. to 7:30 p.m. To review the Environmental Assessment, please visit: FSMRW8-26.airportplans.com or the Fort Smith Regional Airport Administration Offices, 6700 McKennon Blvd, Ste 200, Fort Smith, AR 72903.

The purpose of the Proposed Action is to extend Runway 8-26 by 1,300 feet to meet the Fort Smith Regional Airport Commission's forecasted commercial air carrier and general aviation needs by providing a 9,300-foot runway per Advisory Circular (AC) 150/5325-4B. The Proposed Action and connected actions would be designed to be compatible with all aircraft using the airport.

The following contact information can be used for project and meeting information and the opportunity to provide online, written, and voice recorded comments:

- Website: FSMRW8-26.airportplans.com
- Email: PublicInvolvement@GarverUSA.com
- Mail: Lindi Miller, 4701 Northshore Drive, North Little Rock, AR 72118
- Voice Recording: 501-823-0730

Anyone needing project information or special accommodations under the Americans with Disabilities Act (ADA) is encouraged to contact Lindi Miller at (501) 823-0730, mail Garver, Attn: Lindi Miller, 4701 Northshore Drive, North Little Rock, AR 72118, or email PublicInvolvement@GarverUSA.com. Hearing or speech impaired, please contact the Arkansas Relay System at (Voice/TTY 711). Requests should be made at least four days prior to the public meeting.

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## TRANSPORTATION

### AUTOMOBILES

I Buy Junk Cars, $200/ $800/ $1500. Any Condition, No Charge For Picking Up, Easy Cash Today, Fixer Uppers 08 & Up Prices Negotiables, Call Or Text 479-285-2118

### LEGALS

**LEGALS**

**59 MINI STORAGE will sell the contents of 13 units, at public auction. Auction will be held at 59 MINI STORAGE, 3125 Hwy 59N. Van Buren, Ar. Tue Feb. 8, 2022, 10am**



## LEGALS

REQUEST FOR QUALIFICATIONS (RFQ 22-02-01)

Engineering Services- HVAC/Air Quality Upgrades for Fort Smith Public Schools

Fort Smith Public Schools plans to undertake HVAC/Air Quality Upgrades at a majority of school campuses, utilizing funding received through the Elementary and Secondary School Emergency Relief (ESSER) program. The submitted RFQ's will be used to select (ONE) Engineering firm responsible for all District HVAC/Air Quality upgrade designs.

Copies of the RFQ documents may be obtained directly from the District's website at www.fortsmithschools.org under Departments/ Purchasing.

Applicants are invited to submit responses, in a form outlined in the document, to the following E-Mail no later than 2:00PM Monday February 21st,2022.

Shawn Shaffer – eshaffer@fortsmithschools.org

In the "Subject" line, please refer to the following:

FSPS –Request for Qualifications-HVAC/Air Quality Engineering Service

Fort Smith Public Schools reserves the right to cancel this RFQ process without notice, reject any and all submissions, wave formalities and to accept any submission deemed to be in the best interest of Fort Smith Public Schools.

REQUEST FOR QUALIFICATIONS (RFQ 22-01-01)

Architectural Services for Fort Smith Public Schools

Fort Smith Public Schools plans to undertake a number of projects, at various school campuses, utilizing funding received through the Elementary and Secondary School Emergency Relief (ESSER) program. The submitted RFQ's will be used to select multiple Architectural firms to work with the District on these initial projects and future projects as needed.

Copies of the RFQ documents may be obtained directly from the District's website at www.fortsmithschools.org under Departments/ Purchasing.

Applicants are invited to submit responses, in a form outlined in the document, to the following E-Mail no later than 2:00PM Monday February 21st,2022.

Shawn Shaffer – eshaffer@fortsmithschools.org

In the "Subject" line, please refer to the following:

FSPS –Request for Qualifications-Architectural Services

Fort Smith Public Schools reserves the right to cancel this RFQ process without notice, reject any and all submissions, wave formalities and to accept any submission deemed to be in the best interest of Fort Smith Public Schools.

**REQUST FOR PROPOSAL #4306-21-22-BA**

**DRY CLEAING SERVICES – POLICE DEPARTMENT CITY OF FORT SMITH, ARKANSAS**

The City of Fort Smith Police Department is seeking competitive proposals from local service providers for the provision of dry cleaning services of police uniforms and work attire for nonuniformed officers.

All interest firms must have experience in providing said services and the selected firm will be provided with a list of personnel eligible for the cleaning services.

Proposals will be received by the Purchasing Manager of the City of Fort Smith via email to purchasing@fortsmithar.gov until **2:00 PM, local time, February 21, 2022 or delivered to 623 Garrison Avenue, Suite 101, Fort Smith.**

All proposals shall be submitted in accordance with the Request for Proposal ("RFP") which is available on the City's website at www.fortsmithar.gov or by requesting a copy during normal business hours (Monday – Friday, 8:00AM to 5:00PM).

