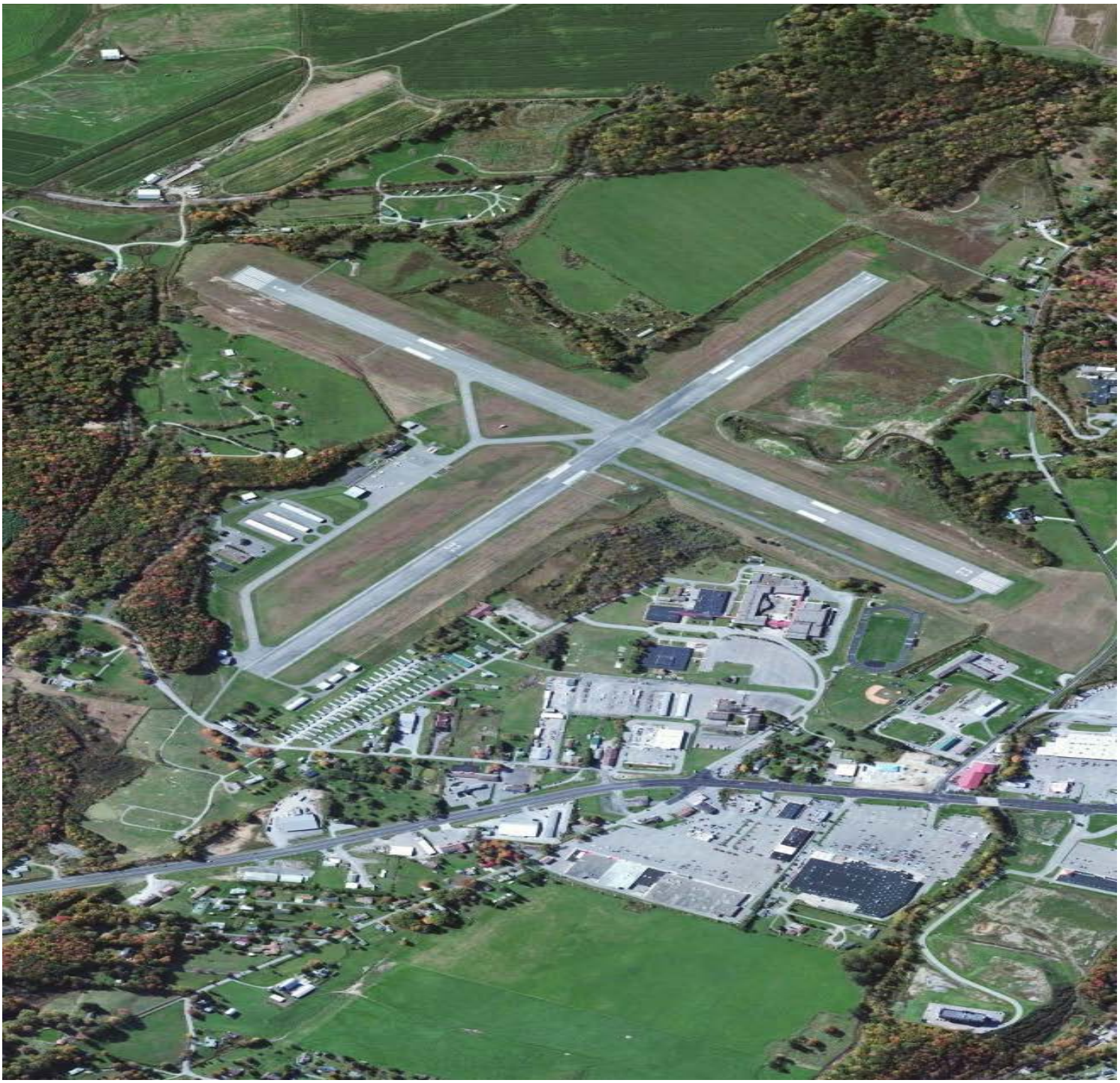


Short Environmental Assessment Form
Obstruction Removal (Runway 5-23 Approaches)
AIP Project No. 3-54-0007-023-2016
September 2020 – Final

Elkins-Randolph County Regional Airport Authority
Elkins-Randolph County Regional Airport
Elkins, West Virginia

Chapman Technical Group
a division of GRW

Chapman Technical Group | 43 East Main Street | Buckhannon, WV 26201 | 304-472-8914

FEDERAL AVIATION ADMINISTRATION

EASTERN REGION
AIRPORTS DIVISION

Short Environmental Assessment Form for AIRPORT DEVELOPMENT PROJECTS



Airport Name: Elkins-Randolph County Regional Airport Identifier: EKN

Project Title: Obstruction Removal (Runway 5-23 Approaches)

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

MATTHEW DIGIULIAN Digitally signed by MATTHEW DIGIULIAN
Date: 2020.11.02 07:51:27 -05'00'

Responsible FAA Official Date

INSTRUCTIONS

THIS FORM IS FOR LIMITED USE ON SPECIFIC TYPES OF PROJECTS. AIRPORT SPONSORS MUST CONTACT YOUR LOCAL AIRPORTS DISTRICT OFFICE (ADO) ENVIRONMENTAL PROTECTION SPECIALIST (EPS) BEFORE COMPLETING THIS FORM.

This form was prepared by FAA Eastern Region Airports Division and can only be used for proposed projects in this region.

Introduction: This Short Environmental Assessment (EA), is based upon the guidance in Federal Aviation Administration (FAA) Orders 1050.1F – *Environmental Impacts: Policies and Procedures,* and the *Environmental Desk Reference for Airport Actions* and 5050.4B – *NEPA Implementing Instructions for Airport Actions.* These orders incorporate the Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA), as well as US Department of Transportation environmental regulations, and other applicable federal statutes and regulations designed to protect the Nation's natural, historic, cultural, and archeological resources. The information provided by sponsors, with potential assistance from consultants, through the use of this form enables the FAA ADO offices to evaluate compliance with NEPA and the applicable special purpose laws.

Use: For situations in which this form may be considered, refer to the APPLICABILITY Section below. The local ADO has the final determination in the applicability of this form to a proposed Federal Action. Proper completion of the Form will allow the FAA to determine whether the proposed airport development project can be processed with a short EA, or whether a more detailed EA or EIS must be prepared. **If you have any questions on whether use of this form is appropriate for your project, or what information to provide, we recommend that you contact the environmental specialist in your local ADO.**

This Form is to be used in conjunction with applicable Orders, laws, and guidance documents, and in consultation with the appropriate resource agencies. Sponsors and their consultants should review the requirements of special purpose laws (See 5050.4B, Table 1-1 for a summary of applicable laws). Sufficient documentation is necessary to enable the FAA to assure compliance with all applicable environmental requirements. Accordingly, any required consultations, findings or determinations by federal and state agencies, or tribal governments, are to be coordinated, and completed if necessary, prior to submitting this form to FAA for review. Coordination with Tribal governments must be conducted through the FAA. We encourage sponsors to begin coordination with these entities as early as possible to provide for sufficient review time. Complete information will help FAA expedite its review. This Form meets the intent of a short EA while satisfying the regulatory requirements of NEPA for an EA. Use of this form acknowledges that all procedural requirements of NEPA or relevant special purpose laws still apply and that this form does not provide a means for circumvention of these requirements.

Submittal: When using this form for an airport project requesting *discretionary funding,* the documentation must be submitted to the local ADO by April 30th of the fiscal year preceding the fiscal year in which funding will be requested. When using this form for an airport project requesting *entitlement funding,* the documentation must be submitted to the local ADO by November 30th of the fiscal year in which the funding will be requested.

Availability: *An electronic version of this Short Form EA is available on-line at http://www.faa.gov/airports/eastern/environmental/media/C10.DOC. Other sources of environmental information including guidance and regulatory documents are available on-line at http://www.faa.gov/airports_airtraffic/airports/environmental.*

APPLICABILITY

Local ADO EPSs make the final determinations for the applicability of this form. If you have questions as to whether the use of this form is appropriate for your project, contact your local EPS BEFORE using this form. Airport sponsors can consider the use of this form if the proposed project meets either Criteria 1 or Criteria 2, 3, and 4 collectively as follows:

1) It is normally categorically excluded (see paragraphs 5-6.1 through 5-6.6 in FAA Order 1050.1F) but, in this instance, involves at least one, but no more than two, extraordinary circumstance(s) that may significantly impact the human environment (see paragraph 5-2 in 1050.1F and the applicable resource chapter in the 1050.1F Desk reference).

2) The action is one that is not specifically listed as categorically excluded or normally requires an EA at a minimum (see paragraph 506 in FAA Order 5050.4B).

3) The proposed project and all connected actions must be comprised of Federal Airports Program actions, including:

(a) Approval of a project on an Airport Layout Plan (ALP),
(b) Approval of Airport Improvement Program (AIP) funding for airport development,
(c) Requests for conveyance of government land,
(d) Approval of release of airport land, or
(e) Approval of the use of Passenger Facility Charges (PFC).

4) The proposed project is not expected to have impacts to more than two of the resource categories defined in the 1050.1F Desk Reference.

This form cannot be used when any of the following circumstances apply:

1) The proposed action, including all connected actions, requires coordination with or approval by an FAA Line of Business of Staff Office other than the Airports Division. Examples include, but are not limited to, changes to runway thresholds, changes to flight procedures, changes to NAVAIDs, review by Regional Counsel, etc.

2) The proposed action, including all connected actions, requires coordination with another Federal Agency outside of the FAA.

3) The proposed action will likely result in the need to issue a Record of Decision.

4) The proposed action requires a construction period exceeding 3 years.

5) The proposed action involves substantial public controversy on environmental grounds.

6) The proposed project would have impacts to, or require mitigation to offset the impacts to more than two resources[1] as defined in the 1050.1F Desk Reference.

7) The proposed project would involve any of the following analyses or documentation:
    a. The development of a Section 4(f) Report for coordination with the Department of the Interior,
    b. The use of any Native American lands or areas of religious or cultural significance,
    c. The project emissions exceed any applicable *de minimis* thresholds for criteria pollutants under the National Ambient Air Quality Standards, or
    d. The project would require noise modeling with AEDT 2b (or current version).

If a project is initiated using this form and any of the preceding circumstances are found to apply, the development of this form must be terminated and a standard Environmental Assessment or Environmental Impact Statement (if applicable) must be prepared.

****

[1] A resource is any one of the following: Air Quality; Biological Resources (including Threatened and Endangered Species); Climate; Coastal Resources; Section 4(f); Farmlands; Hazardous Materials, Solid Waste, and Pollution Prevention; Historical, Architectural, Archaeological, and Cultural Resources; Land Use; Natural Resources and Energy Supply; Noise and Noise-Compatible Land Use; Socioeconomics; Environmental Justice; Children's Environmental Health and Safety Risks; Visual Effects; Wetlands; Floodplains; Surface Waters; Groundwater; Wild and Scenic Rivers; and Cumulative Impacts.

Complete the following information:

Project Location
Airport Name: Elkins-Randolph County Regional Airport Identifier: EKN
Airport Address: 400 Airport Road
City: Elkins County: Randolph State: WV Zip: 26241

Airport Sponsor Information
Point of Contact: Craig Hyre, Authority President
Address: 400 Airport Road
City: Elkins State: WV Zip: 26241
Telephone: 304-636-2726 Fax:
Email: manager@elkinsairport.com

Evaluation Form Preparer Information
Point of Contact: Melissa Defibaugh
Company (if not the sponsor): Chapman Technical Group
Address: 43 E. Main St.
City: Buckhannon State: WV Zip: 26201
Telephone: 304-472-8914 Fax: 304-472-8915
Email: MDefibaugh@chaptech.com

1. Introduction/Background:

Introduction
The Elkins-Randolph County Regional Airport Authority is pursuing a project to address obstructions in the approach surfaces of Runways 5 and 23 at the Elkins-Randolph County Regional Airport. The project will consist of clearing 16.14 acres of trees, trimming 12.37 acres of trees and removing or lowering 5 structures. The proposed action will also consist of acquiring permanent avigation easements to aid in the obstruction removal effort and allow the Airport Authority to exercise a greater level of control over their current and planned airspace.

The Airport Authority is undertaking the Proposed Action to remove these obstructions within their approach surfaces in an effort to achieve the following outcomes: 1) maintaining the current length of available runway and 2) increasing the level of operational safety afforded to aircraft utilizing the airport. In an effort to undertake the removal of the penetrations in an environmentally responsible manner and comply with current Federal and State regulations, the Airport Authority has commissioned the preparation of an Environmental Assessment to analyze the impacts of the proposed action to the surrounding environment and, as applicable, determine the appropriate mitigation measures required to reduce impacts to levels below the applicable thresholds of significance.

Aviation Activity
The Airport Authority recently completed a planning effort to update the airport's Master Plan. One of the primary focuses of the planning effort was to develop a realistic forecast of aviation activity at the airport. For the purposes of brevity, the aviation forecasts are summarized in Tables 1.1 and 1.2 and the detailed analysis from the most recent 2011 Master Plan is included in **Appendix #1.**

Table 1.1: Based Aircraft Forecast

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
2011	21	3	0	0	0	24
2019 (Actual)	22	3	1	1	0	27
2021	22	3	0	0	1	26
2031	22	3	0	0	2	27

Table 1.2: Summary of Aviation Forecasts

Item	2011	2019 (Actual)	2021	2031
Itinerant Operations	1,945	2,615	2,145	2,228
Local Operations	3,950	5,906	4,355	4,522
Total Operations	**5,895**	**8,506**	**6,500**	**6,750**

Runway Length Requirements

FAA Advisory Circular 150/5325-4B sets forth the design criteria to be used when determining the length of runway required for each particular airport. The determination of required runway length takes into consideration such factors as the airport's design aircraft, altitude, temperature, wind conditions, the aircraft's useful load (the load able to be carried by an aircraft in addition to its own weight) and the intended range of the aircraft. When determining the required runway length, a critical determination must be made. This distinction is between what constitutes large and small aircraft. This Advisory Circular defines large aircraft as an aircraft with a maximum certificated takeoff weight of greater than 12,500 pounds. A small aircraft is defined as an aircraft with a maximum certificated takeoff weight of less than 12,500 pounds.

The airport's Master Plan contemplates which classification most appropriately defines the aircraft fleet which utilizes the Elkins-Randolph County Regional Airport. This report designates the Beech King Air 200 as the airport's critical design aircraft. The FAA Advisory Circular designates that an airport's design aircraft is the aircraft with the most demanding characteristics that regularly uses the runway. The FAA defines regular use as a minimum of 500 annual operations. The Beech King Air 200 belongs to a family of aircraft characterized as small airplanes having 10 or more passenger seats. Using Figure 2-2 of FAA Advisory Circular 150/5325-4B, included as **Appendix #2**, the recommended runway length for Runway 5-23 is 4,400 feet.

In instances where the total length of paved runway is not available for operations, the airport operator must declare the distances available for operations. The FAA defines four main categories of declared distances: Takeoff Run Available (TORA), Takeoff Distance Available (TODA), Accelerate-Stop Distance Available (ASDA) and Landing Distance Available (LDA). FAA Advisory Circular 150/5300-13A defines these distances as:

- Takeoff Run Available (TORA) – the runway length declared available and suitable for the ground run of an aircraft taking off;

- Takeoff Distance Available (TODA) – the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of the TODA may need to be reduced because of obstacles in the departure area;

- Accelerate-Stop Distance Available (ASDA) – the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff; and

- Landing Distance Available (LDA) – the runway length declared available and suitable for landing an aircraft.

The threshold of Runway 5 has been displaced by 154 feet to provide a suitable runway safety area end area. Therefore, the distances which are available for aircraft operations are less than the total length of paved runway surface. The declared distances available for operations on Runway 5-23 are as follows:

Table 1.3: Runway Distances

Distance Category	Runway 5[1]	Runway 23
Paved Length	4,501’	
TORA[2]	4,501’	4,347’
TODA[3]	4,501’	4,347’
LDA[4]	4,347’	4,347’
ASDA[5]	4,501’	4,347’

Notes:
1. Runway 5 threshold displaced by 154 feet.
2. TORA – Take Off Run Available
3. TODA – Take Off Distance Available
4. LDA – Landing Distance Available
5. ASDA – Accelerate Stop Distance Available

Operational Compliance

Evaluating the runway environment from an operational standpoint, Runway 5-23 is not in compliance with current FAA design criteria contained in Advisory Circular 150/5300-13A pertaining to an approach surface free of obstacles. The approach surface has a trapezoidal shape of variable dimensions and emanates outward and upward from the runway threshold, or the end of usable runway, at a slope which varies dependent on the type of instrument approach procedures available. The dimensions of the approach surfaces are depicted in Figure 3-2 and Table 3-2 from Advisory Circular 150/5300-13A, included as **Appendix #3**.

Currently, there are two GPS based straight-in instrument approach procedures for Runway 5-23, one for an approach to Runway 5 and another for the approach to Runway 23. Copies of the approach plates for these procedures are included as **Appendix #4**. The airport is predominantly utilized by aircraft which would fall under Category B (Aircraft with approach speeds of 91 knots or more, but less than 121 knots). Based on this classification, the approach minimums for Runways 5 and 23 are as follows:

Table 1.4: Runway Instrument Approach Procedure Minimums

Approach Procedure	Runway 5		Runway 23	
	Ceiling (ft.)	Visibility (miles)	Ceiling (ft.)	Visibility (miles)
LNAV MDA*	3,040	1-1/2	3,160	1-1/2
Circling	3,140	1-1/2	3,160	1-1/2

Note:
LNAV MDA – Lateral Navigation Minimum Descent Altitude

Based on the instrument approach procedures available to Runways 5 and 23, the approach surfaces for the ends of the runway would have the dimensions set forth in Table 3-2 included in **Appendix #3** from Advisory Circular 150/5300-13A for Category 4: *Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only*. The other surface of concern in this assessment is the basic visual approach surface. This surface would be defined as Category 3: *Approach end of runways expected to serve large airplanes (visual day/night); or instrument minimums greater than or equal to 1 statute mile (day only).* This is the most basic approach surface available to the airport.

2. Project Description (List and clearly describe **ALL** components of project proposal including all connected actions). A**ttach a map or drawing of the area with the location(s) of the proposed action(s) identified:**

The Proposed Action consists of removing obstructions which are currently penetrating the approach surfaces of Runway 5-23 at the Elkins-Randolph County Regional Airport. The project will consist of the following actions in the approach surfaces:

Runway 5 Approach Surface
- Clearing 2.56 acres of trees;
- Trimming 1.76 acres of trees;
- Removal of two obstruction light structures; and
- Lowering the top elevation of three silos

Runway 23 Approach Surface
- Clearing 13.58 acres of trees; and
- Trimming 10.61 acres of trees

The locations of the project components are depicted in the site plans included in **Appendix #5** on Sheets No. 5.3 and 5.4.

Tree Clearing
The trees which are designated to be removed in the project areas will be cut at or near the existing ground surface. All trees will be felled on each of the individual parcels and will remain the property of the parcel owner. The felled trees may be left in place at the discretion of the individual parcel owner. Should the felled tree be marketable, and if the landowner does not want the felled tree to remain, the marketable timber may be further processed by the Contractor. Any remaining trees which are not deemed to be marketable, and which the parcel owner does not want to remain, will be removed from the site and disposed of at an off-site location. The Contractor will also be required to

remove all downed limbs. All limbs and smaller slash/waste will be disposed of by chipping. All chips generated will be placed directly into a receiving truck, removed from the site and properly disposed.

Prior to the start of the construction, the Contractor will be required to provide the Airport Authority with documentation which formally designates all disposal area locations and methods of disposal (burning, chipping, etc.). In consideration of the significant forestry industry present in the area, an off-site waste location for the debris should be readily available. All documentation received will be submitted to the FAA for review and acceptance prior to the start of construction.

Once the trees are removed, the Contractor will be required to remove the remaining stumps through a grinding process. All stumps shall be ground to a point a minimum of 4" below the existing ground surface. Upon completion of the grinding process, the stumps shall be covered with a minimum of 4" of suitable topsoil material. In order to minimize ground disturbance, the Contractor will not be permitted to remove the stumps through grading with dozers or graders.

Tree Trimming

Trees which are located in areas designated to be trimmed will be trimmed down to the elevations indicated on the construction plans. The trimming area limits were developed based on an assumed removal height of approximately 10 feet. All limbs and slash/waste will be disposed of by chipping. All chips generated will be placed directly into a receiving truck, removed from the site and properly disposed. The Contractor will be required to provide an ISA Certified Arborist on-site during all tree trimming operations.

Obstruction Light Structure Removal

The obstruction light structure removal will consist of removing a wooden utility pole which was part of an antiquated obstruction lighting system and an aluminum frangible air mast which was located adjacent to a house which was demolished in 2011. The wooden utility pole will be removed a maximum of 12 inches from the existing ground surface and left on site to decompose. The aluminum frangible air mast will be disassembled and the individual components recycled or properly disposed of in the local waste collection system.

Silo Top Elevation Lowering

The Harvestore silos will be lowered by removing existing section pieces of the structure at ground elevation and lowering the silo to an acceptable height. The removed sections will become property of the Contractor and will be required to be properly disposed of off-site by metal scrap recycling or re-used at the Contractor's discretion.

The top dome section will be hoisted off the concrete silo structure and the appropriate number of structure sections will be removed. Once the target height has been achieved, the top dome section will be re-installed. The removed sections will become property of the Contractor and will be required to be properly disposed of off-site.

Site Reclamation

Upon completion of obstruction removal activities, all disturbed areas will be reclaimed through the following procedures:

- All ruts and depressions created by construction activity will be filled with suitable topsoil material or otherwise smoothed;

- All slash generated from the tree removal effort will be collected, removed from the site and properly disposed of at the pre-approved off-site disposal location; and

- All disturbed areas will be seeded and mulched in accordance with FAA specifications in order to establish adequate vegetative cover.

3. Project Purpose and Need:

The primary purpose of the Proposed Action is to remove obstructions which are located within the 20:1 approach surfaces of Runway 5-23 at the Elkins-Randolph County Regional Airport in order to improve the level of operational safety afforded to aircraft utilizing the facility. The purpose of the easement acquisition is to facilitate the removal of the offending obstructions as well as to increase the Airport Authority's future control over the approaches to Runways 5 and 23. It is anticipated the project will be completed by April 2022.

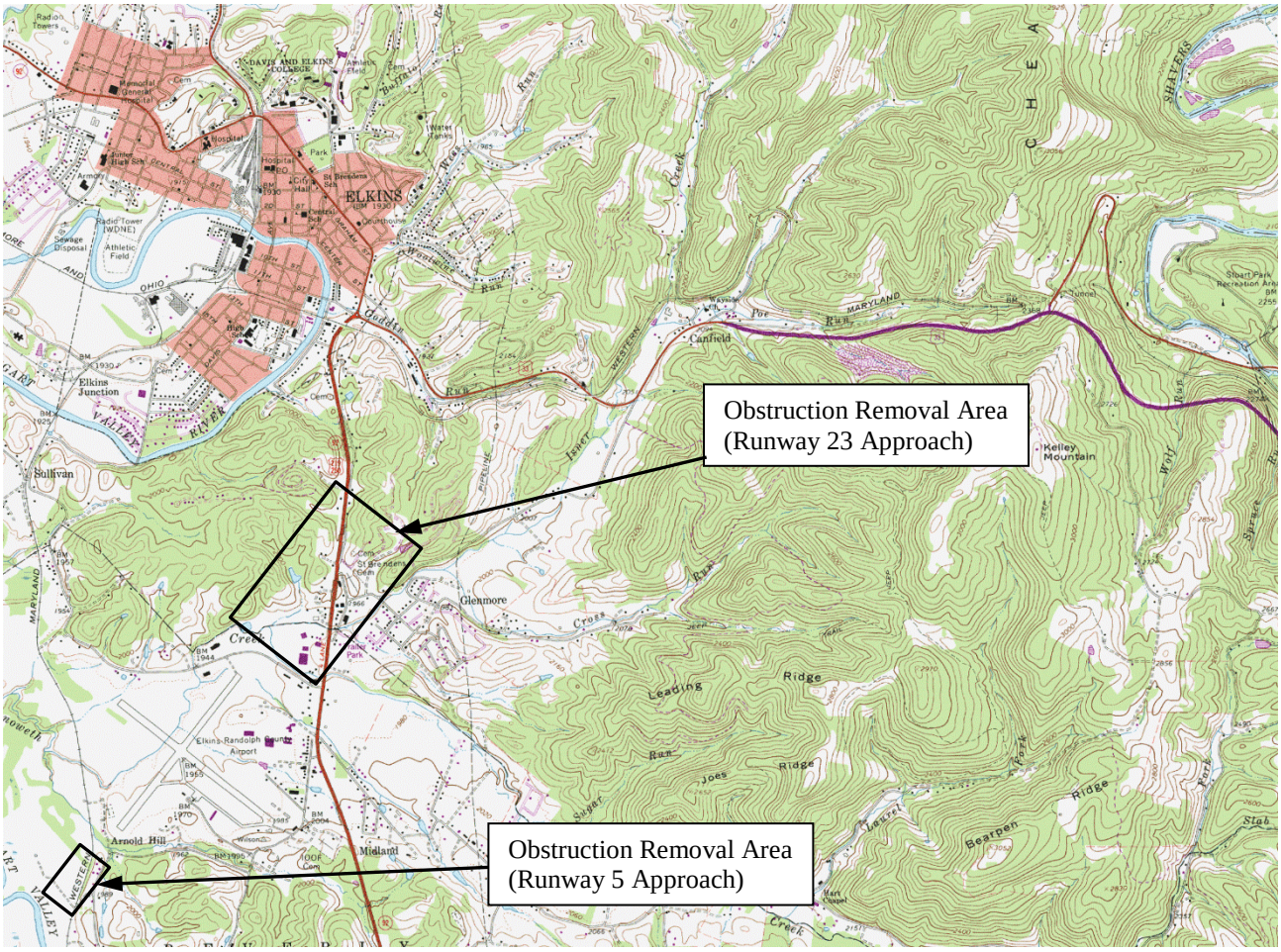
The primary need of the Proposed Action is to bring the airport into compliance with current design standards by removing obstacles which obstruct the airport's airspace while maintaining the existing length of usable runway.

4. Describe the affected environment (existing conditions) and land use in the vicinity of project:

Geographic Location

The Elkins-Randolph County Regional Airport is located approximately 2 miles south of the City of Elkins, West Virginia. The airport is accessed via Elkins-Randolph County Airport Road (County Route 219/27) which connects to Beverly Pike (US-219) via Country Club Road (County Route 219/11) to the east of the airport. The airport is approximately located at 38° 53' 11.67" latitude and 79° 51' 25.20" longitude. The airport's location in relation to the City of Elkins, West Virginia is shown in Figure 4.1 on the following page.

Figure 4.1: Project Location



The proposed action has 9 tree removal and trimming areas which are generally defined in Table 4.1 below. The areas are depicted in the site plans contained in **Appendix #5** on Sheets No. 5.3 and 5.4.

Table 4.1: Obstruction Removal Area Locations

Area No.	Acreage	Clearing/ Trimming	Runway Approach	Latitude	Longitude
1	0.83	0.83 Acre Clearing	Runway 23	38° 54’ 02”	79° 50’ 55”
2	10.11	5.68 Acres Clearing 4.43 Acres Trimming	Runway 23	38° 54’ 04”	79° 50’ 48”
3	4.05	1.09 Acres Clearing 2.96 Acres Trimming	Runway 23	38° 54’ 11”	79° 50’ 45”
4	8.83	5.98 Acres Clearing 2.85 Acres Trimming	Runway 23	38° 54’ 15”	79° 50’ 32”
5	0.37	0.37 Acres Trimming	Runway 23	38° 54’ 25”	79° 50’ 29”
6	0.82	0.82 Acres Trimming	Runway 5	38° 53’ 05”	79° 51’ 53”
7	0.74	0.74 Acres Trimming	Runway 5	38° 53’ 01”	79° 51’ 45”
8	2.56	2.56 Acres Clearing	Runway 5	38° 52’ 56”	79° 51’ 49”
9	0.20	0.20 Acres Trimming	Runway 5	38° 52’ 51”	79° 51’ 54”

Published Soils Information

The Natural Resource Conservation Service's (NRCS) Web Soil Survey was consulted to determine the types of soils present within the project area. A custom summary report was prepared which detailed the soils present. A copy of this report is included as **Appendix #6**. A summary of the soils within the potential impact area is illustrated in Table 4.2 and a general soil series description is included in Table 4.3.

Table 4.2: NRCS Soils

Map Unit Symbol	Map Unit Name	Acreage	Percentage of Potential Impact Area
BkC	Berks-Weikert complex 8 to 15 percent slopes	3.79	13.3%
BkD	Berks-Weikert complex 15 to 25 percent slopes	9.58	33.6%
BkE	Berks-Weikert complex 25 to 35 percent slopes	9.35	32.8%
BkF	Berks-Weikert complex 35 to 70 percent slopes	3.72	13.0%
MoB	Monongahela silt loam, moist 3 to 8 percent slopes	0.20	0.8%
Ph	Philo loam	0.10	0.3%
Pn	Pope-Atkins complex	1.23	4.3%
Py	Purdy silt loam	0.54	1.9%
	Totals	28.51	100%

Table 4.3: Soil Series Descriptions

Soil Series	General Description
Berks	Moderately deep, well drained soils formed in residuum weathered from shale, siltstone and fine grained sandstone on rounded and dissected uplands. Permeability is moderate or moderately rapid.
Weikert	Shallow, well drained soils formed in material that weathered from interbedded gray and brown acid shale, siltstone and fine-grained sandstone on gently sloping to very steep areas on uplands. Permeability is moderately rapid.
Monongahela	Fine loamy mixed semi-active mesic soils formed from old alluvium from soils derived largely from acid sandstone and shale. Permeability is moderate.
Pope	Very deep well drained soils formed in alluvium on flood plains. Permeability is moderate or moderately rapid.
Atkins	Very deep poorly drained soils formed in acid alluvium washed from upland soils that formed in shale and sandstone. Permeability is slow to moderate.

Philo	Very deep moderately well drained soils in flood plains formed in recent alluvium derived mainly from sandstone and shale. Permeability is moderate to moderately rapid.
Purdy	Very deep poorly drainage or very poorly drained soils formed in slack-water deposited alluvial materials on terraces. Permeability is slow or very slow.

Geologic Setting

The West Virginia Geologic and Economic Survey Geological Map of West Virginia was consulted pertaining to the geological setting of the general vicinity of the airport. According to these sources, the Elkins-Randolph County Regional Airport is located in an area underlain by rock comprised of the Paleozoic-Devonian and Cenozoic-Quaternary formations. The Paleozoic-Devonian formation is generally described as redbeds, shale, sandstone, limestone and chert. The Cenozoic-Quaternary formation is generally described as alluvial deposits of sand, gravel, silt, and clay along major streams.

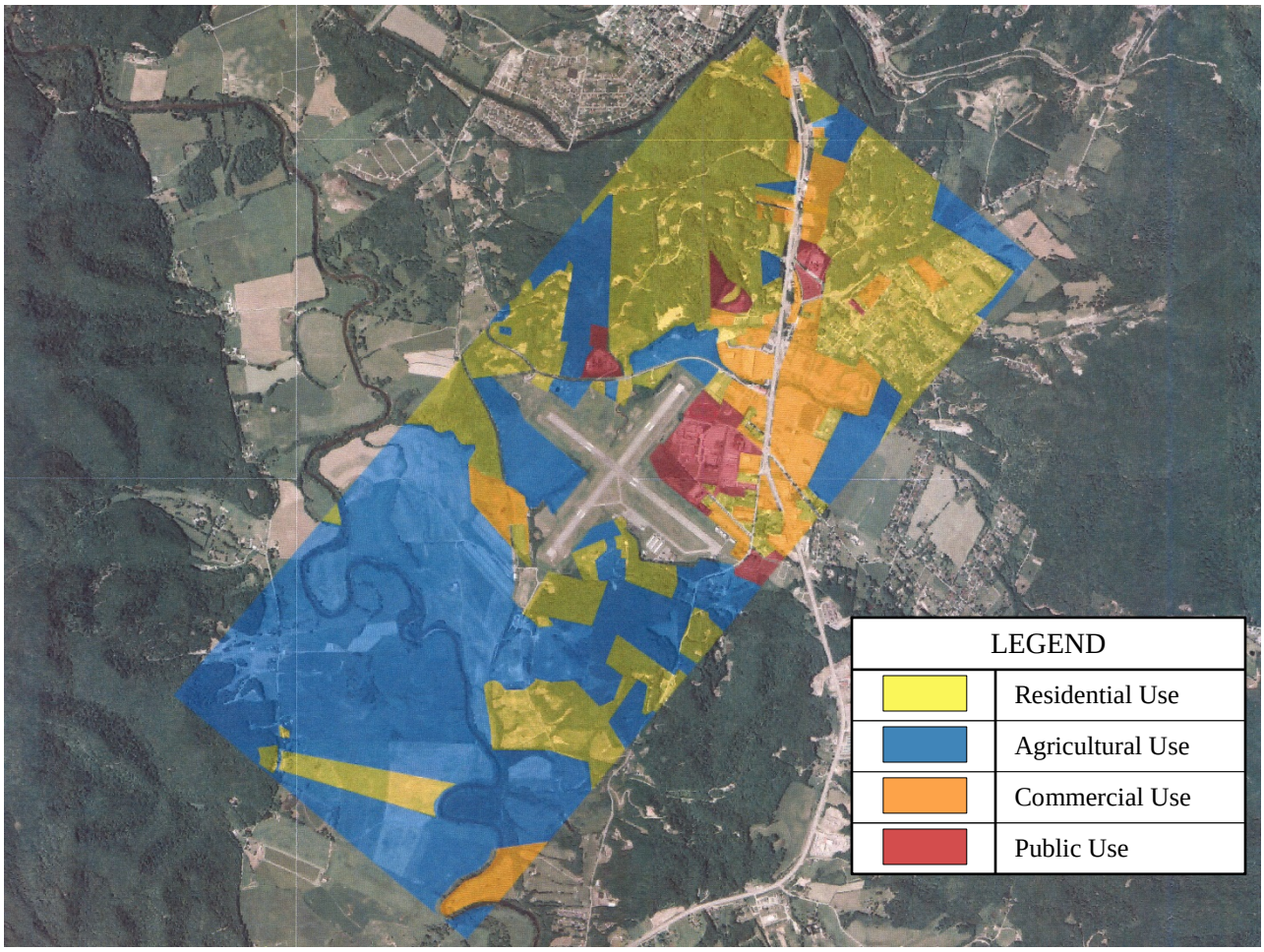
Topography

The Elkins-Randolph County Regional Airport is located in the Potomac Highlands region of West Virginia. The airport is situated in the Tygart River valley with the surrounding terrain rising dramatically to form mountains which constitute a portion of the Allegheny Mountain Range. The topography within the vicinity of the proposed action would be described as rolling hills with the primary obstruction removal areas being located on the hilltops. The general topography of the area is illustrated in Figure 4.1.

Contiguous Land Use

The areas within the general vicinity of the airport contain a mixture of residential, commercial, public use and agricultural use properties. The land uses within the vicinity of the airport are generally shown in Figure 4.2 on the following page.

Figure 4.2: Land Use Map



5. Alternatives to the Project: Describe any other reasonable actions that may feasibly substitute for the proposed project, and include a description of the "No Action" alternative. If there are no feasible or reasonable alternatives to the proposed project, explain why (attach alternatives drawings as applicable)**:**

Alternative No. 1 – Trim Tree Obstructions and Remove Structure Obstructions

Alternative No. 1 consists of the following components:

Runway 23 Approach Surface (**Appendix #5** Sheet No. 5.1)
- Trim 24.19 acres of trees to remove the portion extending above the approach surface

Runway 5 Approach Surface (**Appendix #5** Sheet No. 5.2)
- Trim 4.32 acres of trees to remove the portion extending above the approach surface;
- Remove 2 obstruction light towers; and
- Lowering the top elevation of 3 silos

Tree Trimming

This component will consist of trimming the trees in the designated areas to remove the portion of vegetation extending above the approach surface. The degree of tree removal will vary from 1-foot to approximately 75-feet.

The trimming process will be completed during the winter months to aid in the prevention of damage to the portion of tree to remain. All trimming operations will be conducted in a manner to prevent damage to the remaining portion of the tree and under the supervision of an arborist. The debris created by the trimming operations will be chipped and immediately placed into a truck for removal from the site.

Structure Modifications

The lowering of the top elevation of the silos will consist of removing sections from the structure. The top dome section will be hoisted off the structure and the appropriate number of structure sections will be removed. Once the target height has been achieved, the top dome section will be re-installed. The removed sections will become property of the Contractor and will be required to be properly disposed of off-site.

Alternative Assessment

The implementation of Alternative No. 1 would satisfy the project's primary purpose and need. However, the alternative is inherent with some factors which make it a less desirable option than the Proposed Action. A significant portion of the alternative would consist of removing more than 40-feet from the trees within the obstruction removal areas. Assuming a general tree height of 75-feet, Alternative No. 1 would remove approximately half of the tree. Removing such a significant portion of the tree significantly increases the likelihood of the tree dying as a result of the trimming process. If the tree survives, it is unlikely the tree would branch back out to any significant degree. In the event the tree dies as a result of the trimming operation, the property owner would be left to deal with the removal of the dead tree.

There is also an aesthetic impact associated with trimming a significant portion of the tree. If the tree is trimmed to a point where it will no longer branch out, the property owner is left with numerous trees across their property which are simply the tree trunk with very minimal branching. This would create a significant detriment to the visual aspect of the property.

With these remaining impacts to the property owner in mind, Alternative No. 1 is discounted in favor of the Proposed Action due to the lasting maintenance and visual impacts to the property owner.

Alternative No. 2 - Displace Runway 5-23 Thresholds

Alternative No. 2 consists of displacing the Runway 5 threshold by an additional 140 feet and the Runway 23 threshold by 1,300 feet to maintain an obstruction free 20:1 approach surface. This alternative would consist of re-marking the runway pavement surface and re-configuring the airfield lighting system to coincide with the new threshold location. The instrument approach procedures would also need to be revised to reflect the new threshold location and declared distances would need to be published to reflect the reduced length of Landing Distance Available (LDA).

The primary impact to the airport would be a significant reduction in the length of runway distance available for landing operations on Runway 5-23. The following table illustrates a comparison of the

existing landing distances available and the distances which would be available upon displacement of the threshold:

Distance Category	Runway 5		Runway 23	
	Existing Condition	Post-Displacement Condition	Existing Condition	Post-Displacement Condition
TORA*	4,501’	4,501’	4,347’	4,347’
TODA*	4,501’	4,501’	4,347’	4,347’
LDA*	4,347’	4,207’	4,347’	3,047’
ASDA*	4,501’	4,501’	4,347’	4,347’

Note:
TORA – Take Off Run Available
TODA – Take Off Distance Available
LDA – Landing Distance Available
ASDA – Accelerate Stop Distance Available

The primary need of the proposed action is to bring the airport into compliance with design standards while maintaining the maximum amount of existing runway length. The implementation of this alternative would not be consistent with this primary need because it reduces the length of runway available for landing operations on Runways 5 and 23. Based on the analysis performed in the recent Master Plan update and included attached to this assessment as Appendix #2, the minimum amount of runway landing length needed to accommodate 75% of the fleet mix at 60% of the useful load is 4,400’. The landing distance available after displacement would be 4,207’ for Runway 5 and 3,047’ for Runway 23. The implementation of this alternative would decrease the landing distance available to below the minimum distance needed to accommodate the design aircraft for the airport.

While the displacement of runway thresholds is a viable alternative to provide a clear approach surface in accordance with FAA Advisory Circular 150/5300-13A, it is only to be used if there are no other viable alternatives. As demonstrated in the following Environmental Consequences section of this document, the impacts associated with the Proposed Action are able to be mitigated to levels below the applicable thresholds of significance, and, therefore, Alternative No. 2 should be discounted in favor of the Proposed Action.

Alternative No. 3 - No Action Alternative

In order to fully evaluate the Proposed Action, an alternative which contemplates performing no action must be evaluated and considered. In this instance, no construction activity would be undertaken and the existing environment would remain un-changed. The evaluation of the no action alternative assists in the decision making process by considering the potential effects associated with no action being taken.

In order to maintain a safe and efficient airspace system, it is the FAA’s policy to address obstacles which penetrate an airport’s airspace. Depending on the location of the obstacle and the degree of penetration, there are several actions which can be undertaken to address the penetration. These actions range from disqualifying approach procedures from being applicable at night to requiring a relocation of a runway’s threshold to achieve compliance.

The No Action Alternative does not meet the project's stated purpose and need to improve operational safety, comply with FAA design standards, maintain the existing length of usable runway for the Airport's design aircraft, and maintain surrounding land use compatible with air traffic.

6. Environmental Consequences – Special Impact Categories (refer to the Instructions page and corresponding sections in 1050.1F, the 1050.1F Desk Reference, and the Desk Reference for Airports Actions for more information and direction. Note that when the 1050.1F Desk Reference and Desk Reference for Airports Actions provide conflicting guidance, the 1050.1F Desk Reference takes precedence. The analysis under each section must comply with the requirements and significance thresholds as described in the Desk Reference).

(A) AIR QUALITY

(1) Will the proposed project(s) cause or create a reasonably foreseeable emission increase? Prepare an air quality assessment and disclose the results. Discuss the applicable regulatory criterion and/or thresholds that will be applied to the results, the specific methodologies, data sources and assumptions used; including the supporting documentation and consultation with federal, state, tribal, or local air quality agencies.

The Proposed Action will not cause a reasonably foreseeable emission increase. The Proposed Action will result in temporary emissions associated with construction equipment exhaust and fugitive dust during obstruction removal. Any emissions generated during construction will be well below the established *de minimis* levels for criteria pollutants; therefore, there will be no reasonably foreseen increase in emissions.

The anticipated construction timeframe for the project scope is approximately 200 calendar days. The construction equipment anticipated on-site to accomplish the project scope include the following:

Chain Saw
Feller Buncher
Tree Chipper
Stumper
Tree Skidder
Logging Truck.

Construction emissions inventory for the Proposed Action:

Ozone (NOX) – 4.2 ton/year
Ozone (VOC) – 2.4 ton/year
CO and SO_2 – 6.6 tons/year
PM_{10} - 1.2 ton/year.

De minimis thresholds of:

Ozone (NOX) - 100 tons/year
Ozone (VOC) - 50 tons/year
CO and SO_2 - 100 tons/year
PM_{10} - 100 tons/year.

The construction emissions inventory assumption for the Proposed Action is well below the established de minimis thresholds as delineated above.

Day-to-day operations will not be appreciably different and the frequency of aircraft takeoffs and landings is not anticipated to change with or without the project; therefore, there are no anticipated changes to air quality associated with operations after construction.

(2) Are there any project components containing unusual circumstances, such as emissions sources in close proximity to areas where the public has access or other considerations that may warrant further analysis? If no, proceed to (3); if yes, an analysis of ambient pollutant concentrations may be necessary. Contact your local ADO regarding how to proceed with the analysis.

There are no project components which include the introduction of new emission sources. There are also no project components which contain unusual circumstances.

(3) Is the proposed project(s) located in a nonattainment or maintenance area for the National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act?

The Proposed Action is located in Randolph County, West Virginia. Randolph County is not listed as a non-attainment area in the EPA Green Book. The counties containing non-attainment areas for West Virginia are Berkeley, Brooke, Cabell, Hancock, Kanawha, Marshall, Mason, Ohio, Pleasants, Putnam, Wayne and Wood.

(4) Are all components of the proposed project, including all connected actions, listed as exempt or presumed to conform (See FRN, vol.72 no. 145, pg. 41565)? If yes, cite exemption and go to (B) Biological Resources. If no, go to (5).

Not applicable since Randolph County, West Virginia is in attainment.

(5) Would the net emissions from the project result in exceedances of the applicable *de minimis* threshold (reference 1050.1F Desk Reference and the *Aviation Emissions and Air Quality Handbook* for guidance) of the criteria pollutant for which the county is in non-attainment or maintenance? If no, go to (B) Biological Resources. If yes, stop development of this form and prepare a standard Environmental Assessment.

Randolph County is not listed as a non-attainment or maintenance area in the EPA Green Book; therefore, the project would not result in emissions which would exceed the *de minimis* levels for criteria pollutants.

(B) BIOLOGICAL RESOURCES

Describe the potential of the proposed project to directly or indirectly impact fish, wildlife, and plant communities and/or the displacement of wildlife. Be sure to identify any state or federal species of concern (Candidate, Threatened or Endangered).

(1) Are there any candidate, threatened, or endangered species listed in or near the project area?

As a preliminary review of candidate, threatened or endangered species listed in or near the project, the proposed project site was analyzed using the U.S. Fish and Wildlife Service's (USFWS) IPaC database. An IPaC Trust Resource Report was prepared for the proposed project site and it was determined that the project area may potentially contain the following threatened or endangered plant or mammals:

Flowering Plants
- Running Buffalo Clover
- Small Whorled Pogonia

Mammals
- Indiana Bat
- Northern Long-eared Bat
- Virginia Big-eared Bat

Third Rock Consultants was contracted to perform habitat assessments in the obstruction removal areas to determine the presence of suitable habitat for the threatened or endangered species.

The USFWS has developed guidance which indicates projects which impact less than 17 acres are generally not likely to produce a negative impact on the above listed bat species. Based on guidance received from the USFWS, an assessment of the 28.5 acres, which exceeds the USFWS established impact threshold, could operate under two conditions, 1) listed bat species are assumed to be present or 2) conduct a presence/absence survey to verify if any bats are within the project areas.

The Airport Authority contracted Skybax Ecological Services to conduct a bat mist net presence/absence survey to determine if any bats were present within the project areas. No threatened or endangered species were captured.

The USFWS provided guidance which indicated that there is a known population of Small Whorled Pogonia within 2.5 miles of the project area, as well as modeled suitable habitat within the project area. Based on guidance received from the USFWS, an assessment of the proposed project areas was required to determine whether any rare plants (specifically Running Buffalo Clover and Small Whorled Pogonia) were present in the proposed project areas. USFWS coordination associated with this recommendation is included in **Appendix #7**.

The Airport Authority contracted Skybax Ecological Services to conduct a rare plant survey of the project areas. Neither Running Buffalo Clover nor Small Whorled Pogonia were present within the project areas.

Copies of the technical memorandums prepared by Third Rock Consultants and final correspondence with the USFWS, including the survey reports from Skybax Ecological Services, and the IPaC Trust Resource Report are attached as **Appendix #7**.

(2) Will the action have any long-term or permanent loss of unlisted plants or wildlife species?

The Proposed Action consists of the removal of trees which inherently has the potential for the loss of habitat within the project areas for wildlife species which would utilize the trees as habitat. A higher potential exists for the displacement of wildlife species than the outright loss of wildlife

species. There are numerous acres of similar habitat surrounding the project area which could provide a suitable replacement habitat for any displaced species. With the ample availability of suitable habitat, the Proposed Action is not anticipated to create a permanent loss of wildlife species. Additionally, a significant portion of the obstruction removal will occur in areas that are already disturbed and maintained by the existing property owners.

The Proposed Action would have the potential for the permanent loss of plant species, particularly species of tall growing trees. The primary focus of the proposed action is to remove trees which have grown tall enough to penetrate the airport's approach surface. Once the trees are removed, the project areas will be converted to grass areas which are more easily maintained. Maintaining these areas as grassed areas will result in the permanent loss of tall growing tree species. Although these species will be permanently lost within the project areas, there are numerous acres of wooded terrain surrounding the project area with an abundance of the tree species being lost. The loss of these species within the project area is not considered to create a significant impact.

(3) Will the action adversely impact any species of concern or their habitat?

Guidance from the USFWS indicates projects are not likely to adversely affect Indiana bat populations if the project: (1) will affect less than 17 acres of potential Indiana bat foraging or roosting habitat; (2) is not within any Indiana bat hibernacula or summer use buffers and (3) will not affect any caves or mines which could be used as hibernacula. Since the project area was greater than 17 acres, a bat mist net survey was conducted in 2018. No Indiana bats or NLEB were captured during this survey. USFWS concluded it does not anticipate that the project is likely to adversely affect the Indiana bat.

Correspondence received from the USFWS indicated the Proposed Action is not likely to adversely affect the Northern Long-eared bat because the project is not located around known hibernacula or maternity roost trees and will not affect any known Northern Long-eared bat hibernacula. The USFWS has determined any takes associated with the proposed action are exempted under the 4(d) rule.

Correspondence received from the USFWS indicated the Proposed Action could affect areas that provide habitat for both Small Whorled Pogonia and Running Buffalo Clover. However, the survey of the proposed project areas conducted in 2019 indicated some potential suitable habitat; however, no species of interest were found during the survey. USFWS concluded it does not anticipate that the project is likely to adversely affect Small Whorled Pogonia or Running Buffalo Clover.

(4) Will the action result in substantial loss, reduction, degradation, disturbance, or fragmentation of native species habitats or populations?

The Proposed Action contains the removal of trees and, therefore, has the potential to create a loss of habitat. The proposed project site is located within a much larger wooded area. Within a one-mile radius of the proposed project sites, there are in excess of 1,000 acres of wooded area. Based on the amount of wooded area remaining after the implementation of the Proposed Action, the loss, reduction, degradation, disturbance or fragmentation of habitat associated with the clearing/trimming of 28.51 acres of trees is considered to be minimal.

(5) Will the action have adverse impacts on a species' reproduction rates or mortality rate or ability to sustain population levels?

Based on the level of habitat remaining after the subject trees are removed, it is not anticipated the Proposed Action will have any adverse impacts on species' reproduction or mortality rates.

(6) Are there any habitats, classified as critical by the federal or state agency with jurisdiction, impacted by the proposed project?

Based on correspondence received from the USFWS through correspondence and a review of the IPaC database, there are no critical habitats located in or near the proposed project site.

(7) Would the proposed project affect species protected under the Migratory Bird Act? (If Yes, contact the local ADO).

The Proposed Action contains the removal and/or trimming of approximately 28.5 acres of trees. Projects which involve the removal of trees are inherent with the potential to affect migratory bird populations. A review of the USFWS IPaC database indicates there are 20 species of migratory birds which could potentially be affected by the Proposed Action.

In order to avoid impacts to the migratory bird populations, the tree removal associated with the Proposed Action will be conducted within the period of time between October 15th and March 31st.

If the answer to any of the above is "Yes", consult with the USWFS and appropriate state agencies and provide all correspondence and documentation.

(C) CLIMATE

(1) Would the proposed project or alternative(s) result in the increase or decrease of emissions of Greenhouse gases (GHG)? If neither, this should be briefly explained and no further analysis is required and proceed to (D) Coastal Resources.

The Proposed Action does not include any components which would introduce new sources of Greenhouse gases. Construction equipment emissions will be temporary and will not exceed established *de minimis* levels, and no contributions to GHG are anticipated.

(2) Will the proposed project or alternative(s) result in a net decrease in GHG emissions (as indicated by quantitative data or proxy measures such as reduction in fuel burn, delay, or flight operations)? A brief statement describing the factual basis for this conclusion is sufficient.

Not Applicable.

(3) Will the proposed project or alternative(s) result in an increase in GHG emissions? Emissions should be assessed either qualitatively or quantitatively as described in 1050.1F Desk Reference or Aviation Emissions and Air Quality Handbook.

Not Applicable.

(D) COASTAL RESOURCES

(1) Would the proposed project occur in a coastal zone, or affect the use of a coastal resource, as defined by your state's Coastal Zone Management Plan (CZMP)? Explain.

The National Oceanic and Atmospheric Administration (NOAA) regulates the coastal zone management program. The program is a voluntary partnership between the Federal government and the U.S. coastal states, and territories authorized by the Coastal Zone Management Act of 1972. The purpose of this act was to preserve, protect, develop, and where possible, restore and enhance the nation's coastal zone for this and subsequent generations. The State of West Virginia is not a coastal zone state. Therefore, the Proposed Action is not regulated under the coastal zone management program.

(2) If Yes, is the project consistent with the State's CZMP? (If applicable, attach the sponsor's consistency certification and the state's concurrence of that certification).

Not Applicable.

(3) Is the location of the proposed project within the Coastal Barrier Resources System? (If Yes, and the project would receive federal funding, coordinate with the FWS and attach record of consultation).

Coastal barriers are landscape features that shield and protect the mainland from the full force of wind, wave, and tidal energies. The Coastal Barrier Resources Act was passed in 1982 to address the problems of coastal barrier development. This act prohibits, with some exceptions, federal financial assistance for development within the Coastal Barrier Resources System that consists of undeveloped coastal barriers along the Atlantic and Gulf coasts. The proposed project area does not lie within any of these coastal systems; therefore, the Proposed Action will have no impact on coastal barriers.

(E) SECTION 4(f) RESOURCES

(1) Does the proposed project have an impact on any publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or an historic site of national, state, or local significance? Specify if the use will be physical (an actual taking of the property) or constructive (i.e. activities, features, or attributes of the Section 4 (f) property are substantially impaired.) If the answer is "No," proceed to (F) Farmlands.