**City of Fort Smith Purchasing Department**
**Attn: Alie Bahsoon, Purchasing Manager**
**623 Garrison Avenue, Room 512**
**Fort Smith, AR 72901**
**(479) 784-2268**
**purchasing@fortsmithar.gov**

The City of Fort Smith, Arkansas is an Equal Opportunity Employer

This publication was paid for by the City of Fort Smith Purchasing Department at the cost of $211.09

**INVITATION TO BID**

Sealed proposals for trade bids for the Indoor Practice Facility at the High School and Auxiliary Gymnasium at Northridge Middle School, Van Buren School District, Van Buren, AR, will be received by The Schools Design-Builder at the Van Buren Professional Development Center, 60th Northridge Drive, Van Buren, AR 72956 starting at 2:00 PM on Tuesday February 22, 2022, and as outlined in the Design-Build Manual, when bids will be publicly opened and read aloud. Any bid received after the scheduled opening time will be returned unopened. These bids are for performing the contracts as outlined in the plans, specifications and specifically in the DESIGN-BUILDER'S MANUAL.

A complete set of electronic project documents may be obtained from the Design-Build Contractor located at Beshears Construction, Inc., 12934 Old Hwy 71, Fort Smith, AR 72916, (479) 646-0846.

A cashier's check, drawn upon a bank or trust company doing business in Arkansas, or acceptable bid bond payable to the Van Buren Public Schools, in an amount not less than 5 percent of the total Base Bid must accompany each bid in excess of $25,000.00 as a guarantee that, if awarded the contract, the bidder will promptly enter into the contract and execute forms contained in the Project Documents within 10 days after the notice of award.

The Van Buren Public Schools reserves the right to reject any and all bids and any nonconforming bid and to award the contract in a period of time not exceeding 60 days from the Bid opening date. Bids shall remain firm for that period.

The Van Buren Public Schools hereby notifies that minority business enterprises will be afforded equal opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, age, religion, or national origin in consideration for an award.

Former Camp Chaffee (K06AR0004) Formerly Used Defense Site (FUDS)

The Department of the Army recognizes the importance of stakeholder participation in the Defense Environmental Restoration Program. Therefore, USACE Fort Worth District is assessing public interest in forming a Restoration Advisory Board. RAB members would participate in meetings where environmental restoration issues concerning the cleanup of the Former Camp Chaffee, Fort Smith, AR are discussed. A RAB provides community members an opportunity to become involved with the restoration process either as a RAB member or through attendance at regularly scheduled RAB meetings, which are open to the public. It serves as a collaborative forum where members have the opportunity to influence cleanup decisions through discussion with regulators and Fort Worth District project managers. USACE is currently planning an educational awareness briefing for the community in the Spring of 2022. If formed, a RAB would include members of the local community, USACE personnel, National Forest staff, and employees from the Louisiana Department of Environmental Quality. The RAB would be jointly co-chaired by the USACE and a community representative. The community members of the RAB would be asked to select the community co-chair. Public participation on the RAB is strictly voluntary. The USACE does not provide any form of financial compensation to community members who elect to participate.

If you are interested in being a RAB participant, you should be willing to attend all RAB meetings, which can last between two and four hours each and be willing to spend the time necessary to review Army environmental restoration documents within the prescribed time frames.

Should it be determined there is insufficient public interest in forming a RAB, the USACE will provide interested stakeholders with opportunities to receive timely and accurate information concerning the investigations and possible future actions and activities at the site.

For more information contact:
Kris Saboda
Project Manager
Kristine.l.saboda@usace.army.mil
819 Taylor Street Rm 3A12
Fort Worth, Texas 76102
Work Cell: 817-600-3609

REQUEST FOR PROPOSALS L-01344

School Bus GPS and WiFi Equipment and Service

Fort Smith Public Schools is accepting proposals for equipment and service to allow tracking and monitoring of district buses including onboard video monitoring, WiFi internet access and student tracking.

Copies of the RFP document may be obtained directly from the District's website at www.fortsmithschools.org under Departments/ Purchasing.

Interested dealers are invited to submit proposals, in a form outlined in the document, no later than 2:00PM CT on Tuesday February 22, 2022.

Fort Smith Public Schools reserves the right to cancel this RFP process without notice, reject any or all proposals, wave formalities and accept the submission deemed to be in the best interest of Fort Smith Public Schools.

**www.swtimes.com**

REQUEST FOR BIDS L-01345

Fire Extinguisher Testing and Recharging

Fort Smith Public Schools Is requesting bids from licensed fire extinguisher companies for testing, recharging and maintaining all District fire extinguishers.

A copy of the bid document can be obtained directly from the District's website at www.fortsmithschools.org under Departments/ Purchasing. Copies can also be requested by contacting the District Purchasing Department at (479) 785-2501 x91287.

Vendors are invited to submit bids, in a form outlined in the bid document, no later than 2:00PM on Tuesday February 15th, 2022.

Fort Smith Public Schools reserves the right to reject any or all bids and wave any formalities. In the case of ambiguity in prices stated in the bid, the district reserves the right to adopt the most advantageous interpretation thereof, or to reject the bid altogether. Pursuant to Arkansas Code annotated 22-9-203, all small, minority and women's businesses are encouraged to submit bids.

ADVERTISEMENT FOR BIDS

Separate sealed bids for the Construction of the Creekmore Park Inclusive Playground will be received by the City of Fort Smith, Arkansas, at the Office of the Director of Parks and Recreation until 2:00 p.m. (Local Time), March 11, 2022, and then at said office publicly opened and read aloud.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis.

The Bid Requirements, Sample Form of Contract, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined and obtained at the following location:

Fort Smith Parks & Recreation
Creekmore Community Center 3301
South "M" Street
Fort Smith, Arkansas 72903

Requests for electronic copies of the bid documents may be emailed to sdeuster@fortsmithar.gov.

The Owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his proposal, security in the amount, form and subject to the proposal documents.

All bidders must be licensed Arkansas Contractors, under the terms of Act 150 of the 1965 Acts of the Arkansas Legislature, including subsequent amendments.

No bidder may withdraw his bid within 60 days after the actual date hereof of the opening.

The City of Fort Smith is an EOE M/F.

This publication was paid for by the City of Fort Smith Parks Department at a cost of $ 506.34

Doug Reinert,
Director of Parks and Recreation

**NOTICE OF PUBLIC MEETING**

**Fort Smith Regional Airport Runway Extension**
**Fort Smith, Arkansas**

The Fort Smith Regional Airport (FSM), in coordination with the Federal Aviation Administration (FAA), will conduct an in-person Public Meeting to present and discuss the proposed FSM Runway 8-26 Extension project. Information will also be available online, and comments will be accepted February 6, 2022 through March 8, 2022. The public meeting will be held on Thursday, February 24, 2022 in the Rose Room at the Creekmoore Park Community Center located at 3301 South "M" Street, Fort Smith, AR 72903 from 5:30 p.m. to 7:30 p.m. To review the Environmental Assessment, please visit: FSMRW8-26.airportplans.com or the Fort Smith Regional Airport Administration Offices, 6700 McKennon Blvd, Ste 200, Fort Smith, AR 72903.

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The following contact information can be used for project and meeting information and the opportunity to provide online, written, and voice recorded comments:

- Website: FSMRW8-26.airportplans.com
- Email: PublicInvolvement@GarverUSA.com
- Mail: Lindi Miller, 4701 Northshore Drive, North Little Rock, AR 72118
- Voice Recording: 501-823-0730

Anyone needing project information or special accommodations under the Americans with Disabilities Act (ADA) is encouraged to contact Lindi Miller at (501) 823-0730, mail Garver, Attn: Lindi Miller, 4701 Northshore Drive, North Little Rock, AR 72118, or email PublicInvolvement@GarverUSA.com. Hearing or speech impaired, please contact the Arkansas Relay System at (Voice/TTY 711). Requests should be made at least four days prior to the public meeting.

## BUSINESS AND SERVICE DIRECTORY

swtimes.com/classifieds

### BATHROOMS

RANDALL KING CONSTRUCTION
Check Out Our Bathrooms at
randallkingconstruction.com
479-651-5272

### HANDYMAN

HandyMan Dan Inc.
Construction, Painting and more.
Licensed, Insured.
479-226-1930

HOT

### HAULING

HAULING, Clean Up Junk, Shed Removal, Homes, Tree Removal. 479-652-0055

Junk Removing
Yard Waste Hauling
479-208-8254
479-926-0231

### HOME IMPROVEMENT

HOLLIS SNELL CONSTRUCTION
30 Years Experience
Roofing, Vinyl Siding, Carports, Decks, Patio Covers, Screen Enclosures. Sunrooms
479-719-1749

### HOUSE CLEANING

Don't stress, we'll clean your mess! 479-739-1624

### LAWN MAINTENANCE

Pablo's Lawn Care
Hedge Trimming
Leaf & Trash Removal
479-719-0921
479-452-4309

### TREE SERVICE

Custom Tree Service
Trim top remove,
Licensed, Insured.
479-461-7492

LOOK

### TREE SERVICE

KILLIAN'S TREE SERVICE
*Insured *Prompt
*Reliable
SPECIALIZING IN LARGE HAZARDOUS REMOVALS
479-561-4731
479-494-0496

Who says people don't read small ads...
YOU JUST DID!
Call 785-7711 to create an ad that works for you!