The Proposed Action will not include the acquisition of any publicly owned land or avigation easements which would be subject to the provisions of Section 4(f).

The Proposed Action will not impact a historical site of national, state, or local significance. The West Virginia Division of Culture and History was consulted for a review of the project footprint. The review resulted in a finding that no historic properties will be affected by the proposed undertaking. A copy of the consultation is included in **Appendix #8**.

(2) Is a *De Minimis* impact determination recommended? If "yes", please provide; supporting documentation that this impact will not substantially impair or adversely affect the activities, features, or attributes of the Section 4 (f) property; a Section 106 finding of "no adverse effect" if historic properties are involved; any mitigation measures; a letter from the official with jurisdiction concurring with the recommended *de minimis* finding; and proof of public

involvement. (See Section 5.3.3 of 1050.1F Desk Reference). If "No," stop development of this form and prepare a standard Environmental Assessment.
Not Applicable.

(F) FARMLANDS
Does the project involve acquisition of farmland, or use of farmland, that would be converted to non-agricultural use and is protected by the Federal Farmland Protection Policy Act (FPPA)? (If Yes, attach record of coordination with the Natural Resources Conservation Service (NRCS), including form AD-1006.)

In order to determine the presence of any prime, unique, or statewide or locally important farmland, the Natural Resource Conservation Service (NRCS) Web Soil Survey was consulted. A custom summary report was prepared which detailed the soils contained within the potential impact area. A copy of this report is included as **Appendix #6**. A summary of the soils within the potential impact area are shown in Table 6.F.1 below:

Table 6.F.1: Farmland Classifications

Map Unit Symbol	Map Unit Name	Acreage	Percentage of Potential Impact Area	Farmland Classification
BkC	Berks-Weikert complex 8 to 15 percent slopes	3.79	13.3%	Not Prime Farmland
BkD	Berks-Weikert complex 15 to 25 percent slopes	9.58	33.6%	Not Prime Farmland
BkE	Berks-Weikert complex 25 to 35 percent slopes	9.35	32.8%	Not Prime Farmland
BkF	Berks-Weikert complex 35 to 70 percent slopes	3.72	13.0%	Not Prime Farmland
MoB	Monongahela silt loam, moist 3 to 8 percent slopes	0.20	0.8%	Farmland of Statewide Importance
Ph	Philo loam	0.10	0.3%	Prime Farmland
Pn	Pope-Atkins complex	1.23	4.3%	Not Prime Farmland
Py	Purdy silt loam	0.54	1.9%	Not Prime Farmland
	Totals	28.51	100%	

The Farmland Protection Policy Act (FPPA) regulates Federal actions with the potential to convert farmland to non-agricultural uses. The Proposed Action does not contain any components which would irreversibly convert farmland to non-agricultural uses. The proposed avigation easements will protect against future obstructions; and, as such, the overall use of the properties will not be altered. Therefore, the Proposed Action is not subject to the requirements of FPPA regulations.

(G) HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION
(1) Would the proposed project involve the use of land that may contain hazardous materials or cause potential contamination from hazardous materials? (If Yes, attach record of consultation with appropriate agencies). Explain.

The US EPA National Priorities List (NPL) was reviewed and there are no proposed, final or deleted NPL sites in the project vicinity. The Proposed Action does not contain any components which could potentially create contamination from hazardous materials.

(2) Would the operation and/or construction of the project generate significant amounts of solid waste? If Yes, are local disposal facilities capable of handling the additional volumes of waste resulting from the project? Explain.

The Proposed Action will not generate a significant amount of solid waste. The largest quantity of waste material generated will consist of vegetable material which is bio-degradable. There is a potential for the accumulation of a small amount of solid waste being generated from packaging debris or construction personnel related trash. All waste material will be properly disposed of and the local facilities are capable of handling the minimal volume of waste generated.

The silos will be altered by manufacturers familiar with the construction and composition of the silos. Any solid waste concerns will be coordinated with the manufacturer and included in the design phase of the Proposed Action.

(3) Will the project produce an appreciable different quantity or type of hazardous waste? Will there be any potential impacts that could adversely affect human health or the environment?

The Proposed Action consists of the removal of trees, two light structures and the lowering of three silos and will not produce any type of hazardous waste.

(H) HISTORIC, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

(1) Describe any impact the proposed project might have on any properties listed in, or eligible for inclusion in the National Register of Historic Places. (Include a record of your consultation and response with the State or Tribal Historic Preservation Officer (S/THPO)).

The West Virginia State Historic Preservation Officer was consulted to determine the level of impact, if any, that the Proposed Action may have on property listed in or eligible for inclusion into the National Register of Historic Places. Based on this consultation, there are no properties listed in or eligible for inclusion into the National Register within or immediately adjacent to the proposed project site.

It should be noted that the Section 106 cultural resources review was based on project area descriptors that are different than those presently ascribed to the project areas. The project areas were refined in October 2017 after a Light Detection and Ranging (LIDAR) survey was completed. LIDAR is a remote sensing system that can be used to measure vegetation height. However, the overall project areas are substantially similar, and, there were no significant comments as a result of the previous Section 106 cultural resources review. A review request was submitted to the West Virginia State Historic Preservation Officer in December 2017 and a response was received January 2018. Therefore, the Proposed Action will have no effect on this resource category. A copy of all documentation associated with this consultation is included as **Appendix #8**.

(2) Describe any impacts to archeological resources as a result of the proposed project. (Include a record of consultation with persons or organizations with relevant expertise, including the S/THPO, if applicable).

The West Virginia State Historic Preservation Officer was consulted to determine the level of impact, if any, that the Proposed Action may have on archaeological resources. Historic and archaeological resource surveys were conducted and coordinated with SHPO. Based on this consultation, there are no documented archaeological resources, and it is unlikely that significant archaeological resources are present due to the previously disturbed nature of the project areas. Therefore, the Proposed Action will have no effect on this resource category. A copy of all documentation associated with this consultation is included as **Appendix #8**.

(I) LAND USE

(1) Would the proposed project result in other (besides noise) impacts that have land use ramifications, such as disruption of communities, relocation of residences or businesses, or impact natural resource areas? Explain.

The Proposed Action will not result in significant land use impacts. The implementation of the Proposed Action will not alter the land use of either the project site or any areas within the immediate vicinity. The Proposed Action will temporarily reduce the silage storage on an active dairy farm by reducing the height of three existing silos. The landowner will be monetarily compensated which will allow for the construction of an additional silo to replace the lost storage. The new silo will have a height/location restriction associated with the Runway 5 approaches. There will be no disruption to communities or relocations of residences or businesses associated with the action.

The provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (the Uniform Act) and FAA Advisory Circular 150/5100-17 will be followed for the proposed easement acquisitions and silo impacts. Section 3.2.1 in FAA Advisory Circular 150/5100-17 states that "The sponsor must make all reasonable efforts to contact the owner or the owner's representative and discuss its offer to purchase the property, including the basis for the offer of just compensation and explain its acquisition policies and procedures, including its payment of incidental expenses. The owner must be given reasonable opportunity to consider the offer and present material that the owner believes is relevant in determining the property value, and to suggest modification of the proposed purchase terms and conditions.

(2) Would the proposed project be located near or create a wildlife hazard as defined in FAA Advisory Circular 150/5200-33, "Wildlife Hazards On and Near Airports"? Explain.

Advisory Circular 150/5200-33B indicates the following land uses have the potential to attract hazardous wildlife and threaten aviation safety:

- Waste Disposal Operations;
- Water Management Facilities;
- Wetlands;
- Dredge spoil containment areas;
- Agricultural activities;
- Golf Courses, Landscaping and other Land-Use Considerations; and
- Synergistic Effects of Surrounding Land Uses.

The disturbance areas contained within the Proposed Action are located near wetlands and parcels of property which are currently being utilized for agricultural activities. The parcels of property containing agricultural activities are identified in the land use map included Paragraph 4 and the locations of the wetlands are further identified in Paragraph 5(N).

Agricultural Activities

The areas currently being used for agricultural activities are generally located near the approach end of Runway 5. These parcels are generally used for small scale dairy cattle, swine and crop production. The portion of the Proposed Action in this area consists of altering 5 structures (3 grain silos, 1 obstruction light tower and 1 utility pole), clearing 2.56 acres of trees and trimming 1.76 acres of trees. While being located near these activities, the Proposed Action has no components which would alter the current setting as it relates to the presence of wildlife hazards.

Wetland Areas

Wetlands are present within the general areas covered by the approach surfaces for Runways 5 and 23. While being in the general vicinity, there are no wetlands within the areas which will be disturbed through the Proposed Action. Therefore, the Proposed Action will not alter the current setting of the wetlands as it relates to the presence of a wildlife hazard. The existing conditions will be maintained.

(3) Include documentation to support sponsor's assurance under 49 U.S.C. § 47107 (a) (10), of the 1982 Airport Act, that appropriate actions will be taken, to the extent reasonable, to restrict land use to purposes compatible with normal airport operations.

The Proposed Action involves the acquisition of obstruction removal easements for parcels of property which are situated within the Elkins-Randolph County Regional Airport's airspace. By acquiring avigation easements for these parcels, the Airport Authority will better be able to assure that land uses associated with the subject properties will strictly conform to aviation related operations.

(J) NATURAL RESOURCES AND ENERGY SUPPLY

What effect would the project have on natural resource and energy consumption? (Attach record of consultations with local public utilities or suppliers if appropriate)

The Proposed Action will have a minimal impact on energy consumption associated with construction equipment which will not result in long-term impacts. The lowering of the silos should be accomplished within 60 days. The tree removal and trimming operations should be accomplished within 12 months.

(K) NOISE AND NOISE-COMPATIBLE LAND USE

Will the project increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe? (Use AEM as a screening tool and AEDT 2b as appropriate. See FAA Order 1050.1F Desk Reference, Chapter 11, or FAA Order 1050.1F, Appendix B, for further guidance). Please provide all information used to reach your conclusion. If yes, contact your local ADO.

The Proposed Action does not contain project components which would create an increase in aircraft related noise. Essentially, the Proposed Action is being undertaken to maintain the existing aircraft fleet mix utilizing the airport.

Also, FAA Order 1050.1F states "No noise analysis is needed for projects involving Design Group I and II airplanes (wingspan less than 79 feet) in Approach Categories A through D (landing speed less than 166 knots) operating at airports whose forecast operations in the period covered by the NEPA document do not exceed 90,000 annual propeller operations (247 average daily operations) or 700 annual jet operations (2 average daily operations)…." The Elkins-Randolph County Regional Airport meets these operational level requirements and would not require a noise analysis. The Elkins-Randolph County Regional Airport typically accommodates approach category B aircraft and the maximum number of annual operations within the forecasting period contained in the 2011 master plan update is approximately 6,750.

In order to minimize the disruption to the local residents, the Contractor will be required to limit project activity to a Monday through Friday work schedule with all work commencing after 8:00 a.m. and concluding by 5:00 p.m. Due to the project footprint and separate project areas, disruption to local residents will only occur when tree trimming and/or clearing is occurring in the proximity of each residence, and, not for the duration of the project.

(L) SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, and CHILDREN'S HEALTH and SAFETY RISKS

(1) Would the project cause an alteration in surface traffic patterns, or cause a noticeable increase in surface traffic congestion or decrease in Level of Service?

The Proposed Action does not contain any components which would permanently alter surface traffic patterns or create a noticeable increase in surface traffic congestion in the vicinity of the project site. Upon completion of the Proposed Action, the existing conditions, as they relate to surface traffic patterns, will remain unchanged.

While not having any permanent impacts, the Proposed Action will cause temporary impacts to the surface traffic patterns and could potentially cause temporary intermittent increases in surface traffic congestion. The Proposed Action contains construction elements which would introduce the presence of construction equipment and additional trucks to the area for project material/equipment deliveries to the site or the removal of timber products. There may also be intermittent temporary road closures when trees are being felled adjacent to active roadways.

In order to minimize the disruption to local traffic, the Contractor will be required to limit project activity to a Monday through Friday work schedule with all work commencing after 8:00 a.m. and concluding by 5:00 p.m. The Contractor will only be allowed to transport equipment or materials into or out of the project areas during this time period.

Based on the work being restricted to off-peak hours, the impact to local traffic patterns and congestion is not considered to be significant. The roadways to be used to access the project site are sufficient to accommodate the increase in traffic without a significant decrease in the level of service.

(2) Would the project cause induced, or secondary, socioeconomic impacts to surrounding communities, such as changes to business and economic activity in a community; impact public service demands; induce shifts in population movement and growth, etc.?

The Proposed Action is not anticipated to cause significant socioeconomic impacts to the surrounding communities; however, the Proposed Action does have the potential to negatively impact one business located within the approach surface limits for the Runway 5 approach. The three silos which are to be lowered are located on an active dairy farm operation. The silos are currently being used to store the silage which is utilized as feed for the dairy livestock.

The Proposed Action contemplates reducing the overall height of the three silo structures. This reduction in height will reduce the overall storage capacity of the silos. This reduction in storage volume will impact the dairy operation by creating a situation where the operator has to expend more time and resources to refill the silos at a shorter interval as compared to the filling interval utilized currently. The Proposed Action will reduce the combined storage volume of the three silos by 24,151 cubic feet or 19,406.87 bushels.

In order to mitigate the loss of storage volume, the Proposed Action will include providing monetary compensation to the property owner in an amount equal to the cost associated with constructing a replacement structure. The lost volume can be replaced by a structure with a 25' diameter and 50' tall. This replacement structure would provide a storage capacity of 24,543.69 cubic feet or 19,722.42 bushels. The cost associated with the construction of this replacement structure is estimated to be approximately $250,000. The compensation for the replacement structure would include a stipulation that the replacement structure be constructed in a manner which did not create an obstruction to the Runway 5 approach surface.

(3) Would the project have a disproportionate impact on minority and/or low-income communities? Consider human health, social, economic, and environmental issues in your evaluation. Refer to DOT Order 5610.2(a) which provides the definition for the types of adverse impacts that should be considered when assessing impacts to environmental justice populations.

The Proposed Action will not have a disproportionate impact on minority or low-income communities.

According to the United States Census Bureau, West Virginia has a population of 1,852,994. The race mixture of the population of the state is comprised of approximately 93.5% White, 3.6% African American, 1.7% Hispanic or Latino and 1.2% other races. The median household income for the state is $44,921 with 17.8% of the population living in poverty.

According to the United States Census Bureau, Randolph County, West Virginia has a population of 29,405. The race mixture for the population of the county is comprised of approximately 96.3% White, 1.8% African American, 1.0% Hispanic or Latino and 0.9% other races. The median household income for the county is $41,094 with 19.4% of the population living in poverty.

The Runway 5 end is within Census Tract 9664 and the Runway 23 end is within Census Tract 9660.

According to the most recent data, Census Tract 9664 has an estimated population of 5,990. The race mixture of the population includes 99.3% White, 0.7% African American, 0.5% Hispanic or Latino,

and 0.0% other races. Census Tract 9660 has an estimated population of 4,140. The Race mixture of the population includes 97.5% White, 0.5% African American, 1.3% Hispanic of Latino, and 1.0% other races.

Census Tract 9664 has a median household income of $46,576 and 14.5% of the population are living in poverty. Census Tract 9660 has a median household income of $42,070 and 10.3% of the population are living in poverty.

The area in the vicinity of the airport is not considered a minority community. The income level of the census tracts encompassing the project area is higher than both the County and State average and the percentage of the population living in poverty is lower than both the County and State averages; therefore, the Proposed Action will not have a disproportionate impact on minority and/or low income populations.

The United States Census Bureau information is included as **Appendix #9**.

The provisions of the Uniform Act will be followed for the proposed avigation easement acquisitions.

(4) Would the project have the potential to lead to a disproportionate health or safety risk to children?

According to the United States Census Bureau, in West Virginia, the percentage of children under the age of 18 is 20.2%

According to the United States Census Bureau, in Randolph County, West Virginia, the percentage of children under the age of 18 is 18.8%.

According to the most recent data, children under 18 is 23.7% for Census Tract 9664 and 18.2% for Census Tract 9660. Although Census Tract 9664 is slightly higher than State and County percentages, the Proposed Action is not anticipated to have a disproportionate health and safety risk to children.

The United States Census Bureau information is included as **Appendix #9**.

If the answer is "YES" to any of the above, please explain the nature and degree of the impact. Also provide a description of mitigation measures which would be considered to reduce any adverse impacts.

(M) VISUAL EFFECTS INCLUDING LIGHT EMISSIONS
(1)Would the project have the potential to create annoyance or interfere with normal activities from light emissions for nearby residents?

The Proposed Action does not include any elements which would introduce a new source of light emissions; therefore, the project is not inherent with the potential to create annoyance or interfere with normal activities due to light emissions.

(2) Would the project have the potential to affect the visual character of nearby areas due to light emissions?

The Proposed Action does not include the introduction of any new light emission sources; therefore, the project is not inherent with the potential to affect the visual character of nearby areas due to the presence of new light sources.

While not having the potential to affect the visual character of the areas through the introduction of a new light emission source, the Proposed Action does have the potential to affect the visual character of the project areas through alterations to existing lines of sight. The Proposed Action consists of removing trees and structures which would alter the viewsheds by potentially introducing new lines of sight into previously obscured areas. The proposed clearing and trimming areas in each of the areas have been presented and reviewed with the affected property owners on an individual basis.

Visual resources site plans, Sheets No. 6.1 and 6.2 are included in **Appendix #10**.

Area No. 1 (**Appendix #10** Sheet No. 6.1)
Area No. 1 includes a clearing area of 0.83 acre. The area to be cleared is located on a hillside between a pavilion used by the Elkins Jehovah Witnesses Kingdom Hall and a residence located in the valley below. The area is located in a much larger wooded area surrounding the pavilion and extending down the hill towards the residence. The following is a general description of each of the viewsheds:

- Jehovah's Witnesses Kingdom Hall Pavilion: The pavilion is located at the northeast corner of a flat open area situated to the northwest of the Kingdom Hall building. The pavilion has generally open views of the areas to the south and southwest. The views to the north and northeast are of the wooded area of which Area No. 1 is a part.

- Douglas Residence: The residence is located in secluded wooded area situated in the valley to the northeast of the Kingdom Hall building. The residence has limited views of the surrounding areas.

The removal of the trees will slightly alter the lines of sight between the pavilion and the residence. A small buffer of trees will remain around the residence, so the lines of sight between the two points will only be marginally affected. The general visual nature of the area will essentially remain un-changed, so there are no significant impacts anticipated.

Area No. 2 (**Appendix #10** Sheet No. 6.1)
Area No. 2 includes a disturbance area of 10.11 acres. The area includes 4.43 acres of trimming and 5.68 acres of clearing. The area is located on a hilltop immediately to the west of the extended Runway 23 centerline. The trimming and clearing areas are located in a larger wooded residential area. There are fifteen residences and/or commercial properties in the immediate vicinity of the proposed disturbance areas. The following is a general description of each of the existing viewsheds:

- Simmons Residence: The residence is located in a secluded wooded area with limited views of surrounding residences. The primary open area is towards Oak Street and reveals a view of the Stalnaker residence.

- Stalnaker Residence: The residence is located adjacent to Oak Street in a mostly open area with wooded areas behind the residence. The residence has mostly open views of the surrounding residences. The view from the front of the residence is across Oak Street onto the wooded area included in Area No. 2.

- L. Little Residence: The residence is located in a mostly wooded area with obscured views on the western, northern and eastern sides. The residence has a mostly open view to the south with a direct line of sight through a clear lawn area into Area No. 2.

- J. Little Residence: The residence is located near the southeast corner of the L. Little residence with a mostly wooded area behind the residence to the north and to the east. The residence has mostly open views to the west and south with an obscured view of the Beverly Pike to the east. The residence has a direct line of sight through a clear lawn area to the south into Area No. 2.

- Kisner Residence: The residence is located adjacent to the driveway for the L. Little residence with a mostly wooded area behind the residence to the east. The residence has mostly open view to the north and west with partially obscured views of Oak Street and Area No. 2 to the south and the Beverly Pike to the east.

- L. Little 2nd Residence: The residence is located adjacent to Oak Street in a mostly open area with wooded areas to the east of the residence. The residence has mostly open views of the surrounding residences. The view from the front of the residence is across Oak Street onto the wooded area included in Area No. 2.

- Barger Residence: The residence is located adjacent to the intersection of Oak Street and the Beverly Pike. The residence is located in a generally open area with direct views of the Beverly Pike and the surrounding developed areas. The views to the south and west of the residence are of the wooded areas included in Area No. 2.

- Bosworth Residence: The residence is located in a secluded wooded area with limited views of surrounding residences. The view to the east of the residence extends out over the Beverly Pike to other developed areas. The residence is generally encompassed by Area No. 2 on all sides.

- Gum Residence: The residence is located in a mostly open area with generally open views of the neighboring residences to the south. The residence has limited views in a southeastern direction of the Beverly Pike and the surrounding developed areas. The views to the north and west of the residence are of the wooded areas included in Area No. 2.

- Douglas Residence: The residence is located in secluded wooded area situated in the valley to the northeast of the Kingdom Hall building. The residence has limited views of the surrounding areas. The views to the north and east of the residence are of the wooded area included in Area No. 2.

- Jehovah's Witnesses Kingdom Hall: The Kingdom Hall building is located on a plateau to the southwest of Area No. 2. The views to the east, south and west are of the commercial and residential areas adjacent to the Beverly Pike and the Elkins-Randolph County Regional Airport. The views to the north are of a hillside which rises up to a second plateau on which a pavilion is situated. Area No. 2 is visible from the building to the northeast.

- Bennett Residence: The residence is located in a mostly open area with views of the developed areas around the Beverly Pike to the south and the east. The views to the west are of a partially wooded area. The views to the north of the residence are of adjacent properties and the wooded area included in Area No. 2.

- Shreve Commercial Property: The commercial property is located in an open area with views of the developed areas round the Beverly Pike to the south and the east. The views to the west are of the hillside on which the Jehovah's Witnesses Kingdom Hall is situated. The views to the north are of a partially wooded hillside leading up to the Bennett Residence.

- Sponaugle Residence: The residence is located in an open area with views of the developed areas around the Beverly Pike to the south and the east. The views to the west are of the hillside on which the Jehovah's Witnesses Kingdom Hall is situated. The views to the north are of a partially wooded hillside leading up to the Bennett Residence.

- McLaughlin Residence: The residence is located in an open area adjacent to the Beverly Pike with views of the associated developed areas to the south and the east. The views to the west are of the hillside on which the Jehovah's Witnesses Kingdom Hall is situated. The views to the north are of a partially wooded hillside leading up to the Bennett Residence.

The trimming component of the Proposed Action is not anticipated to have a significant impact on the visual character of the area. However, the clearing component of the Proposed Action is inherent with the potential to alter the lines of sight from the surrounding residences. The removal of trees will create more open space in the area and potentially reduce the secluded character of the residences. The following is a description of the potential for impacts to each residence:

- Simmons Residence: The removal of trees in Area No. 2 will alter the views from the residence to the east and south. The views from the residence will transition from views of a secluded wooded area to partially obscured views of an open grassed area. A small visual buffer consisting of trees which are designated to be trimmed will remain. This visual buffer will help mitigate the impacts to the lines of sight. The remaining areas around the residence as included in the trimming area and the views are anticipated to remain largely unchanged.

- Stalnaker Residence: The removal of trees in Area No. 2 will alter the views from the residence to the south. The views from the residence will transition from views of a secluded wooded area to partially obscured views of an open grassed area. A small visual buffer of trees which are designated to be trimmed will remain. This visual buffer will help mitigate the impacts to the lines of sight. The remaining views from the residence have the potential to be impacted by the Proposed Action. These impacts are discussed in more detail under the Area No. 3 discussion.

- L. Little and J. Little Residences: The removal of trees in Area No. 2 will alter the views from the two residences to the south. The residences have a direct line of sight

over an open lawn area into Area No. 2. The views beyond the open lawn area will transition from views of a wooded area to partially obscured views of an open grassed area. A small visual buffer of trees which are designated to be trimmed will remain. This visual buffer will help mitigate the impacts to the lines of sight. The remaining views from the residences have the potential to be impacted by the Proposed Action. These impacts are discussed in more detail under the Area No. 3 discussion.

- Kisner and L. Little 2nd Residences: The removal of trees in Area No. 2 will alter the views from the residences to the south. The views from the residences will transition from views of a wooded area to partially obscured views of an open grassed area. A small visual buffer of trees which are designated to be trimmed will remain. This visual buffer will help mitigate the impacts to the lines of sight. The remaining views from the residences have the potential to be impacted by the Proposed Action. These impacts are discussed in more detail under the Area No. 3 discussion.

- Barger Residence: The removal of trees in Area No. 2 will have minimal impact on the views to the west and south from the residence. The wooded areas immediately adjacent to the residence are designated as trimming areas; therefore, a visual buffer will remain which will help mitigate any impacts to lines of sight.

- Bosworth Residence: The removal of trees in Area No. 2 will alter the views from the residence to the north and northwest. The character of the views will transition from a wooded area with significant seclusion to an open grassed area.

- Gum Residence: The removal of the trees in Area No. 2 will slightly alter the views from the residence to the north. The character of these views will transition from a wooded area to an open grassed area. A small buffer of trees will remain between the open space created in Area No. 2 and the residence which will help mitigate the impacts to the views. The remaining views from the residence will remain unchanged.

- Douglas Residence: The removal of trees in Area No. 2 will alter the views from the residence to the east. The views to the east of the residence will transition from views of a wooded area to views of an open grassed area. A small visual buffer will remain between the residence and the tree removal area. This visual buffer will help mitigate the impacts to the lines of sight.

- Jehovah's Witnesses Kingdom Hall: The removal of trees in Area No. 2 will marginally alter the views from the Kingdom Hall building to the northeast. The view from the building will transition from a view of a wooded knoll to a grassy knoll. The knoll included in Area No. 2 is approximately 500 feet away at its closest point, so the impact to the lines of sight from the Kingdom Hall building are anticipated to be minimal.

- Bennett Residence: The removal of trees in Area No. 2 will alter the views from the residence to the north. The views to the north of the residence will transition from a wooded hillside to an open grassed hillside. Areas of trees immediately adjacent to the residence are included in the area designated for tree trimming. These remaining trees

will help mitigate the impacts to the lines of sight to the north. The remaining views from the residence will remain largely unchanged.

- Shreve Commercial Property: The removal of trees in Area No. 2 will have no impact to the views from the property. The views to the northwest are of a partially wooded hillside leading up to the Bennett Residence. The hillside obscures any views into the clearing portion of Area No. 2. A small portion of the wooded hillside to the northwest of the property are included in the area designated for tree trimming. While the views of the wooded area will be altered because of the visual effects associated with the tree trimming, no new lines of sight will be introduced. The remaining views from the property will remain largely unchanged.

- Sponaugle Residence: The removal of trees in Area No. 2 will have no impact to the views from the residence. The views to the north are of a partially wooded hillside leading up to the Bennett Residence. The hillside obscures any views into the clearing portion of Area No. 2. A small portion of the wooded hillside to the north of the residence are included in the area designated for tree trimming. While the views of the wooded area will be altered because of the visual effects associated with the tree trimming, no new lines of sight will be introduced. The remaining views from the residence will remain largely unchanged.

- McLaughlin Residence: The removal of trees in Area No. 2 will have no impact to the views from the residence. The views to the northwest are of a partially wooded hillside leading up to the Bennett Residence. The hillside obscures any views into the clearing portion of Area No. 2. A small portion of the wooded hillside to the northwest of the residence are included in the area designated for tree trimming. While the views of the wooded area will be altered because of the visual effects associated with the tree trimming, no new lines of sight will be introduced. The remaining views from the residence will remain largely unchanged.

Area No. 3 (**Appendix #10** Sheet No. 6.1)

Area No. 3 includes a disturbance area of 4.05 acres. The area is divided into 2.96 acres of trimming and 1.09 acres of clearing. The area is generally located on a hilltop with the outer portions of the disturbance area extending down the hillside slightly. The majority of the disturbance area is a stand of trees located around the perimeter of a grassed lawn area. The disturbance area is located in the general vicinity of eight residences. The following is a general description of each of the residence's existing viewshed:

- Stalnaker Residence: The residence is located adjacent to Oak Street in a mostly open area with wooded areas behind the residence. The residence has mostly open views of the surrounding residences. The view from the front of the residence is across Oak Street onto the wooded area included in Area No. 2. The view from the rear of the residence is to the north into Area No. 3.

- L. Little Residence: The residence is located in a mostly wooded area with obscured views on the western, northern and eastern sides. The residence has a mostly open view to the south with direct lines of sight to four neighboring residences.

- J. Little Residence: The residence is located near the southeast corner of the L. Little residence with a mostly wooded area behind the residence to the east. The residence has mostly open views to the north, west and south with an obscured view of the Beverly Pike to the east.

- Kisner Residence: The residence is located adjacent to the driveway for the L. Little residence with a mostly wooded area behind the residence to the east. The residence has mostly open view to the north and west with an obscured views of Oak Street to the south and the Beverly Pike to the east.

- L. Little 2nd Residence: The residence is located adjacent to Oak Street in a mostly open area with wooded areas to the east of the residence. The residence has mostly open views of the surrounding residences. The view from the front of the residence is across Oak Street onto the wooded area included in Area No. 2. The view from the rear of the residence is to the north into Area No. 3.

- W. Arbogast Residence: The residence is located to the northeast of the L. Little residence. The residence is situated in a mostly wooded area. The views from the residence are generally of wooded hillside. The residence has a mostly obscured view of the Beverly Pike to the east.

- Epply Residence: The residence is located on a hill top to the northwest of the L. Little residence. The residence is situated in a mostly wooded area. The views from the residence in all directions is of wooded areas. There is a wooded buffer between the residence and the W. Arbogast and L. Little residences.

- Saseen Residence: The residence is located to the northwest of the Stalnaker residence in a depressed area adjacent to a private drive which connects to Oak Street. The residence is situated in a mostly wooded area with an open view of the street. The views from the residence in all directions is generally of wooded areas. The view to the east is of the wooded hillside which is included in Area No. 3.

The trimming component of the Proposed Action is not anticipated to have a significant impact on the visual character of the area. However, the clearing component of the Proposed Action has the potential to alter the lines of sight from the surrounding residences. The removal of the trees will increase the open spaces in the area and potentially introduce new lines of sight into adjacent developed areas. The following is a description of the potential for impacts to each residence:

- Stalnaker Residence: The removal of the trees in Area No. 3 has the potential to marginally alter the views from the residence to the north. The area designated for clearing is located behind a substantial area designated for trimming. Once the trees area removed, a grassed area may be visible through the stand of remaining trees, but a significant negative impact is not anticipated as the remaining trees will serve as a visual buffer.

- L. Little Residence: The removal of the trees in Area No. 3 will alter the views from the residence to west and north by increasing the open space around the residence. Once the trees are removed, there will still be a wooded area on these sides, but a new

open space will be introduced. The removal of the trees will introduce a new line of sight towards the Epply residence.

- J. Little Residence: The removal of the trees in Area No. 3 will alter the views from the residence to the west by increasing the amount of open space. The views to the west from the residence will still include views of wooded areas, but with an expanded open space prior to the wood line. The views to the east from the residence will still include views of wooded areas; the proposed tree trimming will lower the existing tree heights.

- Kisner Residence: The removal of the trees in Area No. 3 will alter the views from the residence to the northwest by increasing the amount of open space. These views will still include views of wooded areas, but with an expanded open space prior to the wood line. The remaining views from the residence will remain largely the same. The views to the east from the residence will still include views of wooded areas; the proposed tree trimming will lower the existing tree heights.

- L. Little 2nd Residence: The removal of the trees in Area No. 3 will not have a significant impact on the views from the residence. The open area to the north of the residence will be expanded, but the residence is not in close enough proximity to the tree removal area for the impact to be significant. The removal of the trees in Area No. 3 will not introduce any new lines of sight. The views to the east from the residence will still include views of wooded areas and the residence is not in close enough proximity to the tree trimming area for the impact to be significant.

- W. Arbogast Residence: The removal of the trees in Area No. 3 will have little impact on the views from the residence. The residence is located at the bottom of this hill on which Area No. 3 is located. A wooded buffer will remain between the residence and the tree removal area. It is unlikely the views from the residence will be affected. The views to the south from the residence will still include views of wooded areas; the proposed tree trimming will lower the existing tree heights.

- Epply Residence: The removal of the trees in Area No. 3 will alter the views to the south from the residence. Currently, there is a wooded buffer between the residence and the L. Little residence. Upon completion of the tree removal, this wooded buffer will be removed and the direct line of sight between the residences will be cleared. The views to the south from the residence will transition from views of a wooded area to views of a grassy area with a wooded background.

- Saseen Residence: The removal of the trees in Area No. 3 will alter the views from the residence to the northeast. The views will transition from a wooded hillside to an open grassy hillside. The views to the east are generally of areas designated for trimming and should remain largely unchanged.

Area No. 4 (**Appendix #10** Sheet No. 6.1)

Area No. 4 includes a disturbance area of 8.83 acres. The disturbance area consists of 2.85 acres of trimming and 5.98 acres of clearing. The area is located on a ridge line running approximately parallel

to the Beverly Pike. There are six residences and five commercial properties within the general vicinity of the removal area. The following is a general description of each of the existing viewsheds:

- Civiello Residence: The residence is located in a wooded area adjacent to the Beverly Pike. The views to the east of the residence are of a wooded hillside. The remaining views from the property have a small wooded buffer and are of the various developed areas along the Beverly Pike. With the wooded buffer to the east, there are no direct lines of sight between the residence and the limits of Area No. 4.

- St. Brendans Catholic Church Rectory: The rectory is located in a cleared area adjacent to the church. The views to the north are of a wooded hillside. The views from the remaining directions are of the various developed areas in the general vicinity of the church.
- Reckart Residence: The residence is located in a partially wooded area on the ridge which rises up behind the church. The views to the south of the residence are open views of the developed areas in the immediate vicinity of the residence. The residence has clear views of the Beverly Pike to the south. The remaining views are of wooded areas which surround the northern portion of the residence.

- Brown Residence: The residence is located in a mostly wooded area to the east of the Reckart residence. The views to the south are generally open views of the developed areas in the general vicinity. The residence has mostly clear views of the Beverly Pike to the south. The remaining views are of wooded areas surrounding the remaining sides of the residence.

- Cashell Residence: The residence is located in a mostly wooded area to the north of the Brown residence and the northeast of the Reckart residence. The views from the residence are generally of the surrounding wooded areas. There are no direct lines of sight from the residence to the Beverly Pike.

- Stout Residence: The residence is located in a mostly wooded area to the northeast of Area No. 4. The residence is situated on the hillside and is generally surrounded on all sides by wooded areas. The residence has limited views of adjacent houses to the east and south.

- Daniels Commercial Property: The buildings located on the Daniels' commercial property are located at the bottom of a hill adjacent to the Beverly Pike. The views to the east of the buildings are of a steep wooded hillside. The remaining views are of the developed areas along the Beverly Pike. Due to the wooded terrain and the approximately 150 feet of elevation change, there are no direct lines of sight between the commercial buildings and Area No. 4.

- First Priority Real Estate Development Commercial Property: There are three structures located on the property. Two of the structures are commercial buildings and are located on a developed lot adjacent to the Beverly Pike. The third structure is a rental housing unit located on the hillside above the two commercial structures. The views to the east for all three structures is of a wooded hillside. The views to the west

are of the Beverly Pike. The views to the north are of the adjacent Daniels commercial property and the views to the south are of the Hammer commercial property.

- Hammer Commercial Property: The commercial structure is located adjacent to the frontage road which runs parallel to the Beverly Pike. The views to the east of the structure are of a wooded hillside. The views to the north of the structure are of the First Priority Real Estate Development commercial property. The views to the west are of the Beverly Pike. The views to the south are partially obscured and are of the Civiello residence.

- BW Properties Commercial Property: The commercial structure is located adjacent to the frontage road running parallel to the Beverly Pike. The views to the east of the structure are of a wooded hillside. The views to the south are of the Morgan commercial property. The views to the west are of the Beverly Pike. The views to the north are of the wooded area surrounding the Civiello residence.

- Morgan Commercial Property: The commercial structure is located adjacent to the frontage road running parallel to the Beverly Pike. The views to the east and south of the structure are of a wooded hillside. The views to the north of the structure are of an undeveloped parcel of property. The views to the west are of the Beverly Pike.

The trimming component of the Proposed Action is not anticipated to have a significant impact on the visual character of the area. However, the clearing component of the Proposed Action has the potential to alter the visual character of some of the adjacent properties. The removal of the trees will create an open space at the top of the ridge and has the potential to create new lines of sight which were previously obscured by vegetation. The following is a description of the potential for impacts to each residence:

- Civiello Residence: The removal of trees in Area No. 4 will have minimal impact on the views from the residence. Area No. 4 is located on the ridge to the east of and well above the residence. A buffer zone of trees will remain between the residence and Area No. 4. Given the proximity of Area No. 4 to the residence and the residual presence of a tree buffer zone, it is unlikely the viewshed from the residence will be significantly affected.

- St. Brendans Catholic Church Rectory: The removal of trees in Area No. 4 will marginally alter the views to the north from the rectory. Area No. 4 is located along the ridge which runs in a northeasterly direction from the rectory. The area designated for clearing is located farther up the ridge from the Rectory. An area designated for trimming is located between the Rectory and the area designated for clearing. This stand of trees to remain will serve as a visual buffer and will mitigate impacts associated with the clearing of trees further up the hill.

- Reckart Residence: The removal of trees in Area No. 4 will alter the views from the residence to the north and west. The character of the views will transition from a wooded area with an appreciable amount of seclusion to an open grassed space. The removal of the trees will also introduce a new line of sight to the west of the Beverly Pike.

- Brown Residence: The removal of trees in Area No. 4 will marginally alter the views from the residence to the west. The area designated for clearing is located further up the ridge behind an area designated for trimming. The stand of trees to be trimmed will remain and will serve as a visual buffer. This remaining visual buffer will mitigate impacts associated with the clearing of trees further up the hill.

- Cashell Residence: The removal of trees in Area No. 4 will alter the views from the residence to the west. The character of the views will transition from a wooded area with an appreciable amount of seclusion to an open grassed space.

- Stout Residence: The removal of trees in Area No. 4 will not alter the views from the residence to the west significantly. The views to the west from the residence will still include views of wooded areas; the proposed tree trimming will lower the existing tree heights.

- Daniels Commercial Property: The removal of trees in Area No. 4 will have minimal impact on the views from the buildings located at the foot of the hill. A substantial wooded buffer will remain between the buildings and the obstruction removal area. It is unlikely the views from the buildings will be significantly affected. The removal of the trees will not introduce any new lines of sight.

- First Priority Real Estate Development Commercial Property: The removal of trees in Area No. 4 will slightly alter the views from the buildings to the east. The view to the east of the buildings is currently of a wooded hillside. Upon completion of the tree removal, a portion of the hillside will be converted to an open grassed area. A small buffer of trees will remain, but the open grassed area will be visible. The removal of trees will not introduce any new lines of sight.

- Hammer Commercial Property: The removal of trees in Area No. 4 will slightly alter the views from the buildings to the east. The view from the building to the east is currently of a wooded hillside. Once the trees are removed, a portion of the ridge line will be converted to an open grassed area. A small buffer of trees will remain, but the open grassed area will be visible.

- BW Properties Commercial Property: The removal of trees in area No. 5 will alter the views from the building to the east. The character of the views will be changed from a wooded hillside to an open grassed hillside. The removal of the trees will also open the line of sight between the building and the Reckart residence.

- Morgan Commercial Property: The removal of trees in Area No. 4 will alter the views from the building to the east. The character of the views will be changed from a wooded hillside to an open grassed hillside. The removal of the trees will introduce a new line of sight from the building to the Reckart residence.

Area No. 5 (**Appendix #10** Sheet No. 6.1)
Area No. 5 includes a trimming area of 0.37 acre. The area is located on a hilltop in a wooded area. There are two residences and one commercial property within the general vicinity of the removal area. The following is a general description of each of the existing viewsheds:

- Nichols Residence: The residence is located on a hillside in a mostly cleared area adjacent to Westridge Drive. The area on the top of the ridge to the west of the residence is wooded. Due to its location on the hillside, the residence has mostly open views to the east. There are several other residences to the east which can be seen from the Nichols residence. The residence does not have a direct line of sight to Area No. 5.

- Core Residence: Similar to the Nichols residence, the residence is located on a hillside in a mostly cleared area along Westridge Drive. The views to the west of the residence are of wooded hillside with the remaining views to the east being of several other residences in the neighborhood. Due to the woods line directly adjacent to the residence to the west, there are no direct lines of sight to Area No. 5 from the residence.

- Daniels Commercial Property: The buildings located on the Daniels' commercial property are located at the bottom of a hill adjacent to the Beverly Pike. The views to the east of the buildings are of a steep wooded hillside. The remaining views are of the developed areas along the Beverly Pike. Due to the wooded terrain and the approximately 150 feet of elevation change, there are no direct lines of sight between the commercial buildings and Area No. 5.

The trimming of the trees in Area No. 5 has no potential to significantly alter the visual character of the area. The views from the residences and commercial properties will remain unchanged.

Area No. 6 (**Appendix #10** Sheet No. 6.2)
Area No. 6 includes a trimming area of 0.82 acres. The area to be cleared is located in a mostly flat area along an access driveway extending from Arnold Hill Road to the Cupp property.

- Branciaroli Residence: The residence is located in a moderately wooded area adjacent to the airport on the western side of the approach end of Runway 5. The views to the north of the residence are of a flat open area currently being utilized as a campground. The remaining views from the residence are of a moderately wooded hillside.

- Carr Residence: The residence is located on a mostly cleared lot adjacent to Arnold Hill Road and situated on the eastern side of the airport's southernmost property boundary. The views from the residence to the east and south are of a wooded hillside. The views to the north and west are of open grassed hillside.

The trimming of the trees in Area No. 6 has little potential to alter the visual character of the properties. The views from the property will remain unchanged.

Area Nos. 7 and 8 (**Appendix #10** Sheet No. 6.2)
Area No. 7 includes a trimming area of 0.74 acres and Area No. 8 includes a clearing area of 2.56 acres. Area No. 7 is located in a generally flat area at the foot of the airport plateau. The area is located

adjacent to Arnold Hill Road. Area No. 8 is located along a hillside which runs parallel to Arnold Hill Road as it extends to the south away from the approach end of Runway 5.

- Carr Residence: The residence is located on a mostly cleared lot adjacent to Arnold Hill Road and situated on the eastern side of the airport's southernmost property boundary. The views from the residence to the east and south are of a wooded hillside. The views to the north and west are of open grassed hillside.

- Cupp 2nd Residence: The residence is located on a small ridge which runs parallel to Arnold Hill Road. The residence is situated in a mostly open area with a small valley running in between the residence and the road. The views to the north of the residence are of a wooded area with the remaining views to the south being of open pasture areas.

The Proposed Action in Area No. 7 has little potential to alter the visual character of the properties. The views will largely remained unchanged as only tree trimming is proposed in Area No. 7. The Proposed Action in Area No. 8 has the potential to alter the visual character of the properties. The removal of the trees will expand the open grassed area and will not introduce any new lines of sight. The following is a description of the potential for impacts to each residence:

- Carr Residence: The Proposed Action in Area Nos. 7 and 8 will transition the views to the northeast minimally. To the northeast, only tree trimming is proposed. The southwest will be impacted by the transition from wooded to open grassed areas.

- Cupp 2nd Residence: The trimming of the trees in Area No. 7 will not have a significant impact on the views from the residence. The removal of the trees in Area No. 8 has the potential to marginally impact the views from the residence. The removal of the trees will convert the areas in the valley along Arnold Hill Road from wooded areas to open grassed areas. The open grassed areas will be generally consistent with the views of the other open grassed areas in the general vicinity. A wooded buffer will remain between the residence and Area No. 8 which will help minimize any negative impacts.

Area No. 9 (**Appendix #10** Sheet No. 6.2)
Area No. 9 includes a trimming area of 0.20 acre. Area No. 9 is located in the yard directly adjacent to the Cupp residence and is situated in an area with various agricultural use buildings. The trimming of the trees in Area No. 9 has the potential to alter the visual character of the residence. Given the small size of the removal area, the trimming of the trees will have minimal impact on the views from the residence. The trimming of the trees will open up the eastern side of the residence and will reduce the amount of shade available in the area between the residence and Arnold Hill Road.

(3) Would the project have the potential to block or obstruct views of visual resources?

The Proposed Action consists of removing trees; therefore, the project has no potential to block or obstruct views of visual resources.

If the answer is "YES" to any of the above, please explain the nature and degree of the impact using graphic materials. Also provide a description of mitigation measures which would be considered to reduce any adverse impacts.

(N) WATER RESOURCES (INCLUDING WETLANDS, FLOODPLAINS, SURFACE WATERS, GROUNDWATER, AND WILD AND SCENIC RIVERS)
(1) WETLANDS
(a) Does the proposed project involve federal or state regulated wetlands or non-jurisdictional wetlands? (Contact USFWS or appropriate state natural resource agencies if protected resources are affected) (Wetlands must be delineated using methods in the US Army Corps of Engineers 1987 Wetland Delineation Manual. Delineations must be performed by a person certified in wetlands delineation Document coordination with the resource agencies).

As a preliminary review of wetlands or other water resources in or near the project, the proposed project site was analyzed using the U.S. Fish and Wildlife Service's (USFWS) IPaC database. An IPaC Trust Resource Report was prepared for the proposed project site and it was determined that the following resources are contained in or near the proposed project area:

- Two Freshwater Emergent Wetlands
- Three Freshwater Forested/Shrub Wetlands
- One Freshwater Pond
- Three Riverine Entities

The National Wetland Inventory (NWI) was consulted to determine a preliminary location of the wetland and aquatic resources located within the general vicinity of the project area. A copy of the NWI map for the area surrounding the Elkins-Randolph County Regional Airport is included as **Appendix #11**.

With the presence of these resources indicated in the IPaC and NWI databases, a detailed water resources assessment was conducted over the proposed project area to accurately determine the presence of aquatic resources as well as their proximity to potential disturbance areas. No wetlands were identified; however, 224 linear feet of stream was identified in Area No. 7 and 243 linear feet of stream in Area No. 9. Both of these areas are identified for obstruction trimming rather than obstruction clearing. Avoidance measures will be implemented to avoid impacts to the streams including BMP's to avoid siltation.

In conjunction with the resources assessment, a Preliminary Jurisdictional Determination (PJD) was prepared for submission to the U.S. Army Corps of Engineers for their concurrence as to the presence of any jurisdictional aquatic features. A copy of the water resources assessment and consultation documentation with the U.S. Army Corps of Engineers is included as **Appendix #11**.

Although there are jurisdictional waters within the general vicinity of the Proposed Action, the Proposed Action does not contain any components which impact these features below the ordinary high water mark. There are no associated activities which include placing material into or dredging material out of these features. Existing property accesses will be utilized to the maximum extent.

(b) If yes, does the project qualify for an Army Corps of Engineers General permit? (Document coordination with the Corps).

Not Applicable. Coordination with the USACE in **Appendix #11** stated that the USACE did not have enough information to determine if jurisdictional waters will be impacted and require a permit. While

the total project area is approximately 28 acres, the entire footprint of the project area will not be disturbed. Dozers and graders will not be permitted. The tree trimming and clearing operations will be performed on a per tree basis and the tree clearing operations will include grinding activities in lieu of traditional clearing and grubbing activities. As such, jurisdictional water impacts will be avoided.

(c) If there are wetlands impacts, are there feasible mitigation alternatives? Explain.

Not Applicable.

(d) If there are wetlands impacts, describe the measures to be taken to comply with Executive Order 11990, Protection of Wetlands.

Not Applicable.

(2) FLOODPLAINS
(a) Would the proposed project be located in, or would it encroach upon, any 100-year floodplains, as designated by the Federal Emergency Management Agency (FEMA)?

The FEMA Flood Insurance Rate Maps (FIRMs) for the general area were reviewed to determine if any of the project areas would be included within the 100-year floodplain. Copies of the FIRMs for the areas surrounding the Elkins-Randolph County Regional Airport are included as **Appendix #12.**

The Proposed Action consists of removing tree and structure obstructions which are generally located on hilltops which are situated well above the 100-year floodplain. In addition, the Proposed Action consists of removing obstructions and does not contain any components which would introduce new material into the floodplain. Therefore, the Proposed Action will not have any impact on the 100-year flood plain.

(b) If Yes, would the project cause notable adverse impacts on natural and beneficial floodplain values as defined in Paragraph 4.k of DOT Order 5620.2, *Floodplain Management and Protection*?

Not Applicable.

(c) If Yes, attach the corresponding FEMA Flood Insurance Rate Map (FIRM) and describe the measures to be taken to comply with Executive Order 11988, including the public notice requirements.

Not Applicable.

(3) SURFACE WATERS
(a) Would the project impact surface waters such that water quality standards set by Federal, state, local, or tribal regulatory agencies would be exceeded or would the project have the potential to contaminate a public drinking water supply such that public health may be adversely affected?

Obstruction removal projects which include the removal of trees and/or other vegetation are often inherent with the potential to impact surface waters through an increase of erodible surfaces and the creation and transportation of sediment. This increase in the level of erodible surfaces is often created through the removal of existing ground cover through stump removal processes or direct grading operations.

In order to minimize the creation of erodible surfaces, the Proposed Action will include removing stumps through a stump grinding process instead of through a traditional grubbing operation with dozers or graders. This method will limit the amount of disturbance to existing ground cover to the level of disturbance associated with the movement of equipment across the ground surface. The Contractor performing the tree removal will be required to adhere to the best management practices developed by the West Virginia Division of Forestry and the West Virginia Department of Environmental Protection to address the creation and transportation of sediment. These measures include the installation of sediment control devices to provide a structural control to prevent excessive sediment creation or transportation.

The Proposed Action will also transition the surface cover of the obstruction removal areas from wooded ground cover to grassed ground cover. This transition has the potential to increase the rate of surface water runoff. Increased surface water runoff rates can result in increased erosion as well as decreases in slope stability. In order to minimize increases in surface water runoff, the existing leaf litter ground cover will be left in place to the maximum extent possible. The leaf litter ground cover will help reduce the surface water runoff rate and will help promote surface water infiltration as opposed to surface water runoff. The Proposed Action will also include seeding all obstruction removal areas to establish an adequate stand of grass cover to help stabilize the surface soils. Grass ground cover also assists in the reduction of the surface runoff rate by creating openings in the soil surface to promote water infiltration. Trees may be felled and left in place to minimize erosion on slopes at the discretion of individual landowners.

The Proposed Action does not include any components which have the potential to contaminate a public drinking water supply.

(b) Would the water quality impacts associated with the project cause concerns for applicable permitting agencies or require mitigation in order to obtain a permit?

Any water quality impacts associated with the Proposed Action can be adequately mitigated through the installation of sediment and erosion control structures and adherence to the best management practices established by the West Virginia Division of Forestry.

The West Virginia Department of Environmental Protection has advised by phone that a National Pollutant Discharge Elimination System (NPDES) permit will not be required for the proposed project because the proposed project does not include any grubbing.

While the total project area is approximately 28 acres, the entire footprint of the project area will not be disturbed. As stated previously, dozers and graders will not be permitted. The tree trimming and clearing operations will be performed on a per tree basis and the tree clearing operations will include grinding activities in lieu of traditional clearing and grubbing activities.

If the answer to any of the above questions is "Yes", consult with the USEPA or other appropriate Federal and/or state regulatory and permitting agencies and provide all agency correspondence.

(4) GROUNDWATER

(a) Would the project impact groundwater such that water quality standards set by Federal, state, local, or tribal regulatory agencies would be exceeded or would the project have the potential to contaminate an aquifer used for public water supply such that public health may be adversely affected?

The West Virginia Department of Health and Human Resources (WVDHHR) was consulted to determine if any public drinking water sources were located within a 2.5 mile radius of the Elkins-Randolph County Regional Airport. The return correspondence from the WVDHHR, included as **Appendix #13**, identified 6 sources associated with public drinking water sources.

The Proposed Action consists of the clearing and trimming of trees and 5 structure modifications. The scope of the action does not contain any components which would create excessive ground disturbance. The Proposed Action is also not anticipated to include any actions such as blasting would could have a potentially significant impact on groundwater sources. Therefore, the Proposed Action is not anticipated to have any impacts to public or private groundwater sources.

(b) Would the groundwater impacts associated with the project cause concerns for applicable permitting agencies or require mitigation in order to obtain a permit?

The Proposed Action will have no impacts to groundwater.

(c) Is the project to be located over an EPA-designated Sole Source Aquifer?

The proposed project area is not located over an EPA-designated Sole Source Aquifer.

If the answer to any of the above questions is "Yes", consult with the USEPA or other appropriate Federal and/or state regulatory and permitting agencies and provide all agency correspondence as an attachment to this form.

(5) WILD AND SCENIC RIVERS

Would the proposed project affect a river segment that is listed in the Wild and Scenic River System or Nationwide River Inventory (NRI)? (If Yes, coordinate with the jurisdictional agency and attach record of consultation).