Create
Imagine
DREAM
BELIEVE

## EMPLOYMENT

### GENERAL HELP WANTED

**Experienced Auto Mechanic**
Apply in Person at
Jim Grizzle Tire Co.
3002 Towson Avenue

Tire Technician
Apply in Person at
Jim Grizzle Tire Co.
3002 Towson Avenue
Fort Smith AR 72901

### PROFESSIONAL

Executive Administrative Asst, Retail Mgmt Co. (Pocola, OK) Min. 2 yrs related or mgmt. exp. Provide high level admin support to co. president, by preparing reports, handling information requests, and performing clerical functions. 40 hrs/wk, 8A-5P. Resume to: Amn Business Group, 103 West Folsom Blvd, Pocola, OK 74902.

Take Your Pick Of Great Jobs In The Classifieds!
Fresh Listings Every Week
ALL LEVELS
Manufacturing & Industrial
Food Service & Hospitality
Medical & Dental
Computers & Education
Banking & Accounting
Advertising & PR
...and many other fields!

### GENERAL HELP WANTED

**ATTENTION**
**OTR DRIVERS**
**Now Hiring**
- Home Weekly
- Sign On Bonus
- No Touch Freight
- Non-Hazmat Carrier
- Health Insurance
- Paid Holiday
- Assigned Trucks
- Min 2yrs OTR Exp.
- Class A CDL

**GT Transportation Services**
**Contact Ryan**
**1106 S. 28th St., Van Buren, AR**
**Van Buren, AR**
**www.gttransportation.com 479-471-9900**

**Concrete Finishers & Form Setters**

Steve Beam Construction is taking applications for Concrete Finishers and Form Setters.
Drug screen required.

Please apply
**7201 S. 28th Street**
**Fort Smith, AR**

**NO Phone Calls Please**

## ANNOUNCEMENTS

### ADOPTIONS

Filling your baby's life with secure future, endless love is our promise to you. Jessie & Keith, Expenses Paid, 845-475-8015

## MERCHANDISE

### BARGAIN COLUMN

Wrangler cowboy cut jeans, size 32X34, 4 pairs, $50 for all. 479-629-2400.

### FIREWOOD AND FUEL

Firewood: 1/2 rick $40, Full rick $75. 479-216-1260.

### MISCELLANEOUS FOR SALE

**1900's Antique Oak Buffet** with beveled mirror, $375 - excellent condition. Antique breakfast table, dark wood and 4 cane chairs, $350. Victoria record player from 30's/40's, $150. Antique mahogany dresser w/marble top, $300. Ashley sofa and love seat, dark beige, $400. Leather ivory love seat, excellent cond., $350. Coffee and end table, heavy beveled glass, $100. Brass New Orleans bed, great cond., for full/queen size bed, $200. Entertainment center, medium brown distressed oak, $700. Call 479-207-7007

Dell XPS Computer- HP monitor and keyboard- HP Envy 4512 printer/scanner, all in good condition $125 479-689-5001


IN THE
Times Record
CLASSIFIEDS

RIVER VALLEY JOBS
Powered by ZipRecruiter
TIMES RECORD

PROOF OF PUBLICATION
STATE OF ARKANSAS
COUNTY OF SEBASTIAN

I, **Bill Needham,** do solemnly swear that I am **a representative** of the **Times Record,** a daily newspaper having a second class mailing privilege, and being not less than four pages of five columns each, published at a fixed place of business and at fixed daily intervals continuously in the City of Fort Smith, Sebastian County, Arkansas, for more than a period of twelve months, circulated and distributed from an established place of business to subscribers and readers generally of all classes, in the city and county aforesaid, for a definite price for each copy, or a fixed price per annum, which was fixed at what is considered the value of the publication based upon the news service value it contains, that at least fifty percent of the subscribers thereto have paid cash for their subscription to the newspaper or its agents or through recognized news dealers, over a period of at least six months and that said newspaper published an average of more than forty percent news matter. The newspaper is circulated in the counties of Crawford, Franklin, Johnson, Logan, Polk, Scott and Sebastian in Arkansas.
I further certify that the legal notice hereto attached in the matter of:

**RE: Notice of public meeting for FS Regional Airport Runway Extension**

**Order: 1443618**
**COST: $311.14**

Was published in the regular daily issue of said newspaper for consecutive insertions as Follows

First Run: 02/06/22
Second Run:
Third Run:
Fourth Run:

Bill Needham
(Signature)

Sworn before me on the 11th day of March 2022

My Commission expires April 10, 2026

Tawana D. Wright
Notary Public

TAWANA D. WRIGHT
MY COMMISSION # 12347009
EXPIRES: April 10, 2026
Sebastian County

# FORT SMITH REGIONAL AIRPORT
# CITIZEN COMMENT FORM

**FORT SMITH REGIONAL AIRPORT**
**RUNWAY EXTENSION PROJECT**

**DATE:**
**FEBRUARY 24, 2022**

**LOCATION:**
**Creekmoore Park Community Center**
**Rose Room**
**3301 South "M" Street**
**Fort Smith, AR 72903**
**5:30 p.m. - 7:30 p.m.**

Make your comments on this form and provide it to Garver personnel by March 8, 2022. Send by mail to: Lindi Miller, Garver, 4701 Northshore Drive, North Little Rock, AR 72118. Alternatively, email the form to PublicInvolvement@GarverUSA.com.

**Please Print:** **Date:** 2/24/22

**Name:** Sam Sicard

**Address:** 3516 Old Oaks Ln Ft Smith, AR 72903
*Street Address* *City, State, Zip*

**Comments:** This will be a dramatic economic impact on our community and the State of Arkansas. A fully support!!

**Use additional sheets if necessary**

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**at the following address:**
Garver
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4701 Northshore Drive, North Little Rock, AR 72118
Email: PublicInvolvement@GarverUSA.com

**Oral Comments should be received on or before March 8, 2022.**
**Leave a comment by calling:**
Telephone: 501-823-0730

For additional information, please visit our website at: *FSMRW8-26.AirportPlans.com*

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**Please Print:**

**Date:** 2/24/22

**Name:** George McGill

**Address:** 421 North 46th Street Fort Smith, AR 72903
*Street Address* *City, State, Zip*

**Comments:** The runway extension project is positioning our city to meet the needs for economic development rapidly taking place in the river valley.

**Use additional sheets if necessary**

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**Name:** Rodney Shepard

**Address:** 6400 Park Avenue Fort Smith, AR 72903

***Street Address*** ***City, State, Zip***

**Comments:** I'm supportive of the RUNWAY Extension. It's a grant project that will support existing and future Economic opportunities.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** Bonita Holroyd

**Address:** 8511 Silverstone Ct., Fort Smith, AR 72916

*Street Address* *City, State, Zip*

**Comments:** Looking forward to seeing this happen.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2/24/22

**Name:** Roger Holroyd

**Address:** 8511 Silverstone Ct FS AR 72916

***Street Address*** ***City, State, Zip***

**Comments:** Great to see progress of the expansion of the airport capacity.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2/24/2022

**Name:** BRANDON WALL

**Address:** 410 MAY AVE, FORT SMITH, AR 72901

***Street Address*** ***City, State, Zip***

**Comments:** THIS APPEARS TO BE A FANTASTIC OPPORTUNITY FOR FORT SMITH TO EXPAND OUR OFFERING TO AIR TRAVEL, FURTHER FLIGHT DESTINATIONS, AND POTENTIAL EXPANSION OF THE TERMINAL. I THINK ITS A GREAT PROJECT FOR FORT SMITH.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2/24/2022

**Name:** CURTIS RALSTON

**Address:** 8011 DOVER CIRCLE FORT SMITH, AR 72903

***Street Address*** ***City, State, Zip***

**Comments:** THIS IS A GREAT OPPORTUNITY FOR FORT SMITH. EXCITED TO BE ABLE TO BRING IN ADDITIONAL AIRCRAFT WHERE NEEDED.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** KENNETH KAELIN

**Address:** 3100 PARK AVE FORT SMITH AR.
*Street Address* *City, State, Zip*

**Comments:** THINK THIS WILL BE A VERY GOOD THING FOR FORT SMITH.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** Mike Barr

**Address:** 4420 S 35th Dr Ft. AR 72903

***Street Address*** ***City, State, Zip***

**Comments:** This is very important for the airport and to further economic development.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2/24/22

**Name:** Stuart Ghan

**Address:** 5831 Eager Lane Fort Smith AR, 72903
*Street Address* *City, State, Zip*

**Comments:** This is great for Fort Smith. This should allow for more opportunity for our community

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2/24/2022

**Name:** MICHAEL POFFINBARGER

**Address:** 7306 South U Street — Fort Smith, AR, 72903

***Street Address*** ***City, State, Zip***

**Comments:** I believe this is a great opportunity for Fort Smith and the surrounding communities. Also, this is great for the Fort Smith Regional Airport. I fully support this!

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** Michael Pate

**Address:** 16 Berry Hill Rd Ft Smith AR 72903

*Street Address* *City, State, Zip*

**Comments:** We appreciate the development. I think it is a positive project for Fort Smith and its ability to compete with other larger communities/cities.