The Proposed Action will have no impacts to Wild and Scenic Rivers located in the State of West Virginia. The following rivers are the closest rivers that have been designated by the National Park Service NRI as rivers with outstandingly remarkable values (ORVs):

- Tygart Valley River (Recreation) – 0.5 miles west
- Shavers Fork River (Recreation) – 4.3 miles southeast
- Cheat River (Recreation) – 9.0 miles northeast
- Middle Fork River (Recreation) – 10.1 miles west

- Otter Creek (Scenery/Recreation) – 10.7 miles northeast
- Greenbrier River, West Fork (Fish/Recreation) – 15.5 mi southwest
- Blackwater River (Scenery/Recreation/Fish/Other Values) – 17.2 miles northeast
- Laurel Fork (Scenery/Recreation) – 17.7 miles northeast
- Buckhannon River (Recreation) – 18.1 miles west
- Glady Fork (Recreation) – 18.3 miles northeast
- Dry Fork (Recreation) – 19.2 miles northeast
- Seneca Creek (Recreation) – 20.2 miles southwest
- Red Creek (Scenery/Recreation) – 20.2 miles northeast
- Greenbrier River, East Fork (Recreation/Fish/History/Other Values) – 23.7 miles southwest
- Elk River, Left Fork (Other Values) – 24.2 miles southwest
- Holly River, Left Fork (Scenery) – 28.7 miles southwest

The locations of the rivers shown are measured approximately from the closest portion of the river to the proposed project site. Given the appreciable distance between the proposed project site and these rivers, no impacts to these resources are anticipated.

(O) CUMULATIVE IMPACTS

Discuss impacts from past, present, and reasonably foreseeable future projects both on and off the airport. Would the proposed project produce a cumulative effect on any of the environmental impact categories above? Consider projects that are connected and may have common timing and/or location. For purposes of this Form, generally use 3 years for past projects and 5 years for future foreseeable projects.

Past Projects

- 2013 – Rehabilitate Hangar Taxilanes
- 2014 – No Project
- 2015 – No Project

The project undertaken in 2013 was a construction effort to re-construct portions of the existing taxilanes currently serving the airport's aircraft storage facilities. The project did not have any components which were considered extraordinary circumstances or required mitigation to reduce the impact levels below appropriate thresholds of significance. The proposed action, when considered in conjunction with this project, will not create a cumulative effect on any of the resource categories contained in this assessment.

Future Projects

- 2020 – Obstruction Removal (Runway 5-23 Approaches) (Phase II – Easement Acquisition)
- 2021 – Obstruction Removal (Runway 5-23 Approaches) (Phase II – Easement Acquisition/Design)
- 2022 – Obstruction Removal (Runway 5-23 Approaches) (Phase III – Construction)
- 2023 – Rehabilitate Airfield Lighting (Taxiway Lights)
- 2023 – Install Runway 5 Runway End Identifier Lights
- 2023 – Install Runway 5 Precision Approach Path Indicator System

- 2024 – Install Airport Rotating Beacon
- 2025 – Rehabilitate Taxilanes

The projects anticipated to be pursued by the Airport Authority within the next five years contain a mixture of maintenance and airfield development projects. Brief descriptions of the anticipated project scopes as well as discussion pertaining to cumulative effects are as follows:

Rehabilitate Airfield Lighting (Taxiway Lights) - 2023

The airfield lighting rehabilitation project is anticipated to consist of replacing approximately 20 stake-mounted taxiway edge lights with new can-mounted edge light fixtures. This will be the completion of the airfield lighting replacement project which was undertaken in conjunction with the project to rehabilitate Runway 5-23 in 2011. The project will simply replace existing components of the airfield lighting system and is not anticipated to contain any components which would be considered as extraordinary circumstances and require mitigation to reduce impacts to levels below the appropriate thresholds of significance. There are also no cumulative impacts to the resource categories anticipated when considering the Proposed Action in conjunction with the airfield lighting replacement project.

Install Runway 5 Runway End Identifier Lights - 2023

The project is anticipated to consist of installing a set of omni-directional runway end identifier lights on the approach end of Runway 5. The installation of REIL systems are generally benign projects with very few environmental impacts. The installation sites are located in areas which were previously disturbed through the grading activities associated with the construction of the runway. The electrical service for the installations will be obtained from the runway lighting circuit and will be connected at the nearest airfield lighting junction structure. The conduit runs associated with the electrical service installation will be extended through previously disturbed areas. Based on the limited scope of the project, there are no significant construction related impacts associated with the PAPI installation. The most significant impact would be the introduction of an additional light source. The light emission from the REIL system consists of a flashing light which is activated in conjunction with the runway lighting system during periods of darkness or reduced visibility. The system operates off a pilot controlled receiver and will only emit light for a 15-minute period when an aircraft is performing an operation on the runway. The airport experiences a relatively small level of operations during periods of darkness, so any impacts associated with the additional light source should considered to be minimal. Also, there are no sensitive areas in the view shed of the REIL light emission path which would be negatively impacted by the installation.

There are no significant impacts to any of the resource categories when considering the installation of the REIL system in conjunction with the Proposed Action.

Install Runway 5 Precision Approach Path Indicator System - 2023

The project is anticipated to include the installation of a Precision Approach Path Indicator (PAPI) system on the approach end of Runway 5. The installation of PAPI systems are generally benign projects with very little environmental impacts. The installation site will be located in areas which were previously disturbed during the grading activities associated with the construction of the airport. The electrical service for the installation is anticipated to be obtained from the airport's existing electrical building which is located adjacent to the airport's snow removal equipment building. The conduit run required to provide the service will be extended through previously disturbed areas. Based on the limited scope of the project, there are no significant construction related impacts associated

with the PAPI installation. The most significant impact would be the introduction of an additional light source. The light emitted from the PAPI unit is insignificant. Also, there are no sensitive areas in the view shed of the PAPI light emission path which would be negatively impacted by the installation.

There are no significant impacts to any of the resource categories when considering the installation of the PAPI system in conjunction with the Proposed Action.

Install Airport Rotating Beacon – 2024

The project is anticipated to consist of replacing the existing airport rotating beacon with a newer version. The existing beacon is antiquated and is not currently providing an acceptable level of service for the airport. The project will replace an existing light source and is not anticipated to contain any components which would be considered as extraordinary circumstances and require mitigation to reduce impacts to levels below the appropriate thresholds of significance. There are also no cumulative impacts to the resource categories anticipated when considering the Proposed Action in conjunction with the airport beacon replacement.

Rehabilitate Taxilanes – 2025

The project is anticipated to consist of re-constructing sections of taxilanes which serve the airport's hangar storage facilities. The existing pavement structure is in such a deteriorated condition that complete replacement is the only viable rehabilitation option. The re-construction of the taxilanes will generally occur within the footprint of the existing taxilanes with very minimal levels of new disturbance. The project is not anticipated to contain any components which would be considered as extraordinary circumstances and require mitigation to reduce impacts to levels below the appropriate thresholds of significance. There are also no cumulative impacts to the resource categories anticipated when considering the Proposed Action in conjunction with the taxilane rehabilitation project.

The Randolph County Commission was contacted in December 2019 to determine if the proposed project would have any cumulative impacts to off-airport projects for the same timeframe. The Commission indicated that there are no projects within the same timeframe and within the vicinity of the proposed action that would result in cumulative impacts.

7. PERMITS

List all required permits for the proposed project. Has coordination with the appropriate agency commenced? What feedback has the appropriate agency offered in reference to the proposed project? What is the expected time frame for permit review and decision?

None.

8. MITIGATION

Describe those mitigation measures to be taken to avoid creation of significant impacts to a particular resource as a result of the proposed project, and include a discussion of any impacts that cannot be mitigated.

Biological Resources Impact Mitigation

The Proposed Action will include the following components to mitigate impacts to migratory bird species: tree removal operations will be limited to the period of time between October 15th and March 31st.

Socio-Economic Impact Mitigation

The Proposed Action will include providing monetary compensation to mitigate the impact associated with reducing the storage volume available in the three silage storage silos. The estimated cost to build a structure to provide the required replacement storage capacity is $250,000. The compensation for the lost storage will include provisions to prevent a replacement structure from being constructed in a location which would represent an obstruction to the Runway 5 airspace.

Viewshed Impact Mitigation

The Proposed Action does not include any mitigation measures for viewshed impacts. To the extent possible, viewshed impacts are mitigated through tree trimming versus tree clearing based on conversations with individual land owners.

Other Mitigation

The individual parcel owners, may, at their discretion, re-plant trees and/or shrubs in the affected project areas. However, the trees and/or shrubs will have a height/location restriction associated with the Runway 5 and Runway 23 approaches.

9. PUBLIC INVOLVEMENT

Describe the public review process and any comments received. Include copies of Public Notices and proof of publication.

Airport development projects have the potential to spark public interest, especially for projects which are considered to be environmentally sensitive. An important part of the environmental assessment effort is providing the general public an opportunity to review the proposed project and its associated impacts. The public involvement process affords the public an opportunity and a forum to voice concerns about the project's overall impact on the environment. This process also affords the FAA the opportunity to provide the disclosure of project information as required by various environmental laws and regulations.

The proposed public involvement plan for the Proposed Action contains two major components. The first component consists of coordinating the project directly with the property owners whose property will be directly impacted by the action. The Airport Authority, through its consultants on the project, has had ongoing direct contact with these property owners to discuss the project and allow the property owners to express concerns relating to the action, including project scoping changes from tree clearing to tree trimming, to the extent possible, evaluated in conjunction with a Lidar survey in the project areas. Any written concerns of the property owners will be addressed and incorporated into the Proposed Action.

The second component consists of affording the general public an opportunity to participate in a public meeting to review the project and to provide comment. To that end, the Airport Authority has published a Public Notice in the local newspaper, The Inter-Mountain, which has general circulation in Randolph County, West Virginia to notify the general public of the public meeting and the opportunity to review and comment on the Proposed Action. The public notice was published twice within a thirty day period and incorporates comments received from the FAA and other appropriate governmental agencies. The public notice will detail, at a minimum, the following information:

- A statement of the Airport Authority's intent to undertake the proposed action;
- A concise description of the proposed action;
- The location and time of the public meeting;
- The locations and times where the draft environmental assessment will be made available for public review;
- A statement identifying the closing date (30 calendar days after the public notice publication) for receipt of comments; and
- A statement identifying the procedures to be used for submitting comments.

The public meeting was held at the Randolph County Commission Chambers at the James F. Cain Annex on February 12, 2020 at 6:00 PM local time in accordance with the public notice. After a brief introduction and discussion of the meeting purpose, the meeting was opened up to the public for comments.

Largely, the public comments centered on the relevancy, need and timing of the project. Commenters indicated that they have lived in the vicinity of the airport for many years and the airport has never taken issue with any obstructions or other airport issues relative to their properties previously. Commenters questioned the validity of the airport operations and forecasts contained in the Environmental Assessment document. A commenter questioned whether the types of trees in the project areas had been quantified and evaluated for trimming based on their types. Commenters expressed concerns with obstruction removal operations and effects to the ground surfaces once the obstruction removal is complete. A commenter expressed a concern with the tree trimming operations and the impacts on migratory birds. Several questions were asked about the timeline for the review and approval or disapproval of the Environmental Assessment document, as well as the reviewing agency, and the relationship to the commencement of the physical obstruction removal upon approval. Commenters also questioned the comment submission procedure and timeline.

An affidavit of publication from The Inter-Mountain was obtained and submitted to the FAA to serve as documentation of the Airport Authority's compliance with the public involvement plan.

Written comments received during the public meeting as well as those received during the public comment period were fully evaluated and given all due consideration. Public review comments, as considered appropriate, are addressed and incorporated in the environmental assessment as **Appendix #14** Attachment 1.

Based on the comments received during the public comment period from January 24, 2020 to February 23, 2020, a revised draft of the Environmental Assessment was re-issued for public review. The Airport Authority published a second Public Notice in The Inter-Mountain notifying the general public of the opportunity to review and comment on the Proposed Action again from July 17, 2020 to August 16, 2020.

Written comments received during the second review period were fully evaluated and given all due consideration. Public review comments, as considered appropriate, are addressed and incorporated in the environmental assessment as **Appendix #14** Attachment 1.

Copies of the public notices were mailed to property owners whose property will be directly impacted by the action.

A copy of the Public Notices with the associated proof of publications are included as **Appendix #14**.

10. LIST OF ATTACHMENTS

Appendix #1	Aviation Activity Forecasts
Appendix #2	Runway Length Requirement Analysis
Appendix #3	Runway Approach Surface Geometry Requirements
Appendix #4	Instrument Approach Procedures
Appendix #5	Proposed Action Drawings
Appendix #6	NRCS Soils Summary Report
Appendix #7	USFWS Consultation
Appendix #8	SHPO Consultation
Appendix #9	US Census Bureau Information
Appendix #10	Visual Resources Drawings
Appendix #11	USACE Consultation
Appendix #12	FEMA Maps
Appendix #13	WVDHHR Consultation
Appendix #14	Public Notice and Public Comment Documents

Project Title: Obstruction Removal (Runway 5-23 Approaches) **Identifier:** EKN

11. PREPARER CERTIFICATION

I certify that the information I have provided above is, to the best of my knowledge, correct.

M. Defibaugh — 10/13/2020

Signature — Date

Melissa Defibaugh

Name

Project Manager

Title

Chapman Technical Group (Airport Consultant) — 304-472-8914

Affiliation — Phone #

12. AIRPORT SPONSOR CERTIFICATION

I certify that the information I have provided above is, to the best of my knowledge, correct. I also recognize and agree that no construction activity, including but not limited to site preparation, demolition, or land disturbance, shall proceed for the above proposed project(s) until FAA issues a final environmental decision for the proposed project(s), and until compliance with all other applicable FAA approval actions (e.g., ALP approval, airspace approval, grant approval) and special purpose laws has occurred.

10/13/2020

Signature — Date

Craig Hyre

Name

President

Title

Elkins-Randolph County Regional Airport Authority — 304-636-2726

Affiliation — Phone #

APPENDIX 1
AVIATION ACTIVITY FORECASTS

Chapter 3
General Aviation Activity Forecasts

The purpose of forecasting elements of aviation activity is to determine the appropriate timing for airport investments. The idea is to forecast the demand, assess that demand against the capacity of an airport's various facilities, and develop a schedule of airport development to accommodate that demand.

3.1 Introduction

In forecasting aviation demand at smaller general aviation airports, there are two principal focus elements: the number of based aircraft and the number of airport operations, both itinerant and local. The number of based aircraft directly affects the number of hangars and the surface area of aircraft parking apron required. Airport activity, as measured by the number of local and itinerant airport operations and the fleet mix, identifies airport capacity issues, quantifies the required size and scope of transient apron accommodations and identifies the airport's critical aircraft. The critical aircraft, with its approach speed, wingspan and tail height considered, dictates the FAA design standards to be followed in the ongoing development of the airport.

3.2 Based Aircraft Forecast

In general terms, the forecasting process involves making a variety of observations, examining and analyzing historical data, and making insightful projections to predict future activity. The FAA's Field Formulation of the National Plan of Integrated Airport Systems

(NPIAS), Order 5090.3C, states that these projections should be (1) realistic; (2) based on the latest data available; (3) reflect the current conditions at the airport; (3) supported by information contained in this Master Plan Study; and (4) provide an adequate justification for the airport planning and development.

The commercial and general aviation landscapes have changed substantially over the past few years. The United States, as well as many other countries, is in the process of recovering from a global recession, the likes of which have not been seen since the Great Depression. Global recessions are inherent with a myriad of complex issues. These issues combine together to create a great deal of unrest and uncertainty throughout the industrial spectrum. The aviation industry, particularly those sections which are predominantly geared towards the general aviation community, has seen significant shifts as a result of the uncertainty created by the recession. Perhaps one of the most compelling indicators of these shifts is the targeting of general aviation, particularly corporate aviation and its attendant tax treatment, by the Obama administration. Companies, as well as recreational aviators, are forced to re-evaluate their use of aviation as they struggle to remain in a fiscally sound position. These re-evaluations have resulted in a dramatic reduction in operations by both business and recreational aircraft. These reductions in operations, especially those by corporate aircraft, are perhaps most significantly felt by smaller general aviation airports, such as the Elkins-Randolph County Regional Airport, that serve as vital portals into communities throughout the country.

As the country struggles to recover from this recent recession and the cloud of uncertainty it has created, it is difficult to accurately predict if and when the aviation industry will return to the levels it has previously enjoyed. Although the future level of activity is uncertain and increasingly more difficult to accurately predict, the aviation industry, as a whole, has shown the ability to be resilient through times of economic downturn. With this resiliency in mind, it is difficult to utilize forecasting methods which rely too heavily on economic indexes tied to a transient recession.

In the absence of these economic models, this study has adopted a forecasting approach which was developed by incorporating a judgmental review of four basic documents: (1) the based aircraft forecast included in the latest (1996) Master Plan for the Elkins-Randolph County Regional Airport; (2) the 2003 West Virginia State System Study; (3) the FAA's 2010 Terminal Area Forecast (TAF) for the airport; and (4) the FAA Aerospace Forecasts FY 2011-2031.

3.2.1 1996 Master Plan Based Aircraft Forecast

In 1996, Chapman Technical Group prepared the previous edition of the Master Plan Study for the Elkins-Randolph County Regional Airport. With the benefit of 15 years of hindsight, it becomes important to compare the forecasts contained in the 1996 edition to the record. This comparison will facilitate a determination as to the current applicability of those forecasts and the associated forecast method. Table 3.2.1.1 compares the numbers of based aircraft forecasted in the 1996 Master Plan Study for the period 1996 through 2016 to the actual based aircraft numbers of the 2011 record.

Table 3.2.1.1 1996 Master Plan Based Aircraft Forecast vs. The Record							
Year	Fixed Wing				Rotor	Forecast Total	Record Total
	Single Engine	Multi-Engine					
		Piston	Turbo-prop	Turbo-jet			
1992	24	0	0	0	3	-	27[1]
1996	26	1	0	0	3	-	30[1]
2001	27	1	0	0	3	31	28[2]
2006	27	1	0	0	3	31	31[3]
2011	27	1	0	0	3	31	24[4]
2016	27	2	0	0	3	32	-

Sources:

1. 1996 Master Plan
2. West Virginia State System Study
3. 2007 Terminal Area Forecast Data
4. Recorded Data From Airport Manager

The comparison shown in Table 3.2.1.1 illustrates the complexity associated with forecasting numbers of based aircraft over an extended period of time. The forecasts contained in the 1996 Master Plan Study were derived by correlating the number of based aircraft to the number of aircraft registered in West Virginia. It was assumed in the report that a decrease in one value would directly result in a decrease in the other value. In retrospect, it appears that, for the most part, the forecast method employed in the 1996 Master Plan Study was a reasonable one in that, until the effects of the recession were felt-that is, between the forecast years of 2006 and 2011-the forecast was substantiated by the record.

Through interpolation of the data contained in the 1996 Master Plan Study, the projected number of based aircraft for 2011 would be 31. There are actually only 24 aircraft currently based at the airport. Taking the small sample size into careful consideration, a reduction of 7 aircraft is considered to be a substantial variance. This substantial

reduction in the number of based aircraft appears to directly reflect the effects of the country's economic downturn on activity at the airport.

3.2.2 FAA Terminal Area Forecast

The FAA's Terminal Area Forecast (TAF) is the official forecast of aviation activity at FAA-towered airports, federally contracted towered airports, non-federal towered airports, and many non-towered airports that are listed on the NPIAS. The TAF contains both historical and forecast data that is updated annually and incorporated into the NPIAS to accommodate the budgeting and planning needs of the FAA and to provide information useful to both public and private organizations interested in airport activity.

For smaller general aviation airports, the activity levels are usually recorded on the Airport Master Record, FAA's Form 5010. The data contained on this form is typically collected by private companies which are contracted through the FAA to perform site visits and/or inspections. The data can also be collected by federal or state personnel. Ideally, this form should be updated annually or as warranted by significant events which alter the validity of the data contained therein; nevertheless, these forms are typically not updated annually for smaller general aviation airports. Also, as activity statistics are not often kept by small airport operators, the data reported on the Airport Master Record is often obtained by interviewing the airport manager or custodian, pilots who happen to be at the airport when the site visit is performed, or local government officials responsible for the airport. Given the inherent shortcomings

with the various methods of data collection, the reported levels of activity for some smaller airports may be categorized as anecdotal.

The veracity of the data reported on the Airport Master Record notwithstanding, it is this record that is used by the FAA to develop the TAF report for smaller, non-federal facilities. Unless there is other reliable information available, the FAA will, for smaller airports, hold the latest reported numbers constant in projecting airport activity throughout the TAF forecast period. This also holds true for the Elkins-Randolph County Regional Airport. The 2011 TAF projects 22 based aircraft and 10,500 annual operations there through 2031. The number of based aircraft contained in the TAF is less than the record value contained in Table 3.2.1.1. This discrepancy provides another illustration of the inherent fallacies in the data collection methods used for the TAF, particularly when dealing with smaller general aviation airports.

3.2.3 FAA Aerospace Forecasts FY 2011-2031

FAA Aerospace Forecasts are generally made immediately upon the completion of a calendar year, and the latest forecast document echoes the difficulties associated with forecasting aviation activity in times of great uncertainty. In the FAA Aerospace Forecasts FY 2011-2031 it states, "Developing forecasts of aviation demand and activity levels continues to be challenging as the aviation industry evolves and prior relationships change. In times of amplified volatility, the process is filled with uncertainty, particularly in the short term."

The FAA notes that the data used for the forecasts relied heavily on input from industry experts and the results of the 2009 General

Aviation and Part 135 Activity Survey. This data has been updated and tempered by FAA analysts to reflect recent changes in the aviation industry climate.

Table 3.2.3.1, below, was prepared from data contained in Table 27 of the FAA Aerospace Forecasts FY 2011-2031. It summarizes the average annual growth rates of single- and multi-engine piston and turbine-powered aircraft, and for all rotorcraft, for various time frames within the 2011-2031 forecast period.

Table 3.2.3.1 Forecasted Average Annual Growth Rate (%) Active General Aviation and Air Taxi Aircraft

Period	Fixed Wing Piston Aircraft			Fixed Wing Turbine Aircraft			Rotor-craft
	Single Engine	Multi-Engine	Total	Turbo-prop	Turbo-jet	Total	
2000-2010	-0.7	-2.5	**-0.9**	4.8	5.2	**5.0**	3.6
2010-2011	-0.6	-0.9	**-0.6**	1.2	3.1	**2.3**	2.5
2010-2020	-0.2	-0.9	**-0.3**	1.3	4.2	**3.0**	2.7
2010-2031	0.3	-0.9	**0.2**	1.4	4.2	**3.1**	2.6

Source: Table 27, FAA Forecasts FY 2011-2031

3.2.4 Based Aircraft Forecast Summary

The based aircraft forecasts prepared for this Master Plan Study and presented in Table 3.2.4.1 were made by applying the FAA Aerospace Forecast growth rates for the period of 2010-2031, as presented in Table 3.2.3.1, to current numbers of each class of aircraft now based at the Elkins-Randolph County Regional Airport. At this time, the FAA Aerospace Forecast is believed to be the most

appropriate source of forecasting information available given the state of the national economy as it has been manifested locally, in Elkins, West Virginia.

Table 3.2.4.1 Based Aircraft Forecast						
Period	Fixed Wing				Rotor-craft	Total
	Single Engine	Multi-Engine				
		Piston	Turboprop	Turbojet		
	0.3% Growth	-0.9% Growth	1.4% Growth	4.2% Growth	2.6% Growth	
2011	21	3	0	0	0	**24**
2016	21	3	0	0	1	**25**
2021	22	3	0	0	1	**26**
2031	22	3	0	0	2	**27**

3.3 Airport Reference Code and Critical Aircraft

Airport design standards are related to the operational and physical characteristics of the most demanding aircraft which either uses or is reasonably expected to use the facility on a regular basis. For planning purposes, the Federal Aviation Administration defines "regular basis" as being a minimum of 500 operations per year. The characteristics of the most demanding, or "critical", aircraft directly determine the appropriate geometry and separation of airfield surfaces.

The critical aircraft is used to identify the Airport Reference Code (ARC) of the airport. The ARC is used to determine the geometry of the airfield components from the design criteria contained in FAA Advisory Circular 150/5300-13. The ARC is composed of two separate codes which identify the components critical to using the appropriate design criteria. The first code translates into the Aircraft Approach Category. The Aircraft Approach Category is a group of aircraft based

on a speed equal to 1.3 times their stall speed at the maximum flap setting and landing weight. The divisions, as found in the FAA Advisory Circular 150/5300-13, of the Aircraft Approach Categories are:

- **Category A**: Speeds less than 91 knots
- **Category B**: Speeds 91 knots or more but less than 121 knots
- **Category C**: Speeds 121 knots or more but less than 141 knots
- **Category D**: Speeds 141 knots or more but less than 166 knots
- **Category E**: Speeds 166 knots or more

The second code translates into the Airplane Design Group. The Airplane Design Group is a collection of airplanes which are grouped together based on their wingspan or tail height. The Airplane Design Groups, as set forth in FAA Advisory Circular 150/5300-13, are:

- **Group I**: Wingspans up to, but not including, 49 feet or tail heights up to, but not including, 20 feet.
- **Group II**: Wingspans 49 feet up to, but not including, 79 feet or tail heights from 20 feet up to, but not including, 30 feet.
- **Group III**: Wingspans 79 feet up to, but not including, 118 feet or tail heights from 30 feet up to, but not including, 45 feet.
- **Group IV**: Wingspans 118 feet up to, but not including, 171 feet or tail heights from 45 feet up to, but not including, 60 feet.

- **Group V**: Wingspans 171 feet up to, but not including, 214 feet or tail heights from 60 feet up to, but not including, 66 feet.

- **Group VI**: Wingspans 214 feet up to, but not including 262 feet or tail heights from 66 feet up to, but not including, 80 feet.

The two codes are combined to form the ARC. For example, an airport which serviced aircraft which were classified as Approach Category A and Airplane Design Group I would be identified with an ARC of A-I.

The Elkins-Randolph County Regional Airport has always been frequented by a mix of aircraft which are classified by a combination of Aircraft Approach Categories A & B and Airplane Design Groups I & II. The recession has significantly altered the mixture of the fleet of aircraft utilizing the airport. Prior to the onset of the recession, the airport was frequented by a larger share of higher performance turbo prop and turbo jet aircraft. The number of operations previously performed by these aircraft could perhaps range up to 264 per year. The vast majority of these aircraft were operated by companies involved in the wood products industry, the industry group with the largest economic impact in Randolph County. As the recession settled in, this sector, as many other sectors, suffered from the economic downturn. The decline seen by the companies which comprise this sector locally has translated into a reduction in their use of corporate high performance aircraft. As the corporate operations began to decrease, the fleet mixture utilizing the airport began to shift to one comprised of aircraft classified with an ARC of A-I. The fleet mixture has evolved to a point where the airport is now only occasionally utilized by higher performance aircraft, including Beech Baron 58,

Beech King Air (various models), Cessna Caravan and Cessna Citation (various models).

The data which has been collected on airport operations is insufficient to indicate that there are 500 annual operations by either Approach Category B aircraft in general, or B-II aircraft in particular. With insufficient data to validate the required 500 annual operations, the ARC might be inferred to be A-I. Before adopting an ARC of A-I, however, there are several factors which should be considered. The fleet of aircraft utilizing the airport prior to the onset of the recession was composed of aircraft which would suggest an ARC of B-II. This fleet of aircraft and the associated level of operations indicate that the economy of Elkins and the surrounding area has the potential, in a non-recession climate, to sustain the aircraft operations associated with a B-II classification.

It is also imperative to prevent altering a consistent course of development in response to a transient recession. To date, the airport has been classified as a B-II airport and has been developed accordingly. Altering the course of development as a reaction to the recession would be detrimental to the airport's ability to adequately serve the potential post-recession demand.

The Airport Authority possesses several parcels of land adjacent to the airport facilities which are well suited for industrial development. As the United States recovers from this recession, it is certainly reasonable to anticipate an opportunity for new business development as companies begin to recover. The areas surrounding the airport are well suited for such business development by

companies that can reasonably be expected to operate high performance aircraft, ideally in a B-II environment.

With these factors taken into careful consideration, the recommended ARC to be utilized for future development of the airport, pending a post-recession assessment of the economic recovery, is B-II with the critical aircraft being identified as a Beech King Air 200.

3.4 Airport Operations

As a matter of preparing for this master plan study, the Elkins-Randolph County Regional Airport Authority began maintaining aircraft operations logs to document the number of operations performed at the airport. The data collected on these logs is limited to the operations able to be observed by airport personnel while on duty. The operation logs for 2010 and 2011 suggest operations counts of 1,848 and 1,179, respectively. Obviously, it is difficult to assert that all the operations performed at the airport are accounted for in these totals; therefore, it is necessary to determine the overall percentage of operations reflected in the operation logs.

We believe that in logging airport operations, airport personnel have recorded, at best, approximately 20% of the traffic. The airport manager is the only employee at the airport available to record aircraft operations. Furthermore, given his other duties away from the terminal area, it would be inappropriate to assume that he would record much activity over and above that documented on his aircraft fueling logs, which are largely the basis for his airport activity record. The airport manager also asserts that a significant number of aircraft

operations associated with pilot training, conservatively estimated to be 300 operations per month or 3,600 operations annually, are not accounted for in the airport activity record. The omission of this significant sector of airport activity further validates our belief that only 20% of the traffic has been recorded. Assuming, then, that, at best, only 20% of the traffic at the airport has been logged, the total operation counts for 2010 and 2011 would be in the neighborhood of 9,240 and 5,895, respectively.

The TAF indicates an annual operation count of 10,500 operations. This reported activity level has remained constant in the TAF since it was reduced from 14,500 operations in 2004. The discrepancy between the activity levels contained in the TAF and those suggested by the airport activity logs is attributable to the decline in operations associated with the impact of the recession not being reflected in the 5010 form.

To forecast the total airport operations through the planning period, this study adopts an "operations-per-based aircraft" index (OPBA), a method that is commonly used in the industry where there is no reliable traffic count of record. The operation logs maintained by the Airport Authority do not distinguish between local and itinerant traffic. Absent sufficient information to contradict the TAF, this study adopts the 33%-67% proportioning of itinerant and local operations which was included in the TAF prepared in 2010.

Perhaps the largest obstacle to developing an OPBA based forecast is determining which OPBA number is most indicative of the situation at the airport being studied. There are a number of published

sources from which an OPBA index can be directly obtained or indirectly calculated. These sources include the FAA Terminal Area Forecast (TAF), the current FAA Form 5010, the 2003 West Virginia State System Study, and FAA Order 5090.3C Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) . The OPBA indices which are contained within these sources are summarized in Table 3.4.1.

Table 3.4.1 OPBA Indices for General Aviation Aircraft	
Source	OPBA
FAA 2010 Terminal Area Forecast (TAF) for EKN	477
FAA Form 5010 for EKN (2011)	
West Virginia State System Study (2003)[1]	500
NPIAS (FAA Order 5090.3C)[2]	250

Notes:

1. Reported as operations per based [piston] aircraft
2. For rural GA airports with little itinerant traffic

The guidance contained within FAA Order 5090.3C states "When forecast data of aircraft operations is not available, a satisfactory procedure is to forecast based aircraft using the statewide growth rate from the TAF and to develop activity statistics by estimating annual operations per based aircraft. A general guideline is 250 operations per based aircraft for rural general aviation airports with little itinerant traffic, 350 operations per based aircraft for busier general aviation airports with more itinerant traffic and 450 operations per based aircraft for busy reliever airports. In unusual circumstances, such as a busy reliever airport with a large number of itinerant operations, the number of operations per based aircraft may be as high as 750 operations per based aircraft..."

Prior to the recession, the Elkins-Randolph County Regional Airport experienced more itinerant operations than a typical rural general aviation airport. The airport would have been appropriately identified as a "busier general aviation airport with substantial itinerant traffic" and therefore appropriately reflect an OPBA index of 350 operations per based aircraft. As previously discussed, the recession has taken a significant negative toll on the activity levels at the airport. With that taken into consideration, it is more appropriate to classify the airport as "a rural general aviation airport with little itinerant traffic." The appropriate OPBA index to be used from FAA Order 5090.3C would, therefore, be 250 operations per based aircraft. It is also recommended that this index be reviewed once the recession has ended and activity at the airport returns to its pre-recession level.

The OPBA indices derived from the TAF, whose data came from the current FAA Form 5010, and those contained within the state systems plan appear to be slightly higher than those believed to be a reasonable estimation of the activity at the airport. It appears that the declines being experienced as a result of the recession have yet to be accounted for within the activity levels reported on the FAA Form 5010.

Given the OPBA variances associated with the state systems plan and the TAF, this study adopts the OPBA index of 250 from FAA Order 5090.3C for forecasting general aviation operations at the Elkins-Randolph County Regional Airport. This OPBA index was used to prepare the forecasts presented in Table 3.4.2, which summarizes the based aircraft and airport operations forecasts for the planning period.

Table 3.4.2 Summary of Aviation Forecasts				
Item	2011	2016	2021	2031
Based Aircraft:				
Single Engine	21	21	22	22
Multi-Engine	3	3	3	3
Turbo Jet	0	0	0	0
Rotorcraft	0	1	1	2
Total	**24**	**25**	**26**	**27**
Operations:				
GA Local	3,950	4,187	4,355	4,522
GA Itinerant	1,945	2,063	2,145	2,228
Total	**5,895[1]**	**6,250**	**6,500**	**6,750**

Notes:
1. Derived from airport operation logs

The forecast contained in Table 3.4.2 projects a 6% increase in airport operations through the short term period ending in 2016 and an 8% increase through the remainder of the planning period. In 2006, the airport had 31 based aircraft. Using the 250 OPBA index adopted by this report, the total number of operations in 2006 would have been approximately 7,750. In 2011, the airport had 5,895 operations, a reduction of approximately 24%. The 1.2% average annual growth rate in airport operations that we have projected throughout the planning period suggests a slow recovery from the 24% reduction that we have attributed to the recent economic downturn. The projected growth rate is highly dependent on near-term economic progress, particularly the resiliency of the wood products sector. It is highly recommended that the growth rates used in these forecasts be revisited as activity at the airport approaches its pre-recession level, or within five years, whichever comes first.

3.5 Peak Periods

Activity at busier airports may be relatively evenly distributed over the hours of operation. On the other hand, some airports may exhibit certain peaking characteristics that have a bearing on the need and timing for facilities development. Prudent planning requires, then, that a brief analysis of peaking characteristics be performed to ensure that recommendations for development are thoroughly considered and appropriate.

Whereas it is not proper to design airport facilities based upon short-lived peaks in aircraft activity, a middle ground activity index, called a "design hour" is often used to project facility requirements. The design hour, or "peak hour" as it is referred to herein, is an estimate of peak hour operations for the average day of the busiest month at the airport. When a peak hour activity level is taken into consideration, the development of the airport facilities can be adjusted, as warranted, to accommodate the peak hour activity in an effort to prevent excessive congestion or, in the worst case scenario, gridlock.

As noted previously, the Airport Authority does not keep records in such detail as to determine an accurate proportion of local to itinerant traffic. However, the records which are maintained are suitable to generally identify the airport's activity cycle and develop a reasonable approximation as to the percentage of activity seen during each month. Based on the 2011 records, the busiest month is May with approximately 16% of the total recorded operations. September and March were the next two busiest months with approximately 11% and 10%, respectively. When comparing the 2011 records to the 2010

records, the busiest months varied, but the percentage of activity in that month remained in the range of 15%-18%. Although the busiest month may vary from year to year, using the 2011 peak value of 16% is a reasonable approximation of the peak activity typically seen at the airport.

For the year 2011, 16% of the projected total annual operations amounts to 943 operations. Peak day operations, as the average daily operations for the busiest month assuming an average of 30 days, amounted to 31 operations.

At smaller general aviation airports, activity is neither level nor evenly distributed throughout the day; therefore peak hour operations must be estimated by applying a "peaking factor" to average daily operations. A typical peaking factor for smaller airports is 30%, meaning that as much as 30% of the busiest day's activity could be expected to occur in the busiest hour. Applying that peaking factor to the 31 peak day operations produces a current peak hour figure of 9 operations at the Elkins-Randolph County Regional Airport.

Table 3.5.1 projects peak day and peak hour operations throughout the planning period. These projections rely on two basic assumptions: (1) the 16% monthly peaking factor and (2) the 30% hourly peaking factor remain constant throughout the planning period.

Table 3.5.1 Peak Day and Peak Hour Forecasts				
Year	Annual Operations	Peak Month Operations[1]	Avg. Daily Operations	Peak Hour Operations[2]
2011	5,895	943	31	9
2016	6,250	1,000	33	10
2021	6,500	1,040	35	11
2031	6,750	1,080	36	11

Notes:

1. 16% peaking factor
2. 30% peaking factor

APPENDIX 2
RUNWAY LENGTH REQUIREMENT ANALYSIS

Chapter 4
Requirements Analysis and Concepts Development

This chapter of the Master Plan Report deals with the ability of the airport to accommodate the operational demands placed upon the facility in a manner that is consistent with prevailing airport design standards and notions of fundamental airport development.

4.1 Introduction

Existing facilities at the Elkins-Randolph County Regional Airport were inventoried in Chapter 2 of this report. In Chapter 3, forecasts of aeronautical activity were developed for the short-, intermediate- and long-term planning periods. This chapter of the report examines the ability of the inventoried facilities to safely and efficiently accommodate that activity, referred to now as "demand," as time goes by. Items addressed include:

- The capacity of the runway/taxiway configuration to accommodate existing and forecasted operations;
- The extent to which any airspace limitations would adversely impact flight operations;
- The degree to which the airfield configuration conforms to the dimensional standards for the critical aircraft;
- The sufficiency of the aircraft parking apron to accommodate existing and forecasted based and transient aircraft;
- The adequacy of existing airfield accessory components in relation to the standards for fundamental airport development;

- The adequacy of the airport access road and automobile parking facilities; and

- The need and timing for the development of other support facilities.

4.2 Airside Capacity

The "capacity" of an airport is defined as the "throughput rate"; that is, it is the maximum number of aircraft operations that can take place at the facility in one hour. The annual service volume, or ASV, is an estimate, expressed as a single number, of an airport's annual capacity. Either of these numbers may be compared to existing and forecast demand to identify deficiencies in capacity, and to determine the timing for capacity enhancing projects, if they are needed at all. Principal among the factors that affect airport capacity at smaller airports are airfield configuration, taxiway accommodations, aircraft (fleet) mix, weather conditions and the relative number of "touch and go" operations.

The capacity provided by the existing airport facilities can be approximated by the procedures set forth in FAA Advisory Circular 5060-5. Using Figure 2-1 contained in Chapter 2 of the advisory circular, which is an approximation to be used for long range planning, the VFR and IFR capacities are approximately 98 and 59 operations per hour, respectively. Based on this figure, the airport facilities can handle an Annual Service Volume (ASV) of 230,000 operations. Figure 2-1 is an approximation which is intended to give a broad picture of the facility's capacity to be used for long range planning. Given the fact that the highest forecast demand throughout the study period is 6,750

operations, approximately 3% of the ASV included in Figure 2-1, the capacity of the Elkins-Randolph County Regional Airport is adequate to service the anticipated demand. A more detailed review of the capacity would be warranted if the operation levels were to approach the values contained in the table.

4.3 Airspace

Along with the proximity of airports to one another, the proximity of an airport to low altitude (Victor) airways, to restricted or prohibited airspace, or to obstructing terrain could adversely impact the capacity of an airport by occasioning the necessity for circuitous vectors or routings to final approach segments. When conflicts exist, there may be a reduction in the IFR capacity for the airports involved due to the intermixing of traffic within the common parcel of airspace.

Figure 2.10.1.1 is a section of a low altitude enroute chart, which depicts the airport and airspace in the vicinity of the Elkins-Randolph County Regional Airport. The nearest airports that have instrument approaches are the Upshur County Regional Airport (24 NM), the Philippi-Barbour County Regional Airport (22 NM) and the North Central West Virginia Regional Airport (34 NM). These airports and their corresponding approach patterns pose no direct conflict to the operations at the Elkins-Randolph County Regional Airport.

There are three ground based navigation stations in the general vicinity of the airport. The closest station, Elkins VORTAC (EKN), is located approximately 12 miles west. The Kessel VOR/DME (ESL) is located approximately 46 miles to the northeast and the Clarksburg VOR/DME (CKB) is located 22 miles to the northwest. Three Victor

Airways, V286, V4 and V38, pass through the general vicinity of the airport. V4 passes through the area approximately 6 miles north of the airport and V38 passes approximately 12 miles south. These airways pose to no conflicts to the operations of the airport. Victor Airway V286 extends almost directly over the airport as it runs 106 nautical miles from the Elkins VORTAC to the Casanova VORTAC (CSN). With a Minimum Enroute Altitude (MEA) of 5,700 feet, traffic along this airway should not interfere with operations at the Elkins-Randolph County Regional Airport.

There are no obvious constraints on capacity posed by the proximity of the Elkins-Randolph County Regional Airport to any restricted or prohibited areas, or to obstructing terrain.

4.4 Airport Configuration and Dimensional Standards

In order to fully evaluate the ability of the Elkins-Randolph County Regional Airport to accommodate the operational demands, both present and forecast, the airport's configuration and geometry, as it relates to accommodating the critical aircraft, must be reviewed. Airside facility improvements may be indicated when existing airfield components do not conform to prevailing design standards.

4.4.1 Runway Length, Width and Strength

The recommended runway length for the primary runway at an airport is generally determined by considering the requirements of a family of airplanes characterized by their approach speeds, gross weights and seating capacities. FAA Advisory Circular 150/5325-4B sets forth a process to use in determining recommended runway lengths for new runways or extensions to existing runways. As defined

in the Advisory Circular, the Beech King Air 200, defined as the critical aircraft in Chapter 3, belongs to a family of aircraft characterized as small airplanes having 10 or more passenger seats. Using Table 2-2 of FAA Advisory Circular 150/5325-4B, the recommended runway length is 4,400 feet. Runways 5-23, 4,501 feet long, and 14-32, 4,542 feet long, are both considered to be sufficient to accommodate the current level of activity at the airport.

As more thoroughly discussed in Chapter 3, the recent recession has had a significantly detrimental impact on the aircraft fleet mix which frequents the Elkins-Randolph County Regional Airport. Prior to the onset of the recession, the airport saw a considerable amount of operations from turbo-jet and turbo-prop aircraft. While not reaching the 500 operations threshold the FAA considers as representing "regular use," the number of operations by business jets was considerable enough to merit concern over the adequacy of the airport facilities to safely accommodate these aircraft. Assuming an economic recovery which restores the number of business jet operations to pre-recession levels, the required runway length may need to be re-evaluated with consideration given to the then-current aircraft fleet mix. A follow-up evaluation of the fleet mix and required runway length is recommended upon the economy's emergence from the current recession or in five years, whichever occurs first.

The design criteria for runway width are found in Chapter 3 of FAA Advisory Circular 150/5300-13. Runway width is based on the airport's critical aircraft Airplane Design Group classification. As discussed in Chapter 3, the ARC for the Elkins-Randolph County Regional Airport is B-II. According to Table 3-1, the required runway

width is 75 feet. Runway 5-23 will be reduced to 75 feet wide upon the completion of the current runway rehabilitation project and Runway 14-32 currently has a usable width of 130 feet. Both runways are adequate to accommodate the current level of activity.

Generally speaking, the load bearing capacity (generally identified in terms of a 20 year service life) of a runway pavement structure is dependent on two factors; the landing gear configurations of the aircraft comprising the fleet mix, and the quality and thickness of the layers of material constituting the pavement structure. The airport's fleet mix consists of aircraft with single and dual wheel landing gear configurations and typically with a gross takeoff weight of less than 12,500 pounds. The existing pavement structure for both runways consists of an asphalt pavement layer of varying thickness over a crushed stone aggregate base layer of varying thickness. The sub-grade soil beneath the runways is predominantly fill materials with a mixture of lean clays, fat clays, sandy silts, clayey gravels, sands and sandstone bedrock. The California Bearing Ratios (CBR) for these areas varies significantly between 2 and 13.

The pavement structure of Runway 14-32 consists of approximately 6 to 7 inches of asphalt pavement overlying 4 to 6 inches of crushed aggregate base course. Based on geotechnical materials testing conducted during a previous rehabilitation of Runway 14-32, the sub-grade soil has a CBR value of approximately 2 to 3. Using the lower value in the range of these parameters, conservative estimates of the single and dual wheel load bearing

capacities of Runway 14-32 are 15,000 pounds and 16,500 pounds, respectively.

The current project to rehabilitate Runway 5-23 is scheduled to be completed in the summer of 2012. Upon completion of this project, the runway pavement structure will consist of 4 inches of asphalt pavement overlying 1 to 2 feet of crushed aggregate base course. Based on the geotechnical materials testing completed for the project, the sub-grade soil can conservatively be defined by a CBR value of 2. Conservative estimates of the single and dual wheel load bearing capacities of Runway 5-23 are, then, 15,000 pounds and 16,500 pounds, respectively.

4.4.2 Taxiways

Taxiways link airside operational areas. Their absence, or when present, their configuration can have a significant effect on airfield capacity. All taxiways should provide aircraft with the most direct routing to their destination as possible, provide for expeditious runway exit, avoid bottlenecks and minimize runway crossings and the necessity to "back-taxi" on an active runway. Fundamental airport design principles suggest, in fact, that each runway have a full-length parallel taxiway. A parallel taxiway is recommended for any airport with an instrument approach.

The design standard for the airport's taxiways, based on the current B-II ARC is 35 feet wide. The older portions of the airport's taxiway system, Taxiway B and Taxiway C, are 50 feet wide. Taxiway A, constructed more recently, conforms to the design standard width of 35 feet. Taxiway B is a partial parallel taxiway serving Runway 14-

32. It extends from the approach end of Runway 32 and connects back into the runway at the intersection of Runways 14-32 and 5-23. Taxiway C is a short section of taxiway which provides access from Taxiway B to the approach end of Runway 5. Taxiway A is a partial parallel taxiway serving Runway 5-23. It provides access to the approach end of Runway 23 beginning at Taxiway B and extending across Runway 14-32. The current taxiway configuration does not provide full parallel taxiway access to the approach ends of Runways 5 and 14.

The ARC B-II design standard for centerline-to-centerline runway-taxiway separation is 240 feet for visual runways and runways with approach visibility minimums not lower than ¾ statute mile. The separation distances for the two portions of parallel taxiway meet or exceed this dimensional criterion. The separation distances between Taxiway A/Runway 5-23 and Taxiway B/Runway 14-32 are 240 feet and 500 feet, respectively.

To ensure the greatest utility of the airport under all-weather conditions, provisions should be made for full parallel taxiway access to the approach ends of Runway 5 and Runway 14. The creation of full parallel access to these areas will eliminate all "back-taxi" operations. When full parallel access has been provided to the approach end of Runway 14, the Airport Authority should consider removing the section of Taxiway B that connects into the intersection of Runway 5-23 and Runway 14-32. Once full parallel taxiway access is provided, this section of taxiway will no longer be operationally relevant.

4.4.3 Runway Safety Area

The runway safety area (RSA) is a rectangular surface, centered about the runway, that has been prepared, or is suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot or excursion from the runway. The dimensional standards of the RSA are related to the Airport Reference Code and to the lowest visibility minimums for an approach serving the runway. For Approach Category B, Design Group II visual runways or runways with an instrument approach procedure having visibility minimums of not less than 1 statute mile, the required width of the RSA is 150 feet, and its length beyond the runway ends is 300 feet.

As noted in Chapter 2, except for a 139-foot deficiency in length of the RSA beyond the threshold of Runway 5 and a positive surface gradient beyond the threshold of Runway 32, the runway safety areas for each runway generally conform to the ARC B-II standard. The deficiencies in the Runway 5 RSA can be rectified by the placement of engineered fill or a retaining structure. The positive surface gradient beyond the threshold of Runway 32 would be difficult and cost prohibitive to correct. The excavation of the material required to achieve ARC B-II design standards would create a high wall off the end of the runway; a result less desirable than the existing positive grade.

4.4.4 Runway Protection Zone

Runway Protection Zones (RPZ) are trapezoidal-shaped areas centered about the extended runway centerline beginning 200 feet off each end and projecting away and fanning out from the runway. Their

purpose is to enhance the protection of people and property on the ground; thus, the FAA asserts that, when possible, the airport operator should have sufficient property interests to control activities within the RPZ's. With instrument approach visibility minimums of not less than 1 mile, and with the airport serving Approach Category A and B aircraft, the RPZ dimensions at the end of all runways at the Elkins-Randolph County Regional Airport are as follows:

Inner Width:	500 feet
Length:	1,000 feet
Outer Width:	700 feet
Acres:	13.77 acres

Presently, the Airport Authority's property interest in each of the runway protection zones is insufficient to fully encompass the required surface area. The Airport Authority owns the following portions of the runway protection zones:

Runway 5:	9.90 acres
Runway 23:	1.45 acres
Runway 14:	10.49 acres
Runway 32:	1.32 acres

The Airport Authority has several easements pertaining to obstruction removal on the adjacent properties; however, these easements are not sufficient to fully prevent non-compliant land use. At the appropriate time, the Airport Authority should consider revising its current

easement agreements or acquiring sufficient property interest to affect the level of control specified by the FAA.

4.4.5 Other Elements of "Fundamental Airport Development"

Table 4.4.5.1, on the following page, lists items of fundamental airport development not otherwise discussed in this chapter. Items whose boxes in the left column have been checked require no further attention.

4.5 Aircraft Parking and Storage

Inadequate tie-down and hangar facilities at an airport may cause an overall lowering and/or redistribution of demand as reflected in the numbers of based aircraft. It is extremely important, then, that to the extent practical, provisions be made to store aircraft in a manner commensurate with the desires and financial wherewithal of the aircraft owners, and that adequate parking and servicing facilities be available to accommodate transient aircraft if an airport is to realize its full development potential.

Table 4.4.5.1 Fundamental Airport Development - Airfield		
	Development Item	Notes
☑	Crosswind Runway	
☐	Airfield Lighting	Runway 14-32 needs to be equipped with a medium intensity edge lighting system.
☐	Visual Glide Slope Indicators	Runway 23 currently has a PAPI system. The remaining runways need to have some form of visual glide slope indicator equipment installed, if able to be properly sited.
☐	Runway End Identification Lights	Runway 23 currently has a REIL system. The remaining runways need to have REIL systems installed.
☐	Runway and Taxiway Marking	Runway and Taxiway markings have a useful service life of approximately 5 years. They should be re-painted every 5 years as part of an on-going maintenance program.
☐	Runway Grooving	Grooving is recommended for runways serving turbojets. Consider grooving when turbojet activity increases.
☑	Instrument Approach	GPS approaches serve all runways.
☐	Rotating Beacon	The existing beacon needs to be relocated to a more suitable location and replaced with updated equipment.
☐	Wind Cone & Segmented Circle	Consider installing supplemental wind cones and a segmented circle.
☐	Obstruction Marking and Lighting	Install obstruction markers and/or lights for obstructions which cannot be removed. Refer to the Airport Layout Plan.
☑	Perimeter Fencing	The entire perimeter of the airport is fenced and secure.

4.5.1 Apron Facilities

Since local conditions vary so significantly from one airport to another, there is no formula or index that can be applied to determine the exact amount of apron space required at a given installation. It is generally accepted, however, that the apron area set aside for based aircraft should be separate from that used by transient airplanes. The transient apron should be conveniently located to terminal facilities or gates accessing areas reserved for ground transportation or passenger transfer, and to fueling facilities.

Appendix 5 of FAA Advisory Circular 150/5300-13 provides some guidance for determining the amount of apron space that should be reserved for both based and transient aircraft. Tables 4.5.1.1, 4.5.1.2 and 4.5.1.3, on the following page, set forth these apron size requirements for the Elkins-Randolph County Regional Airport for the planning period addressed in this study. It is important to note that these requirements were developed in consideration of the fact that all based aircraft are presently hangared and the assumption that no hangars offering "community storage" will be built over the planning period. The based aircraft apron requirement is arbitrarily established at 33 percent of the total complement of based aircraft. This allows for positioning four aircraft on the apron during maintenance activities.

Table 4.5.1.1 Projected Based Aircraft Apron Requirements				
Year	# Based Aircraft	# Occupying Apron[1]	SY Required (300/aircraft)	Expansion Requirement[2]
2011	24	8	2,400	2,640
2016	25	8	2,400	2,640
2021	26	9	2,700	2,970
2031	27	9	2,700	2,970

Notes:
1. Assumes an arbitrary 33% percent of based aircraft occupying apron space.
2. Accommodates a 10% expansion over a 2-year period.