**Use additional sheets if necessary**

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**Please Print:** **Date:** 02-24-22

**Name:** Bob Cooper

**Address:** 4611 Rogers Ave Ft. Smith, AR 72903
*Street Address* *City, State, Zip*

**Comments:** Great Expansion. This will be great for Fort Smith Arkansas.

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** Rob Datley

**Address:** 2105 S. 88th St Fort Smith, AR. 72903

***Street Address*** ***City, State, Zip***

**Comments:**

Ext of RUNWAY IS A GREAT INVESTMENT TO FORT SMITH REGION E.D. INFRASTRUCTURE.

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**Please Print:**

**Date:** 2-24-22

**Name:** MIKE JACIMORE

**Address:** 9221 R.A. YOUNG DR, FORT SMITH, AR 72916

***Street Address*** ***City, State, Zip***

**Comments:** WITH LIMITED LAND BETWEEN MARSHARD AND OLD GREENWOOD, WE NEED TO EXPAND IT TO ALLOW AS MUCH RUNWAY AS POSSIBLE TO ENABLE AND PLAN ECONOMIC DEVELOPMENT WITH LIMITED RESTRICTIONS.

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**FEBRUARY 24, 2022**

**LOCATION:**
**Creekmoore Park Community Center**
**Rose Room**
**3301 South "M" Street**
**Fort Smith, AR 72903**
**5:30 p.m. - 7:30 p.m.**

Make your comments on this form and provide it to Garver personnel by March 8, 2022. Send by mail to: Lindi Miller, Garver, 4701 Northshore Drive, North Little Rock, AR 72118. Alternatively, email the form to PublicInvolvement@GarverUSA.com.

**Please Print:**

**Date:** 2/24/2022

**Name:** Jim Geels

**Address:** 2017 So 68 Ft. Smith, AR 72903

***Street Address*** ***City, State, Zip***

**Comments:** GREAT opportunity to increase economic development in this AREA.

**Use additional sheets if necessary**

**Written Comments should be received by March 8, 2022**
**at the following address:**
Garver
Attn: Lindi Miller
4701 Northshore Drive, North Little Rock, AR 72118
Email: PublicInvolvement@GarverUSA.com

**Oral Comments should be received on or before March 8, 2022.**
**Leave a comment by calling:**
Telephone: 501-823-0730

For additional information, please visit our website at: *FSMRW8-26.AirportPlans.com*

# FORT SMITH REGIONAL AIRPORT
# CITIZEN COMMENT FORM

**FORT SMITH REGIONAL AIRPORT**
**RUNWAY EXTENSION PROJECT**

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**Please Print:**

**Date:** 2-24-22

**Name:** Aaron Littlefield

**Address:** 7107 Highland Park Dr FS, AR 72916

***Street Address*** ***City, State, Zip***

**Comments:** Great for Fort Smith

**Use additional sheets if necessary**

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**Please Print:**

**Date:** 2-24-22

**Name:** Tim Allen

**Address:** 612 Garrison Ave, FS, AR 72901
*Street Address* *City, State, Zip*

**Comments:** Great Investment in Our Growing City

**Use additional sheets if necessary**

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**at the following address:**
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Respondent

1 | Anonymous

07:24
Time to complete

1. Name

Larry Sharum

2. Address, City, State, Zip Code

311 Sibyl Drive Central City, Ar 72941

3. Phone Number

479 414 7495

4. Email Address

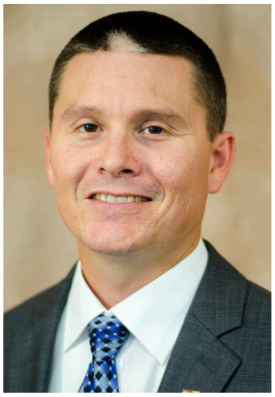
sharumle@cox.net

5. Do you have any comments on the proposed Fort Smith Regional Airport Runway 25 Extension project?

Our family owns the property east of S.89 and Meandering Way intersection. This is currently vacant land but to settle the estate, it will be for sale. According to the maps, part of this property will be in the "Proposed Action Alternative" area. What is the plan for addressing the issue of increased noise in this area?