Table 4.5.1.2 Projected Transient Aircraft Apron Requirements					
Year	Operations	Peak Average Daily Ops	Itinerant Operations	Aircraft Occupying Apron[1]	SY Required (360/aircraft)
2011	1,945	31	10	5	1,800
2016	2,063	33	11	5	1,800
2021	2,145	35	12	6	2,160
2031	2,228	36	12	6	2,160

Notes:
1. Assumes 50% of the itinerant operations will occupy the apron during the busy day.

Table 4.5.1.3 Total Apron Requirements			
Year	Based Aircraft Requirement (SY)	Transient Aircraft Requirement (SY)	Total Apron Requirement (SY)
2011	2,640	1,800	4,440
2016	2,640	1,800	4,440
2021	2,970	2,160	5,130
2031	2,970	2,160	5,130

The area of the existing apron is approximately 10,208 square yards. Over the planning period, the maximum amount of apron required is 5,130 square yards, approximately half of the existing apron surface; therefore, without any further consideration, the existing apron is more than sufficient to meet the demand anticipated over the planning period.

4.5.2 Hangar Facilities

The fortunes of an airport are closely related to the number of based aircraft at the facility. Congressional debates during times of AIP re-authorization have, at times, suggested that the level of AIP funding be correlated to the number of aircraft based at eligible general aviation airports. Generally speaking, especially in severe climate areas, the number of based airplanes is related to the availability of adequate hangar space.

There are four T-hangars and four box hangars located at the Elkins-Randolph County Regional Airport and they currently house all of the twenty-four based aircraft. Twenty-one of the twenty-four based aircraft are housed in the four T-hangar structures. The 80-foot by 70-foot box hangar located on the southeastern corner of the main apron is currently being utilized as storage space for transient aircraft.

The number of based piston aircraft is not forecasted to increase over the planning period. With all based aircraft now hangared and the availability of additional hangar space, there is no obvious requirement to construct any T-hangar units over the planning period, as piston aircraft are the ones that populate most of these structures. Any efforts pertaining to T-hangar development should be focused on rehabilitating the existing structures to extend their useful service life.

Any increases in based aircraft over the planning period should be reflected in the numbers of turbine airplanes and/or helicopters located at the Elkins-Randolph County Regional Airport. Owners of

such high end equipment will seek to protect their aircraft by storing them in hangars built either by them, the airport operator or a third party. There is sufficient space available with easy access to the airfield to accommodate the construction of hangars should the need arise.

4.6 Airport Access Roads and Automobile Parking

The Elkins-Randolph County Regional Airport is accessed by County Route 219/27, which extends approximately 0.4 miles from the intersection with County Route 219/11 before terminating at the terminal building. The airport access road, recently re-surfaced by the West Virginia Division of Highways (WVDOH), appears to have been constructed to WVDOH standards, and it affords excellent access to the airport.

There is no specific guidance for determining the functional requirements for parking lots at general aviation airports; accordingly, projections must be prepared based upon an analysis of the local situation. The existing 16,000-square foot parking lot located to the east of the terminal building provides parking and circulation space for 32 automobiles. These 32 parking spaces are not typically occupied by pilots whose aircraft are hangared at the airport. This parking area provides parking capacity to accommodate transient vehicular traffic as well as additional spaces for rental cars. The automobile parking accommodations are entirely adequate for the planning period.

4.7 Airside Access

The full utility of any airport can only be realized by ensuring its accessibility during other than visual meteorological conditions. There are various items required of the airspace, the landing surface and its appurtenances before an instrument approach procedure may be commissioned. These requirements are dependent upon the type of approach and landing minimums requested. Stated another way, the type of approach that might be commissioned at an airport depends upon the characteristics of the airspace, the landing surfaces and other factors associated with the airport. The paragraphs that follow identify those factors that enable the achievement of the lowest landing minimums.

As mentioned in Chapter 2, there are three straight-in GPS approaches serving the Elkins-Randolph County Regional Airport. The straight-in (as opposed to circling) minimums for these approaches are summarized in Table 4.7.1.

Table 4.7.1 GPS Approach Minimums

Approach Category	Runway 5		Runway 23		Runway 14	
	Ceiling[1]	Visibility[2]	Ceiling	Visibility	Ceiling	Visibility
A	1067	1-1/4	1202	1-1/4	1432	1-1/4
B	1067	1-1/2	1202	1-1/2	1432	1-1/2

Notes:
1. Height above the airport (feet)
2. Statute miles

According to FAA Advisory Circular 150/5300-13, Airport Design, Appendix 16, Table A16-1C, Non-Precision Approach

Requirements, to achieve visibility minimums greater than ¾-statute mile and less than 1-statue mile requires the following:

1. The 20:1 approach surface must be clear;
2. The Airport Layout Plan (ALP) must be current;
3. The runway must have a paved length of at least 4,200 feet;
4. The runway must be marked with non-precision instrument markings;
5. The airfield must have holding positions signs and markings;
6. The runway must have high or medium intensity runway edge lights;
7. The runway obstacle free zone (OFZ) must meet appropriate design standards;
8. The runway must have a full parallel taxiway leading to the runway threshold and, with airplanes on centerline, no protrusions into the runway OFZ can be present;
9. The runway must have an approach lighting system;
10. The runway should have no penetrations into the Threshold Siting Surface, as configured in accordance with the appropriate criteria;
11. An Airport Airspace Analysis Survey for Non-Vertically Guided Airports must have been completed.

Based on previous conversations with FAA Flight Standards personnel, the principal concern associated with designing instrument approaches with the lowest minimums is not necessarily related to the airport dimensional standards set forth in Advisory Circular 150/5300-

13. The variables which most profoundly affect the design of instrument approaches are:

- The approach surfaces are clear of obstructions;
- The runway length is sufficient for airplanes utilizing the airport;
- Appropriate airfield lighting is in place;
- Landing aircraft have a means to expeditiously exit and clear the end of the rollout runway.

In order to optimize the utility of Runway 5-23 and Runway 14-32, the Elkins-Randolph County Regional Airport Authority should endeavor to accommodate all of the requirements enumerated above.

4.8 Equipment Requirements

The Master Agreement attached to Airport Improvement Program grants imposes on the Airport Authority a continuing obligation to preserve and maintain airport facilities in a safe and serviceable condition. The extent of the maintenance effort, and thus the type and amount of equipment required to sustain that effort is, however, a matter of the airport operator's professional judgment.

Interestingly, the obligation to maintain a non-certificated (ref. Part 139) airport does not impose any specific responsibility to remove snow or slush, or to otherwise treat icy pavements. Nevertheless, the Airport Authority is responsible, in general, for providing a safe, usable facility to the maximum extent practical, and that requires the deployment of special equipment, most notably, to remove snow from

the airfield pavement surfaces. When climatic conditions render an airport unsafe, the Airport Authority must promptly notify airmen by proper notices (NOTAMs) and, if necessary, to close all or a part of the airport until the conditions are corrected, hopefully, within a reasonable amount of time.

The Elkins-Randolph County Regional Airport Authority's maintenance vehicle fleet consists of the following pieces of equipment:

- 1978 International tandem dump truck with 10'snow plow;
- 1993 Dodge W200 truck with 8' snow plow;
- 1996 Case/IH 4210 tractor with loader;
- 2002 New Holland TV140 tractor with multiple attachments;
- 2005 Ford F-350 truck with 8' snow plow; and
- Miscellaneous grass mowing equipment

Considering the limited personnel resources available to the Airport Authority, the type and quantity of maintenance equipment is considered to be adequate to maintain the airport facilities. Future equipment expenditures should focus on replacing the existing pieces of equipment as warranted. Replacing and updating the current equipment inventory will afford the Airport Authority the greatest flexibility in addressing airfield maintenance issues.

4.9 Summary

Observations cited in this chapter include the following:

- The existing airfield configuration provides adequate VFR and IFR capacity for the planning period.

- There are no obvious or significant constraints on airfield capacity posed by the proximity of the Elkins-Randolph County Regional Airport to any surrounding airport, to Victor airways, to any restricted or prohibited areas or to obstructing terrain.

- The runway width and single-wheel weight bearing capacity of Runway 14-32 exceeds that required for the critical civilian aircraft. The existing runway length and surface gradient are sufficient to accommodate the critical aircraft.

- Upon completion of the current runway rehabilitation project, the width of Runway 5-23 will comply with the design standards for the critical aircraft. The single-wheel weight bearing capacity will exceed the minimum value required. The runway length and surface gradient will be sufficient to accommodate the critical aircraft.

- In order to maximize the utility of the airport under all weather conditions, full length parallel taxiways should be provided to the approach ends of Runways 5 and 14.

- The Airport Authority should revise their current easement agreements or acquire additional property interests in order to institute the required control of the Runway Protection Zones (RPZs).

- The existing apron facilities are adequate to accommodate all based and transient aircraft projected through the planning period.

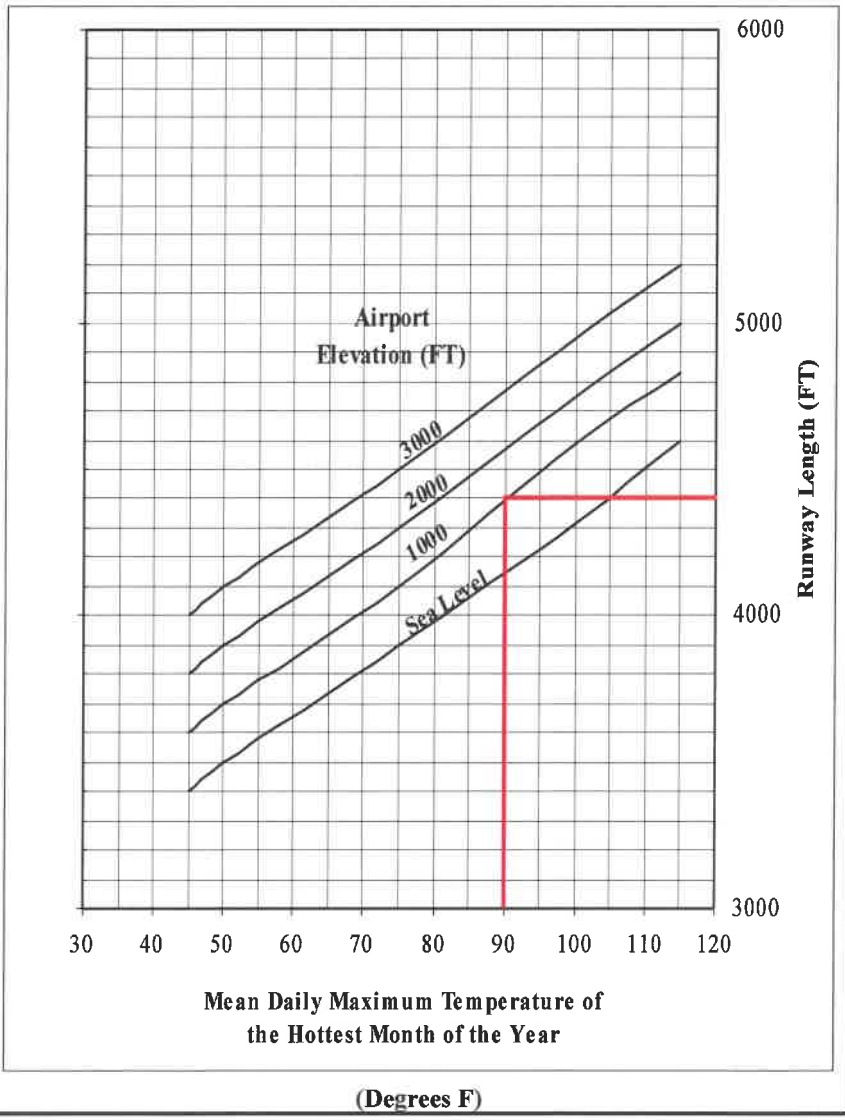
- Currently, the aircraft storage facilities are adequate to contain all the based aircraft throughout the planning period. Sufficient developable space is available and well situated to accommodate further hangar development as desired, or if required.

- Upon completion of the Runway 5-23 rehabilitation project, the majority of the existing airfield lighting system will comply with current design standards. A medium intensity edge lighting system should be installed to service Runway 14-32 to increase utility of the airport during all weather conditions.

- The remaining obstructions penetrating the Threshold Siting Surface and FAR Part 77 Imaginary Surfaces should be removed to assist obtaining the lowest practical approach minimums.

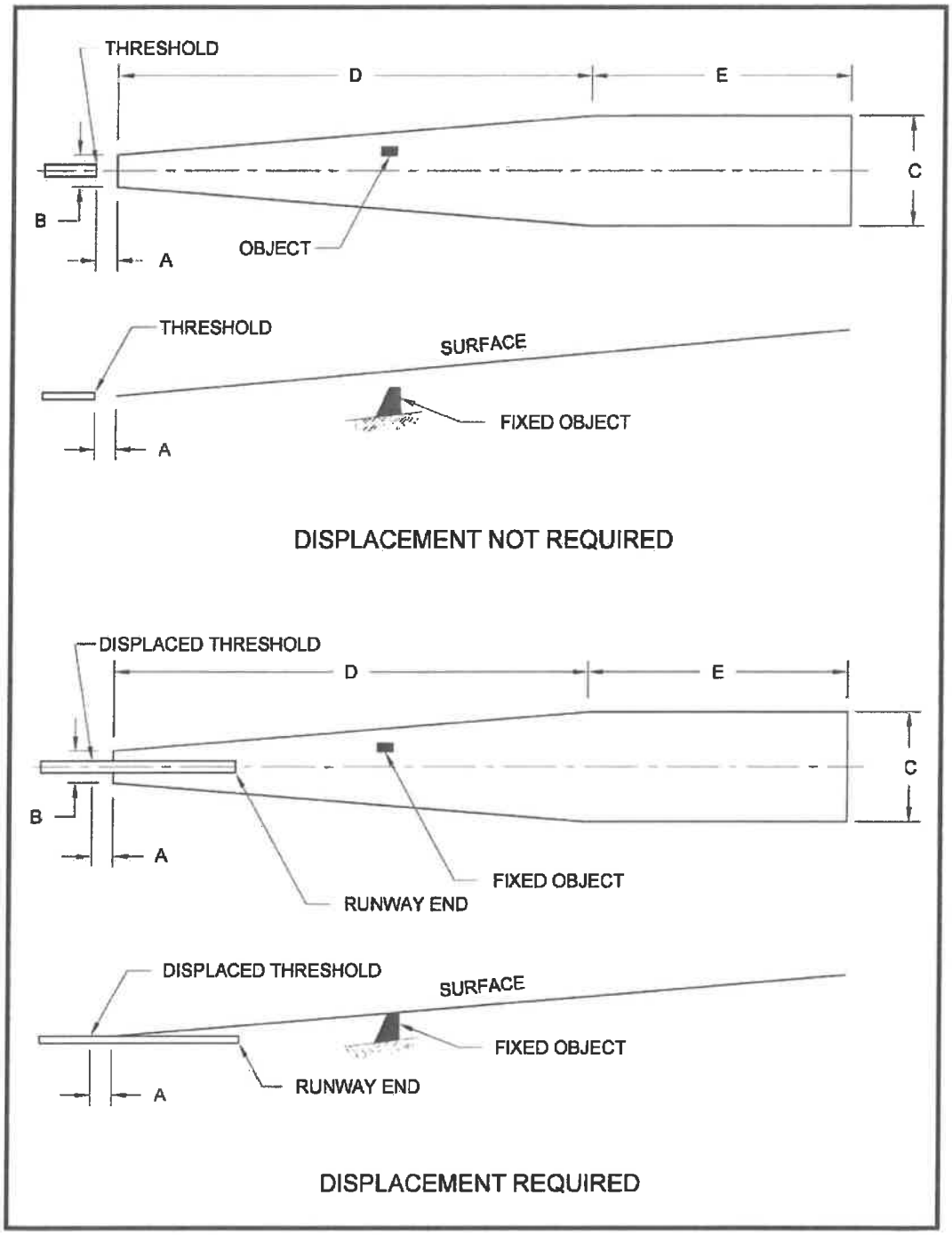
- Airport access and vehicular parking facilities are adequate for the planning period.

Figure 2-2. Small Airplanes Having 10 or More Passenger Seats
(Excludes Pilot and Co-pilot)

Representative Airplanes	Runway Length Curves
Raytheon B80 Queen Air **Raytheon** E90 King Air **Raytheon** B99 Airliner **Raytheon** A100 King Air (Raytheon formerly Beech Aircraft) **Britten-Norman** Mark III-I Trilander **Mitsubishi** MU-2L **Swearigen** Merlin III-A **Swearigen** Merlin IV-A **Swearigen** Metro II	**Example:** Temperature (mean day max hot month) 90° F (32° C) Airport Elevation (msl) 1,000 feet (328 m) Recommended Runway Length 4,400 feet (1,341 m) **Note:** For airport elevations above 3,000 feet (915 m), use the 100 percent of fleet grouping in figure 2-1. 

APPENDIX 3

RUNWAY APPROACH SURFACE GEOMETRY REQUIREMENTS



Notes:
1. See Table 3-2 for dimensional data.
2. The starting elevation of the approach slope begins at the elevation of the runway threshold. For displaced thresholds, the approach slope begins at the runway elevation at the displaced threshold.

Figure 3-2. Threshold siting based on approach slope

Table 3-2. Approach/departure standards table

Runway Type		DIMENSIONAL STANDARDS* Feet (Meters)					Slope/ OCS
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (1.6 km) (day only).	0 (0)	400 (122)	1000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only. [1]	200 (61)	400 (122)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
5	Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft. [1]	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
6	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but <1 statute mile (≥ 1.2 km but < 1.6 km), day or night.	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
7	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile (1.2 km).	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	34:1
8[3,5,6,7]	Approach end of runways expected to accommodate approaches with vertical guidance (Glide Path Qualification Surface [GQS]).	0 (0)	Runway width + 200 (61)	1520 (463)	10,000 [2] (3048)	0 (0)	30:1
9	Departure runway ends for all instrument operations.	0 [4] (0)	See Figure 3-4.				40:1

* The letters are keyed to those shown in Figure 3-2.

Notes:

1. Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Slope Indicator (VGSI), as defined by Order 8260.3, may avoid displacing the threshold.
2. 10,000 feet (3048 m) is a nominal value for planning purposes. The actual length of these areas is dependent upon the visual descent point position for 20:1 and 34:1, and DA point for the 30:1.
3. When objects exceed the height of the GQS, an approach with vertical guidance is not authorized. Refer to Table 3-4 and its footnote 4 for further information on GQS.
4. Dimension A is measured relative to TODA (to include clearway).
5. Surface dimensions / OCS slope represent a nominal approach with 3 degree Glide Path Angle (GPA), 50 feet (15 m) TCH, < 500 feet (152 m) HATh. For specific cases, refer to Order 8260.3. The OCS slope (30:1) supports a nominal approach of 3 degrees (also known as the GPA). This assumes a TCH of 50 feet (15 m). Three degrees is commonly used for ILS systems and VGSI aiming angles. This approximates a 30:1 approach slope that is between the 34:1 and the 20:1 approach surfaces of Part 77. Surfaces cleared to 34:1 should accommodate a 30:1 approach without any obstacle clearance problems.
6. For runways with vertically guided approaches the criteria in row 8 is in addition to the basic criteria established within the table, to ensure the protection of the GQS.
7. For planning purposes, determine a tentative DA based on a 3 degree GPA and a 50-foot (15 m) TCH.

APPENDIX 4
INSTRUMENT APPROACH PROCEDURES

RNAV (GPS) RWY 5

ELKINS-RANDOLPH CO-JENNINGS RANDOLPH FIELD (EKN)

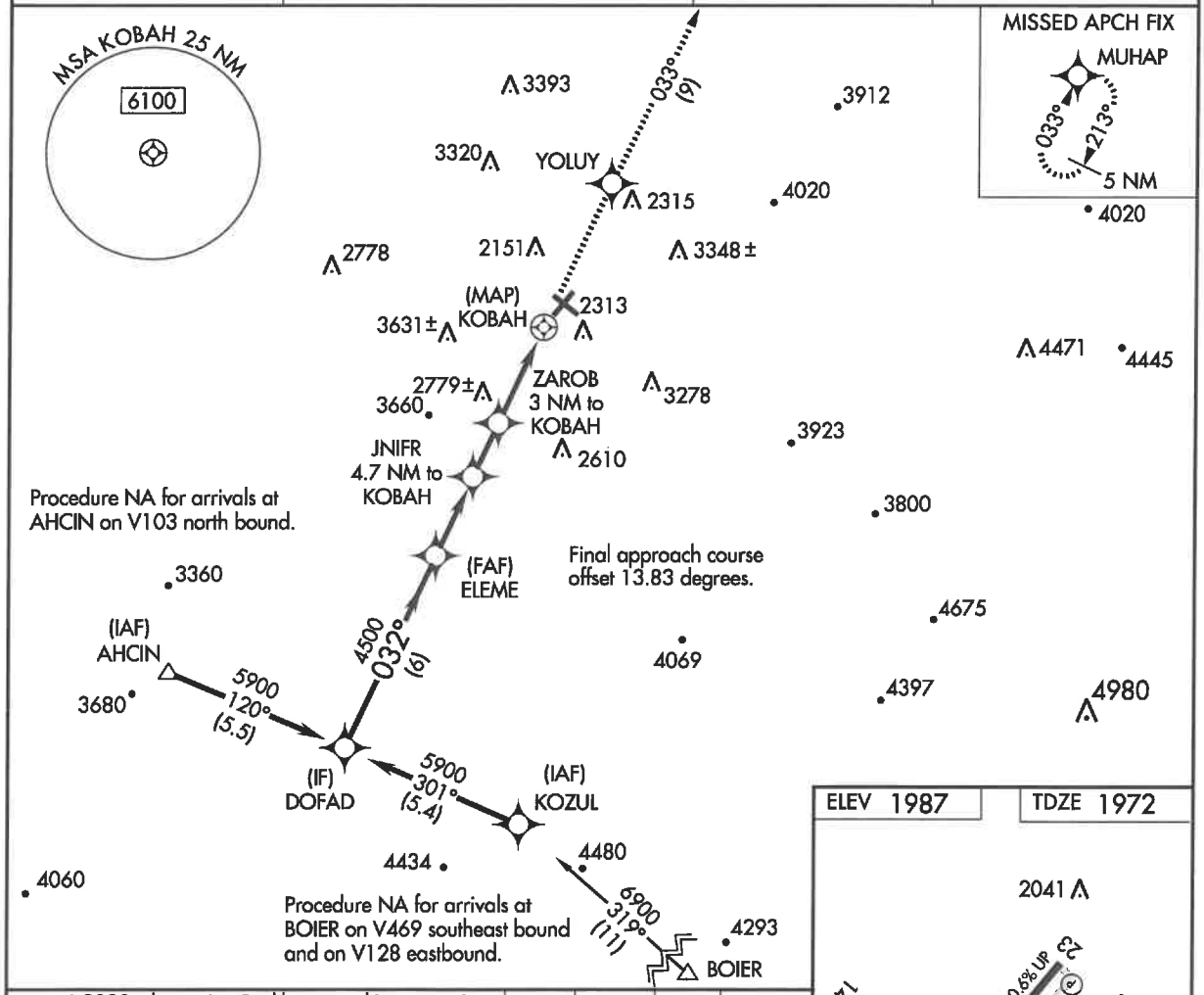
APP CRS	Rwy ldg	4347
032°	TDZE	1972
	Apt Elev	1987

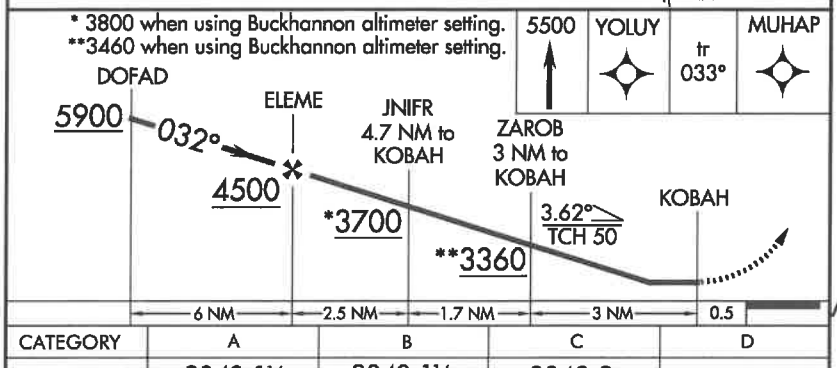
RNP APCH.

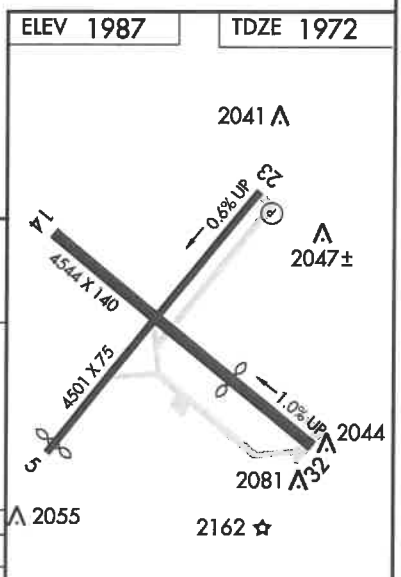
Circling Rwy 14, 23, 32 NA at night. When local altimeter setting not received, use Buckhannon altimeter setting and increase all MDA 100 feet.
Straight-in minimums NA when using Buckhannon altimeter setting.
Rwy 5 helicopter visibility reduction below ¾ SM NA.
-17°C

MISSED APPROACH: Climb to 5500 direct YOLUY and on track 033° to MUHAP and hold.

ASOS	CLARKSBURG APP CON ★	CTAF	
119.275	121.15 284.65	123.6	122.9







CATEGORY	A	B	C	D
LNAV MDA	3040-1¼ 1068 (1100-1¼)	3040-1½ 1068 (1100-1½)	3040-3 1068 (1100-3)	NA
C CIRCLING	3040-1¼ 1053 (1100-1¼)	3140-1½ 1153 (1200-1½)	3720-3 1733 (1800-3)	4020-3 2033 (2100-3)

REIL Rwy 23
MIRL Rwy 5-23

NE-4, 07 NOV 2019 to 05 DEC 2019

RNAV (GPS) RWY 23

ELKINS-RANDOLPH CO-JENNINGS RANDOLPH FIELD (EKN)

APP CRS	Rwy Idg	4501
211°	TDZE	1958
	Apt Elev	1987

RNP APCH.

-17°C

Straight-in Rwy 23 NA at night, Circling to Rwy 14, 23, 32 NA at night. When local altimeter setting not received, use Buckhannon altimeter setting and increase all MDA 100 feet. Rwy 23 helicopter visibility reduction below 1 SM NA.

MISSED APPROACH: Climb to 6300 direct YUKNE and on track 195° to BEVFE and hold.

ASOS	CLARKSBURG APP CON ★	CTAF	122.9 L
119.275	121.15 284.65	123.6	

CLARKSBURG CKB

6000 098° (20.6)

(IAF) UGJOB

Procedure NA for arrival on CKB VOR/ DME airway radials 050 CW 163.

5000 166° (10.5)

MSA TYGRT 25 NM 6100

3988

EPXOP 3653

6000 267° (16.4)

(IAF) OMIYO

5000 267° (5)

(IF) MUHAP

Procedure NA for arrival at OMIYO on V4 eastbound.

3573 3843 4145 4380

3486

3900 211° (6.4)

Final approach course offset 14.86 degrees.

3393

(FAF) ELUXY

3912

3320 2939± 2315 2151 4020 4020 4790

2778 3348± 4889

(MAP) TYGRT

3631± 2313

MISSED APCH FIX

BEVFE 021° 201° 7 NM

3660 YUKNE 3278 3923 2610 195° (6.2) 3800

ELEV 1987 TDZE 1958

2041

23 14 32 5

0.6% UP 4544 X 140

4501 X 75

1.0% UP

2047± 2044 2081 2055 2162 ☆

6300 YUKNE tr 195° BEVFE

Visual Segment - Obstacles.

MUHAP 5000 211° ELUXY 3900 TYGRT

0.5 5.4 NM 6.4 NM

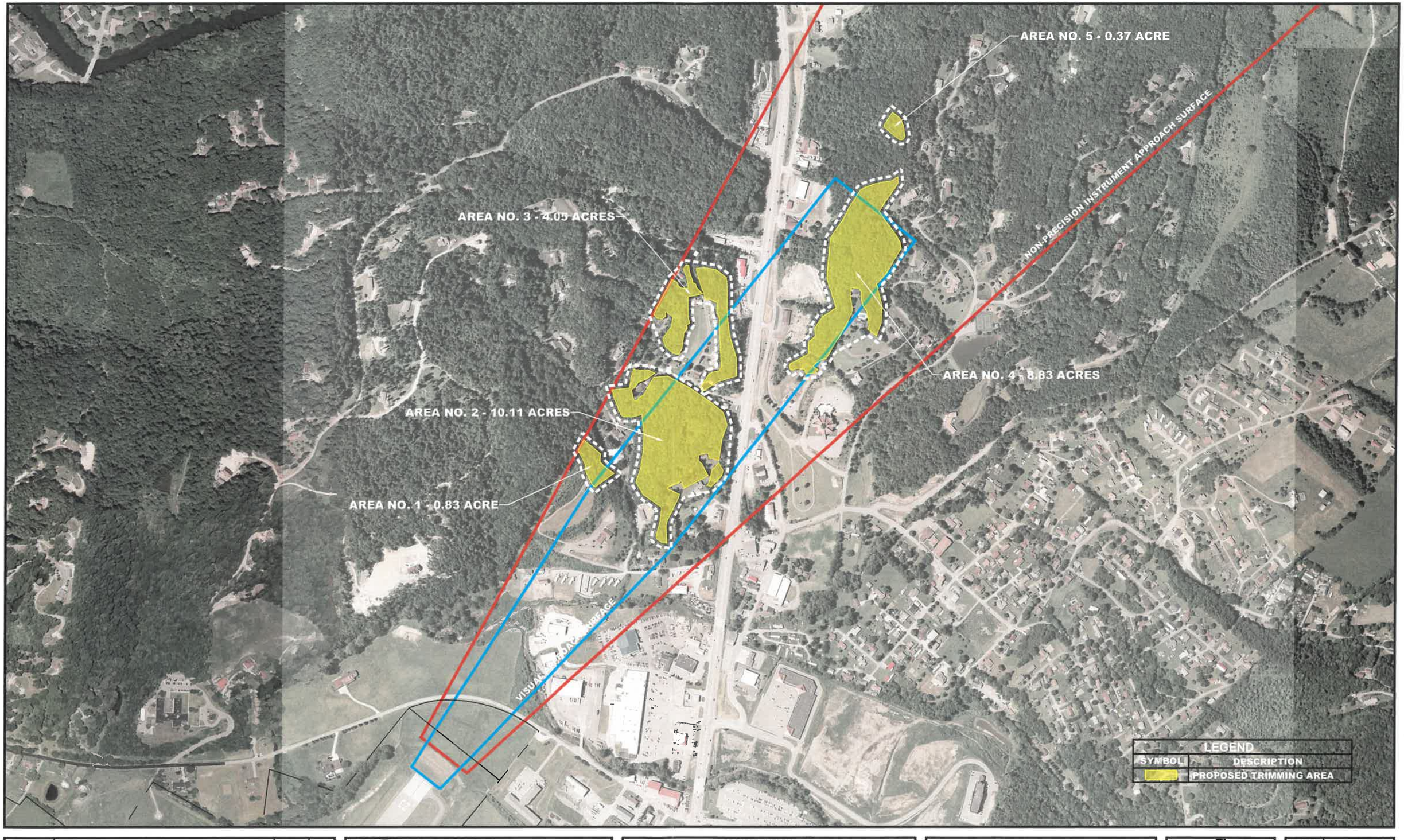
CATEGORY	A	B	C	D
LNAV MDA	3160-1¼ 1202 (1200-1¼)	3160-1½ 1202 (1200-1½)	3160-3 1202 (1200-3)	
C CIRCLING	3160-1¼ 1173 (1200-1¼)	3160-1½ 1173 (1200-1½)	3720-3 1733 (1800-3)	4020-3 2033 (2100-3)

REIL Rwy 23 L

MIRL Rwy 5-23 L

NE-4, 07 NOV 2019 to 05 DEC 2019

APPENDIX 5
PROPOSED ACTION DRAWINGS



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group
a division of GRW

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

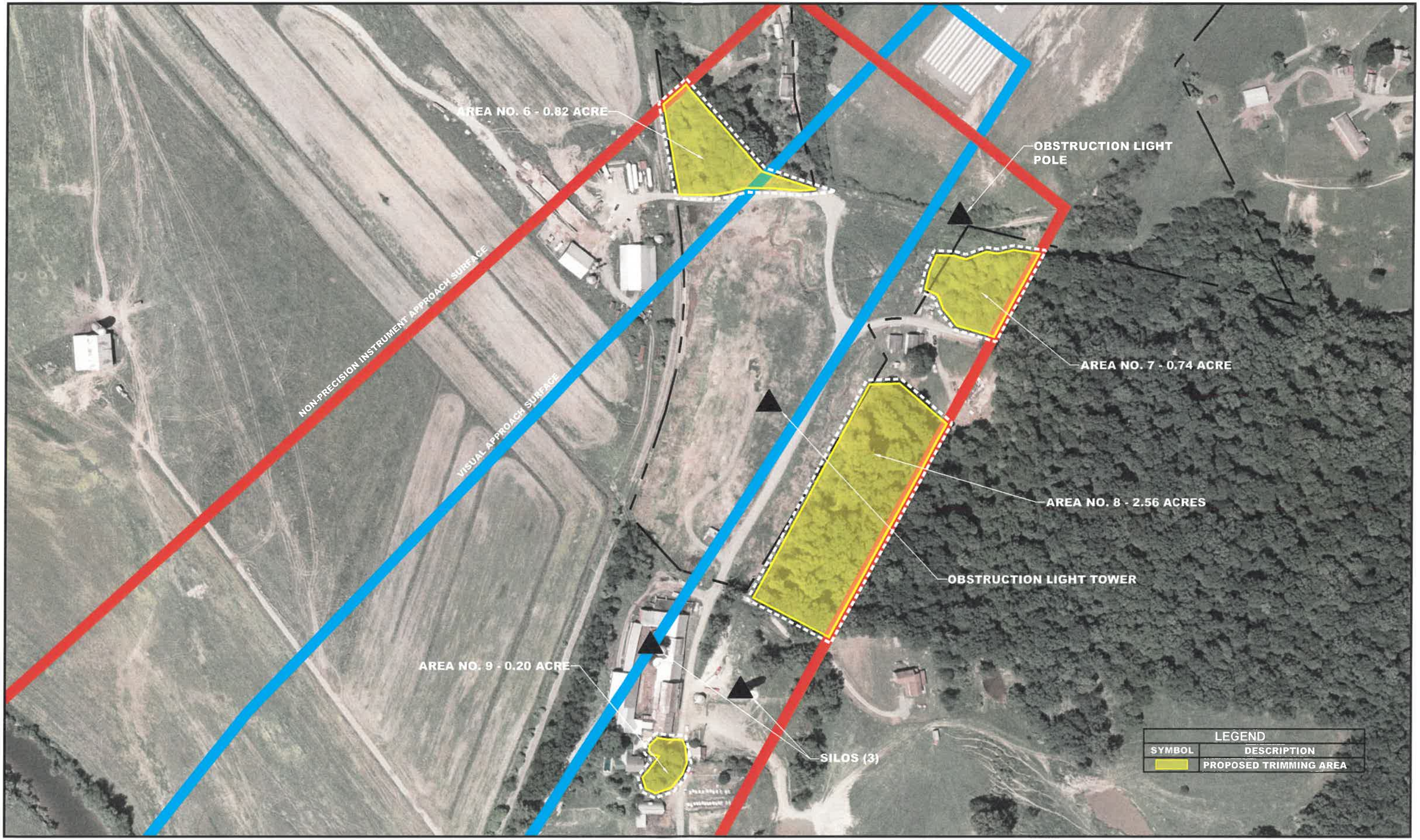
PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN

SEAL

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER:	15003
SCALE:	1" = 600'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	5.1
REVISION	0



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group, a division of GRW
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

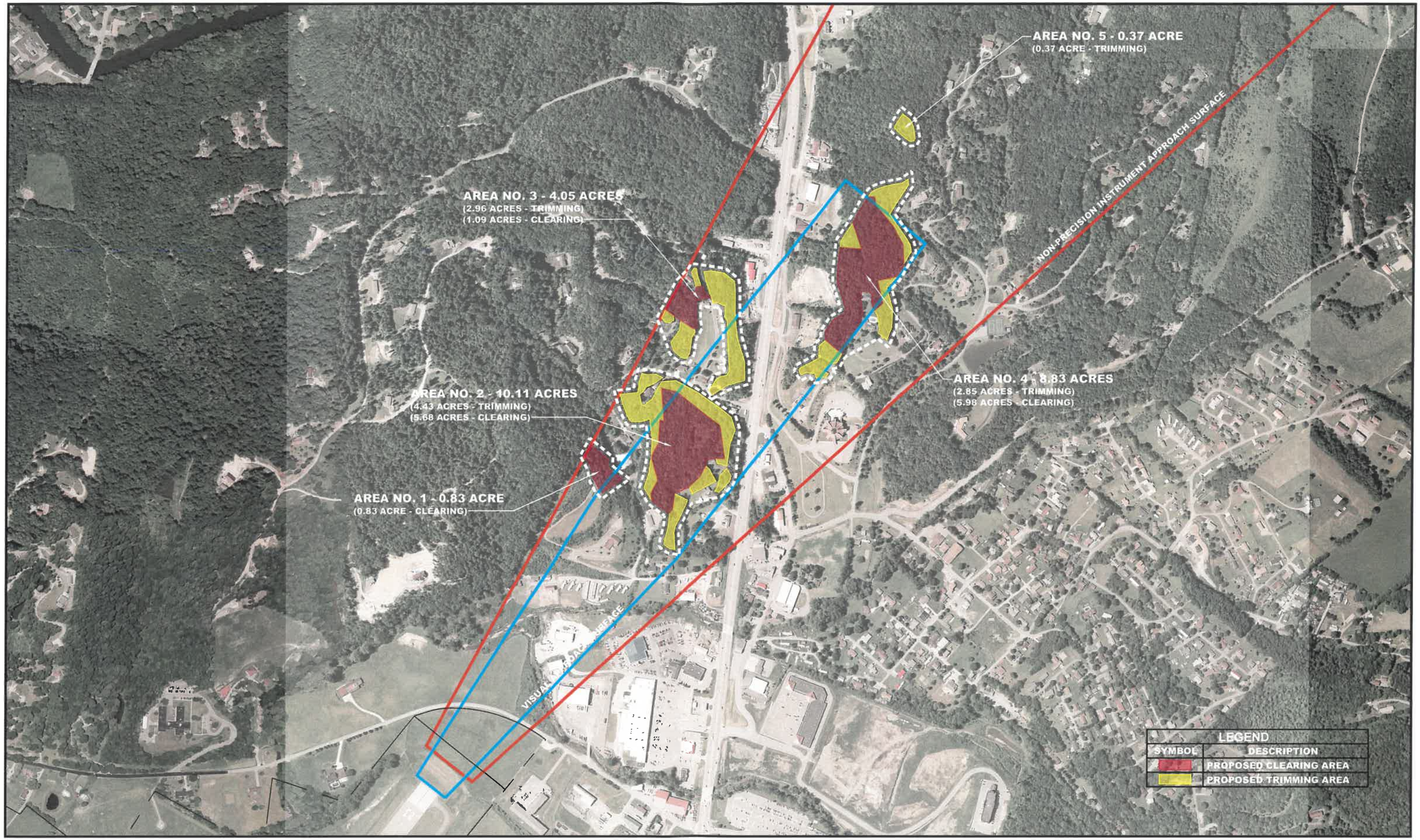
PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 5 APPROACH SITE PLAN

SEAL

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER:	15003
SCALE:	1" = 200'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	5.2
REVISION	0



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group
a division of GRW

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

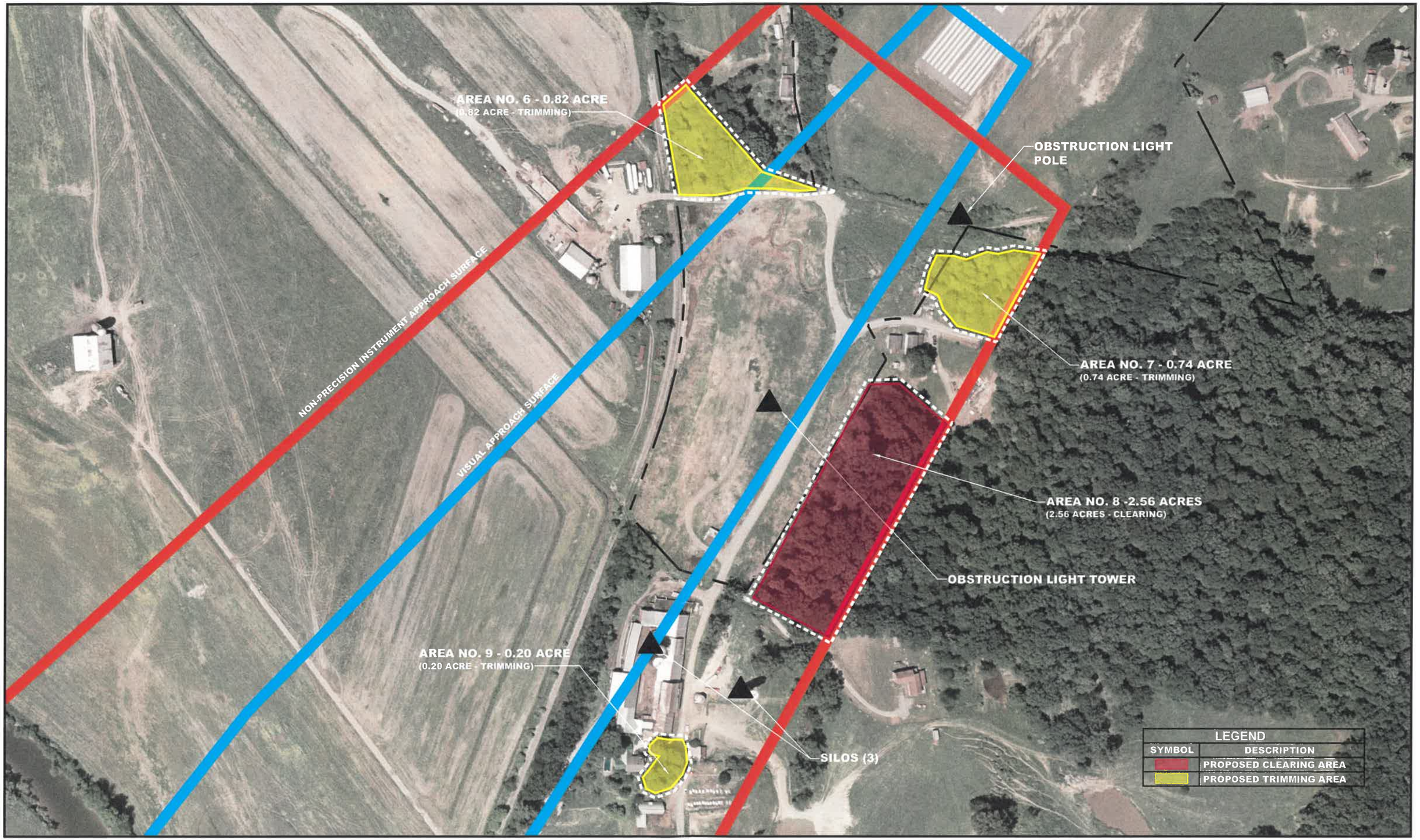
PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN

SEAL

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER:	15003
SCALE:	1" = 600'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	5.3
REVISION	0



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group, a division of GRW
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 5 APPROACH SITE PLAN

SEAL

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER:	15003
SCALE:	1" = 200'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	5.4
REVISION	0

APPENDIX 6
NRCS SOILS SUMMARY REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Randolph County Area, Main Part, West Virginia

Obstruction Removal (Runway 5-23 Approaches)



June 9, 2017

Preface

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

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

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

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

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface 2
How Soil Surveys Are Made 5
Soil Map 8
Soil Map 9
Legend 10
Map Unit Legend 11
Map Unit Descriptions 11
Randolph County Area, Main Part, West Virginia 14
At—Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded 14
BkC—Berks-Weikert complex, 8 to 15 percent slopes 15
BkD—Berks-Weikert complex, 15 to 25 percent slopes 17
BkE—Berks-Weikert complex, 25 to 35 percent slopes 19
BkF—Berks-Weikert complex, 35 to 70 percent slopes 20
Bo—Blago silty clay loam 22
EnC—Ernest silt loam, moist, 8 to 15 percent slopes 23
Ka—Kanawha loam 25
MoB—Monongahela silt loam, moist, 3 to 8 percent slopes 26
Ph—Philo loam, moist, 0 to 3 percent slopes, occasionally flooded 28
Pm—Philo variant silt loam 29
Pn—Pope-Atkins complex 31
Po—Pope and Linden fine sandy loams 32
Pv—Pope variant gravelly sandy loam 34
Py—Purdy silt loam 35
Tg—Tygart silt loam 36
Tv—Tygart variant silt loam 38
U1—Udorthents, cut and fill 39
References 41
Glossary 43

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


79° 52' 22" W
79° 50' 10" W
38° 54' 47" N
38° 52' 30" N
597800
598300
598800
599300
599800
600300
600800
4307600
4307100
4306600
4306100
4305600
4305100
4304600
4304100
4303600
Sylvester Dr
Logan Dr
23
County Hwy 23
Isner Creek
Chenoweth Creek
Us Hwy 219
BkF
BkE
EnC
BkD
BkC
At
Po
Pn
Ka
Pv
Ph
Tv
U1
Tg
Pm
Py
Bo
MoB
Map Scale: 1:20,600 if printed on A portrait (8.5" x 11") sheet.
Meters
0
300
600
1200
1800
Feet
0
1000
2000
4000
6000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Randolph County Area, Main Part, West Virginia
Survey Area Data: Version 11, Sep 19, 2016

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

Date(s) aerial images were photographed: Nov 8, 2010—Oct 25, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Randolph County Area, Main Part, West Virginia (WV603)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
At	Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded	21.4	4.6%
BkC	Berks-Weikert complex, 8 to 15 percent slopes	15.8	3.4%
BkD	Berks-Weikert complex, 15 to 25 percent slopes	56.4	12.3%
BkE	Berks-Weikert complex, 25 to 35 percent slopes	49.2	10.7%
BkF	Berks-Weikert complex, 35 to 70 percent slopes	51.1	11.1%
Bo	Blago silty clay loam	14.3	3.1%
EnC	Ernest silt loam, moist, 8 to 15 percent slopes	16.6	3.6%
Ka	Kanawha loam	15.7	3.4%
MoB	Monongahela silt loam, moist, 3 to 8 percent slopes	11.8	2.6%
Ph	Philo loam, moist, 0 to 3 percent slopes, occasionally flooded	29.3	6.4%
Pm	Philo variant silt loam	2.4	0.5%
Pn	Pope-Atkins complex	10.4	2.3%
Po	Pope and Linden fine sandy loams	11.0	2.4%
Pv	Pope variant gravelly sandy loam	0.4	0.1%
Py	Purdy silt loam	9.9	2.1%
Tg	Tygart silt loam	11.9	2.6%
Tv	Tygart variant silt loam	12.4	2.7%
U1	Udorthents, cut and fill	120.3	26.1%
Totals for Area of Interest		**460.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic

class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Randolph County Area, Main Part, West Virginia

At—Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2sfsr
Elevation: 550 to 3,820 feet
Mean annual precipitation: 46 to 67 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 123 to 162 days
Farmland classification: Not prime farmland

Map Unit Composition

Atkins, moist, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atkins, Moist

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Acid fine-loamy alluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 8 inches: silt loam
Bg - 8 to 26 inches: loam
BCg - 26 to 38 inches: silt loam
Cg - 38 to 80 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Philo, moist

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Blago, moist

Percent of map unit: 3 percent
Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Purdy, moist

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

BkC—Berks-Weikert complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: k9fw
Elevation: 90 to 490 feet
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 45 percent
Weikert and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile

H1 - 0 to 3 inches: channery silt loam
H2 - 3 to 21 inches: very channery silt loam
H3 - 21 to 35 inches: extremely channery silt loam
R - 35 to 39 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Dry Uplands (DU3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Acid residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 16 inches: extremely channery silt loam
R - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD3)
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 15 percent
Hydric soil rating: No

BkD—Berks-Weikert complex, 15 to 25 percent slopes

Map Unit Setting
National map unit symbol: k9fx
Elevation: 90 to 490 feet
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition
Berks and similar soils: 45 percent
Weikert and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting
Landform: Mountain slopes on ridges
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile
H1 - 0 to 3 inches: channery silt loam
H2 - 3 to 21 inches: very channery silt loam
H3 - 21 to 35 inches: extremely channery silt loam
R - 35 to 39 inches: bedrock

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Dry Hills (DH3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Acid residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 16 inches: extremely channery silt loam
R - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Shale Hills (SH3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

BkE—Berks-Weikert complex, 25 to 35 percent slopes

Map Unit Setting

National map unit symbol: k9fy
Elevation: 90 to 490 feet
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 45 percent
Weikert and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile

H1 - 0 to 3 inches: channery silt loam
H2 - 3 to 21 inches: very channery silt loam
H3 - 21 to 35 inches: extremely channery silt loam
R - 35 to 39 inches: bedrock

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Dry Hills (DH3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Acid residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 16 inches: extremely channery silt loam
R - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Other vegetative classification: Shale Hills (SH3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

BkF—Berks-Weikert complex, 35 to 70 percent slopes

Map Unit Setting

National map unit symbol: k9fz
Elevation: 90 to 490 feet
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 60 percent
Weikert and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile

H1 - 0 to 3 inches: channery silt loam
H2 - 3 to 21 inches: very channery silt loam
H3 - 21 to 35 inches: extremely channery silt loam
R - 35 to 39 inches: bedrock

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Acid residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 16 inches: extremely channery silt loam
R - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 35 to 70 percent

Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

Bo—Blago silty clay loam

Map Unit Setting

National map unit symbol: k9g0
Mean annual precipitation: 27 to 56 inches
Mean annual air temperature: 36 to 56 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Blago and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blago

Setting

Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid, slackwater-deposited alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 16 inches: silty clay loam
H2 - 16 to 51 inches: silty clay
H3 - 51 to 72 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

Purdy

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

EnC—Ernest silt loam, moist, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2sgqz
Elevation: 1,460 to 4,200 feet
Mean annual precipitation: 46 to 67 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 123 to 162 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ernest, moist, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ernest, Moist

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 4 inches: silt loam
E - 4 to 7 inches: silt loam
BE - 7 to 11 inches: silt loam
Bt - 11 to 23 inches: silty clay loam
Btx - 23 to 56 inches: channery loam
C - 56 to 65 inches: channery silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 17 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Gilpin, moist

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton, moist, wooded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Albrights, moist

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Dekalb, moist

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Dry Uplands (DU4)
Hydric soil rating: No

Philo, moist

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ka—Kanawha loam

Map Unit Setting

National map unit symbol: k9hs
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kanawha and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kanawha

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Lime-influenced and acid alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 45 inches: loam
H3 - 45 to 72 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 18 percent
Hydric soil rating: No

Atkins

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

MoB—Monongahela silt loam, moist, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2stxh
Elevation: 790 to 3,300 feet
Mean annual precipitation: 46 to 67 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 123 to 162 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monongahela, moist, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monongahela, Moist

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid loamy alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
BA - 7 to 12 inches: silt loam
Bt - 12 to 24 inches: silt loam
Btx - 24 to 52 inches: silt loam
C - 52 to 65 inches: very cobbly silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Minor Components

Cotaco

Percent of map unit: 8 percent
Landform: Stream terraces on mountain valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Other vegetative classification: Oak/Ericad Forest (Upland Forest and Woodlands. 7), Disturbed Area (Cultural and Disturbed Areas.2), Oak-Hickory Forest (Upland Forest and Woodlands.15), Oak - Hickory Forest (CEGL007267), Acid Loams (AL3)
Hydric soil rating: No

Allegheny

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tygart

Percent of map unit: 2 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: No

Ph—Philo loam, moist, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2sft8
Elevation: 1,880 to 2,860 feet
Mean annual precipitation: 46 to 67 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 123 to 162 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Philo, moist, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Philo, Moist

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 6 inches: loam
Bw1 - 6 to 16 inches: loam
Bw2 - 16 to 22 inches: loam
C1 - 22 to 42 inches: sandy loam
2C2 - 42 to 80 inches: stratified gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: About 14 to 31 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Atkins, moist

Percent of map unit: 9 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Pope, moist

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Linden, moist

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pm—Philo variant silt loam

Map Unit Setting

National map unit symbol: k9j5

Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Philo variant and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Philo Variant

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 40 inches: silty clay loam
H3 - 40 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Minor Components

Other soils

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

Pn—Pope-Atkins complex

Map Unit Setting

National map unit symbol: k9j6
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Pope and similar soils: 30 percent
Atkins and similar soils: 25 percent
Minor components: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pope

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 42 inches: fine sandy loam
H3 - 42 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Description of Atkins

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 48 inches: loam
H3 - 48 to 60 inches: stratified gravelly sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Minor Components

Other soils

Percent of map unit: 45 percent
Hydric soil rating: No

Po—Pope and Linden fine sandy loams

Map Unit Setting

National map unit symbol: k9j7
Elevation: 60 to 310 feet
Mean annual precipitation: 27 to 56 inches
Mean annual air temperature: 36 to 56 degrees F
Frost-free period: 138 to 163 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pope and similar soils: 45 percent
Linden and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pope

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid coarse-loamy alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 42 inches: fine sandy loam
H3 - 42 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Description of Linden

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 11 inches: fine sandy loam
H2 - 11 to 26 inches: sandy loam
H3 - 26 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 12 percent
Hydric soil rating: No

Atkins

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Pv—Pope variant gravelly sandy loam

Map Unit Setting

National map unit symbol: k9j8
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Pope variant and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pope Variant

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid alluvium derived from sandstone and shale

Typical profile
H1 - 0 to 6 inches: gravelly sandy loam
H2 - 6 to 59 inches: extremely gravelly loamy sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 25 percent
Hydric soil rating: No

Py—Purdy silt loam

Map Unit Setting
National map unit symbol: k9j9
Mean annual precipitation: 27 to 56 inches
Mean annual air temperature: 36 to 56 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition
Purdy and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Purdy

Setting
Landform: Terraces

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slackwater-deposited, acid alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 42 inches: silty clay
H3 - 42 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Minor Components

Other soils

Percent of map unit: 25 percent
Hydric soil rating: No

Blago

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Tg—Tygart silt loam

Map Unit Setting

National map unit symbol: k9jf
Mean annual precipitation: 27 to 56 inches

Mean annual air temperature: 36 to 56 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Tygart and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tygart

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid and lime-influenced colluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 46 inches: silty clay loam
H3 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Wetlands (W3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 12 percent
Hydric soil rating: No

Blago

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)

Hydric soil rating: Yes

Purdy

Percent of map unit: 4 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Tv—Tygart variant silt loam

Map Unit Setting

National map unit symbol: k9jg
Mean annual precipitation: 27 to 56 inches
Mean annual air temperature: 36 to 56 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Tygart variant and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tygart Variant

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid, slackwater-deposited alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 60 inches: clay loam
H3 - 60 to 65 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Wetlands (W3)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 17 percent
Hydric soil rating: No

Blago

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

Purdy

Percent of map unit: 4 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetlands (W3)
Hydric soil rating: Yes

U1—Udorthents, cut and fill

Map Unit Setting

National map unit symbol: k9jh
Mean annual precipitation: 41 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 138 to 163 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Linear
Across-slope shape: Linear

Properties and qualities

Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the "National Soil Survey Handbook."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5
Extremely acid: 3.5 to 4.4
Very strongly acid: 4.5 to 5.0
Strongly acid: 5.1 to 5.5
Moderately acid: 5.6 to 6.0
Slightly acid: 6.1 to 6.5
Neutral: 6.6 to 7.3
Slightly alkaline: 7.4 to 7.8
Moderately alkaline: 7.9 to 8.4
Strongly alkaline: 8.5 to 9.0
Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where "Rock outcrop" is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)
High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)
Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)
Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)
Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)
Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which "severely eroded," "very severely eroded," or "gullied" is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1
Moderate: 13-30:1
Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0
Coarse sand: 1.0 to 0.5
Medium sand: 0.5 to 0.25
Fine sand: 0.25 to 0.10
Very fine sand: 0.10 to 0.05
Silt: 0.05 to 0.002
Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

APPENDIX 7
USFWS CONSULTATION

THIRD ROCK

TECHNICAL MEMORANDUM

Submitted to: Shawn Tucker
Chapman Technical Group

Prepared by: James Storm

Subject: Elkins-Randolph County Regional Airport
Obstruction Removal Project – Phase I
FAA Short Environmental Assessment Form C
Rare, Threatened and Endangered (RTE) Species Habitat Assessment

Submitted on: March 17, 2017

BACKGROUND

Chapman Technical Group (Chapman) has been retained by the Elkins-Randolph County Regional Airport to provide consulting engineering services in support of an obstruction removal project associated with Runways 5 and 23 in Elkins, West Virginia. Chapman retained Third Rock Consultants, LLC (Third Rock) to provide environmental services in support of Chapman's preparation of the Federal Aviation Administration's (FAA) Short Environmental Assessment Form C for Airport Development Projects. This memorandum documents the findings and conclusions of Third Rock's RTE Species Habitat Assessment.

The project will consist of clearing and grubbing approximately 26 acres of trees in ten areas, and the removal (and/or placement of an obstruction light) of five structures. Runway 5 Obstruction Areas include four tree clearing/grubbing areas and five structures (three grain silos, one obstruction light tower, and one utility pole). Runway 23 Obstruction Areas include six tree clearing/grubbing areas. For purposes of this memo, "survey area" encompasses all Obstruction Areas as shown on **Exhibits 1** and **2**, **Appendix A**.

METHODS

Third Rock ecologists conducted an assessment to evaluate the survey area for suitable RTE habitat. To inform subsequent field survey efforts, publicly available online resources such as aerial imagery, regulatory databases, and published literature were reviewed and analyzed using ArcView GIS to identify the general ecological condition of the survey area and identify potential RTE species habitat. Subsequent field reconnaissance was conducted by Third Rock ecologist James Storm on December 15 and 16, 2016, and February 15, 2017.

FINDINGS

Suitable RTE species habitat identified within the survey area was documented with a Trimble GPS, digital/coordinate-referenced photographs (**Appendix B**), and agency-approved data sheets and forms (**Appendix C**). All work was conducted in accordance with current United States Fish and Wildlife Service's (USFWS) Survey Guidelines.

Federally-Listed Species

On August 15, 2016, the USFWS Information Planning and Consultation System (IPaC) was accessed and a preliminary report was generated to confirm the potential for federally-listed threatened and endangered species to occur within the survey area (see **Appendix D**, *IPAC Trust Resource Report*, Consultation Code ZEPQF-NOK5Z-F67CK-BR7T5-T27YKU). Five species were identified as follows:

1. Indiana bat (*Myotis sodalis*)
2. Northern long-eared bat (*Myotis septentrionalis*)
3. Small whorled pogonia (*Isotria medeoloides*)
4. Running buffalo clover (*Trifolium stoloniferum*)
5. Virginia big-eared bat (*Corynorhinus townsendii virginianus*)

A subsequent request for official coordination with the USFWS West Virginia Field Office (Consultation #2016-I-0730) was made by Chapman August 18, 2016 (See **Appendix D**). USFWS's official response is currently pending.

Indiana Bat and Northern Long-eared Bats

Summer / Forested Habitat

Indiana and northern long-eared bats travel, forage, and roost within a variety of interconnected forested habitats including riparian corridors, bottomlands, and uplands. Both bats are known to typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (*i.e.*, dead trees or dead portions of live trees). Trees in excess of 16 inches in diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of nine inches DBH appear to provide suitable maternity roosting habitat. Northern long-eared bats have been known to use shorter trees and trees with more canopy cover with more frequency than Indiana bats. Suitable summer habitat was identified within each of the ten tree removal areas.

Obstruction Area 1 - The forested area contains 1.2 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. One large DBH snag (greater than 9" DBH), a suitable primary maternity roost, with cracks and crevices, was identified. Several snags were also located amongst the mid-story that are considered suitable roost habitat. The dominant canopy species are red oak (*Quercus rubra*), white oak (*Quercus alba*), and maple species (*Acer sp.*).

Obstruction Area 2 - The forested area contains 11.7 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. The area was assessed in two sections. Section I (9.6 acres) is the mixed-deciduous forest on the western and eastern facing hillslopes which bound a narrow pine dominant ridgetop (Section II). Section I contains many canopy trees that are greater than 9" DBH but none were observed to have characteristics suitable for a primary maternity roost. Several did have broken limbs with cracks and crevices that could be suitable roost habitat. Section I also contains one pine (*Pinus sp.*) snag (less than 9" DBH) and multiple live shagbark hickory (*Carya ovata*) that are also considered suitable roost habitat. The pine dominant ridgetop of Section II (2.1 acres) contains the highest concentrations of suitable roost trees of the survey area. Over fifty percent of the trees within the canopy and

mid-story of Section II are pine snags with exfoliating bark, totaling over 100 suitable roost trees, approximately 10% of which meet the definition of a suitable maternity roost.

Obstruction Area 3 - The forested area contains 1.5 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. Trees of the forest interior are large enough to provide suitable summer roosting and maternity habitat but do not have obvious signs of roost characteristics (loose bark, cracks, and crevices). Few standing snags and trees with dead and broken limbs were observed throughout the forest. Shagbark hickory was identified as one of the species within the mid-story, a species which naturally features peeling bark. Oak (*Quercus sp.*) and ash (*Fraxinus sp.*) are the dominant canopy species and oak, maple, eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), and shagbark hickory are amongst the mid-story.

Obstruction Area 4 - The forested area contains 5.7 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. Many larger canopy trees were observed to be live but have broken limbs with exfoliating bark or cracks and crevices. Although no suitable primary maternity roost trees were observed (dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark), several mid-story black locust (*Robinia pseudoacacia*) snags were present and are considered suitable roost trees (live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark). Dominant tree species included chestnut oak (*Quercus prinus*), maple species, American beech (*Fagus grandifolia*), black cherry, and black locust.

Obstruction Area 5 - The forested area contains 0.5 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. The canopy within the habitat area is dominated by large DBH white pine (*Pinus strobus*) with tight bark. No visible snags were observed but broken branches with cracks and crevices that could provide suitable roosts were present on several of the canopy trees. Mid-story trees species include black cherry, white oak, elm (*Ulmus sp.*), and maple species.

Obstruction Area 6 - The forested area contains 0.6 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. Located on a steep eastward facing slope, this habitat area has been cleared in the past, resulting in scattered mid-story trees and large "slash" piles of felled trees. At the hillslope's toe is a narrow forested corridor of large DBH pine, American sycamore (*Platanus occidentalis*), and tulip poplar (*Liriodendron tulipifera*), all of which are live and have tight bark with no visible cracks or crevices. The only suitable Indiana bat roost trees are a few standing snags amongst the scattered mid-story trees on the hillslope. However, while not considered habitat for Indiana bats, the large piles of "slashed" trees are suitable roost habitat for northern long-eared bats.

Obstruction Area 7 - The forested area contains 0.8 acre of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. The area contains many canopy trees that are greater than 9" DBH, but none were observed to have characteristics suitable for a primary maternity roost. Three snags with cracks, crevices, and cavities were located amongst the mid-story and are considered suitable roost habitat. Dominant canopy species are oaks, black cherry, and black locust with scattered maple and oak in the mid-story, with a relatively open understory. Additionally, approximately 224 feet of intermittent stream located along the southern boundary provides foraging and travel habitat.

Obstruction Area 9 - The forested area contains 0.7 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. Many canopy trees are greater than 9" DBH, but none were observed to have characteristics suitable for a primary maternity roost. Several did have broken limbs with cracks and crevices that could be suitable roost habitat. Several snags were observed amongst the mid-story that are considered suitable roost habitat. Dominant tree species within the canopy and mid-story are American beech, elm, and maples. Additionally, approximately 243 feet of intermittent stream meanders through the southern and western portions of the area providing foraging and travel habitat.

Obstruction Area 11 - The forested area contains 2.5 acres of trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. Seven large DBH snags (greater than 9" DBH), suitable primary maternity roosts, with cracks and crevices, were identified. Located on a westward facing slope, the dominant canopy species are oaks and ash. American beech and box elder are dominant within the mid-story and understory. This area contains the highest quality, potential primary maternity trees of all Obstruction Areas.

Obstruction Area 15 - This area contains four large DBH trees of a habitable diameter for Indiana and northern long-eared bat summer roost habitat. The trees cover approximately 0.1 acres in the lawn of a residence. While landowner permission was not granted to conduct a pedestrian survey on the property, the trees could be observed from the adjacent public roadway. The four trees were observed to be live with tight bark and had no visible roost tree characteristics.

Winter / Cave and Cave-like Habitat

Both Indiana and northern long-eared bats hibernate in caves and cave like structures (mine portals, *etc.*) known as hibernacula during the winter months. They require very specific habitat features in these hibernacula, with cool, stable temperatures, preferably between 4°C and 8°C, and humidity levels above 74% but below saturation. No cave or cave-like winter habitat was observed within the survey area.

Small Whorled Pogonia

Small whorled pogonia grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams.

Obstruction Area 11 – The forested area contains 2.5 acres of suitable habitat for small whorled pogonia. Located on a westward facing slope, the dominant canopy species are oaks and ash with an estimated canopy closure of 50%. There are many openings in the canopy created by several standing snags. The understory is open and soils are covered with a layer of dead leaves. A small stream is located outside the Obstruction Area at the toe of the slope.

Running Buffalo Clover

Running buffalo clover is associated with limestone-based soils and is dependent on partial shade (often described as filtered sunlight) and periodic disturbance e.g., scouring from run-off or flooding, hoof disturbance by grazing livestock, mowing, and low traffic trails.

Obstruction Area 2 - A cemetery located at the southern end was investigated for habitat for running buffalo clover. While the cemetery does receive periodic disturbance from mowing and partial shade, the soils at the site are not limestone based and therefore do not meet running buffalo clover habitat requirements.

Virginia Big-eared Bat

The Virginia big-eared bat prefers caves and cliff line habitats that are dominated by oak-hickory or beech-maple-hemlock forests. They hibernate in cool, well ventilated portions of caves. The hibernacula may contain only a few or several thousand individuals, usually in small clusters. Upon emerging in the spring, individuals move to warmer sections of the cave or disperse to different caves, rock-shelters, and large cliff fissures. Maternity sites may be sandstone or limestone caves, but are typically in caves with high domed ceilings that trap warm air. Males and non-reproductive Virginia big-eared bats use a wide variety of habitats during the summer, including caves, mines, rock-shelters, and large fissures in cliffs.

Obstruction Areas 12, 13 and 14 - Three silos are to be removed. Virginia big-eared bats have been documented using manmade structures as roosts, but the silos near Runway 5 are actively used and do not represent Virginia big-eared bat habitat.

State-Listed Species

Publicly available NatureServe data for Randolph County was accessed July 22, 2015 to confirm the potential for rare state ranked species to occur within the survey area. Eleven species were identified as follows:

1. Cannulate cave isopod (*Caecidotea cannula*)
2. Roan Mountain sedge (*Carex roanensis*)
3. Townsend's big-eared bat (*Corynorhinus townsendii*)
4. Organ cave snail (*Fontigens tartarea*)
5. Large-flowered Barbara's-Buttons (*Marshallia grandiflora*)
6. Cheat minnow (*Pararhinichthys bowersi*)
7. Shriver's frilly orchid (*Platanthera shriveri*)
8. Cheat Mountain salamander (*Plethodon nettingi*)
9. Gandy Creek Cave springtail (*Pseudosinella certa*)
10. Culver's Cave amphipod (*Stygobromus culveri*)
11. Minute Cave amphipod (*Stygobromus parvus*)

No caves (Cannulate cave isopod, Townsend's big-eared bat, Organ cavesnail, Gandy Creek Cave springtail, Culver's Cave amphipod, Minute Cave amphipod), medium to high gradient rivers (Large-flowered Barbara's-Buttons, Cheat minnow), mid to high elevation mountains (Roan Mountain sedge, Shriver's frilly orchid), red spruce-yellow birch or spruce dominated forests (Cheat Mountain salamander) were identified within the survey area, *i.e.* no suitable rare state ranked species habitat was identified within the survey area.

CONCLUSIONS AND RECOMMENDATIONS

Federally-Listed Species

Indiana Bat and Northern Long-Eared Bats

25.3 acres of suitable Indiana and northern long-eared bat summer habitat was observed within the survey area as summarized in **Table 1** below. Of those, 21.2 acres is within Obstruction Areas 1 through 6 in the approach surface of Runway 23, while 4.1 acres is within Obstruction Areas 7, 9, 11 and 15 in the approach surface of Runway 5.

Obstruction Area	Total Acres of Trees to be Cleared/Grubbed	Acres of Indiana and Northern Long-Eared Bat Habitat
1	1.2	1.2
2	11.7	11.7
3	1.8	1.5
4	5.7	5.7
5	0.5	0.5
6	0.6	0.6
7	1.0	0.8
9	0.7	0.7
11	2.5	2.5
15	0.2	0.1
Totals	25.9	25.3

Because the project is *not* located within a half mile of a known northern long-eared bat hibernacula or within a quarter mile of a known northern long-eared bat summer maternity roost tree, it is covered under the USFWS's 4(d) rule and as such, compensatory mitigation and seasonal tree clearing restrictions are not required for impacts to northern long-eared bat habitat (*Northern Long-eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats,* USFWS).

Unavoidable impacts to Indiana bat habitat will require further coordination with the USFWS. Because the obstruction removal project does propose the removal of more than 17 acres, but is not located within USFWS designated Indiana bat hibernacula or summer use buffers (USFWS's Amanda Selnic, March 9, 2017), the USFWS West Virginia Field Office recommends two options to avoid incidental take. Both options are summarized below and discussed in detail in an open letter from the USFWS West Virginia Field Office (**Appendix E**).

Option 1 – Develop an Indiana Bat Conservation Plan (to be approved by USFWS) and restrict all tree clearing to between November 15 and March 31 when Indiana bats are in hibernation. This

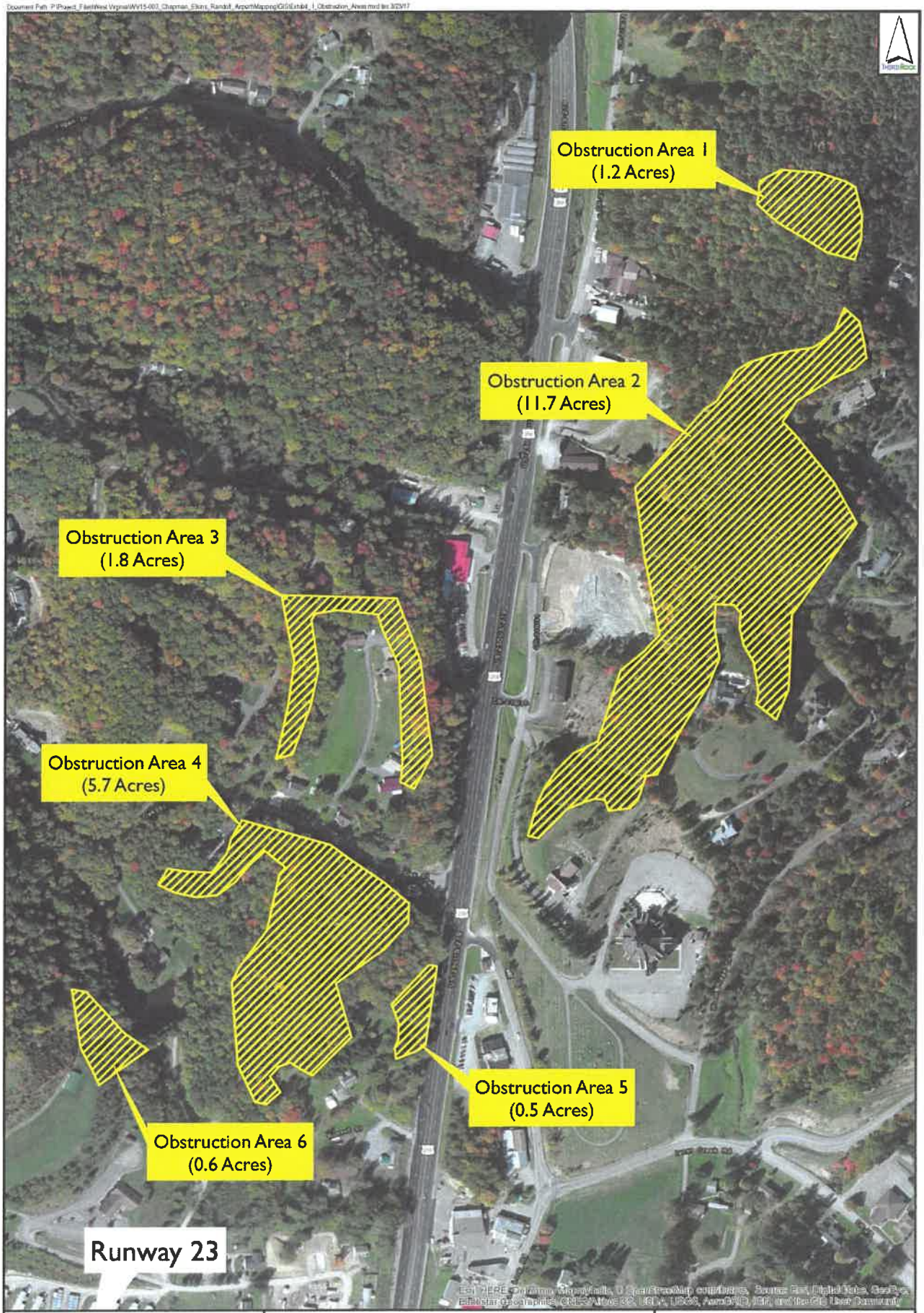
option presumes that Indiana bats are present and sufficient avoidance and minimization measures will be developed and implemented to avoid incidental take.

Option 2 – Conduct presence/absence surveys to determine if the summer foraging and roosting habitats within the survey area are occupied by the Indiana bat. Acoustic surveys must be conducted between May 15 and August 15, while mist-net surveys must be conducted between June 1 and August 15. The surveys should be conducted by a qualified mammalogist with experience in identifying Indiana bats, and who hold current, valid collection permits from both the USFWS and West Virginia Division of Natural Resources (WVDNR). If no endangered bats are captured and USFWS concurs with the survey findings, tree clearing may proceed at any time of year. If endangered bats are captured, the West Virginia Field Office must be notified the next business day and additional coordination and negotiation will be required prior to clearing to minimize impacts.

Small Whorled Pogonia

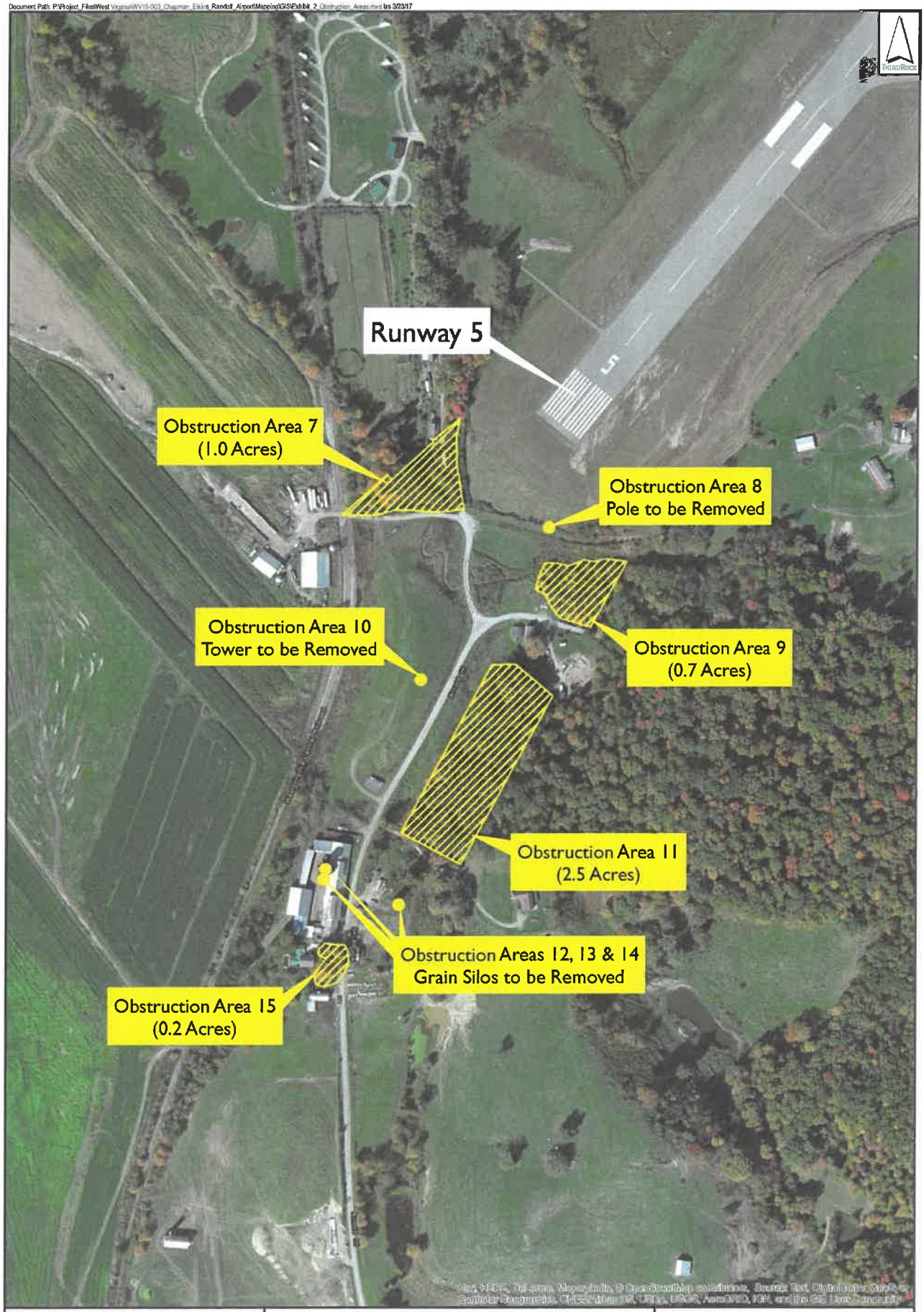
2.5 acres of suitable habitat for small whorled pogonia was identified in Obstruction Area 11. Additional coordination with USFWS and a subsequent survey for small whorled pogonia will be required. Said survey must be conducted between Mid-May and Mid-June (during the plants blooming period) to determine if its presence or absence within the area.

APPENDIX A



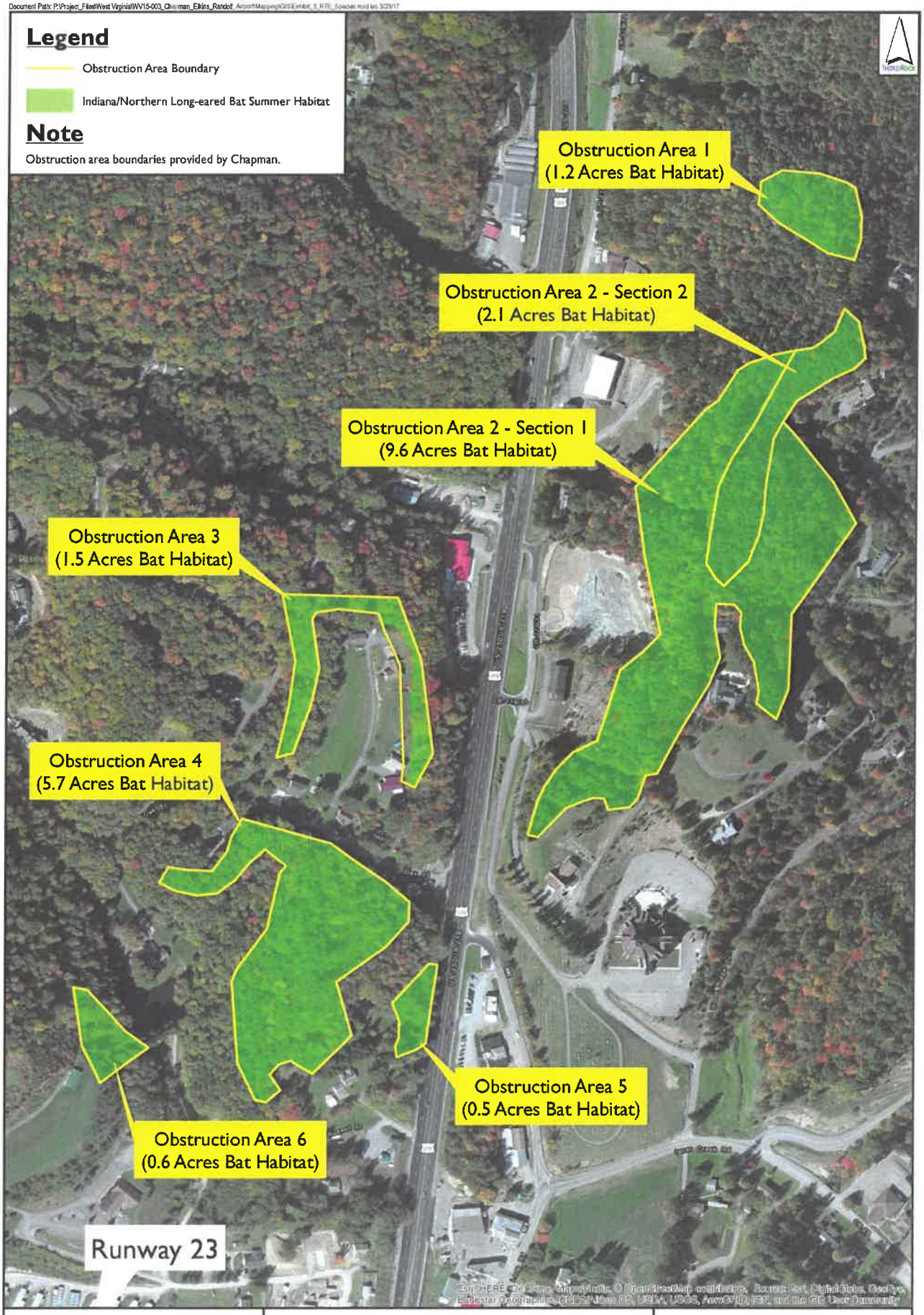
Prepared by:	Exhibit 1 - Survey Area Runway 23 Obstruction Areas Elkins-Randolph County Regional Airport	Prepared for:
Third Rock Consultants, LLC 2526 Regency Road, Suite 180 Lexington, Kentucky 40503	0 150 300 600 Feet	Chapman Technical Group 43 East Main Street Buckhannon, West Virginia 26201

Document Path: P:\Project_Files\West Virginia\WV15-003_Chapman_Elkins Randolf_Airport\Mapping\GIS\Exhibit 2_Obstruction_Areas.mxd las 3/23/17



Prepared by:	**Exhibit 2 - Survey Area** **Runway 5 Obstruction Areas** **Elkins-Randolph County Regional Airport** 0 150 300 600 Feet	**Prepared for:**
Third Rock Consultants, LLC 2526 Regency Road, Suite 180 Lexington, Kentucky 40503		Chapman Technical Group 43 East Main Street Buckhannon, West Virginia 26201

Document Path: P:\Project_Files\West Virginia\WV15-003_Chairman_Elkins_Randolf_Airport\Mapping\GIS\Exhibit_3_RTE_Species.mxd las 3/20/17



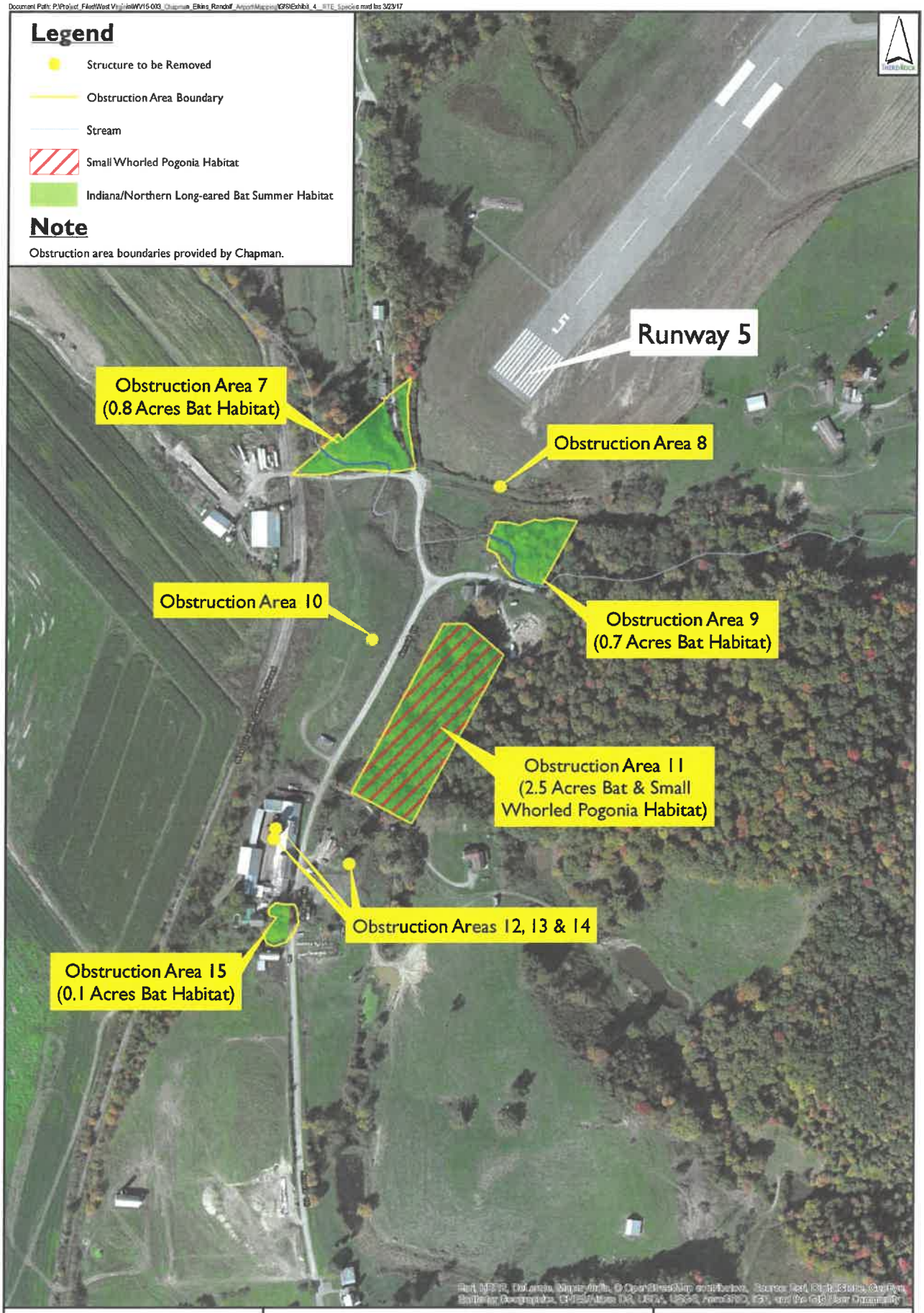
Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 3 - RTE Species Habitat
Runway 23 Obstruction Areas
Elkins-Randolph County Regional Airport

0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

Document Path: P:\Project Files\West Virginia\WV15-003_Chapman_Elkins_Randolf_Airport\Mapping\GIS\Exhibit_4_RTE_Species.mxd ltes 3/23/17



Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 4 - RTE Species Habitat
Runway 5 Obstruction Areas
Elkins-Randolph County Regional Airport
0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

APPENDIX B



Obstruction Area 1 - DSC01153.jpg



Obstruction Area 1 Large Live Tree with Broken Limb - DSC01155.jpg



Obstruction Area 1 Snag With Cracks and Crevices - DSC01154.jpg



Obstruction Area 2 Cemetery Not Suitable Running Buffalo Clover Habitat - DSC01159.jpg



Obstruction Area 2 Section 1 - DSC01157.jpg



Obstruction Area 2 Section 1 - DSC01171.jpg



Obstruction Area 2 Section I Snag With Loose Bark - DSC01163.jpg



Obstruction Area 2 Section II Multiple Pine Snags - DSC01165.jpg



Obstruction Area 2 Section II Multiple Pine Snags - DSC01167.jpg



Obstruction Area 2 Section II Multiple Pine Snags - DSC01170.jpg



Obstruction Area 3 - DSC01149.jpg



Obstruction Area 3 - DSC01152.jpg



Obstruction Area 3 Large White Oaks - DSC01151.jpg



Obstruction Area 3 Shagbark Hickory - DSC01150.jpg



Obstruction Area 4 - DSC01130.jpg



Obstruction Area 4 - DSC01133.jpg



Obstruction Area 4 Snag With Loose Bark, Cracks, and Crevices - DSC01132.jpg



Obstruction Area 5 - DSC01138.jpg



Obstruction Area 5 White Pine Stand - DSC01140.jpg



Obstruction Area 6 Dense Understory with Slash Piles - DSC01144.jpg



Obstruction Area 6 Open Canopy with Several Midstory Snags - DSC01145.jpg



Obstruction Area 7 Snag With Cracks, Crevices, and Cavities - DSC01274.jpg



Obstruction Area 7 Two Black Locust Snags -DSC01272.jpg



Obstruction Area 7 Stream - Downstream View DSC01283.jpg



Obstruction Area 9 Forested Riparin with One Visible Snag (tight bark) - DSC01278.jpg



Obstruction Area 9 Forested Riparian with Broken Limbs, Cracks and Crevices - DSC01276.jpg



Obstruction Area 9 Stream Upstream View -DSC01277.jpg



Obstruction Area 11 Multiple Large Diameter Snags and Small Whorled Pogonia Habitat - DSC01282.jpg



Obstruction Area 11 Multiple Large Diameter Snags and Small Whorled Pogonia Habitat - DSC01281.jpg



Obstruction Area 15 Four Large Trees In Residential Lawn - DSC01284.jpg

APPENDIX C

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.907064 Longitude: -79.841312

Habitat Area(s) ID: Obstruction Area 1 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	2	5	5	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	1	4	4	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) *(dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

One large diameter snags with cracks and crevices was observed.

Roost Tree(s) *(live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark)*

Snags with cracks and crevices were observed.

Flight Corridors to Other Forested Areas *(within a 5-mile radius)*

Streams, forest edges, forested trails and roads.

Photographs *(List the name and image number of each photo)*

See photolog.

Notes *(Diagram Habitat Area on reverse)*

THIRD ROCK CONSULTANTS, LLC
T&E SPECIES HABITAT ASSESSMENT – PLANTS

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.902423 Longitude: -79.843529

Habitat Area(s) ID: Obstruction Area 2 - Potential RBC Habitat Investigator(s): James Storm

Slope: 10% Aspect: West % Shade: 50 % Ground Cover: 5

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same.*

Dominant Plant Species

Mowed fescue and white pine

Disturbance Present (i.e., *what kind*)

Periodic mowing of cemetery

If listed species is observed, *complete this section*.

Colony Size (*Approx. Area*): Width: _____ Depth: _____ Distance to Pavement: _____

No. of Individual Plants: Single Plant ☐ < 20 ☐ 20-99 ☐ 100-999 ☐ >1,000 ☐

Distribution: Infrequent ☐ Even ☐ Localized ☐ Frequent ☐ Dense ☐

Phenology: _____

Photographs (*List the name and image number of each photo*)

See photolog

Notes (*Diagram habitat area on reverse*)

Soils are not limestone based

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.904787 Longitude: -79.842297

Habitat Area(s) ID: Obstruction Area 2, Section 1 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	2	5	4	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	2	4	4	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None observed.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Several of the large DBH trees in the area have broken limbs with cracks and crevices. Shagbark hickory were observed in the area.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog.

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.904787 Longitude: -79.842297

Habitat Area(s) ID: Obstruction Area 2, Section II Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	2	5	4	
% Trees with Exfoliating Bark	1	4	4	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	2	4	4	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

The majority of the large DBH trees in the assessment area are pine snags with loose bark.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

The dominant tree in the area is pine, which are nearly all standing snags with loose bark with cracks and crevices.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog.

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.903390 Longitude: -79.846473

Habitat Area(s) ID: Obstruction Area 3 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	4	5	3	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	3	4	3	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

Many trees were observed to be greater than 9" DBH, some of which are snags with loose bark, cracks/crevices.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Snags with loose bark are present in the area, as are shagbark hickory trees.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog.

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.900549 Longitude: -79.846946

Habitat Area(s) ID: Obstruction Area 4 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	4	6	6	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	2	4	3	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

No standing snags greater than 9" DBH observed. Several do have broken limbs with cracks and crevices.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Several mid-story locust snags with exfoliating bark.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.900841 Longitude: -79.845497

Habitat Area(s) ID: Obstruction Area 5 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	4	2	3	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	4	2	3	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None observed.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Broken branches of larger DBH trees could provide roost habitat.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 12/15/16 & 12/16/16

County: Randolph State: WV Latitude: 38.900378 Longitude: -79.848420

Habitat Area(s) ID: Obstruction Area 6 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	6	2	2	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	6	2	2	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None observed.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Some standing snags were observed with cracks and crevices. Tree clearing has occurred in the past, resulting in a relatively open canopy and dense slash piles.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 2/15/17

County: Randolph State: WV Latitude: 38.884316 Longitude: -79.864468

Habitat Area(s) ID: Obstruction Area 7 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	2	5	4	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	1	3	4	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None observed.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

3 midstory snags were observed within the habitat area.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

Dominant trees are oaks, black cherry, and maples. Stream 2 flows through this habitat area.

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 2/15/17

County: Randolph State: WV Latitude: 38.883359 Longitude: -79.862357

Habitat Area(s) ID: Obstruction Area 9 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	6	6	5	
% Trees with Exfoliating Bark	1	1	1	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	3	4	2	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None observed.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Several canopy trees with dead limbs and some midstory snags greater than 3" DBH are present.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

Dominant trees are beech, elm, and maple species. Stream 1 flows through this habitat area.

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 2/15/17

County: Randolph State: WV Latitude: 38.882400 Longitude: -79.863525

Habitat Area(s) ID: Obstruction Area 11 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	2	4	4	
% Trees with Exfoliating Bark	1	1	2	
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	
	1	4	4	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

Seven snags, greater than 9" DBH, were observed in the habitat area, many of them have loose bark, and/or cracks/crevices. These snags are on a west facing slope.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

Midstory snags and broken limbs of large canopy trees were observed in the habitat area and could act as roost trees.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See Photolog

Notes (*Diagram Habitat Area on reverse*)

Dominant canopy trees are beech, oaks, and ash with an understory of beech and box elder.

THIRD ROCK CONSULTANTS, LLC
T&E SPECIES HABITAT ASSESSMENT – PLANTS

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 2/15/17

County: Randolph State: WV Latitude: 38.882562 Longitude: -79.863494

Habitat Area(s) ID: Obstruction Area 11 Investigator(s): James Storm

Slope: 40 Aspect: West % Shade: 50 % Ground Cover: 10

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same.*

Dominant Plant Species

Oak, Ash, American beech, box elder

Disturbance Present (i.e., *what kind*)

None

If listed species is observed, *complete this section*.

Colony Size (*Approx. Area*): Width: _____ Depth: _____ Distance to Pavement: _____

No. of Individual Plants: Single Plant ☐ < 20 ☐ 20-99 ☐ 100-999 ☐ >1,000 ☐

Distribution: Infrequent ☐ Even ☐ Localized ☐ Frequent ☐ Dense ☐

Phenology: _____

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram habitat area on reverse*)

Potential Small Whorled Pogonia Habitat

THIRD ROCK CONSULTANTS, LLC
T&E HABITAT ASSESSMENT - FOREST-DWELLING BATS (SUMMER HABITAT)

Project No: WV15-003 Name: Elkins-Randolph County Regional Airport Date(s): 2/15/17

County: Randolph State: WV Latitude: 38.880602 Longitude: -79.865312

Habitat Area(s) ID: Obstruction Area 15 Investigator(s): James Storm

If necessary, use additional sheets to assess discreet habitat types at multiple sites in a project area. *Include a map depicting locations of sites if assessing discreet habitats. A single sheet can be used for multiple sample sites if habitat is the same. Locate suitable roost trees with GPS, record DBH and condition, and photograph.*

Parameter[1]	Understory < 20'	Midstory 20' - 50'	Canopy > 50'	Comment
% Closure / Density	-	-	4	No understory or midstory trees
% Trees with Exfoliating Bark	-	-	1	No understory or midstory trees
Size Composition of Live Trees (%)	Small DBH 3-8 in	Medium DBH 9-15 in	Large DBH >15 in	No understory or midstory trees
	-	-	6	

[1] *Use the following scoring system:* **1** = 1-10%; **2** = 11-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 80-100%

Maternity Roost Tree(s) (*dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark)*

None.

Roost Tree(s) (*live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark*)

This habitat area only contains 4 large, live, canopy trees. Broken limbs were observed on the trees which could represent roost habitat.

Flight Corridors to Other Forested Areas (*within a 5-mile radius*)

Streams, forest edges, forested trails and roads.

Photographs (*List the name and image number of each photo)*

See photolog

Notes (*Diagram Habitat Area on reverse*)

Only 4 trees are located in this habitat area. They were assessed from the adjacent roadway because landowner permission to access the property was not granted for a pedestrian survey.

APPENDIX D

U.S. Fish & Wildlife Service

Elkins-Randolph County Regional Airport - Obstruction Removal (Runway 5/23)

IPaC Trust Resources Report

Generated August 15, 2016 07:52 AM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analysis of project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or consultation, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

IPaC Trust Resources Report 1
Project Description 1
Endangered Species 2
Migratory Birds 4
Refuges & Hatcheries 6
Wetlands 7

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

Elkins-Randolph County Regional Airport - Obstruction Removal (Runway 5/23)

LOCATION

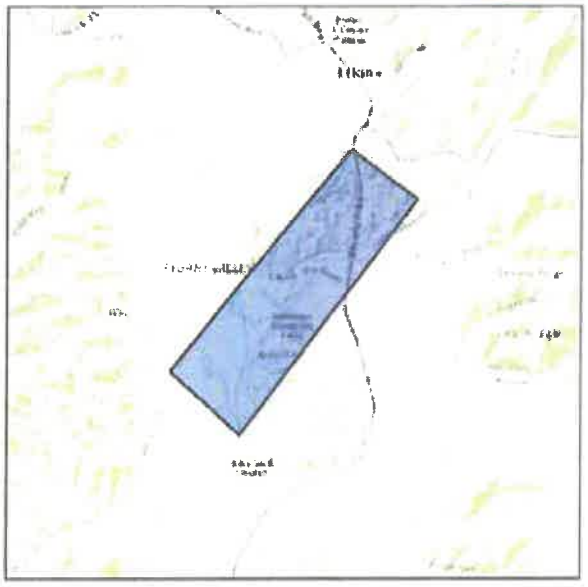
Randolph County, West Virginia

DESCRIPTION

The project will consist of clearing and grubbing approximately 26 acres of trees and removing and/or installing an obstruction light on 5 structures.

IPAC LINK

https://ecos.fws.gov/ipac/project/ZEPQF-NOK5Z-F67CK-BR7T5-T27YKU



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, WV 26241-9475
(304) 636-6586

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Flowering Plants

Running Buffalo Clover Trifolium stoloniferum — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2RE

Small Whorled Pogonia Isotria medeoloides — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1XL

Mammals

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/ipac_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/ipac_public/profile/speciesProfile.action?spcode=A0JE

Virginia Big-eared Bat Corynorhinus (=Plecotus) townsendii virginianus — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/ipac_public/profile/speciesProfile.action?spcode=A080

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/less_public/profile/speciesProfile.action?spcode=B008

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/less_public/profile/speciesProfile.action?spcode=B0HI

Black-capped Chickadee Poecile atricapillus — Bird of conservation concern
Season: Year-round

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Louisiana Waterthrush Parkesia motacilla — Bird of conservation concern
Season: Breeding

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Red Crossbill Loxia curvirostra — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FS

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0E6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Yellow-bellied Sapsucker sphyrapicus varius — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FR

Northern Saw-whet Owl Aegolius acadicus — Bird of conservation concern
Season: Year-round

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

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

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

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

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

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

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

PEM1A
PEM1C

Freshwater Forested/shrub Wetland

PFO1A
PFO1Ad

PFO1C

Freshwater Pond

PUBHh

Riverine

R2UBH
R4SBC
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

August 18, 2016

U.S Fish and Wildlife Service
West Virginia Field Office
Attn: Project Review Request
694 Beverly Pike
Elkins, West Virginia 26241

Re: Elkins-Randolph Co. Regional Airport
Elkins, West Virginia
Obstruction Removal (Phase I – EA)
Project Review

Dear U.S. Fish and Wildlife Representative:

On behalf of Elkins-Randolph County Regional Airport, Chapman Technical Group is in the process of conducting an Environmental Assessment (EA) for a project to remove obstructions which are currently penetrating the approach surface of Runways 5 and 23 at the Elkins-Randolph County Regional Airport. As part of the assessment process, we are requesting a review and written correspondence from your office outlining any further regulatory requirements or recommendations that you may have pertaining to the proposed project. We are requesting additional guidance/information on rare, threatened or endangered species or critical habitat which may be present in the general vicinity of the project area. The following is the pertinent information for the project:

- **Location data, including latitude and longitude of project area, site address or nearest town, and county;**
  The closest town to the project site is Elkins, WV, which is located about 2 miles north of the Elkins-Randolph County Regional Airport in Randolph County. The obstruction removal area locations are generally indicated in the following table:

Area	Latitude	Longitude
1	38° 54' 01.79"	79° 50' 55.35"
2	38° 54' 04.21"	79° 50' 47.78"
3	38° 54' 11.87"	79° 50' 45.78"
4	38° 54' 25.09"	79° 50' 29.18"
5	38° 54' 16.12"	79° 50' 31.80"
6	38° 54' 02.24"	79° 50' 43.90
7	38° 53' 04.52"	79° 51' 50.57"
8	38° 53' 01.34"	79° 51' 45.12"
9	38° 52' 56.75"	79° 51' 48.50"
10	38° 52' 50.67"	79° 51' 53.99"

Chapman Technical Group
a division of GRW

43 East Main Street
Buckhannon, WV 26201

304.472.8914
304.472.8915 Fax

St. Albans, WV
Martinsburg, WV
Lexington, KY

www.chaptech.com

- **A topographic map with the project area identified, including the name of the USGS quadrangle (aerial photos may also be helpful);**
  See Figures 1, 2 and 3 attached.

- **A detailed project description, including plans and designs of any new construction;**
  The Elkins-Randolph County Regional Airport Authority is pursuing a project to remove obstructions which are currently penetrating the approach surfaces of Runways 5 and 23 at the Elkins-Randolph County Regional Airport. These obstacles represent an obstacle to safe and efficient use of the airspace and should be removed to comply with FAA standards. It is crucial to the Elkins-Randolph County Regional Airport Authority these obstructions be removed in order to maintain the current length of available runway and to increase the level of operational safety afforded to aircraft utilizing the airport.

  The proposed project will consist of clearing and grubbing approximately 26 acres of trees and removing and/or placing an obstruction light on 5 structures (3 grain silos, 1 obstruction light tower and 1 utility pole). The trees to be removed will be cut and removed from the site. The remaining stumps will be removed and the disturbed areas reclaimed. The project will also include the implementation of any required mitigation measures as determined through the environmental assessment process.

- **The total amount of acreage or linear miles within the project area;**
  The total amount of acreage within the project area is approximately 26 acres.

- **A detailed description of onsite habitat, including the size, location and quality (when available) of stream, wetlands, forest and other natural areas, and proposed impacts;**
  The habitat within the proposed project sites within the Runway 23 approach surface consists mostly of forested residential areas. The projects areas within the Runway 5 approach surface consist mostly of open pasture land. An IPaC Trust Resource Report was conducted for the project location and 9 aquatic resources were indicated within the proposed project limits. The IPaC Trust Resource Report is attached to this Project Review Request.

- **The total number of acres of ground disturbance that will result from the project;**
  There will be the potential for approximately 26 acres of ground disturbance from the project.

- **The number of acres of forested habitat that will be disturbed as part of the project;**
  There will be approximately 26 acres of forested habitat cleared to remove obstructions from the approach surfaces of Runways 5 and 23.

- **If clearing is greater than or equal to 17 acres then a written commitment to either seasonal clearing (between November 15 and March 31) or summer mist net surveys for bats (between June 1 and August 15) is required.**
  In order to reduce the impact of sensitive species, the project will utilize seasonal clearing (between November 15 and March 31).

- **Commitment to horizontal directional drill if it is known that the project will cross a stream containing habitat that supports federally listed species;**
  Not Applicable.

- **A "frack-out" plan (i.e., description of remedial steps to resolve mechanical or materials failure resulting in hydrofracking water bubbling up through stream substrate) if such a crossing is occurring**
  Not Applicable.

- **Identification of locations for both water withdrawals and subsequent water depositions;**
  Not Applicable.

- **Photographs representative of all cover types on the site and encompassing views of the entire site; and**
  Aerial photographs showing the areas are included in Figures 2 and 3 attached.

- **A description of whether any previous mining has occurred on the site, and if you are aware of any potential mine portals or cave openings that may be in the area.**
  To the best of the Airport Authority's knowledge, there has not been any mining activity conducted within the proposed project limits. The Airport Authority is not aware of any potential mine portals or cave openings within the project site.