# APPENDIX G

## Preparer Resumes



# RYAN MOUNTAIN, PWS

*Senior Environmental Scientist/Specialist*

Ryan Mountain is our environmental special studies lead and senior environmental scientist with 17 years of environmental and project management experience. Ryan's primary responsibilities include overseeing and conducting Phase I environmental site assessments; Section 404 permitting; performing wetland and stream delineations; providing detailed wetland and stream mitigation planning and specifications; authoring and co-authoring NEPA documents; performing biological evaluations, habitat assessments, and functional value assessments; and preparing spill prevention and stormwater plans. He has previous experience in fish population surveys, rearing, distribution, spawning, identification, and aging and has completed numerous Phase I environmental site assessments. Ryan has completed the Federal Highway Administration's Section 4(f) overview course, covering the important statute that protects parklands, recreation areas, wildlife and waterfowl refuges, and significant historic sites; TNM 2.5 Noise Modeling and Noise Fundamentals courses; and wildlife hazard management training required by the Federal Aviation Administration for conducting wildlife hazard assessments at airports.

**EDUCATION**
Bachelor of Science, Fisheries & Wildlife Management

**REGISTRATION**
Professional Wetland Scientist, 2745

MDOT Storm Water Pollution Prevention, MS, 12420

TDEC Qualified Hydrologic Professional, TN

**AFFILIATIONS**
Society of Wetland Scientists

**OFFICE LOCATION**
Fayetteville, AR

**EXPERIENCE**
13 years (firm)

19 years (total)

## EXPERIENCE

### NORTH PICKENS AIRPORT PARALLEL TAXIWAY ENVIRONMENTAL ASSESSMENT

*Reform , AL*

Environmental scientist responsible for leading an Environmental Assessment (EA) for this general aviation airport to help plan for a future partial parallel taxiway, taxilanes, and T-hangar development. Responsibilities included coordinating with the U.S. Fisheries and Wildlife Service and compiling the EA report, completing wetlands delineation and endangered species and habitat assessment, and proposing actions and alternatives.

### SOUTHWEST ALABAMA REGIONAL AIRPORT ESTABLISHMENT

*Thomasville, AL*

Lead environmental scientist responsible for completing an Environmental Assessment (EA) through the Federal Aviation Administration for this new regional airport. Primary responsibilities included local, state, and federal agency coordination; interest group coordination; assistance at the Draft EA public hearing; wetland delineation on 973 acres; cursory wildlife and habitat observations at the proposed airport location; and U.S. Army Corps of Engineers coordination and approval.

### WALKER COUNTY AIRFIELD OBSTRUCTION REMOVAL

*Jasper, AL*

Environmental scientist responsible for performing a wetland delineation on 67-plus acres of airport-owned wooded land in preparation of clearing and grubbing for the removal of obstructions. Wetland and stream areas were field delineated and mapped in MicroStation format for the client.

## EDUCATION

Bachelor of Science in Geology

Master of Science, Geology

## REGISTRATION

Professional Geologist, PA, PG000936G

## OFFICE LOCATION

Remote

## EXPERIENCE

2 years (firm)

32 years (total)

# DAVID BEDNAR, PG

*Environmental Scientist/Environmental Specialist*

David Bednar is a Senior Environmental Scientist at Garver with more than 30 years of multidisciplinary environmental experience primarily focused on NEPA documentation. He has served as one of the primary or supporting authors of seven environmental impact statements for highway corridor studies in Arkansas, Lousiana, and West Virginia; primary author of categorical exclusion documentation for highway widening projects; and primary or supporting author for environmental assessments to address proposed oil and gas well locations, dock modification projects, and marina improvement and expansion projects. David was involved with the design and monitoring of four groundwater dye trace studies to access the potential impacts in areas of karst topography near important springs along the Appalachian Corridor H Highway Project that included 59 monitoring stations. He has conducted NEPA documentation for projects located in Arkansas, Louisiana, Oklahoma, Texas, Utah, Mississippi, and West Virginia.

## EXPERIENCE

### AUBURN UNIVERSITY REGIONAL AIRPORT ENVIRONMENTAL ASSESSMENT

*Auburn, AL*

Environmental scientist involved with the preparation of the Environmental Assessment to address the potential environmental impacts associated with improvements to the runway safety area (RSA) for Runway 18 at the Auburn University Regional Airport in Auburn, Alabama. Responsibilities included the preparation of the affected environmental, environmental consequences, and mitigations section of the environmental assessment.

### NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS – NEPA

*Benton County, AR*

Environmental scientist responsible for conducting studies to address social and natural impacts as part of environmental assessment documentation for the Northwest Arkansas National Airport Access Road in Benton County, AR. Responsibilities included identifying the unique geologic karst landscape of the project area. Additionally responsible for serving as a contributing author of the environmental assessment and participating as project representative during public meetings.

### HIGHWAY 67 EIS WALNUT RIDGE TO MO STATE LINE

*Multiple Counties, AR*

Environmental scientist and contributing author for the Highway 67 EIS project. Prepared the water quality section of the Environmental Impact Statement and Waters Technical Report. This involved a description of the surface water and groundwater resources within the study area and impact analysis. Additionally, involved with the preparation of the screening level noise analysis for this 40+ mile Environmental Impact Statement.