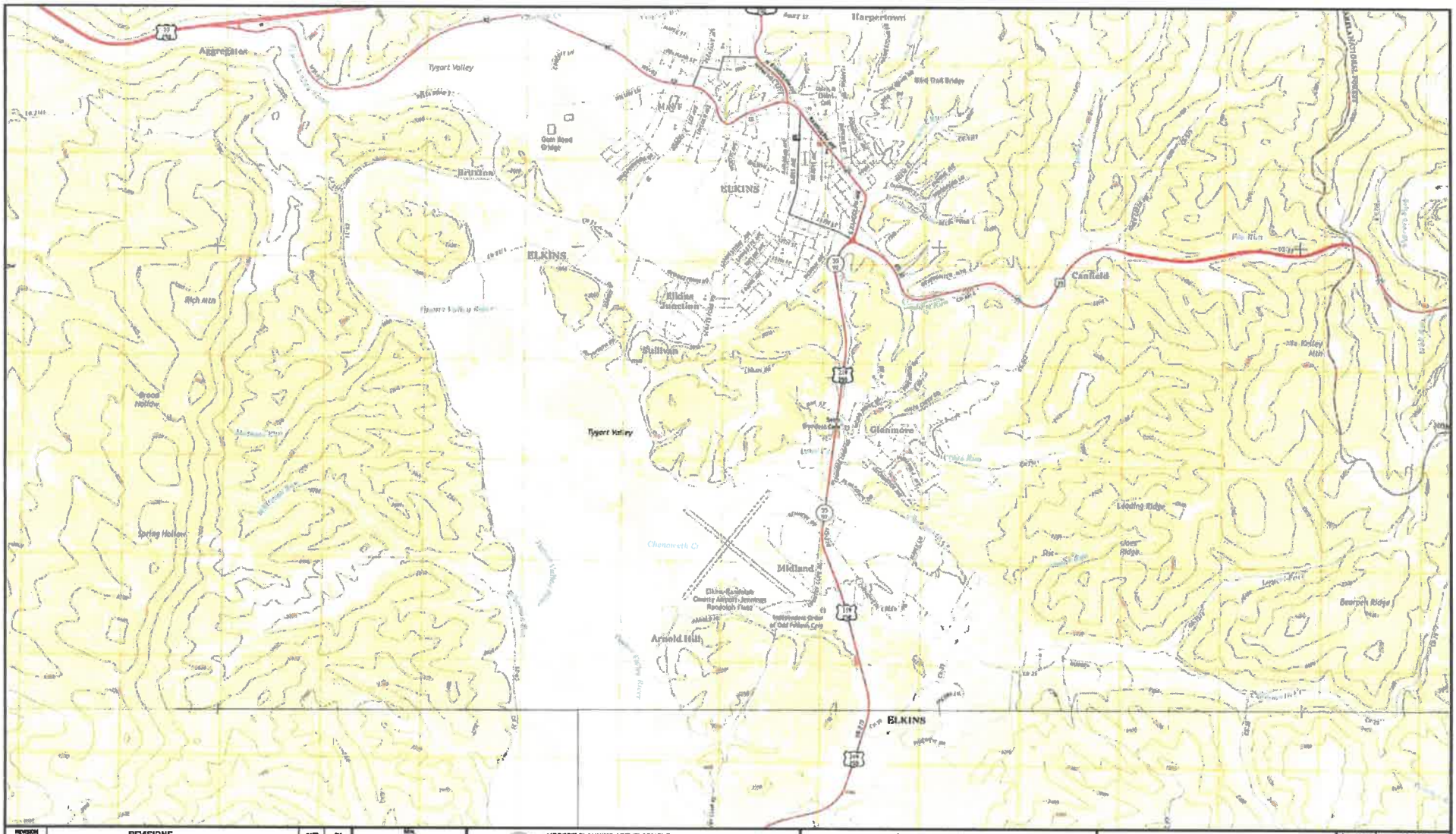
Comments that you provide will be incorporated into the Environmental Assessment and subsequent project to ensure that all required steps are taken to facilitate the completion of the proposed project in an environmentally responsible manner. We sincerely appreciate your attention to this request and assistance in this project. If you should have any questions, please do not hesitate to give me a call at (304) 472-8914. I look forward to receiving your return written correspondence.

Sincerely,

CHAPMAN TECHNICAL GROUP

Shawn D. Tucker, P.E.
Project Manager

Attachments



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

Topographic Map

JOB NUMBER	15003
SCALE	1" = 3,000'
DATE	AUGUST 2016
DRAWN BY	C. MARKS
DESIGNED BY	S. TUCKER
CHECKED BY	S. TUCKER
SHEET NO.	FIG. 1

PRELIMINARY - NOT FOR CONSTRUCTION



	REVISIONS		

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-6501
Buckhannon, WV (304) 472-8814
Martinsburg, WV (304) 200-1222
www.chaptech.com

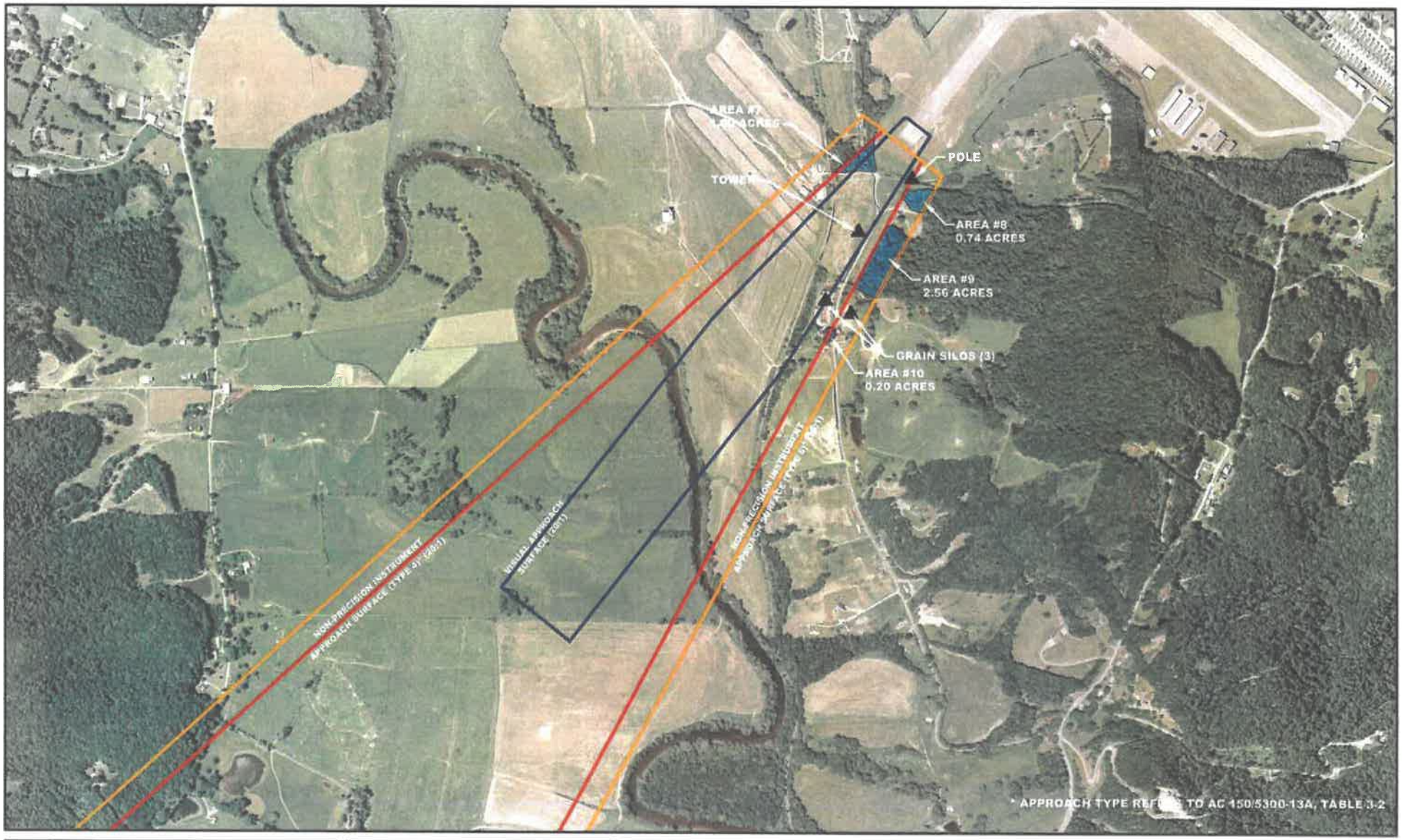
PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

OBSTRUCTION REMOVAL SITE PLAN
RUNWAY 23 APPROACH SURFACE

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER:	18003
SCALE:	1" = 300'
DATE:	AUGUST 2018
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	6

FIG. 2



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St Albans, WV (304) 727-6501
Buckhannon, WV (304) 472-5814
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

OBSTRUCTION REMOVAL SITE PLAN
RUNWAY 5 APPROACH SURFACE

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	18065
SCALE	1" = 300'
DATE	AUGUST 2019
DRAWN BY	S. TUCKER
REVIEWED BY	S. TUCKER
CHECKED BY	J. TUCKER

SHEET NO. FIG. 3 REVISION 0

THIRD ROCK

TECHNICAL MEMORANDUM

Submitted to: Shawn Tucker
Chapman Technical Group

Prepared by: James Storm
Project Ecologist

Subject: Elkins-Randolph County Regional Airport
Obstruction Removal Project – Phase I
FAA Short Environmental Assessment Form C
Addendum to 3-17-17 RTE and Water Resources Memorandums

Submitted on: March 1, 2018

BACKGROUND

Chapman Technical Group (Chapman) has been retained by the Elkins-Randolph County Regional Airport to provide consulting engineering services in support of an obstruction removal project associated with Runways 5 and 23 in Elkins, West Virginia. Chapman retained Third Rock Consultants, LLC (Third Rock) to provide environmental services in support of Chapman's preparation of the Federal Aviation Administration's (FAA) Short Environmental Assessment Form C for Airport Development Projects.

As originally proposed, clearing and/or grubbing of approximately 26 acres of trees in ten areas, and the removal (and/or placement of an obstruction light) of five structures, was anticipated. Runway 5 Obstruction Areas included four tree clearing/grubbing areas and five structures (three grain silos, one obstruction light tower, and one utility pole). Runway 23 Obstruction Areas included six tree clearing/grubbing areas.

Third Rock ecologists conducted water resources and Rare, Threatened and/or Endangered (RTE) species habitat assessments in 2017, the results of which were documented in separate Technical Memorandums and submitted March 17, 2017. Since that time, Chapman has revised the design to expand the disturbance limits of some of the originally illustrated Obstruction Areas and determined that tree trimming will be used in certain areas in lieu of clearing and/or grubbing. As a result, Chapman has asked Third Rock to reassess the previously defined survey area sufficient to document RTE habitat and water resources within the new Obstruction Area boundaries and quantify potential impacts. Chapman also asked that Third Rock renumber the obstruction areas and refer to the new IDs in this Technical Memorandum and associated appendices.

Exhibits 1 and **2** (**Appendix A**), illustrate the shift in Obstruction Area boundaries and extent of the survey area for this effort, while **Exhibits 3** and 4 (**Appendix A**) show the proposed method of removal (trimming or clearing/grubbing).

METHODS

Third Rock ecologists James Storm and Ryan McGregor conducted field reconnaissance January 24, 2018 to evaluate the potential for impacts to RTE species habitat and water resources given the shift in obstruction area boundaries and selection of trimming as a method of removal. The location suitable RTE species habitat and water resources within the shifted survey area was documented with a Trimble GPS (**Exhibits 5** and **6**, **Appendix** A) and coordinate-referenced photographs (Photo Log **Appendix B**, Photo Stations **Exhibits 5** and **6**), and agency-approved field data sheets and forms (**Appendix C**). All work was conducted in accordance with current U.S. Fish and Wildlife Service's (USFWS) Survey, U.S. Army Corp of Engineers (USACE) (*Wetland Delineation: Eastern Mountains and Piedmont Region*), and Environmental Protection Agency (EPA) protocols (*Rapid Bioassessment*).

FINDINGS

Federally-Listed Species

On August 15, 2016, the USFWS Information Planning and Consultation System (IPaC) was accessed and a preliminary report was generated to confirm the potential for federally-listed threatened and endangered species to occur within the survey area (see **Appendix D**, *IPAC Trust Resource Report,* Consultation Code ZEPQF-NOK5Z-F67CK-BR7T5-T27YKU). Five (5) species were identified as follows:

1. Indiana bat (*Myotis sodalis*)
2. Northern long-eared bat (*Myotis septentrionalis*)
3. Small whorled pogonia (*Isotria medeoloides*)
4. Running buffalo clover (*Trifolium stoloniferum*)
5. Virginia big-eared bat (*Corynorhinus townsendii virginianus*)

No change in federally-listed threatened and endangered species has occurred since submittal of previous documents.

Indiana Bat and Northern Long-eared Bats

The current Obstruction Area boundaries were systematically surveyed to assess the quality and quantity of potentially suitable roosting habitat and enumerate the number of potentially suitable primary and secondary roost trees (PRTs). Potentially suitable summer bat habitat identified within the Obstruction Areas are discussed in more below and shown on **Exhibits 5** and **6** (**Appendix A**). **Table 1**, page 3, summarizes the acreage within each Obstruction Area designated to either be trimmed or cleared. When evaluating areas slated to be trimmed, it was assumed that all limbs greater than 15' above the ground will be removed.

No cave or cave-like winter bat habitat was observed within the survey area.

Table 1. Summary of Treatment Type

Obstruction Area	Indiana/NLEB Habitat (ac) Trimmed	Indiana/NLEB Habitat (ac) Cleared	Total
1	0	0.83	**0.83**
2-1 - 2-2	4.38	5.67	**10.05**
3	2.37	1.09	**3.46**
4-1	2.39	4.75	**7.14**
4-2	0.47	1.22	**1.69**
5	0.37	0	**0.37**
6	0.82	0	**0.82**
7	0.74	0	**0.74**
8	0	2.56	**2.56**
9	0.14	0	**0.14**
Total	**11.68**	**16.12**	**27.8**

Obstruction Area 1 – The forested area contains 0.83 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be cleared. Located on a steep eastward facing slope, this habitat area has been cleared in the past, resulting in scattered mid-story trees and large "slash" piles of felled trees. At the hillslope's toe is a narrow, forested corridor of large DBH pine, American sycamore (*Platanus occidentalis*), and tulip poplar (*Liriodendron tulipifera*); all of which are live and have tight bark with no visible cracks or crevices. The only suitable Indiana bat roost trees are a few standing snags amongst the scattered mid-story trees on the hillslope. However, while not considered habitat for Indiana bats, the large piles of "slashed" trees are suitable roost habitat for northern long-eared bats.

Obstruction Area 2-Section 1 – The forested area contains 4.17 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. Obstruction Area 4 also contains 5.67 acres of habitat that will be cleared. Many larger canopy trees were observed to be live, but have broken limbs with exfoliating bark or cracks and crevices. Although no suitable primary maternity roost trees were observed (dead or partially dead trees, at least 9" DBH with cracks, crevices and/or loose/exfoliating bark), several mid-story black locust (*Robinia pseudoacacia*) snags were present and are considered suitable secondary roost trees (live or dead trees, at least 3" DBH with cracks, crevices, and/or loose/exfoliating bark). Dominant tree species included chestnut oak (*Quercus prinus*), maple species, American beech (*Fagus grandifolia*), black cherry, and black locust.

Obstruction Area 2-Section 2 – The forested area contains 0.21 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. The canopy within the habitat area is dominated by large DBH white pine (*Pinus strobus*) with tight bark. No visible snags were observed but broken branches with cracks and crevices that could provide suitable roosts were present on several of the canopy trees. Mid-story trees species include black cherry, white oak, elm (*Ulmus sp.*), and maple species.

Obstruction Area 3 – The forested area contains 3.46 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. Trees of the forest interior are large enough to provide suitable summer roosting and maternity habitat, but do not have obvious signs of roost characteristics (loose bark, cracks, and crevices). Few standing snags and trees with dead and broken limbs were observed throughout the forest. Shagbark hickory was identified as one (1) of the species within the mid-story, a species that naturally features peeling bark. Oak (*Quercus sp.*) and ash (*Fraxinus sp.*) are the dominant canopy species; oak, maple, eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), and shagbark hickory are amongst the mid-story.

Obstruction Area 4 – The forested area contains 8.83 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat. The area was assessed in two (2) sections:

1. Section 1: Section 1 (7.14 acres) is the mixed-deciduous forest on the western and eastern facing hillslopes that bound a narrow pine dominant ridgetop (Section 2). Of Section 1, 2.39 acres will be trimmed and 4.75 acres will be cleared. Section 1 also contains many canopy trees that are greater than 9" DBH, but none were observed to have characteristics suitable for a primary maternity roost. Several did have broken limbs with cracks and crevices that could be suitable roost habitat. Section 1 also contains one (1) pine (*Pinus sp.*) snag (less than 9" DBH) and multiple live shagbark hickory (*Carya ovata*) that are also considered suitable roost habitat.

2. Section 2: The pine dominant ridgetop of Section 2 contains 1.69 acres of suitable summer roost habitat, of which, 0.47 acres will be trimmed and 1.22 acres will be cleared. Section 2 also contains the highest concentrations of suitable roost trees of the survey area. Over 50% of the trees within the canopy and mid-story of Section 2 are pine snags with exfoliating bark, totaling over 100 suitable roost trees, approximately 10% meet the definition of a suitable maternity roost.

Obstruction Area 5 – The forested area contains 0.37 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat. One (1) large diameter at breast height (DBH) snag (greater than 9" DBH), a suitable primary maternity roost, with cracks and crevices, was identified. Smaller snags were also located amongst the mid-story that are considered suitable roost habitat. The dominant canopy species are red oak (*Quercus rubra*), white oak (*Quercus alba*), and maple species (*Acer sp.*).

Obstruction Area 6 – The forested area contains 0.82 acre of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. The area contains many canopy trees that are greater than 9" DBH, but none were observed to have characteristics suitable for a primary maternity roost. Three (3) snags with cracks, crevices, and cavities were located amongst the mid-story and are considered suitable roost habitat. Dominant canopy species are oaks, black cherry, and black locust with scattered maple and oak in the mid-story, with a relatively open understory. Additionally, approximately 409' of intermittent stream provides foraging and travel habitat.

Obstruction Area 7 – The forested area contains 0.74 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. Many canopy trees are greater than 9" DBH, but none were observed to have characteristics suitable for a primary maternity roost. Several did have broken limbs with cracks and crevices that could be suitable roost habitat. Several snags were observed amongst the mid-story that are considered suitable roost habitat. Dominant tree species within the canopy and mid-story are American beech, elm, and maples. Additionally, approximately 268' of intermittent stream meanders through the southern and western portions of the area providing foraging and travel habitat.

Obstruction Area 8 – The forested area contains 2.56 acres of trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be cleared. Seven (7) large DBH snags (greater than 9" DBH), suitable primary maternity roosts, with cracks and crevices, were identified. Located on a westward facing slope, the dominant canopy species are oaks and ash. American beech and box elder are dominant within the mid-story and understory. This area contains the highest quality, potential primary maternity trees of all Obstruction Areas.

Obstruction Area 9 – This area contains four large DBH trees of a habitable diameter for the Indiana bat and northern long-eared bat summer roost habitat, which will be trimmed. The trees cover approximately 0.14 acres in the lawn of a residence. While landowner permission was not granted to conduct a pedestrian survey on the property, the trees could be observed from the adjacent public roadway. The four (4) trees were observed to be live with tight bark and had no visible roost tree characteristics.

Small Whorled Pogonia, Running Buffalo Clover, and Virginia Big-eared Bat

No small whorled pogonia, running buffalo clover, or Virginia big-eared bat habitat was identified within the survey area.

State-Listed Species

No state-listed species habitat was identified within the survey area.

Water Resources

One (1) intermittent, one (1) ephemeral, and one (1) potentially perennial stream were identified in the survey area (Streams 1, 2, and 3, respectively) as shown on **Exhibits 5** and **6** (**Appendix A**).

Stream 1, an unnamed tributary to Chenoweth Creek, flows westward through Obstruction Areas 6 and 7 and was therefore assessed in two (2) Reaches. Approximately 268' of Stream 1 is located within Obstruction Area 7 (Reach 1). Reach 1 is approximately 8' wide and 2.5' deep with a Rapid Bioassessment Protocol (RBP) habitat assessment score of 136 and a "fair" rating. Approximately 409' of Stream 1 is located within Obstruction Area 6 (Reach 2). Reach 2 is approximately 3' wide and 1.5' deep with an RBP habitat assessment score of 127 and a "fair" rating.

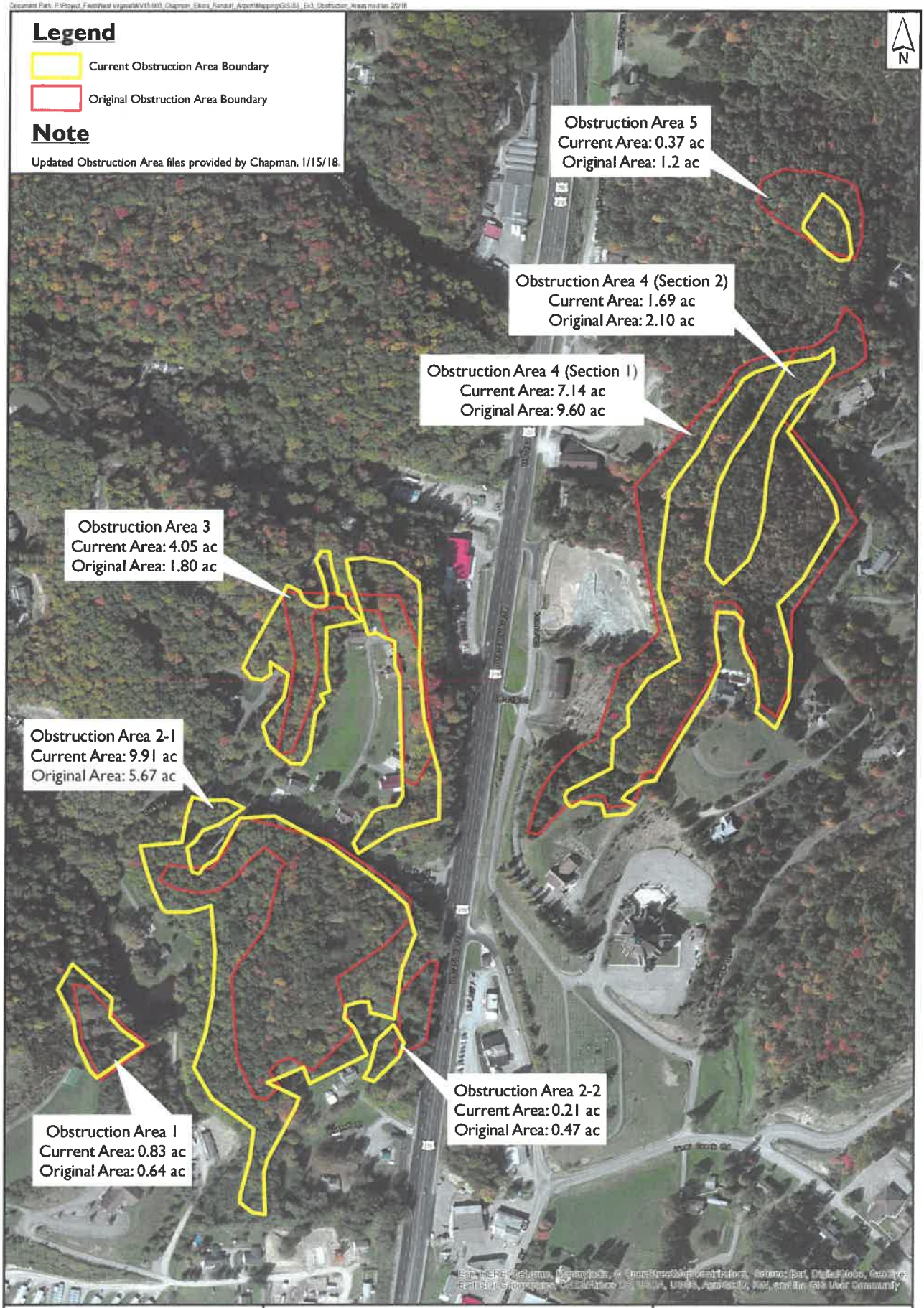
Stream 2, located within Obstruction Area 2-Section 1, is a westward flowing ephemeral stream approximately 1.5' wide and 0.5' deep, with an RBP score of 135 and a "fair" rating.

Stream 3, a westward flowing spring-fed stream, located at the toe of a hillslope in the southwest of Obstruction Area 2-Section 1, is approximately 1' wide and 0.5' deep with an RBP score of 125 and a "fair" rating. Stream 3 was assessed as perennial because it was flowing at the time of the field survey and originated at a spring. Future investigations may be required to more accurately assess the Stream 3 flow regime.

No ponds or wetlands were identified either on National Wetland Inventory (NWI) mapping or in the field during reconnaissance.

An updated USACE Preliminary Jurisdictional Determination (JD) Form is included as **Appendix E**. Upon final design, should impacts to streams be unavoidable, submittal of the JD form and further coordination with the USACE will be necessary to facilitate the 404-permitting process.

APPENDIX A
EXHIBITS

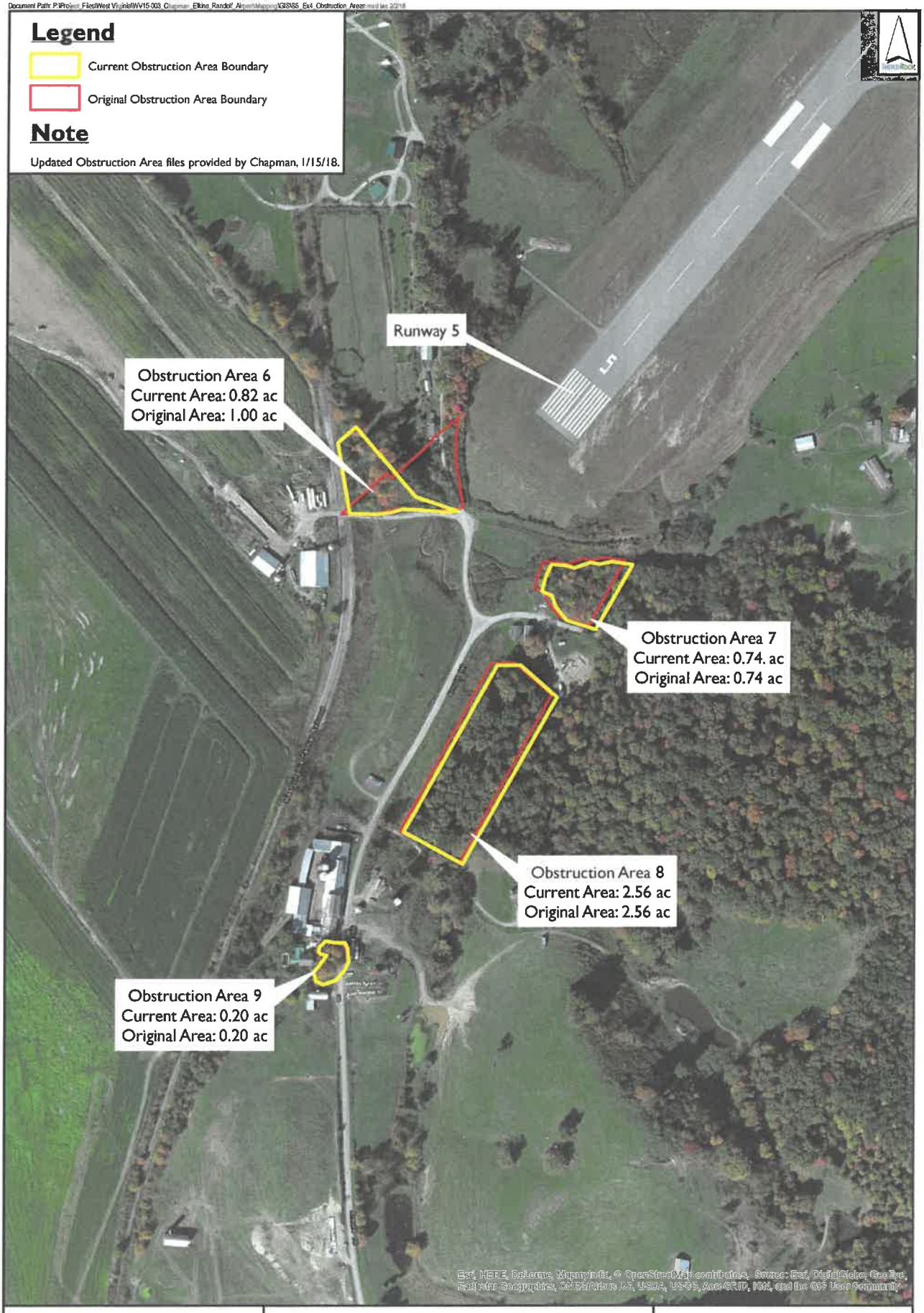


Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 1 - Runway 23 Revised Survey Area
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport

0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

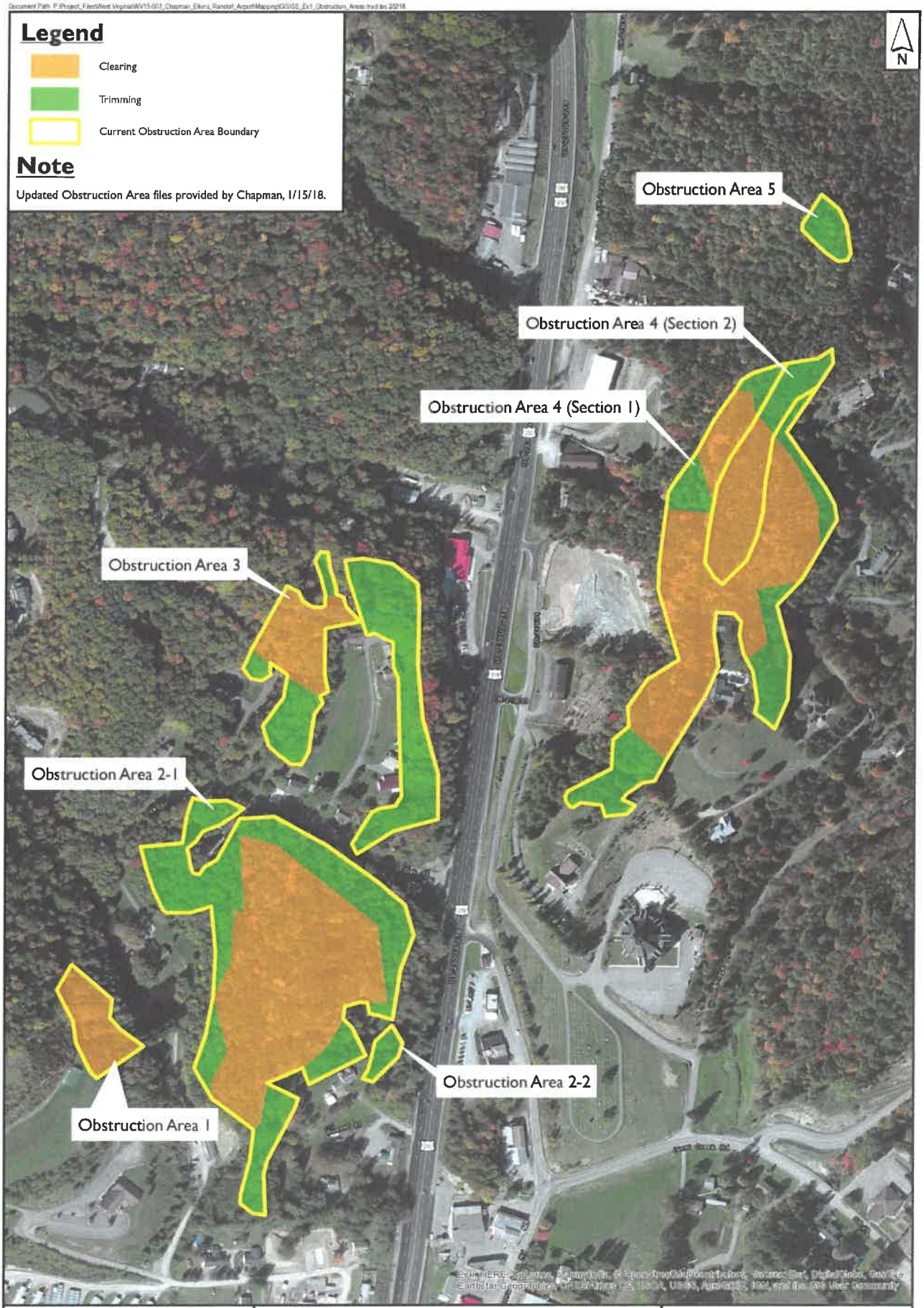


Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 4 - Runway 5 Revised Survey Area
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport

0 150 300 600 Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201



Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 3 - Runway 23 Removal Methods
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport

0 150 300 600
Feet

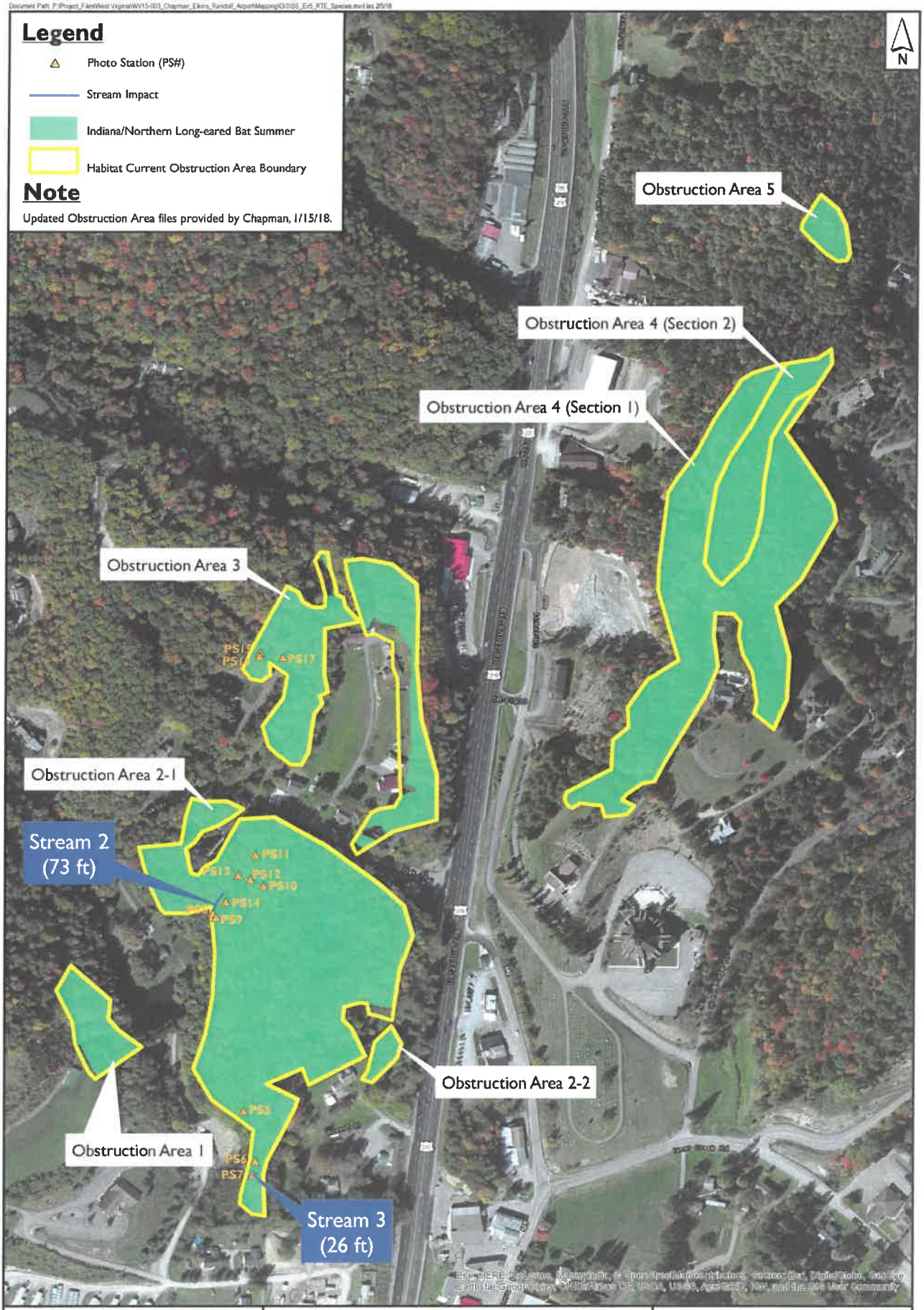
Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 4 - Runway 5 Removal Method
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport

0 150 300 600 Feet

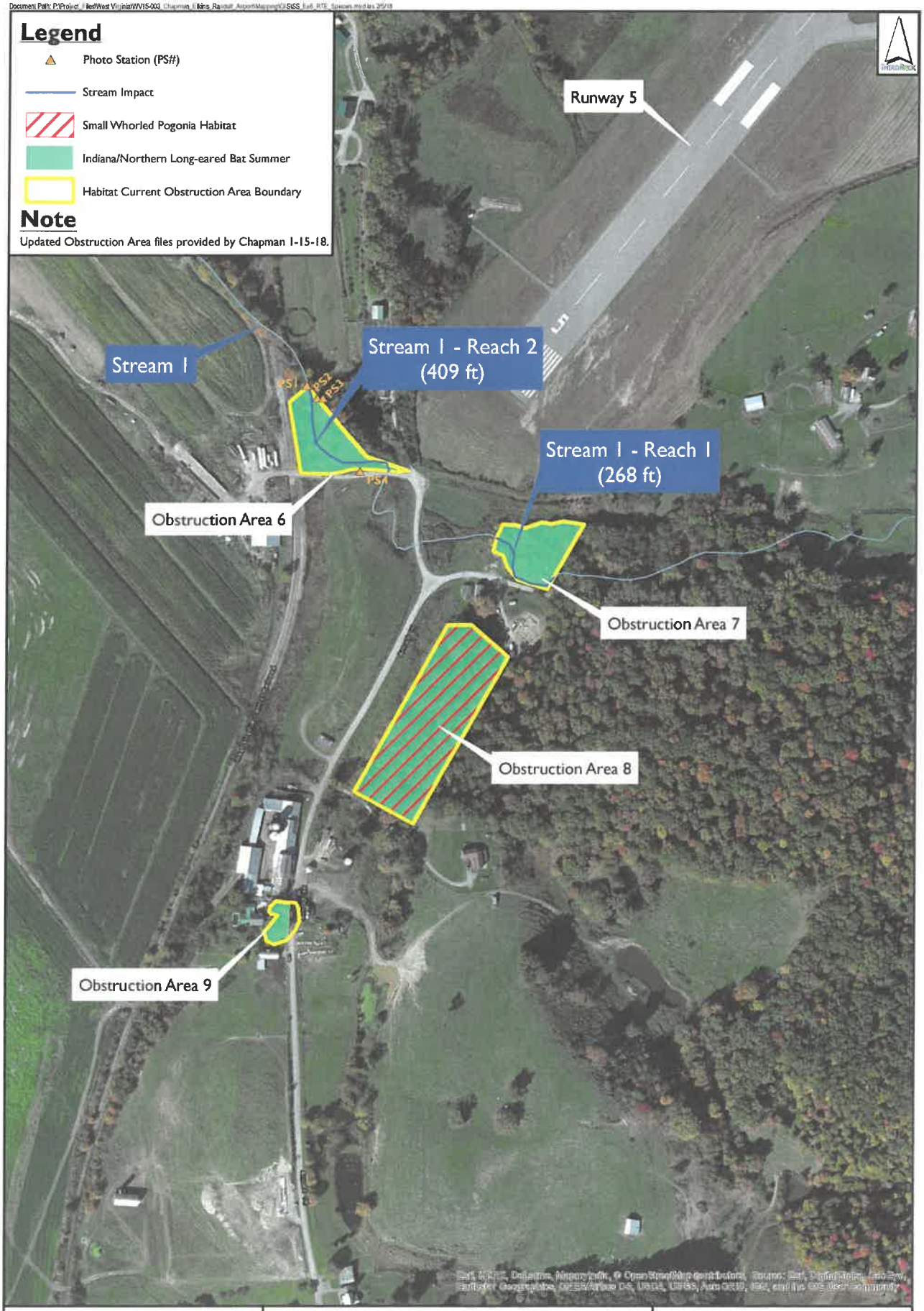
Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201



Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 5 - Runway 23
RTE Habitat and Water Resources
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport
0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201



Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 6 - Runway 5
RTE and Water Resources
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport
0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

APPENDIX B
PHOTO LOG



PS1 - OA 6; Forested Riparian, Facing South
DSC01674.jpg



PS2 - OA 6; Stream 1 - Reach 2, Facing Upstream
DSC01675.jpg



PS4 - OA 6; Four Snags of Maturnity Roosting Size, Previously Trimmed (No Further Impacts Anticipated) DSC01677.jpg



PS5 - OA 2-1; Facing North, Oak Dominant with No Snags or Exfoliating Bark DSC01680.jpg



PS6 - OA 2-1; Facing South, Pine Dominant Hilltop with Two Snags of Suitable Roosting Size DSC01681.jpg



PS7 - OA 2-1; Stream 3, Downstream View
DSC01682.jpg



PS8 - OA 2-1; Stream 2, Upstream View
DSC01683.jpg



PS9 - OA 2-1; Stream 2, Downstream View
DSC01684.jpg



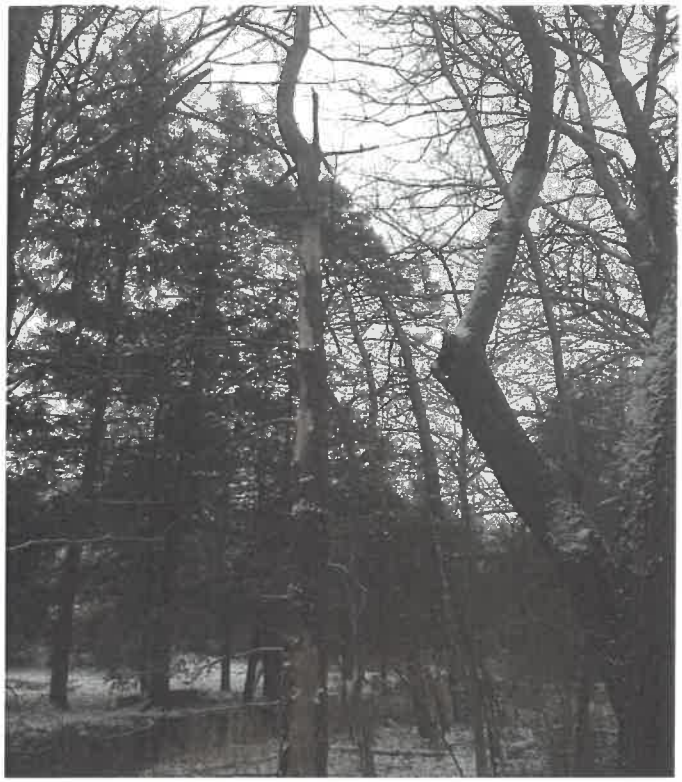
PS14 - OA 2-1; Stream 2, Facing Downstream From
Head of Stream DSC01689.jpg



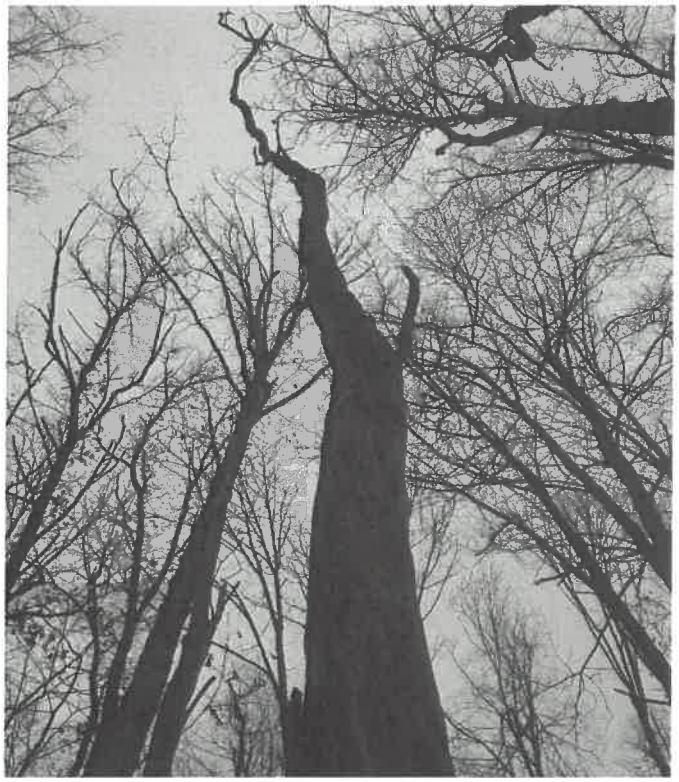
PS15 - OA 3; Facing Southwest, No Snags or Trees
with Exfoliating Bark DSC01690.jpg



PS16 - OA 3; Facing East, One Suitable Roost Tree with a Cavity
and Exfoliating Bark (See PS17) DSC01691.jpg



PS3 - OA 6; Pine Snag of Suitable Roosting Size
DSC01676.jpg



PS10 - OA 2-1; Snag of Suitable Roosting Size
DSC01685.jpg



PS11 - OA 2-1; Snag of Suitable Roosting Size
DSC01686.jpg



PS12 - OA 2-1; Snag of Suitable Roosting Size
DSC01687.jpg



PS13 - OA 2-1; Snag of Suitable Roosting Size
DSC01688.jpg



PS17 - OA 3; Live Tree with Cavity and Exfoliating Bark
DSC01692.jpg

APPENDIX C
FIELD DATA

Prepared for Shawn Tucker, Chapman Technical Group
Prepared by Third Rock Consultants, LLC March 1, 2018
WV15-003 / Technical Memorandum 03-01-18

Sheet	Stream Name / Station ID	Date	Lat	Long	Stream Size (ft)			Flow Type			Habitat Assessment Parameters													
					W	D	R	P	E	I	1	2	3	4	5	6	7	8 LB	8 RB	9 LB	9 RB	10 LB	10 RB	Score
HG1	Stream 1, Reach 1	1/24/2018	38.883409	-79.862492	8.0	2.5	268.0	0	0	X	11	9	12	12	17	16	9	9	7	8	9	10	7	136
HG2	Stream 1, Reach 2	1/24/2018	38.884389	-79.864280	3.0	1.5	409.0	0	0	x	11	9	11	10	18	11	12	9	9	6	8	4	9	127
HG3	Stream 2	1/24/2018	38.901442	-79.847542	1.5	0.5	73.0	0	X	0	8	10	10	16	10	17	15	10	10	5	5	10	9	135
HG4	Stream 3	1/24/2018	38.899365	-79.847119	1.0	0.5	26.0	X	0	0	5	5	10	7	16	13	15	10	10	8	8	10	8	125

THIRD ROCK CONSULTANTS, LLC
STREAM HABITAT ASSESSMENT (HIGH GRADIENT)

STREAM ID Stream 1, Reach 1 **DATE:** 1/24/2018 **LAT:** 38.883409 **LONG:** -79.862492

INVESTIGATOR(S) James Storm **COWARDIN CLASS:** R4 **WATERSHED:** Chenoweth Creek (050200010403)

STREAM SIZE:		**STREAM TYPE:**		**IMAGE ID:**	**IMAGE COMMENT:**
Width (Ft)	8.0	Perennial		IMG	
Depth (Ft)	2.5	Ephemeral		IMG	
Reach (Ft)	268.0	Intermittent	X	IMG	

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	**SUBOPTIMAL**	**MARGINAL**	**POOR**
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
1. Epifaunal Substrate / Available Cover Score 11	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.)	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness Score 9	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity / Depth Regime Score 12	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
4. Sediment Deposition Score 12	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status Score 17	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration Score 16	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or Bends) Score 9	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream < 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ration of > 25.

	OPTIMAL		SUBOPTIMAL			MARGINAL			POOR		
8. Bank Stability	10	9	8	7	6	5	4	3	2	1	0
LB Score 9 RB Score 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.		Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.			Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
9. Vegetative Protection LB Score 8 RB Score 9	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.			50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.			Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
10. Riparian Vegetative Zone Width LB Score 10 RB Score 7 Total Score 136	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.		Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.			Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.			Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		

REMARKS / NOTES:

THIRD ROCK CONSULTANTS, LLC
STREAM HABITAT ASSESSMENT (HIGH GRADIENT)

STREAM ID Stream 1, Reach 2 **DATE:** 1/24/2018 **LAT:** 38.884389 **LONG:** -79.864280

INVESTIGATOR(S) James Storm **COWARDIN CLASS:** R4 **WATERSHED** Chenoweth Creek (050200010403)

STREAM SIZE:		**STREAM TYPE:**		**IMAGE ID:**	**IMAGE COMMENT:**
Width (Ft)	3.0	Perennial		IMG	
Depth (Ft)	1.5	Ephemeral		IMG	
Reach (Ft)	409.0	Intermittent	x	IMG	

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	**SUBOPTIMAL**	**MARGINAL**	**POOR**
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
1. Epifaunal Substrate / Available Cover Score 11	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.)	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness Score 9	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity / Depth Regime Score 11	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
4. Sediment Deposition Score 10	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status Score 18	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or Bends) Score 12	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream < 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ration of > 25.

	OPTIMAL		SUBOPTIMAL			MARGINAL			POOR		
	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB Score 9 RB Score 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.		Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.			Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
9. Vegetative Protection LB Score 6 RB Score 8	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.			50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.			Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
10. Riparian Vegetative Zone Width LB Score 4 RB Score 9 Total Score 127	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.		Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.			Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.			Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		

REMARKS / NOTES:

THIRD ROCK CONSULTANTS, LLC
STREAM HABITAT ASSESSMENT (HIGH GRADIENT)

STREAM ID Stream 2 **DATE:** 1/24/2018 **LAT:** 38.901442 **LONG:** -79.847542

INVESTIGATOR(S) James Storm **COWARDIN CLASS:** R6 **WATERSHED:** Chenoweth Creek (050200010403)

STREAM SIZE:		**STREAM TYPE:**		**IMAGE ID:**	**IMAGE COMMENT:**
Width (Ft)	1.5	Perennial		IMG	
Depth (Ft)	0.5	Ephemeral	X	IMG	
Reach (Ft)	73.0	Intermittent		IMG	

HABITAT PARAMETER	**CONDITION CATEGORY**			
	OPTIMAL	**SUBOPTIMAL**	**MARGINAL**	**POOR**
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
1. Epifaunal Substrate / Available Cover Score 8	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.)	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness Score 10	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity / Depth Regime Score 10	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
4. Sediment Deposition Score 16	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status Score 10	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration Score 17	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or Bends) Score 15	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream < 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ration of > 25.

	OPTIMAL		SUBOPTIMAL			MARGINAL			POOR		
8. Bank Stability	10	9	8	7	6	5	4	3	2	1	0
LB Score 10 RB Score 10	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.		Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.			Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
9. Vegetative Protection LB Score 5 RB Score 5	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.			50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.			Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
10. Riparian Vegetative Zone Width LB Score 10 RB Score 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.		Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.			Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.			Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		

Total Score 135

REMARKS / NOTES:

THIRD ROCK CONSULTANTS, LLC
STREAM HABITAT ASSESSMENT (HIGH GRADIENT)

STREAM ID Stream 3 **DATE:** 1/24/2018 **LAT:** 38.899365 **LONG:** -79.847119

INVESTIGATOR(S) James Storm **COWARDIN CLASS:** R3 **WATERSHED:** Chenoweth Creek (050200010403)

STREAM SIZE:		**STREAM TYPE:**		**IMAGE ID:**	**IMAGE COMMENT:**
Width (Ft)	1.0	Perennial	X	IMG	
Depth (Ft)	0.5	Ephemeral		IMG	
Reach (Ft)	26.0	Intermittent		IMG	

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	**SUBOPTIMAL**	**MARGINAL**	**POOR**
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
1. Epifaunal Substrate / Available Cover Score 5	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.)	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness Score 5	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity / Depth Regime Score 10	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
4. Sediment Deposition Score 7	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status Score 16	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration Score 13	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or Bends) Score 15	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream < 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ration of > 25.