## EDUCATION

Bachelor of Science in Civil Engineering

## REGISTRATION

Professional Engineer, AR, 15425

## AFFILIATIONS

Engineering Early Career Alumni Council (UofA)

Arkansas Society of Professional Engineers

ACEC of Arkansas Emerging Leaders Alumnus

National Society of Professional Engineers

Arkansas Civil Engineering Alumni Society

## OFFICE LOCATION

Fayetteville, AR

## EXPERIENCE

15 years (firm)

13 years (total)

# ADAM WHITE, PE

*Senior Project Manager*

Adam White is a senior project manager on Garver's Aviation Team and serves as the team leader for the Northwest Arkansas Aviation Team and the leader of Garver's Aviation Design Center. He has 13 years of experience specializing in design, evaluation, and maintenance of airfield pavements. Adam's responsibilities include airport design, project management, construction management, airport master planning, coordination with commercial service and general aviation clients, coordination with the FAA, and writing specifications. His project experience includes construction of runways, taxiways, aprons, hangars, perimeter fencing, parking lots, access roads, ARFF stations, and terminals. Adam has participated in the development of four greenfield airports. He also specializes in pavement rehabilitation and has inspected over 10 million square feet of airport pavement.

## EXPERIENCE

### NASHVILLE INTERNATIONAL AIRPORT TAXIWAY K RECONSTRUCTION

*Nashville, TN*

Project engineer responsible for review of the geotechnical investigation and developments of multiple pavement design alternatives. Also provided a life cycle cost analysis and a recommendation for the most economical pavement design.

### ROGERS EXECUTIVE AIRPORT RUNWAY REHABILITATION

*Rogers, AR*

Project manager for the environmental, design, bidding, and construction phase services of the runway rehabilitation project. Rehabilitation included full-depth keel reconstruction and overlay of the entire runway on a fast-track, nine-calendar-day schedule. The $5.5M project also included full lighting rehabilitation and full-length underdrain installation. The project was completed in eight days, one day ahead of schedule.

### BOONE COUNTY REGIONAL AIRPORT RUNWAY REHABILITATION

*Harrison, AR*

Project manager responsible for the analysis and rehabilitation design of Runway 18-36 at Boone County Regional Airport. The analysis included a full Pavement Condition Index (PCI) survey of the runway and connector taxiways. Evaluation also included Non-Destructive Testing (NDT) and Geotechnical Analysis. A full width mill and overlay was selected as the preferred option for construction. Also responsible for construction management for the $2 million construction project which included the pavement rehabilitation, lighting rehabilitation, and drainage improvements.

# MICHELE LOPEZ

*Senior Environmental Planner*

**EDUCATION**
Bachelor of Science, Biology

**OFFICE LOCATION**
Frisco, TX

**EXPERIENCE**
2 years (firm)

22 years (total)

Michele Lopez is a senior environmental planner on our Transportation Team with 21 years of experience. Michele has provided environmental oversight and has performed technical tasks for various schematic, feasibility, and corridor study projects. Her responsibilities include reviewing technical documents, assisting in data collection, overseeing public involvement and outreach tasks, writing study reports, managing all environmental deliverables, and coordinating with subconsultants for all reports and overall environmental assessments. Michele is familiar with NEPA guidelines and requirements and has experience performing specific analyses in indirect impacts, cumulative impacts, and socioeconomic impacts including environmental justice and community impact assessments.

## EXPERIENCE

### BASTROP CORRIDOR, INNOVATIVE I-SECTION FEASIBILITY STUDIES

*Bastrop, TX*

Environmental task leader responsible for overseeing public involvement activities. Responsibilities include developing and implementing a Public Involvement Plan which includes a public meeting and several stakeholder open house meetings. Also responsible for preparing the purpose and need statements for each of the four corridors included in the study and ultimately a feasible study report documenting findings and recommendations for each of the study corridors.

### FM 1378 SE, FEASIBILITY STUDY

*Lucas, TX*

Environmental task leader responsible for overseeing environmental documentation, including data collection, constraints mapping, and technical reports. Responsibilities include overseeing the implementation of the Public Involvement Plan and associated outreach activities. Also responsible for preparing and reviewing the Environmental Assessment and associated technical reports for the Schematic/Environmental portion of the project.

### ADDITIONAL EXPERIENCE

- Nashville International Airport Concourse Gate Expansion Environmental Assessment
  *Nashville, TN*
- Dallas Fort Worth International Airport EastWest Connector Roadway
  *Dallas, TX*
- Northwest Arkansas National Airport Access - NEPA
  *Fayetteville, AR*
- TxDOT US Highway 80 SCH/ENV DAL
  *Kaufman, TX*