	OPTIMAL		SUBOPTIMAL			MARGINAL			POOR		
	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability *LB Score* 10 *RB Score* 10	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.		Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.			Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
9. Vegetative Protection *LB Score* 8 *RB Score* 8	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.			50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.			Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
10. Riparian Vegetative Zone Width *LB Score* 10 *RB Score* 8 *Total Score* 125	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.		Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.			Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.			Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		

REMARKS / NOTES:

APPENDIX D
IPAC TRUST RESOURCE REPORT

Prepared for Shawn Tucker, Chapman Technical Group
Prepared by Third Rock Consultants, LLC March 1, 2018
WV15-003 / Technical Memorandum 03-01-18

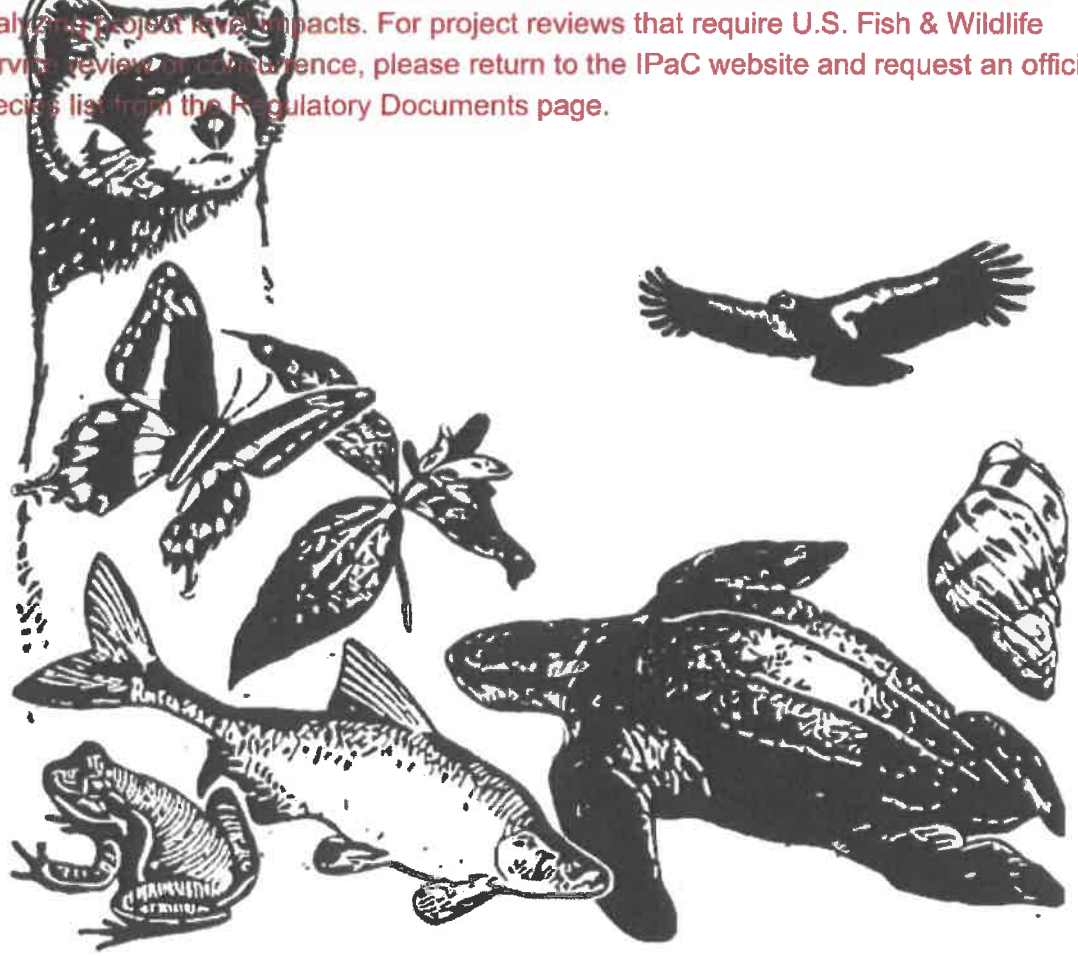
U.S. Fish & Wildlife Service

Elkins-Randolph County Regional Airport - Obstruction Removal (Runway 5/23)

IPaC Trust Resources Report

Generated August 15, 2016 07:52 AM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

IPaC Trust Resources Report 1
Project Description 1
Endangered Species 2
Migratory Birds 4
Refuges & Hatcheries 6
Wetlands 7

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

Elkins-Randolph County Regional Airport - Obstruction Removal (Runway 5/23)

LOCATION

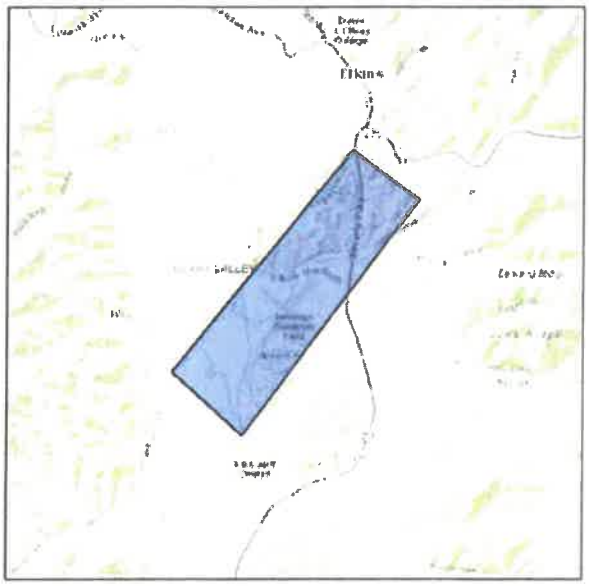
Randolph County, West Virginia

DESCRIPTION

The project will consist of clearing and grubbing approximately 26 acres of trees and removing and/or installing an obstruction light on 5 structures.

IPAC LINK

https://ecos.fws.gov/ipac/project/ZEPQF-NOK5Z-F67CK-BR7T5-T27YKU



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, WV 26241-9475
(304) 636-6586

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Flowering Plants

Running Buffalo Clover Trifolium stoloniferum — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2RE

Small Whorled Pogonia Isotria medeoloides — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1XL

Mammals

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Virginia Big-eared Bat Corynorhinus (=Plecotus) townsendii virginianus — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A080

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Black-capped Chickadee Poecile atricapillus — Bird of conservation concern
Season: Year-round

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Louisiana Waterthrush Parkesia motacilla — Bird of conservation concern
Season: Breeding

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Red Crossbill Loxia curvirostra — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FS

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Yellow-bellied Sapsucker sphyrapicus varius — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FR

Northern Saw-whet Owl Aegolius acadicus — Bird of conservation concern
Season: Year-round

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

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

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

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

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

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

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

PEM1A
PEM1C

Freshwater Forested/shrub Wetland

PFO1A
PFO1Ad

PFO1C

Freshwater Pond

PUBHh

Riverine

R2UBH
R4SBC
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

APPENDIX E
USACE PRELIMINARY JD FORM

Prepared for Shawn Tucker, Chapman Technical Group
Prepared by Third Rock Consultants, LLC March 1, 2018
WV15-003 / Technical Memorandum 03-01-18

PRELIMINARY JURISDICTIONAL DETERMINATION (JD) FORM
U.S. ARMY CORPS OF ENGINEERS

A. COMPLETION DATE FOR PRELIMINARY JD FORM: March 1, 2018

B. NAME OF ADDRESS OF PERSON REQUESTING PRELIMINARY JD: James Storm, Third Rock Consultants, LLC,

2526 Regency Road, Suite 180, Lexington, KY 40503

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Pittsburgh District Corps of Engineers, 412-395-7155

D. PROJECT LOCATION INFORMATION: (Use attached table to document multiple water bodies at different sites):

State: WV **County/Parish/Borough:** Randolph **City:** Elkins

Center Coordinates of Site (*in degree decimal format*): Lat. 38.884004°, Long. -79.863344°

Universal Transverse Mercator: 17S **Name of Nearest Waterbody:** Chenoweth Creek

Watershed or Hydrologic Unit Code (HUC): Chenoweth Creek (050200010403)

☑ map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ other sites (e.g., offsite mitigation sites, disposal sites, *etc*) are associated and recorded on a different form

E. AMOUNT OF WATERS IN REVIEW AREA (ESTIMATE):

NON-WETLAND WATERS						
SITE ID	**LAT**	**LONG**	**COWARDIN CLASS**	**STREAM FLOW**	**AQUATIC RESOURCE CLASS[1]**	**AMOUNT (FT)**
Stream 1 – Reach 1	38.883409	-79.862492	R4	Intermittent	CWA Section 404	268
Stream 1 – Reach 2	38.884389	-79.864280	R4	Intermittent	CWA Section 404	409
Stream 2	38.901442	-79.847542	R6	Ephemeral	CWA Section 404	73
Stream 3	38.899365	-79.847119	Possible R3	Possible Perennial	CWA Section 404	26
						776

[1] RHA Section 10 *or* CWA Section 404; if RHA Section 10, note tidal or non-tidal

WETLAND WATERS					
SITE ID	**LAT**	**LONG**	**COWARDIN CLASS**	**AQUATIC RESOURCE CLASS**	**AMOUNT (AC)**
N/A					

F. REVIEW PERFORMED FOR SITE EVALUATION (Check all that apply):

☐ Office (Desk) Determination. Date: *Click here to enter a date.*

☑ Field Determination. Date(s): January 24, 2018, *Click here to enter a date.*

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special

conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Data reviewed for Preliminary JD (check all that apply):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: *Click here to enter text.*
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: *Click here to enter text.*
- ☐ Corps navigable waters' study: *Click here to enter text.*
- ☐ U.S. Geological Survey Hydrologic Atlas: *Click here to enter text.*
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: *Click here to enter text.*
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: *Click here to enter text.*
- ☐ National wetlands inventory map(s). Cite name: *Click here to enter text.*
- ☐ State/Local wetland inventory map(s): *Click here to enter text.*
- ☐ FEMA/FIRM maps: *Click here to enter text.*
- ☐ 100-year Floodplain Elevation is: *Click here to enter text.* (National Geodectic Vertical Datum of 1929)
- ☑ Photographs: ☑ Aerial (Name & Date): ESRI ArcGIS Online
  ☐ or ☑ Other (Name & Date): Third Rock Photo Log 1-24-18
- ☐ Previous determination(s). File no. and date of response letter: *Click here to enter text.*
- ☐ Other information (please specify): *Click here to enter text.*

NOTE: *The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determination.*

Signature and Title of Person Requesting Preliminary JD	March 1, 2018 Date
Signature and Title of Regulatory Project Manager	*Click here to enter a date.* Date

Bat Survey Report for the Elkins – Randolph County Regional Airport Elkins, West Virginia



SKYBAX
ECOLOGICAL SERVICES
PO Box 1093
Berea, KY 40403
(859) 302-2897

August 16, 2018

I. INTRODUCTION

The Elkins – Randolph County Regional Airport is proposing tree clearing and trimming at 9 locations, encompassing about 30 acres (see attached maps). Skybax Ecological Services, LLC, Berea, KY, was contracted by Chapman Technical Group, Buckhannon, WV, to conduct a presence/probable absence for Indiana and Northern Long-eared bat in the area.

II. STUDY AREA

The study area is located adjacent to the Elkins – Randolph County Regional Airport in Elkins, West Virginia (see attached maps). This area is situated within the Allegheny Mountain and Upland Section of West Virginia. The forest is classified as Northern Hardwood cover type.

III. METHODS

Using the *2018 Range-wide Indiana Bat Survey Guidelines,* a study plan was developed proposing that mist netting would be done at five (5) sites for three (3) nights each, using 3 net sets per night. This results in a total effort of 45 net nights. This study plan was approved by United States Fish & Wildlife Service, Elkins, WV, on July 20, 2018.

IV. RESULTS

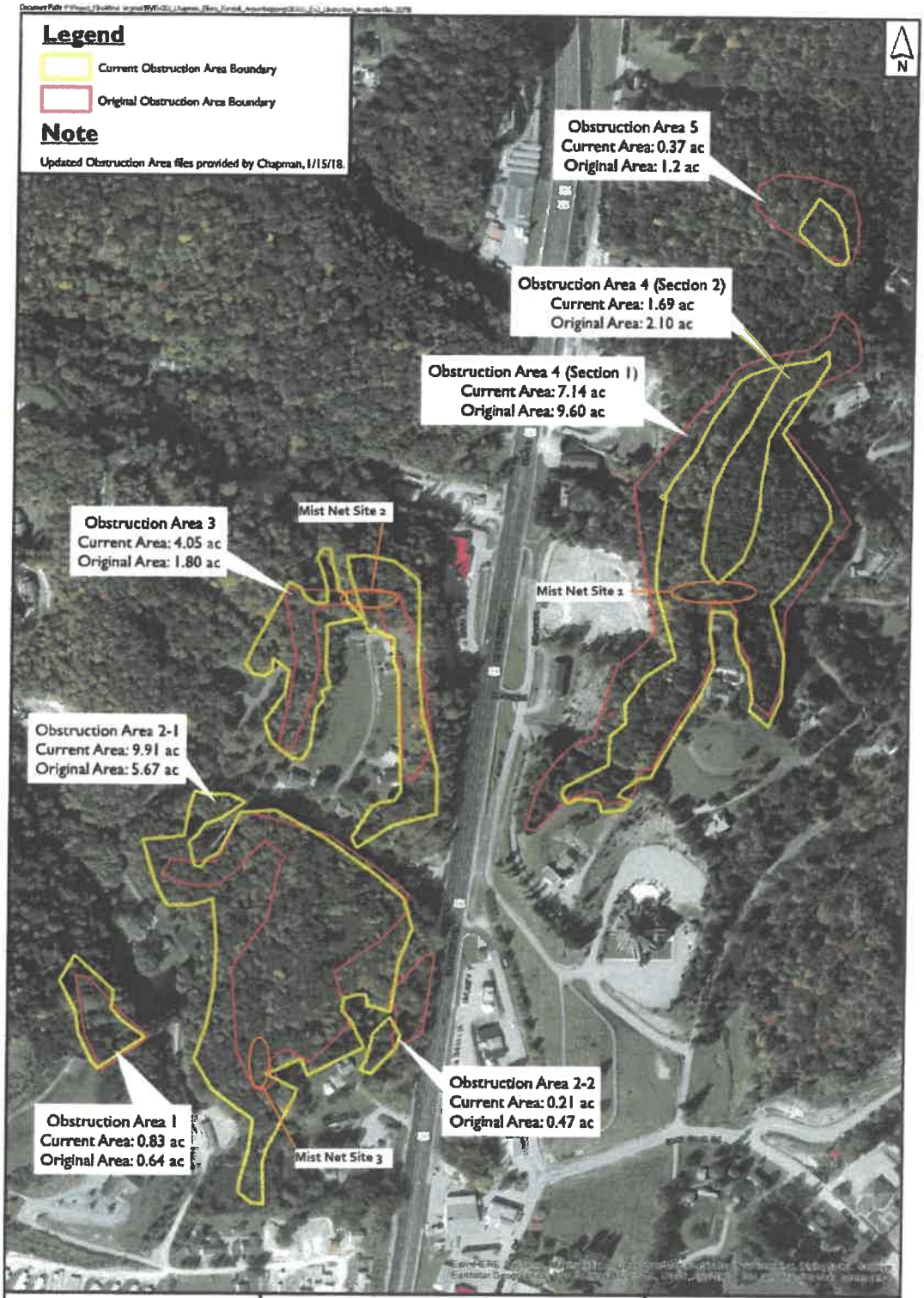
Mist net arrays were set up prior to dusk each evening. Mist netting was done beginning at dusk and continued for at least five hours (typically around 9:00 pm to 2:00 am). Mist netting was not done in continuous rain or low temperatures (below 50 degrees Fahrenheit). All bats were identified, sexed, aged, measured, weighed, and photographed.

Mist netting was done at five (5) sites for three (3) nights each (15 net-nights). Surveys were conducted from July 30th through August 9th. Rain prevented surveys on July 31st and August 2nd. Temperatures were between 61 and 75 degrees Fahrenheit each night. Site leaders were Gary Libby (Sites 1, 3, and 5) and Hunter Stuart (Sites 2 and 4). Federal T&E Recovery Permit (TE156392-3) and West Virginia Scientific Collecting Permits (2018.355 and 2018.356) are attached.

A total of 11 bats were captured during mist net surveys. Species consisted of Big Brown bats (*Eptesicus fuscus*) (n=8) and Eastern Red bats (*Lasiurus borealis*) (n=3). Details regarding net setups, bat measurements, and site characteristics are in the attached data sheets. In addition, photographs of all mist net sets area attached.

V. CONCLUSION

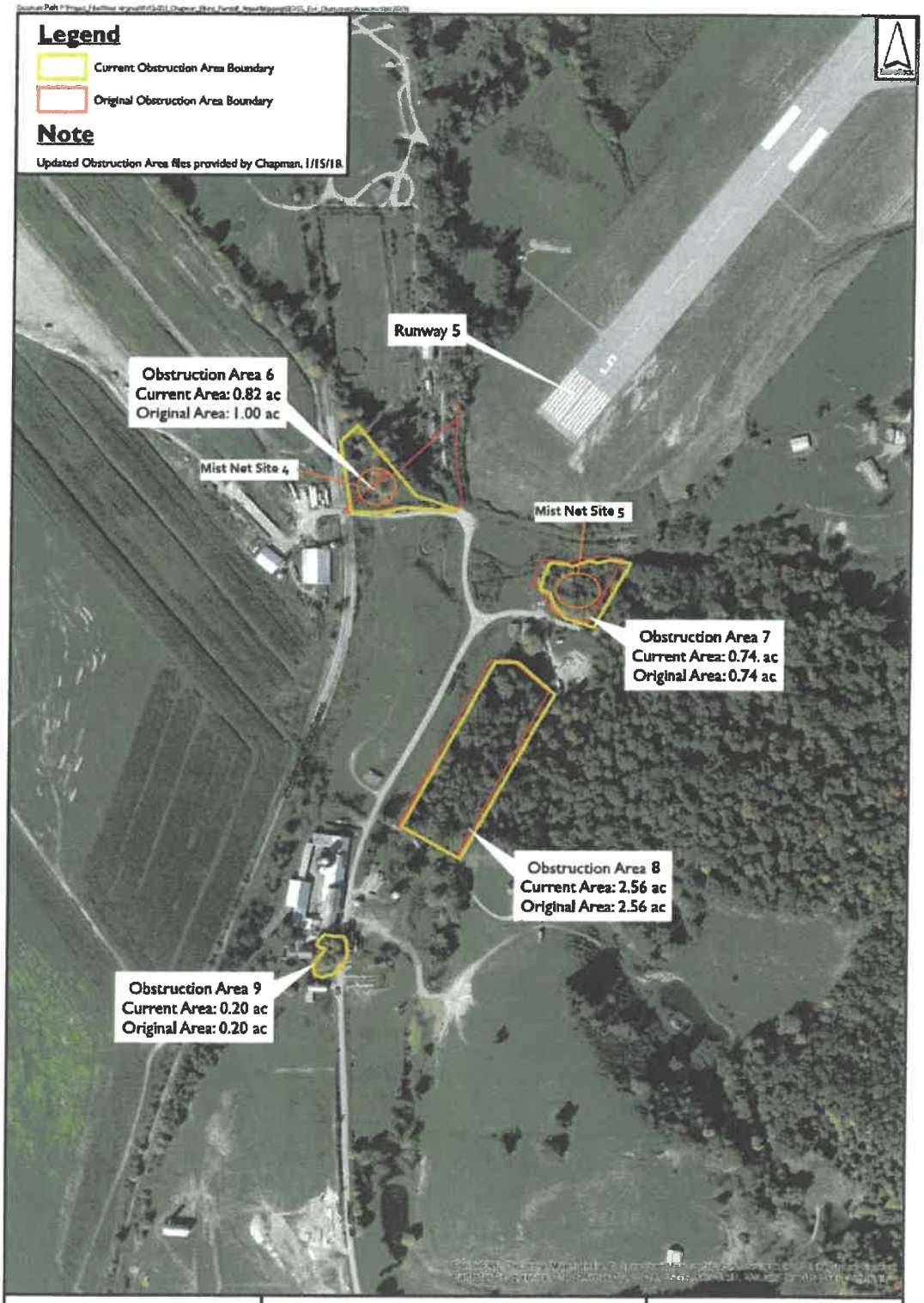
No Indiana bats (*Myotis sodalis*) or Northern Long-eared bats (*Myotis septentrionalis*) were captured during summer mist netting surveys conducted in the study area. The proposed tree clearing and trimming is not likely to affect the continued existence of these species. This report should be submitted to the USFWS Elkins Field Office, WV, for concurrence of findings



Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503

Exhibit 1 - Runway 23 Revised Survey Area
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport
0 150 300 600
Feet

Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201


Legend
Current Obstruction Area Boundary
Original Obstruction Area Boundary
Note
Updated Obstruction Area files provided by Chapman, 1/15/18.
Runway 5
Obstruction Area 6
Current Area: 0.82 ac
Original Area: 1.00 ac
Mist Net Site 4
Mist Net Site 5
Obstruction Area 7
Current Area: 0.74. ac
Original Area: 0.74 ac
Obstruction Area 8
Current Area: 2.56 ac
Original Area: 2.56 ac
Obstruction Area 9
Current Area: 0.20 ac
Original Area: 0.20 ac
Prepared by:
Third Rock Consultants, LLC
2526 Regency Road, Suite 180
Lexington, Kentucky 40503
Exhibit 4 - Runway 5 Revised Survey Area
Proposed Obstruction Removal Project
Elkins-Randolph County Regional Airport
0 150 300 600
Feet
Prepared for:
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
90 Vance Drive
Elkins, West Virginia 26241

Concurrence Form for Myotid Bat Study Plan – Mist Netting

Contact Name: Melissa Defibaugh

Email Address or Fax Number: MDefibaugh@chaptech.com

FWS File # 2016-I-0730 **All future correspondence should clearly reference this FWS File #.**

Project: Elkins-Randolph County Regional Airport - Runways 5/23 Obstruction Removal

Date of Plan Submission: July 18, 2018

The U.S. Fish and Wildlife Service (Service) has reviewed the study plan and we concur with the proposed survey methods. Surveys will be conducted in accordance with the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the endangered Indiana bat *(Myotis sodalis)* and the threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB).

Mist net surveys will be conducted. You propose sampling at 5 net sites for activities proposed within 26 acres/kilometers of potential bat habitat. This survey would have a total effort of 45 net nights.

If any Indiana bats or NLEB are captured during this survey, we recommend that you conduct additional surveys including acoustic surveys, radio-tracking, roost tree identification, and emergence counts. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Additional surveys are also recommended if other federally listed endangered or threatened bats are located.

We request that the following be provided in the final survey reports:

1) Name, permit number, and location (latitude, longitude) of the proposed project;
2) A map with the project boundary and net sites indicated;
3) A description of the survey effort, including number of nets used at each site, distance between sites, and selection of sites;
4) Color photos of the sites;
5) Copies of field data sheets;

6) Any additional information that may be relevant, such as weather and habitat conditions; and
7) A description of whether any potential bat hibernacula (caves/abandoned mine portals) may be present on site, and a summary of any surveys planned or conducted.

In addition to a final written report, we recommend providing data results in the Region 5 spreadsheet which is available here:

http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html

This datasheet is supplemental to the one required by the West Virginia Division of Natural Resources (WVDNR).

Reports may be submitted on CD. Please be aware that mist net survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the WVDNR, Elkins Operation Center, Ward Road, Elkins, West Virginia, 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report.

All federally listed species captures must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 1 business day. If you have any questions regarding these comments, please contact the biologist listed below at (304) 636-6586 or at the letterhead address.

Amanda Selmon Date: 7/19/2018
Biologist

Barbara Douglas for Date: 07/20/2018
Field Supervisor

DEPARTMENT OF THE INTERIOR
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
1875 Century Boulevard, Suite 200
Atlanta, GA 30345
permitsR4ES@fws.gov

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

SKYBAX ECOLOGICAL SERVICES, LLC
107 VANWINKLE GROVE
BEREA, KY 40403
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(a)
16 USC 1533(d)

REGULATIONS
50 CFR 17.22
50 CFR 17.32

50 CFR 13

3. NUMBER
TE156392-3
AMENDMENT

4. RENEWABLE
☒ YES
☐ NO

5. MAY COPY
☒ YES
☐ NO

6. EFFECTIVE
04/20/2016

7. EXPIRES
04/30/2021

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If BY (a business))*
GARY W. LIBBY
PRINCIPAL ECOLOGIST

9. TYPE OF PERMIT
NATIVE ENDANGERED & THREATENED SP. RECOVERY - E & T WILDLIFE

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
Location: Alabama, Arkansas, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

C. 1. The following individuals are authorized to conduct activities as authorized by this permit: ALL SPECIES: Gary Libby; INDIANA BAT AND NORTHERN LONG-EARED BAT ONLY: B. Hunter Stuart.

Trained assistants not named on this permit may work on permitted bat activities under the direct and on-site supervision of the individuals named above. However, trained assistants may not work independently at a site. Trained assistants are individuals who are considered qualified by the permittee to select sampling sites, deploy sampling equipment and nets, and handle bats in the field. The permittee must remain present at each mist-net and harp trap site while it is being operated.

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the terms of this permit and all sections of title 50 Code of Federal Regulations, parts 13 and 17, pertinent to issued permits. Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

E. Permittee is authorized to take (enter hibernacula, capture with mist nets or harp traps, handle, identify, band,

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
Annual reports are due January 31 following each year the permit is in effect.

ISSUED BY	TITLE	DATE
for	ASSISTANT REGIONAL DIRECTOR - ES	04/20/2016

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

NUMBER 2018.355

SCIENTIFIC COLLECTING PERMIT

Under Authority Conferred by Chapter 20, Article 2, Section 50, Code of West Virginia, As Amended

Brandon Hunter Stuart
Skybax Ecological Services, LLC
107 Vanwinkle Grove
Berea, KY 40403

is hereby permitted to collect specimens according to the attached application and the Special Provisions on the reverse side of this permit.

This permit is not transferable and expires on August 16, 2018.

A complete list of all specimens collected will be kept and reported to the Director of the Division of Natural Resources of West Virginia no later than 45 days after the expiration date of this permit.

PERMIT PROVISIONS

I understand that (1) The privileges granted under this permit are not transferable, and to allow anyone other than myself to use my permit is unlawful and will be considered cause for revocation of said permit; (2) A Federal Scientific Collection Permit issued by the U.S. Department of Interior must be obtained before any migratory birds, or their nests or eggs, are collected or held in captivity; (3) The Federal Permit does not extend the privileges of the permittee beyond those granted by the Division of Natural Resources; (4) Permission must be obtained from either the owner or the custodian of any fenced or posted land before entering same for the purpose of collecting scientific specimens; (5) It is unlawful to carry a revolver or pistol contrary to Article VII, Chapter 61, Code of West Virginia; (6) It is unlawful to collect specimens with a gun on a Sunday; (7) It is unlawful to sell, offer for sale, barter, or offer to barter any wild animals, wild birds, fish or frogs collected; (8) When traps or nets or other devices are used UNATTENDED while exercising the privileges of this permit, said traps, nets, or devices must have attached thereto a tag bearing the name, address and number of the Scientific Collecting Permit; (9) It is unlawful to take or attempt to take any wild animals, wild birds, fish or frogs under said permit except for scientific and propagation purposes; (10) A hunting or fishing license must be obtained before specimens may be taken for sport; (11) Only those species or classes of wild birds, wild animals, fish or frogs listed below, and in the numbers stated, may be lawfully taken under said permit; and (12) I am required by law to carry my Scientific Collecting Permit, on my person while exercising the privileges granted thereunder, and to exhibit the permit to anyone requesting to see the same.

Must be signed before valid.

Signature of permittee

Chief, Wildlife Resources, WVDNR

Date of issue 7/26/18

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

NUMBER 2018.356

SCIENTIFIC COLLECTING PERMIT

Under Authority Conferred by Chapter 20, Article 2, Section 50, Code of West Virginia, As Amended

Gary Libby
Skybax Ecological Services, LLC
107 Vanwinkle Grove
Berea, KY 40403

is hereby permitted to collect specimens according to the attached application and the Special Provisions on the reverse side of this permit.

This permit is not transferable and expires on August 16, 2018.

A complete list of all specimens collected will be kept and reported to the Director of the Division of Natural Resources of West Virginia no later than 45 days after the expiration date of this permit.

PERMIT PROVISIONS

I understand that (1) The privileges granted under this permit are not transferable, and to allow anyone other than myself to use my permit is unlawful and will be considered cause for revocation of said permit; (2) A Federal Scientific Collection Permit issued by the U.S. Department of Interior must be obtained before any migratory birds, or their nests or eggs, are collected or held in captivity; (3) The Federal Permit does not extend the privileges of the permittee beyond those granted by the Division of Natural Resources; (4) Permission must be obtained from either the owner or the custodian of any fenced or posted land before entering same for the purpose of collecting scientific specimens; (5) It is unlawful to carry a revolver or pistol contrary to Article VII, Chapter 61, Code of West Virginia; (6) It is unlawful to collect specimens with a gun on a Sunday; (7) It is unlawful to sell, offer for sale, barter, or offer to barter any wild animals, wild birds, fish or frogs collected; (8) When traps or nets or other devices are used UNATTENDED while exercising the privileges of this permit, said traps, nets, or devices must have attached thereto a tag bearing the name, address and number of the Scientific Collecting Permit; (9) It is unlawful to take or attempt to take any wild animals, wild birds, fish or frogs under said permit except for scientific and propagation purposes; (10) A hunting or fishing license must be obtained before specimens may be taken for sport; (11) Only those species or classes of wild birds, wild animals, fish or frogs listed below, and in the numbers stated, may be lawfully taken under said permit; and (12) I am required by law to carry my Scientific Collecting Permit, on my person while exercising the privileges granted thereunder, and to exhibit the permit to anyone requesting to see the same.

Must be signed before valid.

Gary Libby
Signature of permittee

Chief, Wildlife Resources, WVDNR

Date of issue 7/26/18

BAT SURVEY DATA FORM

SURVEY AREA: Site 1 (Elkins Airport) COUNTY: Randolf WV SITE NO: 1

DATE: 7/30/18 Start Temp. (Time): 72° (2100) Finish Temp. (Time): 64° (200)

SKY CONDITIONS: cloudy, overcast MOON PHASE: mostly full waning gibbous

SITE DESCRIPTION: old forest road on top of hill above Water Works

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A = DBL 4M, B = DBL 6m, C = DBL 4m)

TIME OPENED: 2100 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
Eptesicus fuscus	2115	A	M	scrotal	15.8	45	3M	DNB	none	Net B
Eptesicus fuscus	2125	A	M	scrotal	16.6	46	3M	DNB	none	Net B

7/30/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: Whitetail deer

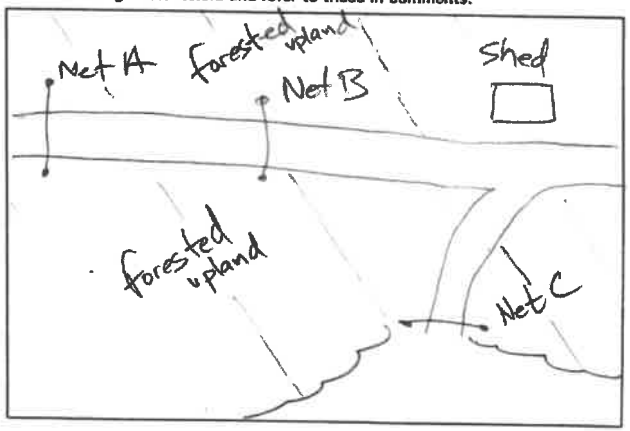
GENERAL COMMENTS:

Net A = 38.90477 / 79.84236 (2036')

Net B = 38.90441 / 79.84240 (2160')

Net C = 38.90414 / 79.84302 (2110')

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Site 1 (Elkins Airport) COUNTY: Randolf WV SITE NO: 1

DATE: 8-1-2018 Start Temp. (Time): 2100 (68°) Finish Temp. (Time): 0200 (64°)

SKY CONDITIONS: mostly cloudy MOON PHASE Waning gibbous

SITE DESCRIPTION: old road through wood on top of hill behind Water Works

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A = DBL 4M, B = DBL 6M, C = DBL 4M)

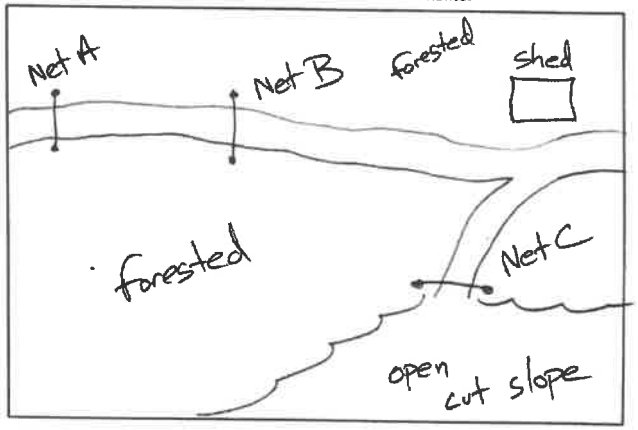
TIME OPENED: 2100 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
Lasiurus borealis	2105	EFN	F	EFN	EFN	EFN	3M	DNB	EFN	escaped from net B

8/1/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES:

GENERAL COMMENTS:

Net A = 38.90477 / 79.84236 (2036')

Net B = 38.90441 / 79.84240 (2160')

Net C = 38.90414 / 79.84302 (2110')

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport 1 COUNTY: Randolf WV SITE NO: 1

DATE: 8/3/18 Start Temp. (Time): 2100, 68° Finish Temp. (Time): 0200, 62°

SKY CONDITIONS: clear MOON PHASE last quarter

SITE DESCRIPTION: old road through woods on top of hill above cut slope

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A=4m DBL, B=6m DBL, C=4m DBL)

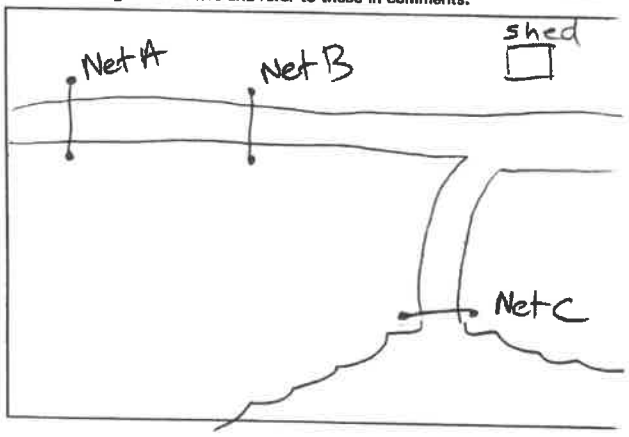
TIME OPENED: 2050 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
Eptesicus fuscus	2105	A	M	Scrotal	16.9g	46	3M	DNB	none	Net B

8/3/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: whitetail deer

GENERAL COMMENTS:

Net A = 38.90477 / 79.84236 (2036')
Net B = 38.90441 / 79.84240 (2160')
Net C = 38.90414 / 79.84302 (2110')

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolph WV SITE NO: 2

DATE: 07/30/2013 Start Temp. (Time): 72°F (2030) Finish Temp. (Time): 64°F (0200)

SKY CONDITIONS: Overcast thru the night MOON PHASE Full waning

SITE DESCRIPTION: Upland deciduous with open understory. Woods bordered by mowed ATV paths

OBSERVERS: Sean Nilan

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 4 (2 single 2.6m nets, 1 double 4m net, 1 double 9m net)

TIME OPENED: 20:30 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
No BATS										

07/30/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

OTHER WILDLIFE NOTED:

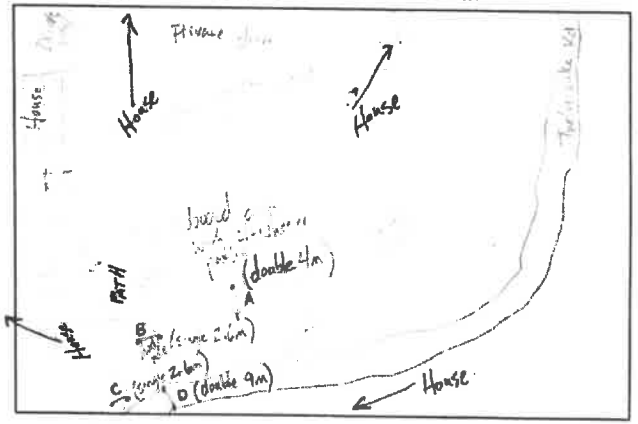
NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: White-tailed deer

GENERAL COMMENTS:

A: 38°54' 12.2"N 79°50'49"W
B: 38°54' 12.3"N 79°50'48.4W
C: 38°54' 13" N 79°50'50.6W
D: 38°54' 13.9" N 79°50'50.4"W

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolph WV SITE NO: 2

DATE: 08/01/2018 Start Temp. (Time): 68°F (2030) Finish Temp. (Time): 64°F (0200)

SKY CONDITIONS: Mostly cloud a start [illegible] MOON PHASE Waning gibbous

SITE DESCRIPTION: Spring [illegible]

OBSERVERS: Deer Vilar

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 4total (4m x 2tiers) 2.6m x 1 tier 2.6m x 1 tier (9m x 2 tiers)

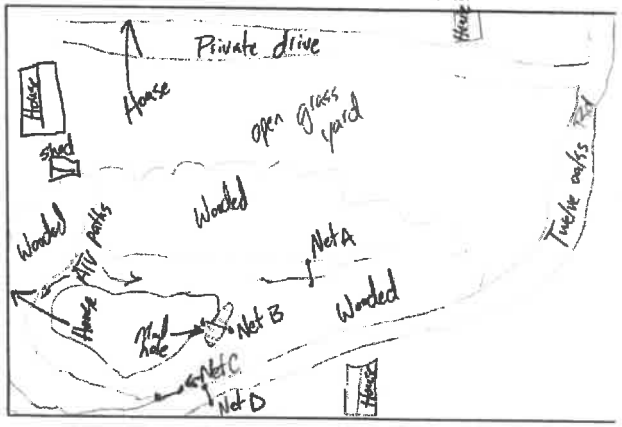
TIME OPENED: 2030 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
No BATS										

08/01/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: White-tailed deer

GENERAL COMMENTS: A: 38°54' 12.2"N 79°50'49"W
B: 38°54' 12.3"N 79°50'48.4"W
C: 38°54' 13"N 79°50'50.6"W
D: 38°54' 13.9"N 79°50'50.4"W

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolph WV SITE NO: 2

DATE: 08/03/2018 Start Temp. (Time): 69°F (2030) Finish Temp. (Time): 61°F (0200)

SKY CONDITIONS: Partly cloudy declining to clear clearing after midnight MOON PHASE Last quarter

SITE DESCRIPTION: Mixed use/industry housing development forested on two sides and [illegible]

OBSERVERS: Sean Nilan

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 4 total (Net A 2x4m Net B 1x2.6m Net C 1x2.6m Net D 2x9m)

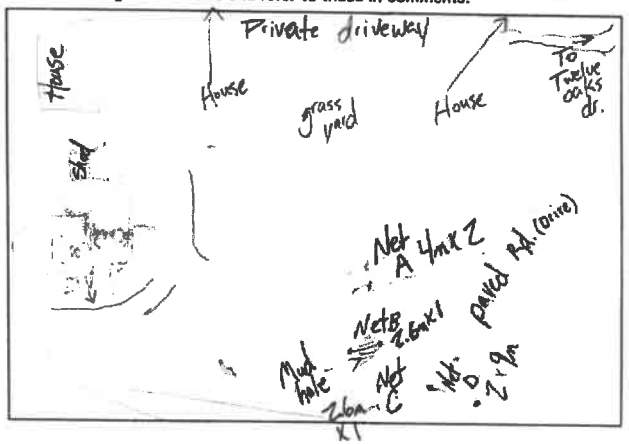
TIME OPENED: 2030 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight (g)	Forearm Length	Height in Net	Band	Parasite	Comments
LABO	2040	J	[illegible]	NR	11.50	41mm	4m	-	-	Net D
LABO	0055	A	F	PL	15-50	45MM	[illegible]	-	-	Net D
EPFU	2330	A	M	NR	17.25	[illegible]	[illegible]	-	-	Net D

08/03/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: White-tailed deer

GENERAL COMMENTS:

Net A. 38°54 12.2"N 79°50 49 W

Net B. 38° 54' 12.3"N 79° 50' 48.4 W

Net C. 38° 54 13" N 79° 50' 50.6 W

Net D. 38° 54' 13.9" N 79° 50' 50.4" W

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 3

DATE: 8/7/18 Start Temp. (Time): 2045, 72° Finish Temp. (Time): 0200, 65°

SKY CONDITIONS: cloudy MOON PHASE Waning crescent

SITE DESCRIPTION: closed canopy gravel road through upland forest

OBSERVERS: Sean Nilan

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A=4M/2tiers, B=9m/2tiers, C=6m/2tiers)

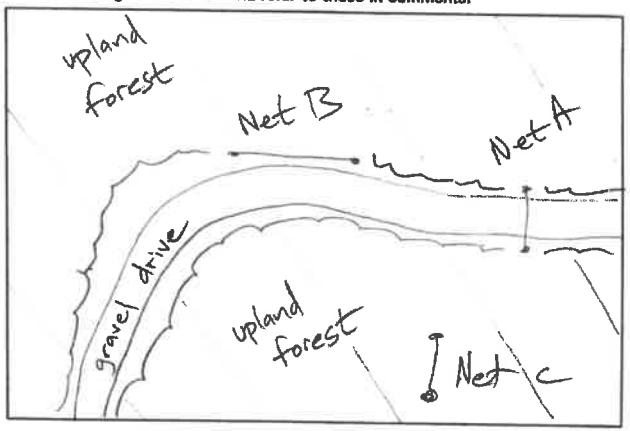
TIME OPENED: 2045 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
Eptesicus fuscus	2205	A	m	scrotal	17.1g	47mm	3m	DNB	none	

8/7/18

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES:

GENERAL COMMENTS:

A = 38.90067 / 79.84710 (2018')
B = 38.90054 / 79.84691 (2087')
C = 38.90070 / 79.84665 (2009')

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 3

DATE: 8/8/18 Start Temp. (Time): 2045, 75° Finish Temp. (Time): 0200, 68°

SKY CONDITIONS: cloudy, patchy fog MOON PHASE waning crescent

SITE DESCRIPTION: closed canopy gravel road through upland forest

OBSERVERS: Sean Nilan

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A=4m/2tiers, B=9m/2tiers, 6m/2tiers)

TIME OPENED: 2045 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.*	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
no bats captured										

8/8/18

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

OTHER WILDLIFE NOTED:

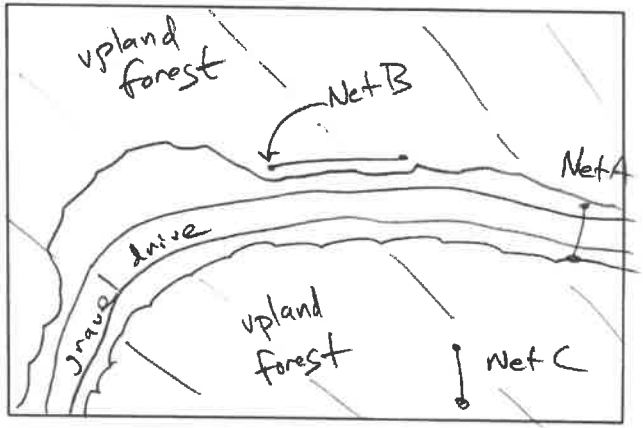
NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: flying squirrel (vocal)

GENERAL COMMENTS:

A = 38.90067 / 79.84710 (2018')
B = 38.90054 / 79.84691 (2087')
C = 38.90070 / 79.84665 (2009')

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 3

DATE: 8/9/18 Start Temp. (Time): 2045, 70° Finish Temp. (Time): 0200, 63°

SKY CONDITIONS: partly cloudy / clear, calm MOON PHASE waning crescent

SITE DESCRIPTION: closed canopy gravel road through upland forest

OBSERVERS: Sean Nilan

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A=4m/2tiers, B=9m/2tiers, C=6m/2tiers)

TIME OPENED: 2045 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
no bats captured										

8/9/18

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: flying squirrel (southern) captured in Net B @ 2145

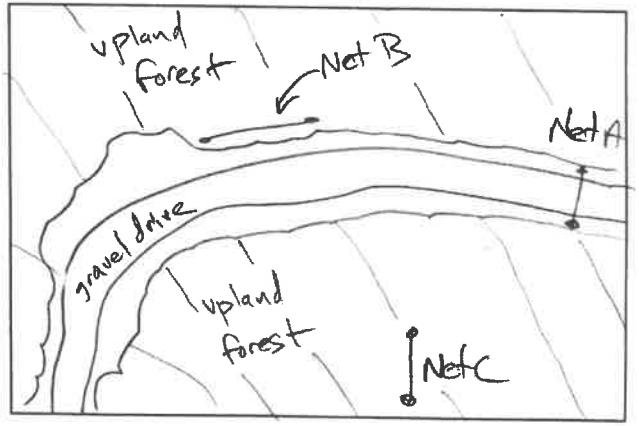
GENERAL COMMENTS:

A = 38.90067 / 79.84710 (2018')

B = 38.90054 / 79.84691 (2087')

C = 38.90070 / 79.84665 (2009')

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins' Airport COUNTY: Randolph WV SITE NO: 4

DATE: Aug 4 2018 Start Temp. (Time): 68° (2030) Finish Temp. (Time): 64°F, 0200

SKY CONDITIONS: Clear MOON PHASE last quarter

SITE DESCRIPTION: Bottomland w/ stream ; edge of mature woods (Mix oak, poplar, spruce)

OBSERVERS: Sean Nilan

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 Total (A: 6m x 2, B: 9m x 2, C: 4m x 2)

TIME OPENED: 2030 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
EPFU	2150	J	M	NR	15.0g	46.0mm	4m			Net B
EPFU	2316	J	F	NR	14.75g	45.0mm	4m			Net B

08/04/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

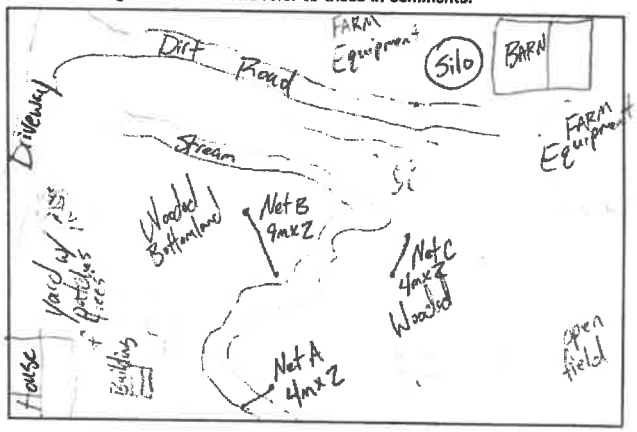
OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: ∅

OTHER SPECIES: Green frog, green tree frog, coyotes, muskrat

GENERAL COMMENTS: A: 38°53'5.4" 79°51'52.4" W
B: 38°53'4.3" 79°51'53 W
C: 38 53'4.5" 79°51'55W

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolph WV SITE NO: 4

DATE: Aug 5, 2018 Start Temp. (Time): 72°F (2030) Finish Temp. (Time): 60°F (0200)

SKY CONDITIONS: Clear MOON PHASE Waning Crescent

SITE DESCRIPTION: Bottomland w/ stream winding through small block of mainly oak, poplar, spruce, beech

OBSERVERS: Sean Nilan

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 Total (A: 6m x 2, B: 9m x 2, C: 4m x 2)

TIME OPENED: 2030 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
EPFU	21:00	J	F	NR	14.5	46mm	2m			Net A

08/05/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

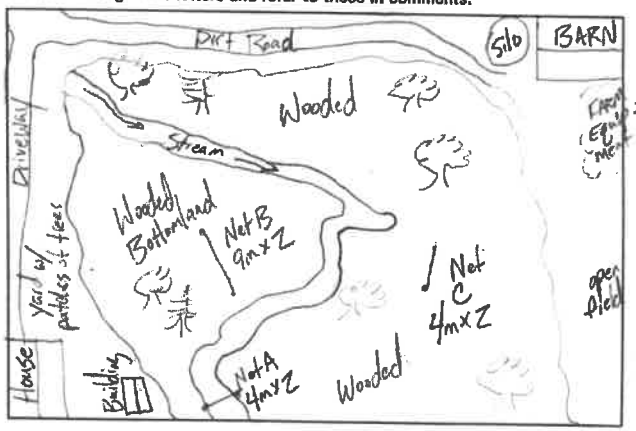
OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: Ø

OTHER SPECIES: Green tree frog, Green frog, screech owl

GENERAL COMMENTS: A: 38°53'5.4" 79°51'52.4"W
B: 38°53'4.3" 79°51'53" W
C: 38°53'4.5" 79°51'53"W

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolph WV SITE NO: 4

DATE: 08/06/2018 Start Temp. (Time): 71°F (2030) Finish Temp. (Time): 66°F (0200)

SKY CONDITIONS: Clear to start w/ few clouds to finish MOON PHASE

SITE DESCRIPTION: Mature block of mixed woods in lowland w/ stream winding through

OBSERVERS: Sean Vilar

ID BY: Hunter Stuart

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 total (A: 4m x 2, B: 9m x 2, C: 6m x 2)

TIME OPENED: 2030 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
No BATS										

08/06/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

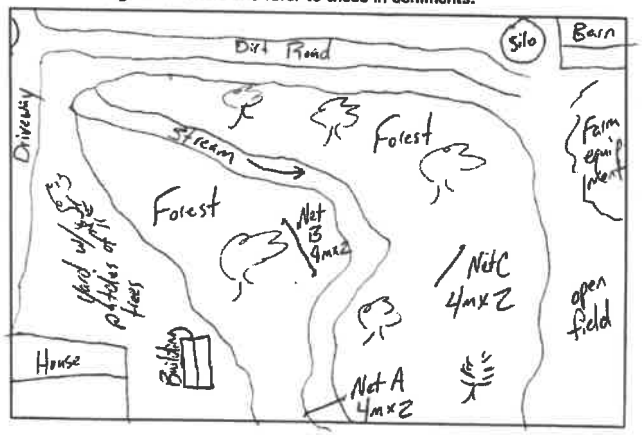
OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: Screech owl, white-tailed deer

GENERAL COMMENTS:

Sketch net configuration below. Assign nets letters and refer to these in comments.



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 5

DATE: 8/4/18 Start Temp. (Time): 2100 (72°) Finish Temp. (Time): 0200 (64°)

SKY CONDITIONS: Clear and calm MOON PHASE third quarter

SITE DESCRIPTION: riparian woodland with channel

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A=9m/2, B=5m/2, C=6m/2)

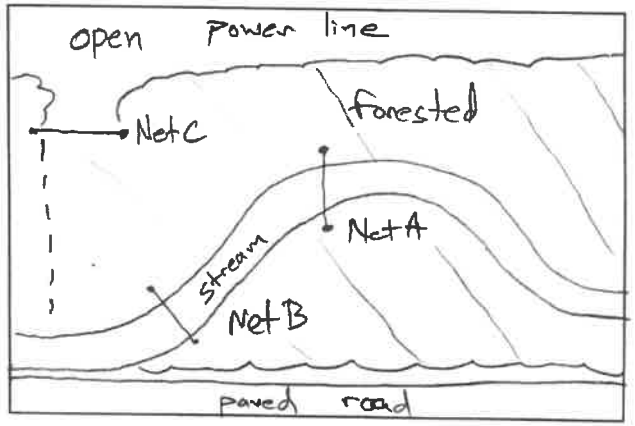
TIME OPENED: 2100 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
no bats captured										

8/4/18

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.



OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: opossum, whitetail deer, barred owl, coyote

GENERAL COMMENTS:

A = 38.88349 / 79.86214 (1940')
B = 38.88354 / 79.86240 (1940')
C = 38.88367 / 79.86244 (1971')

BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 5

DATE: 8/5/18 Start Temp. (Time): 2100 (68°) Finish Temp. (Time): 0200 (64°)

SKY CONDITIONS: clear and calm MOON PHASE last quarter

SITE DESCRIPTION: riparian woodland with meandering stream channel

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A = 9m/DBL, B = 5M/DBL, C = 6m/DBL)

TIME OPENED: 2050 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
no bats captured										

8/5/2018

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

Sketch net configuration below. Assign nets letters and refer to these in comments.

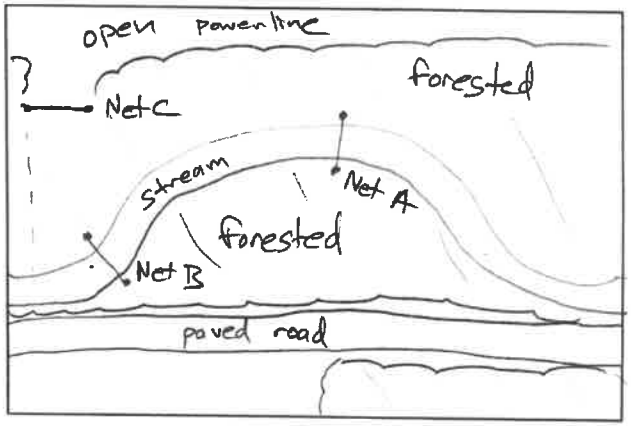
OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: opossum

GENERAL COMMENTS:

A = 38.88349 / 79.86214 (1940')
B = 38.88354 / 79.86240 (1940')
C = 38.88367 / 79.86244 (1971')



BAT SURVEY DATA FORM

SURVEY AREA: Elkins Airport COUNTY: Randolf WV SITE NO: 5

DATE: 8/6/2018 Start Temp. (Time): 2100, 72° Finish Temp. (Time): 0200, 68°

SKY CONDITIONS: clear and calm MOON PHASE Waning crescent

SITE DESCRIPTION: riparian woodland with meandering stream channel

OBSERVERS: Gary Libby

ID BY: Gary Libby

NUMBER OF NETS AT SITE (Lengths/Tiers): 3 (A = 9m/2 tiers, B = 5m/2, C = 6m/2)

TIME OPENED: 2050 TIME CLOSED: 0200

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments
no bats captured										

8/6/18

SPECIES	Time	Age	Sex	Repro. Cond.	Weight	Forearm Length	Height in Net	Band	Parasite	Comments

OTHER WILDLIFE NOTED:

NUMBER OF WHIP-POOR-WILLS HEARD: 0

OTHER SPECIES: opossum, gray tree frog

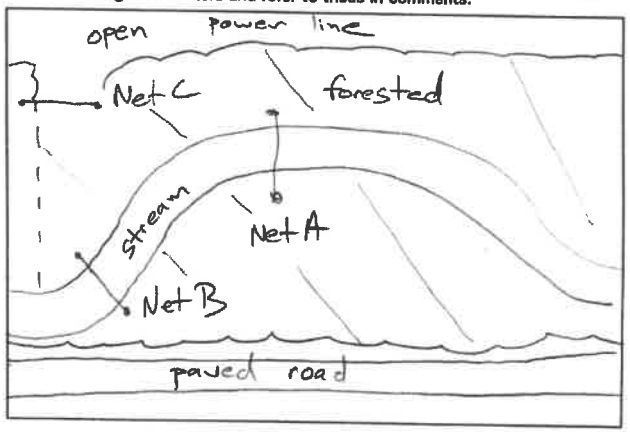
GENERAL COMMENTS:

A = 38.88349 / 79.86214 (1940')

B = 38.88334 / 79.86240 (1940')

C = 38.88367 / 79.86244 (1971')

Sketch net configuration below. Assign nets letters and refer to these in comments.





Site 1, Net A



Site 1, Net B



Site 1, Net C



Site 2, Net A



Site 2, Net B



Site 2, Net C



Site 2, Net D



Site 3, Net A



Site 3, Net B



Site 3, Net C



Site 4, Net A



Site 4, Net B



Site 4, Net C



Site 5, Net A



Site 5, Net B



Site 5, Net C



Big Brown Bat (*Eptesicus fuscus*) captured at Site 1



Eastern Red Bat (*Lasiurus borealis*) captured at Site 2

Defibaugh, Melissa

From: Selnick, Amanda <amanda_selnick@fws.gov>
Sent: Wednesday, October 31, 2018 9:40 AM
To: Defibaugh, Melissa
Subject: Re: [EXTERNAL] Elkins-Randolph County Regional Airport
Attachments: WV_Plant_Surveyors.pdf

Categories: Filed by Newforma

Good morning Melissa,

I apologize for the delay in responding to you about this. I reviewed Mr. Storm's qualifications, and he has not conducted small whorled pogonia surveys, nor any plant surveys in the state of West Virginia. His qualifications for Kentucky do not necessarily transfer to West Virginia. Additionally, I checked our model for potential suitable habitat for the small whorled pogonia, and there is a likelihood for suitable habitat in the majority of the obstruction areas (all obstruction areas north of the airport have some modeled suitable habitat). Therefore, I recommend that you have a qualified plant surveyor (our list is attached for your reference) conduct surveys for T&E plants within the entire project area to determine whether any federally listed plants occur within the areas to be cleared and grubbed. I understand that this recommendation may not align with your NEPA timeline; feel free to call me if you have any questions about this and we can determine the best path forward.

Thank you,

Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_selnick@fws.gov
http://www.fws.gov/westvirginiafieldoffice/index.html

On Mon, Oct 15, 2018 at 12:30 PM Selnick, Amanda <amanda_selnick@fws.gov> wrote:

Hi Melissa,

He did send them to me before I went on leave. I don't have good feedback on them for you yet; I need to check with other folks in my office, but his experience doesn't indicate that he has ever conducted T&E plant surveys in West Virginia, or ever surveyed for small whorled pogonia anywhere. I will get back to you on this.

Thanks,

Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive

Elkins, WV 26241
304-636-6586 x 24
amanda_selnick@fws.gov
http://www.fws.gov/westvirginiafieldoffice/index.html

On Fri, Sep 28, 2018 at 10:22 AM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Hope your wedding was wonderful! I was checking in with you to see if James had responded to your request for his plant survey qualifications?

Thanks so much!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

Defibaugh, Melissa

From: Susan.Stafford@faa.gov
Sent: Thursday, December 20, 2018 8:34 AM
To: amanda_selnick@fws.gov; Defibaugh, Melissa
Cc: Matthew.DiGiulian@faa.gov
Subject: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730
Attachments: EKN Obstruction Removal USFWS Letter (Signed).pdf

Categories: Filed by Newforma

Amanda,

Thank you for discussing the proposed obstruction removal and easement acquisition project at Elkins-Randolph County Regional Airport (EKN) with myself and Melissa Defibaugh, as well as providing us with modeling information on the probabilities of suitable habitat for the Small Whorled Pogonia. Attached is the Federal Aviation Administration effects determination letter for the proposed project at EKN (consultation code #2016-1-0730). A hard copy of this letter will be placed in today's mail.

Susan B. Stafford
Environmental Protection Specialist
Beckley Airports Field Office
176 Airport Circle, Rm 101
Beaver, WV 25813
304-252-6216 x 130

U.S. Department of Transportation
Federal Aviation Administration

Beckley Airports Field Office
176 Airport Circle, Room 101
Beaver, West Virginia 25813
Telephone: (304) 252-6216
FAX: (304) 253-8028

December 20, 2018

Ms. Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241

RE: Section 7 Consultation for Obstruction Removal on the Runway 5-23 Approaches at Elkins-Randolph County Regional Airport (EKN) (Consultation Code #2016-1-0730)

Dear Ms. Murnane,

Thank you for participating in a telephone conversation on December 3, 2018 with myself and Chapman Technical Group who is conducting an environmental assessment (EA) for a proposed obstruction removal project at EKN. As we discussed, EKN is a county owned and operated facility that is part of the National Plan of Integrated Airport Systems (NPIAS). As part of the NPIAS, the Airport is required to meet 39 Federal Aviation Administration (FAA) grant assurances any time they accept federal funding for projects under the Airport Improvement Program (AIP). Failure to address the removal of obstructions to air navigation would result in the Airport violating three of these grant assurances.

- *Grant Assurance 19 (Operations and Maintenance):* The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal, state and local agencies for maintenance and operation.
- *Grant Assurance 20 (Hazard Removal and Mitigation):* Take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.
- *Grant Assurance 21 (Compatible Land Use):* Take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to, or in the immediate vicinity of, the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft.

EKN is pursuing AIP funds to address several obstruction areas based on the Airport's latest obstruction data, to maintain approach surfaces to Runway 5-23. These areas include clearing +/- 16.14 acres and trimming +/-12.37 acres of trees from the Runway 23 approach surface and clearing +/-2.56 acres and trimming +/-1.76 acres of trees from the Runway 5 approach surface (Attachment 1). The project will also require removal of two light structure obstructions and lowering the top elevation of three silos within the Runway 5 approach surface. The obstruction removal areas are located over 43 parcels and primarily consist of private property. Only +/- 0.87 acre of obstructions are located on airport property and occur within the Runway 5 approach surface.

The proposed action will also consist of acquiring permanent avigation easements on private property to aid in the obstruction removal effort and to allow the Airport Authority to exercise a greater level of control over their current and planned airspace. These avigation easements will allow for future obstruction maintenance activities and restrict types of development that can occur within these obstruction removal areas to prevent future penetrations to the airport's airspace. Actions occurring on private property will be negotiated with each of the private property owners.

Per our December 3, 2018 telephone conversation regarding the FAA's Section 7 consultation obligations under the Endangered Species Act, we are requesting your concurrence with our assessment and determination of potential effects associated with the proposed action on Federally-listed threatened and endangered species and their critical habitats.

Federally-Threatened and Endangered Species

The threatened and endangered species listed by the United States Fish and Wildlife Service (USFWS) that may occur, or could potentially be affected by, the proposed action include:

Species	**Designation**	**Critical Habitat Designated**
Indiana Bat *(Myotis sodalist)*	Endangered	No
Northern Long-eared Bat *(Myotis septentrionalis)*	Threatened	No
Virginia Big-eared Bat *(Corynorhinus townsendii virginianus)*	Endangered	Yes
Small Whorled Pogonia *(Isotria medeoloides)*	Threatened	No
Running Buffalo Clover *(Trifolium stoloniferum)*	Endangered	No

Mammals

A habitat assessment of the obstruction removal areas was performed in December and February 2017 to determine suitable habitat for the three listed bat species. The assessment determined that suitable habitat is present for the Indiana Bat and Northern Long-eared Bat. Both suitable and critical habitat for the Virginia Big-eared Bat is not present within the obstruction removal areas; therefore, this species will not be affected by the proposed action. The USFWS responded by email on May 12, 2017 with a suggestion to complete an Indiana Bat Conservation Plan, conduct mist net surveys, or minimize the required tree clearing below seventeen (17) acres if possible (Attachment 2).

Plants

A habitat assessment was also performed for plant species. The USFWS responded by email on May 12, 2017 with a suggestion to complete a plant survey for the Small Whorled Pogonia (Attachment 2). Through additional coordination with the USFWS, only obstruction removal areas occurring within the Runway 23 approach surface (2, 3, 4, and 5) are shown through modeling to have a higher probability of containing suitable habitat (Attachment 3).

Effects Determinations

Mammals

FAA has determined that the proposed action warrants a ***May Affect, Not Likely to Adversely Affect*** for the **Indiana Bat**.

A determination of ***May Affect*** is warranted for the proposed action based on the following rationale:

- The presence of potentially suitable habitat within the obstruction removal areas.

A determination of ***Not Likely to Adversely Affect*** is warranted for the proposed action based on the following rationale:

- A Mist Net Survey Plan was submitted to the USFWS on July 18, 2018.
- A *Concurrence Form for Myotid Bat Study Plan – Mist Netting* was issued by the USFWS on July 20, 2018 based on the submitted plan.
- A mist net survey was conducted for the proposed action at five (5) sites for three (3) nights each (15 net-nights) between July 30 and August 9, 2018 and submitted to the USFWS on August 20, 2018.
- A total of 11 bats were captured during mist net surveys. Captured bat species were limited to Big Brown Bats (n=8) and Eastern Red Bats (n=3).
- No endangered or threatened bat species were captured.
- The proposed action is not located within USFWS designated Indiana Bat hibernacula or summer use buffers.
- Time of restrictions will be employed to limit disturbance. Clearing and trimming will be limited to November 15 through March 31.

FAA has also determined that the proposed action warrants a ***May Affect, Not Likely to Adversely Affect*** for the **Northern Long-eared Bat**.

A determination of ***May Affect*** is warranted for the proposed action based on the following rationale:

- The presence of potentially suitable habitat within the obstruction removal areas.

A determination of ***Not Likely to Adversely Affect*** is warranted for the proposed action based on the following rationale:

- A Mist Net Survey Plan was submitted to the USFWS on July 18, 2018.
- A *Concurrence Form for Myotid Bat Study Plan – Mist Netting* was issued by the USFWS on July 20, 2018 based on the submitted plan.

- A mist net survey was conducted for the proposed action at five (5) sites for three (3) nights each (15 net-nights) between July 30 and August 9, 2018 and submitted to the USFWS on August 20, 2018.
- A total of 11 bats were captured during mist net surveys. Captured bat species were limited to Big Brown Bats (n=8) and Eastern Red Bats (n=3).
- No endangered or threatened bat species were captured.
- Because the project is not located within a half mile of a known Northern Long-eared Bat hibernacula, or within a quarter mile of a known Northern Long-eared Bat summer maternity roost tree, it is covered under the USFWS's 4(d) rule and as such, compensatory mitigation and seasonal tree clearing restrictions are not required for impacts to Northern Long-eared Bat habitat.

Plants

The FAA has determined that the proposed action warrants a ***May Affect, Not Likely to Adversely Affect*** for the **Small Whorled Pogonia**. According to the USFWS 1992 Recovery Plan and subsequent 5-year Review, the Small Whorled Pogonia is a species with a low degree of threat and high recovery potential. It is a species with wide population fluctuations, with dormancy that can last for at least four (4) years, which make assessment of their presence and viability difficult. Characteristics of the species preferred habitat include sparse to moderate ground cover, a relatively open understory, proximity to logging roads, streams, or other features that create a certain level of disturbance resulting in long persisting breaks in the forest canopy. Decaying vegetable material such as fallen trunks and limbs, leaf and frond litter, bark, stumps, and roots may also be important for the species habitat.

A determination of ***May Affect*** is warranted for the proposed action based on the following rationale:

- The presence of potentially suitable habitat within the obstruction removal areas.

A determination of ***Not Likely to Adversely Affect*** is based on the following rationale:

- A combination of trimming and cutting in the obstruction removal areas will limit disturbance and provide habitat by reducing the canopy and creating canopy breaks.
- Based on the outcome of property owner negotiations, no grubbing/leaving stumps and select limbs in place in currently wooded areas will limit disturbance and provide habitat.
- Limited disturbance associated with tree trimming and cutting, and any required/negotiated access/logging roads, may improve the overall habitat.
- Time of restrictions employed for the Indiana Bat will limit disturbance to dormancy.
- Avigation easements on obstruction removal areas may provide partial habitat protection.

The FAA has also determined that the proposed action warrants a ***May Affect, Not Likely to Adversely Affect*** for **Running Buffalo Clover**. According to the USFWS 2007 Revised Recovery Plan and the subsequent 5-Year Reviews, Running Buffalo Clover has a moderate degree of threat and a high recovery potential. It occurs in two distinct habitats, shaded lawn and mesic forest. Plants may not appear in the exact location from year to year due to their clonal nature and seed banking abilities. In West Virginia, Running Buffalo Clover seems to occur more frequently on old logging roads, off-road vehicle (ORV) trails, hawthorne thickets, grazed woodlands, jeep trails, railroad grades, game trails, and old fields succeeding to mesic woodlands. The larger occurrences exist within a matrix of mesophytic deciduous forest. All

populations are associated with light to moderate disturbance such as occasional ORV traffic, stream scour, grazing, or foot-traffic. Current logging practices may benefit Running Buffalo Clover. In a study performed at Fernow Experimental Forest in West Virginia, logging-related disturbances greatly contribute to the presence of Running Buffalo Clover within the Forest. Additionally, the study found that interactions between canopy structure, basal tree area, and disturbance history determined Running Buffalo Clover patch abundance.

A determination of ***May Affect*** is warranted for the proposed action based on the following rationale:

- The presence of potentially suitable habitat within the obstruction removal areas.

A determination of ***Not Likely to Adversely Affect*** is based on the following rationale:

- A combination of trimming and cutting in the obstruction removal areas will limit disturbance and provide habitat by reducing the canopy and creating canopy breaks.
- Based on the outcome of property owner negotiations, no grubbing/leaving stumps in place in currently wooded areas will limit disturbance.
- Limited disturbance associated with tree trimming and cutting, and any required/ negotiated access/logging roads, may improve the overall habitat.
- Time of restrictions employed for the Indiana Bat will limit disturbance to dormancy.
- Avigation easements on obstruction removal areas may provide partial habitat protection.

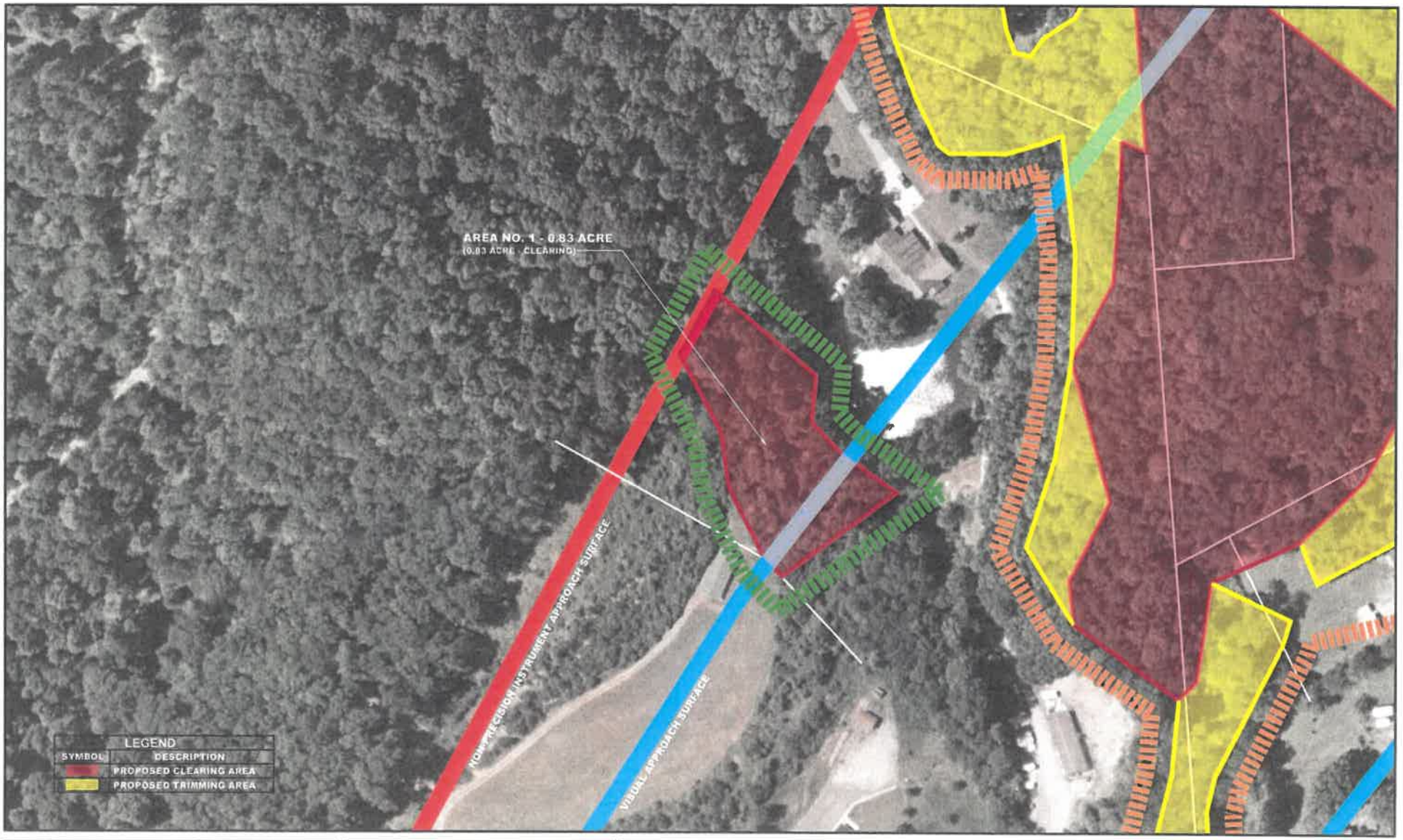
Sincerely,



Susan B. Stafford
Environmental Protection Specialist
Beckley Airports Field Office

ATTACHMENT 1

Obstruction Removal Areas



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-4991
Buckhannon, WV (304) 472-5914
Martinsburg, WV (304) 268-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN
AREA NO. 1

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	19003
SCALE	1" = 50'
DATE	MAY 2017
DRAWN BY	S. TUCKER
REVIEWED BY	S. TUCKER
CHECKED BY	S. TUCKER

SHEET NO. 2.1a
REVISION 1



REVISIONS		

Chapman Technical Group
a division of CHPW

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

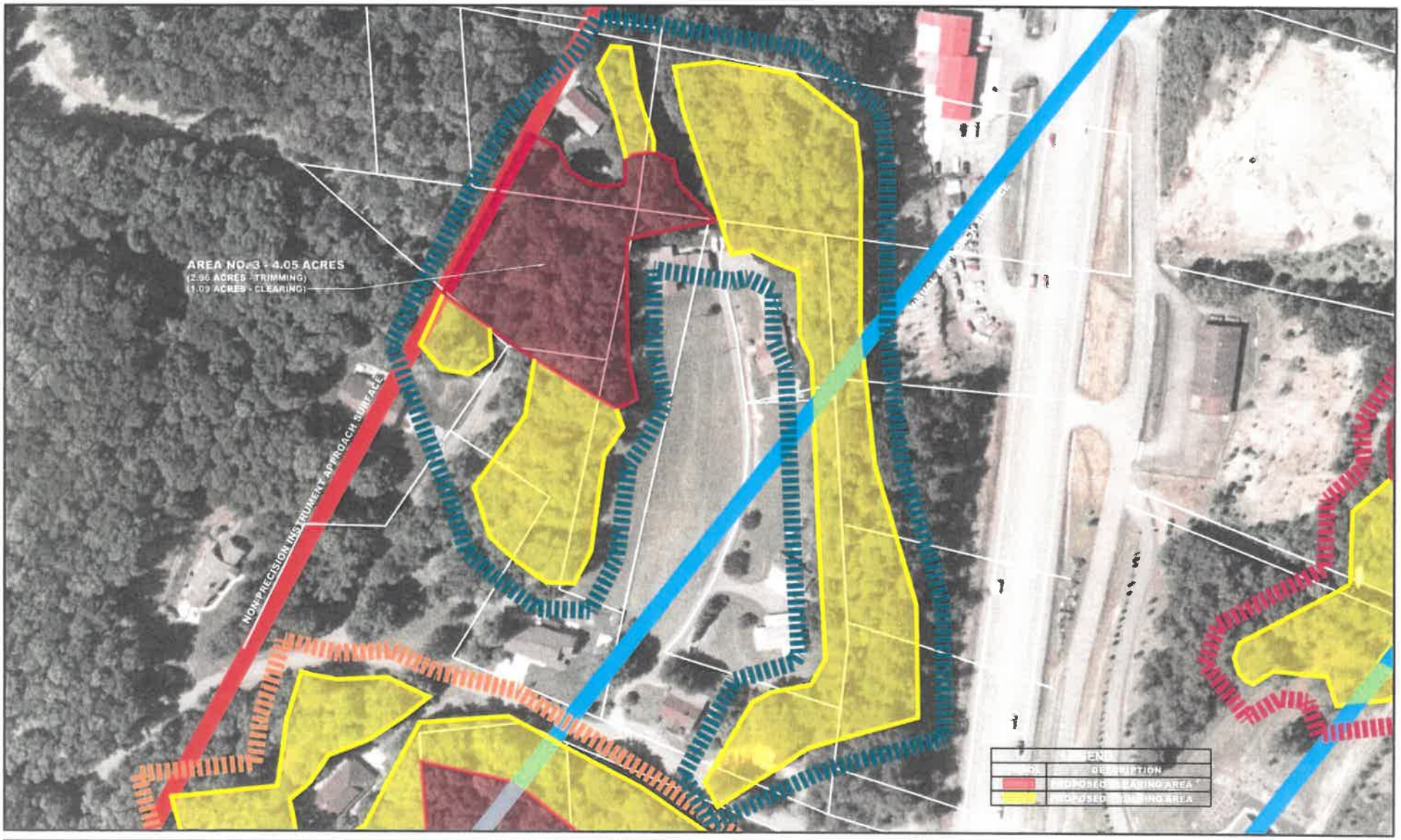
St. Albans, WV (304) 727-0801
Buckhannon, WV (304) 473-6914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN
AREA NO. 2

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER:	16003
SCALE:	1" = 80'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	2.1b



REVISION NUMBER	REVISIONS	DRAWN	BY

Chapman Technical Group
a division of CHA CONSULTING

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

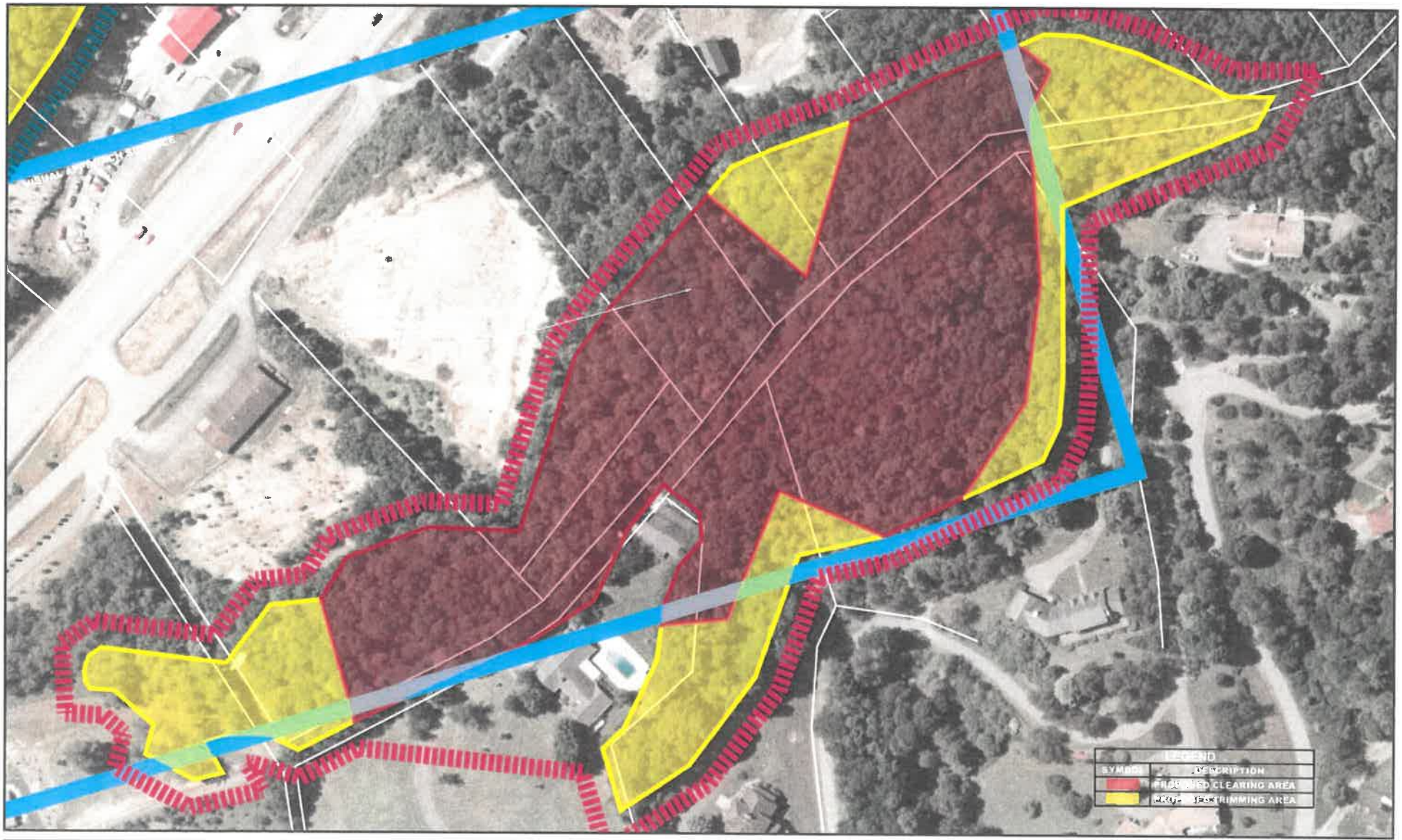
St. Albans, WV (304) 727-2991
Buckhannon, WV (304) 472-2814
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN
AREA NO. 3

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	180331
SCALE	1" = 80'
DATE	MAY 2017
DRAWN BY	S. TUCKER
REVIEWED BY	S. TUCKER
CHECKED BY	S. TUCKER
SHEET NO.	2.1c



REVISION NUMBER	REVISIONS	BY	DATE

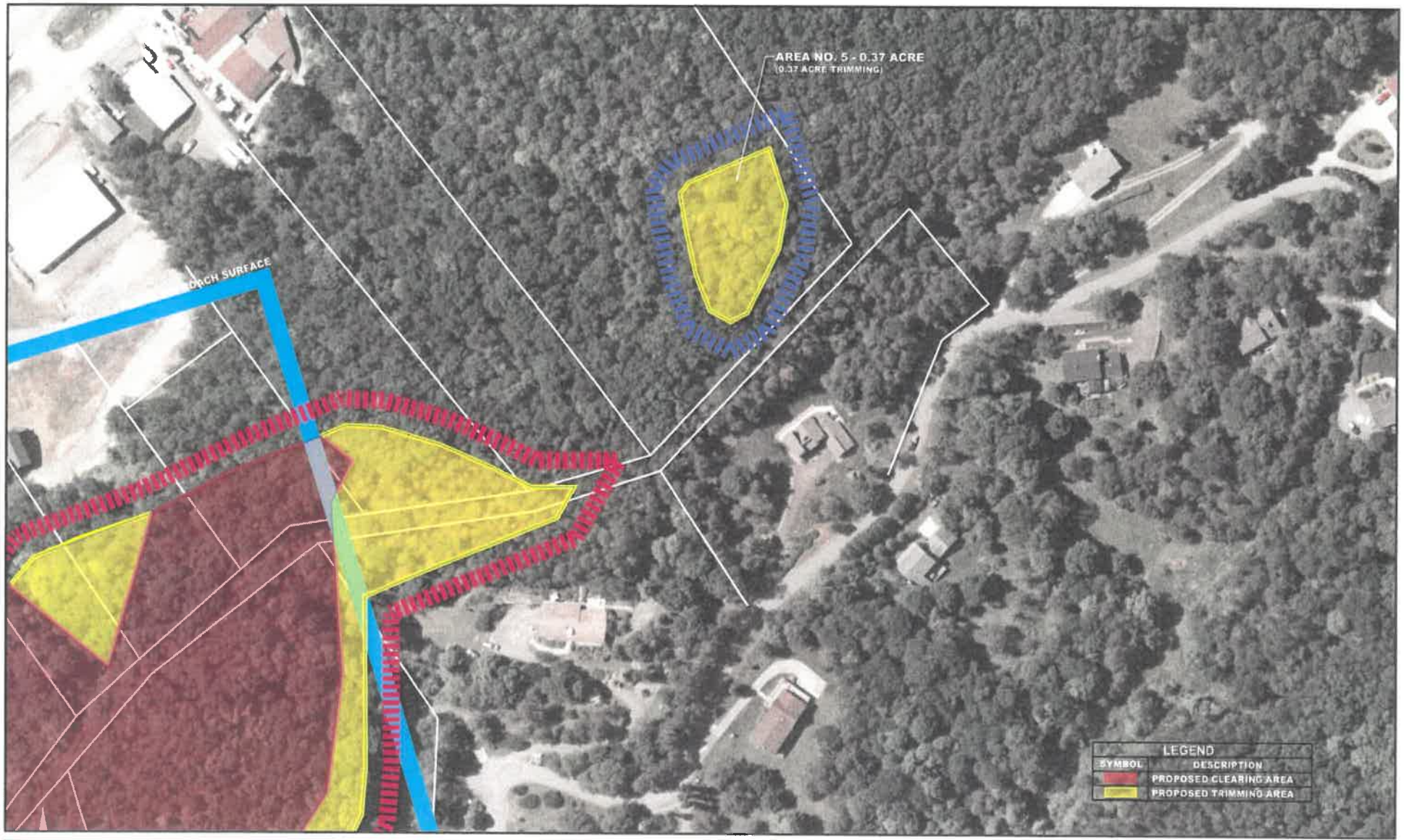
Chapman Technical Group
a division of CHA
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-3501
Beckley, WV (304) 672-9814
Martinsburg, WV (304) 268-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN
AREA NO. 4

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER	160033
SCALE	1" = 80'
DATE	MAY 2017
DRAWN BY	S. TUCKER
CHECKED BY	S. TUCKER
CHECKED BY	S. TUCKER
SHEET NO.	2.1d
REVISION	A



REVISIONS			

Chapman Technical Group
a division of CHA

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-6911
Martinsburg, WV (304) 260-1222
www.chaptech.com

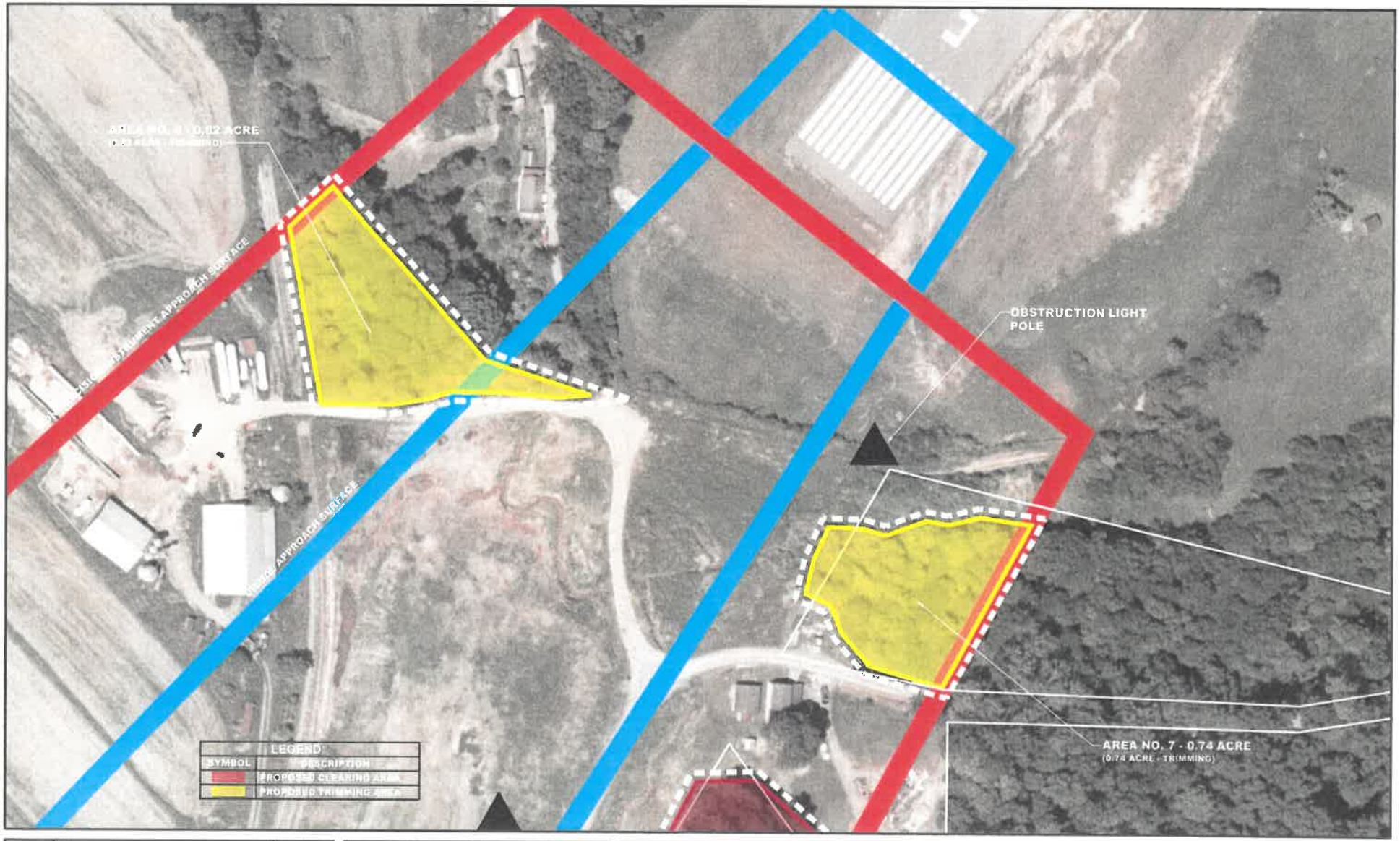
PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN
AREA NO. 5

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER	150XX
SCALE	1" = 80'
DATE	MAY 2017
DRAWN BY	S. TUCKER
DESIGNED BY	S. TUCKER
CHECKED BY	S. TUCKER

SHEET NO. 2.1e
REVISION



REVISIONS	BY	BY

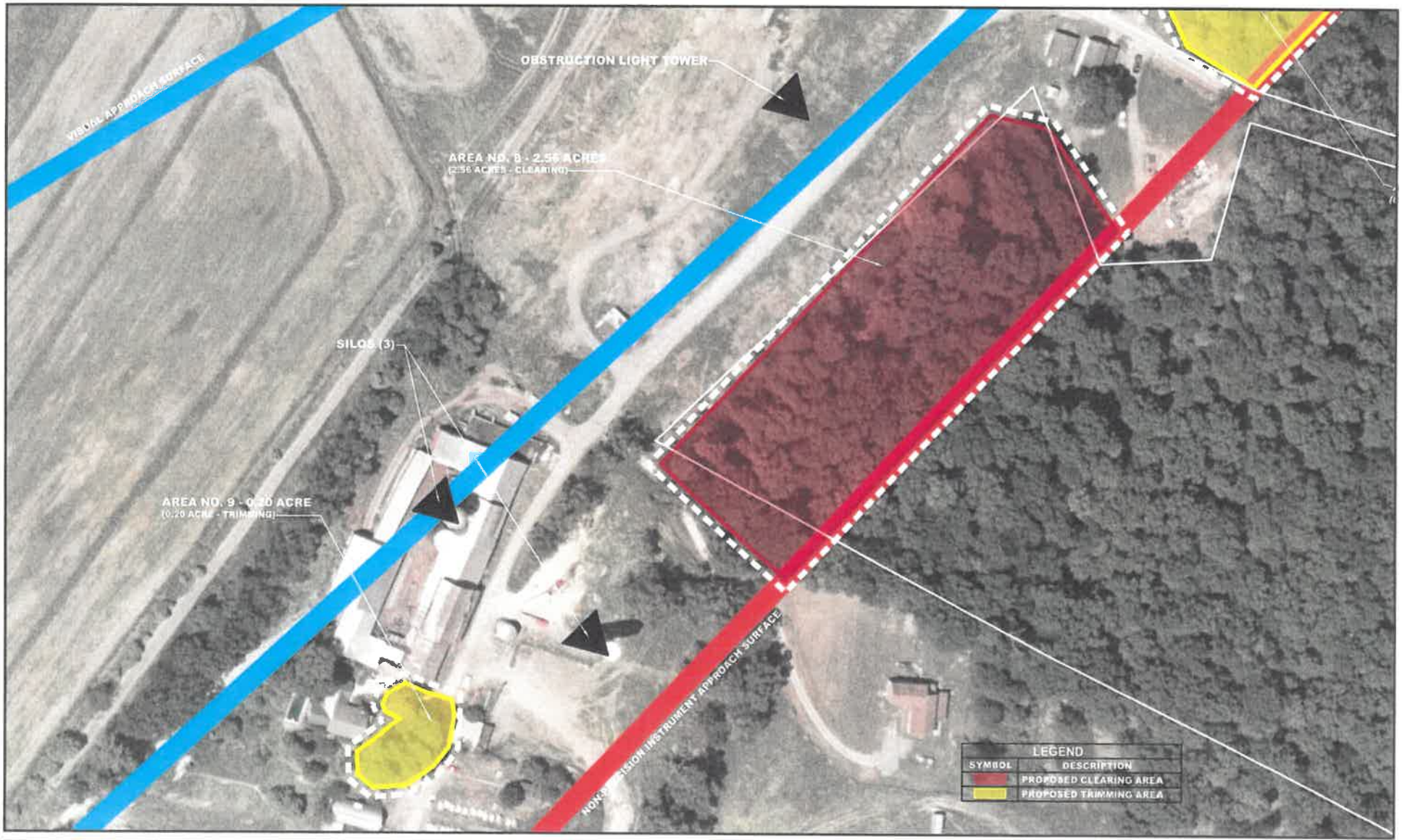
Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-4501
Buckhannon, WV (304) 473-8914
Martinsburg, WV (304) 263-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 6 APPROACH SITE PLAN
AREA NO. 6 & AREA NO. 7

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER:	16033
SCALE:	1" = 50'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	2.2a



REVISION NUMBER	REVISIONS	DATE	BY

Chapman Technical Group, a division of Chapman Group

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV (304) 727-6801
Buckhannon, WV (304) 473-6914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 5 APPROACH SITE PLAN
AREA NO. 8 & AREA NO. 9

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER	18003
SCALE	1" = 50'
DATE	MAY 2019
DRAWN BY	S. TUCKER
REVIEWED BY	S. TUCKER
CHECKED BY	S. TUCKER

SHEET NO. 2.2b

ATTACHMENT 2

May 12, 2017 USFWS Correspondence

Defibaugh, Melissa

From: Selnick, Amanda <amanda_selnick@fws.gov>
Sent: Friday, May 12, 2017 2:31 PM
To: Shawn Tucker
Subject: Re: Elkins-Randolph County Regional Airport Authority

Categories: Filed by Newforma

Hi Shawn,

I had reviewed that document before we met, but we don't provide concurrence on habitat assessments alone. We provide technical assistance with regards to a completed Indiana Bat Conservation Plan (which I don't believe has been developed). Since we haven't seen a bat survey plan or plant survey plan, we can't provide concurrence for those either. All I can provide the sub-consultant at this point is that we agree with the suggestion to either do an IBCP or mist net surveys (or to minimize tree clearing to below 17 acres if possible, as we had discussed when we met) and the suggestion to do a plant survey for SWP. If this email isn't enough then I can draft up a technical assistance letter stating those suggestions.

Thanks,

Amanda Selnick
Student Trainee (Biological Sciences)
U.S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241
304-636-6586 x 24
amanda_selnick@fws.gov
http://www.fws.gov/westvirginiafieldoffice/index.html

On Fri, May 12, 2017 at 2:18 PM, Shawn Tucker <stucker@chaptech.com> wrote:

Hi Amanda,

Attached is a copy of the habitat assessment for the obstruction removal areas at the Elkins-Randolph County Regional Airport. I just realized that I had not previously sent you a copy. Could you look over the attached document and see if you could provide some form of concurrence? I believe we need some documentation of concurrence before our sub-consultant can forward you their survey plan for review/acceptance. If you should have any questions, please let me know. Hope you have a good weekend.

Thanks,

Shawn Tucker, P.E.

Project Manager
Chapman Technical Group

ATTACHMENT 3

December 14, 2018 USFWS Correspondence

From: Selnick, Amanda [mailto:amanda_selnick@fws.gov]
Sent: Friday, December 14, 2018 9:15 AM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Subject: Re: [EXTERNAL] Elkins-Randolph County Regional Airport

Thank you Melissa. According to our model, Areas 2, 3, 4 and 5 have the higher probability of having suitable habitat for small whorled pogonia (i.e. above the threshold value set by the model that indicates likelihood of suitable habitat being present).

Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_selnick@fws.gov
http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 12/13-14

On Mon, Dec 3, 2018 at 2:59 PM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Per our earlier conversation. Thanks so much for all of your help!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

Defibaugh, Melissa

From: Murnane, Amanda <amanda_murnane@fws.gov>
Sent: Friday, March 29, 2019 2:53 PM
To: Susan.Stafford@faa.gov
Cc: Amanda Selnick; Defibaugh, Melissa; Matthew.DiGiulian@faa.gov
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730
Attachments: WV_Plant_Surveyors.pdf; Protocol_Listed_Plant_Surveys.pdf

Categories: Filed by Newforma

Hi Susan,

This week I was able to review this project with the WVDNR's state botanist. They have the most up-to-date information on species occurrence data and habitat suitability models. Because there is a known population of small whorled pogonia within 2.5 miles of the project area, and there is modeled suitable habitat within the project area, we cannot concur with an effects determination without having a qualified botanist survey the area to determine whether the plants are present and may be affected by project activities. We recommend that you select a qualified botanist to conduct a rare plant survey during the appropriate survey window (guidelines attached). The qualified surveyor should look for small whorled pogonia, running buffalo clover, and other rare plants throughout the entire project area.

Please let me know if you have any questions or need additional information.

Thank you,

Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_murnane@fws.gov ***(Please note the change in email address)***
http://www.fws.gov/westvirginiafieldoffice/index.html

On Wed, Mar 27, 2019 at 7:49 AM <Susan.Stafford@faa.gov> wrote:

> Amanda,
>
> I'm checking back in to see if you could provide a status update on the proposed obstruction removal project at Elkins-Randolph County Regional Airport (Consultation Code 2016-1-0730).
>
> Thank you,

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

From: Murnane, Amanda <amanda_murnane@fws.gov>
Sent: Thursday, February 21, 2019 4:30 PM
To: Stafford, Susan (FAA) <Susan.Stafford@faa.gov>
Cc: Amanda Selnick <amanda_selnick@fws.gov>; MDefibaugh@chaptech.com; DiGiulian, Matthew (FAA) <Matthew.DiGiulian@faa.gov>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Susan,

You are correct in that we are very backlogged due to the furlough. I don't have a status update for you but I hope to get to it as soon as I can.

Thank you,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 2/17; 2/19 to 2/21

On Wed, Feb 20, 2019 at 10:56 AM <Susan.Stafford@faa.gov> wrote:

Amanda,

I was curious if you have a status update on the attached letter regarding the proposed obstruction removal project at Elkins-Randolph County Regional Airport (Consultation Code 2016-1-0730). I'm sure the workload has been backed up as a result of the furlough.

Thank you,

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

From: Stafford, Susan (FAA)
Sent: Thursday, December 20, 2018 8:34 AM
To: 'amanda_selnick@fws.gov' <amanda_selnick@fws.gov>; 'Defibaugh, Melissa' <MDefibaugh@chaptech.com>
Cc: DiGiulian, Matthew (FAA) <Matthew.DiGiulian@faa.gov>
Subject: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Amanda,

Thank you for discussing the proposed obstruction removal and easement acquisition project at Elkins-Randolph County Regional Airport (EKN) with myself and Melissa Defibaugh, as well as providing us with modeling information on the probabilities of suitable habitat for the Small Whorled Pogonia. Attached is the Federal Aviation Administration effects determination letter for the proposed project at EKN (consultation code #2016-1-0730). A hard copy of this letter will be placed in today's mail.

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

Defibaugh, Melissa

From: Defibaugh, Melissa
Sent: Wednesday, May 29, 2019 8:46 AM
To: 'Gary Libby'
Subject: FW: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730
Attachments: PlantProcedures2019.pdf

Categories: Filed by Newforma

Gary-

I received this email yesterday. You have been approved by USFWS. We are working through property access with the attorney currently. When do you think that you might be available to conduct the survey?

Thanks so much!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Tuesday, May 28, 2019 1:21 PM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

No, I don't need a new study plan - but please be aware that we've also updated our reporting guidelines and Mr. Libby should follow these if he is not aware of the changes. We're still working on distributing these to all of the qualified surveyors.

Thanks,

Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_murnane@fws.gov ***(Please note the change in email address)***
http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 5/28-31

On Tue, May 28, 2019 at 1:16 PM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Thanks so much! Do I need to submit a survey plan or anything for your review prior to initiating the survey?

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Tuesday, May 28, 2019 1:13 PM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Melissa,

The WVDNR and USFWS has updated our list of qualified surveyors - Mr. Libby is now approved for both RBC and SWP and we will accept his results for surveying the airport's obstruction removal areas.

Thanks,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 5/28-31

On Wed, May 8, 2019 at 2:15 PM Murnane, Amanda <amanda_murnane@fws.gov> wrote:

Hi Melissa - just running buffalo clover and small whorled pogonia.

Thanks,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 5/5 to 5/9

On Wed, May 8, 2019 at 1:43 PM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Good afternoon! Can you provide me a list of the plants that need to be included in our plant survey for the Elkins-Randolph County Regional Airport?

Thank you!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Thursday, May 2, 2019 1:08 PM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Cc: Susan.Stafford@faa.gov
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Melissa,

Thank you for submitting the proposal. Mr. Libby is not currently on our list of surveyors qualified to conduct T&E plant surveys in West Virginia. If he is intending to subcontract someone who is qualified, then we would need to have that information up front. The list of qualified surveyors is currently being reviewed by the state botanist and our endangered species biologist, and it sounds as though Mr. Libby has submitted his qualifications but he has not been reviewed for this iteration of the list. The 2019 list should be ready within the next few weeks if you wish to have more individuals to choose from. I recommend that you choose an individual from the 2016 list (or wait until the 2019 list is ready) in order for the survey results to be reviewed quickly.

Thank you,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

On Thu, May 2, 2019 at 11:44 AM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Good morning! Please find attached a proposal from Skybax Ecological Services for the rare plant survey requested for the project at the Elkins-Randolph County Regional Airport. If you could please review and advise if this will be appropriate for the rare plant survey as requested, I would appreciate it very much.

Thank you!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn **Subscribe to Our Client E-Newsletter**

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Friday, March 29, 2019 2:53 PM
To: Susan.Stafford@faa.gov
Cc: Amanda Selnick <amanda_selnick@fws.gov>; Defibaugh, Melissa <MDefibaugh@chaptech.com>; Matthew.DiGiulian@faa.gov
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Susan,

This week I was able to review this project with the WVDNR's state botanist. They have the most up-to-date information on species occurrence data and habitat suitability models. Because there is a known population of small whorled pogonia within 2.5 miles of the project area, and there is modeled suitable habitat within the project area, we cannot concur with an effects determination without having a qualified botanist survey the area to determine whether the plants are present and may be affected by project activities. We recommend that you select a qualified botanist to conduct a rare plant survey during the appropriate survey window (guidelines attached). The qualified surveyor should look for small whorled pogonia, running buffalo clover, and other rare plants throughout the entire project area.

Please let me know if you have any questions or need additional information.

Thank you,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

On Wed, Mar 27, 2019 at 7:49 AM <Susan.Stafford@faa.gov> wrote:

Amanda,

I'm checking back in to see if you could provide a status update on the proposed obstruction removal project at Elkins-Randolph County Regional Airport (Consultation Code 2016-1-0730).

Thank you,

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

From: Murnane, Amanda <amanda_murnane@fws.gov>
Sent: Thursday, February 21, 2019 4:30 PM
To: Stafford, Susan (FAA) <Susan.Stafford@faa.gov>
Cc: Amanda Selnick <amanda_selnick@fws.gov>; MDefibaugh@chaptech.com; DiGiulian, Matthew (FAA) <Matthew.DiGiulian@faa.gov>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Susan,

You are correct in that we are very backlogged due to the furlough. I don't have a status update for you but I hope to get to it as soon as I can.

Thank you,

Amanda (Selnick) Murnane

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

West Virginia Field Office

90 Vance Drive

Elkins, WV 26241

304-636-6586 x 24

amanda_murnane@fws.gov ***(Please note the change in email address)***

http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 2/17; 2/19 to 2/21

On Wed, Feb 20, 2019 at 10:56 AM <Susan.Stafford@faa.gov> wrote:

Amanda,

I was curious if you have a status update on the attached letter regarding the proposed obstruction removal project at Elkins-Randolph County Regional Airport (Consultation Code 2016-1-0730). I'm sure the workload has been backed up as a result of the furlough.

Thank you,

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

From: Stafford, Susan (FAA)
Sent: Thursday, December 20, 2018 8:34 AM
To: 'amanda_selnick@fws.gov' <amanda_selnick@fws.gov>; 'Defibaugh, Melissa' <MDefibaugh@chaptech.com>
Cc: DiGiulian, Matthew (FAA) <Matthew.DiGiulian@faa.gov>
Subject: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Amanda,

Thank you for discussing the proposed obstruction removal and easement acquisition project at Elkins-Randolph County Regional Airport (EKN) with myself and Melissa Defibaugh, as well as providing us with modeling information on the probabilities of suitable habitat for the Small Whorled Pogonia. Attached is the Federal Aviation Administration effects determination letter for the proposed project at EKN (consultation code #2016-1-0730). A hard copy of this letter will be placed in today's mail.

Susan B. Stafford

Environmental Protection Specialist

Beckley Airports Field Office

176 Airport Circle, Rm 101

Beaver, WV 25813

304-252-6216 x 130

Rare Plant Survey for the Elkins-Randolph County Regional Airport, West Virginia



SKYBAX ECOLOGICAL SERVICES

PO Box 1093
Berea, KY 40403
(859) 302-2897

October 11, 2019

I. INTRODUCTION

The Elkins – Randolph County Regional Airport is proposing tree clearing and trimming at 9 locations, encompassing about 30 acres (see attached maps). Skybax Ecological Services, LLC, (Gary W. Libby), Berea, KY, was contracted by Chapman Technical Group, Buckhannon, WV, to conduct surveys for rare plants in these areas. The target listed species for this survey were *Isotria medeoloides* (Small whorled pogonia) (Federally Threatened) and *Trifolium stoloniferum* (Running buffalo clover) (Federally Endangered).

II. STUDY AREA

The study area is located adjacent to the Elkins – Randolph County Regional Airport in Elkins, West Virginia (see attached maps). This area is situated within the Allegheny Mountain and Upland Section of West Virginia. The forest is classified as Northern Hardwood cover type.

III. METHODS

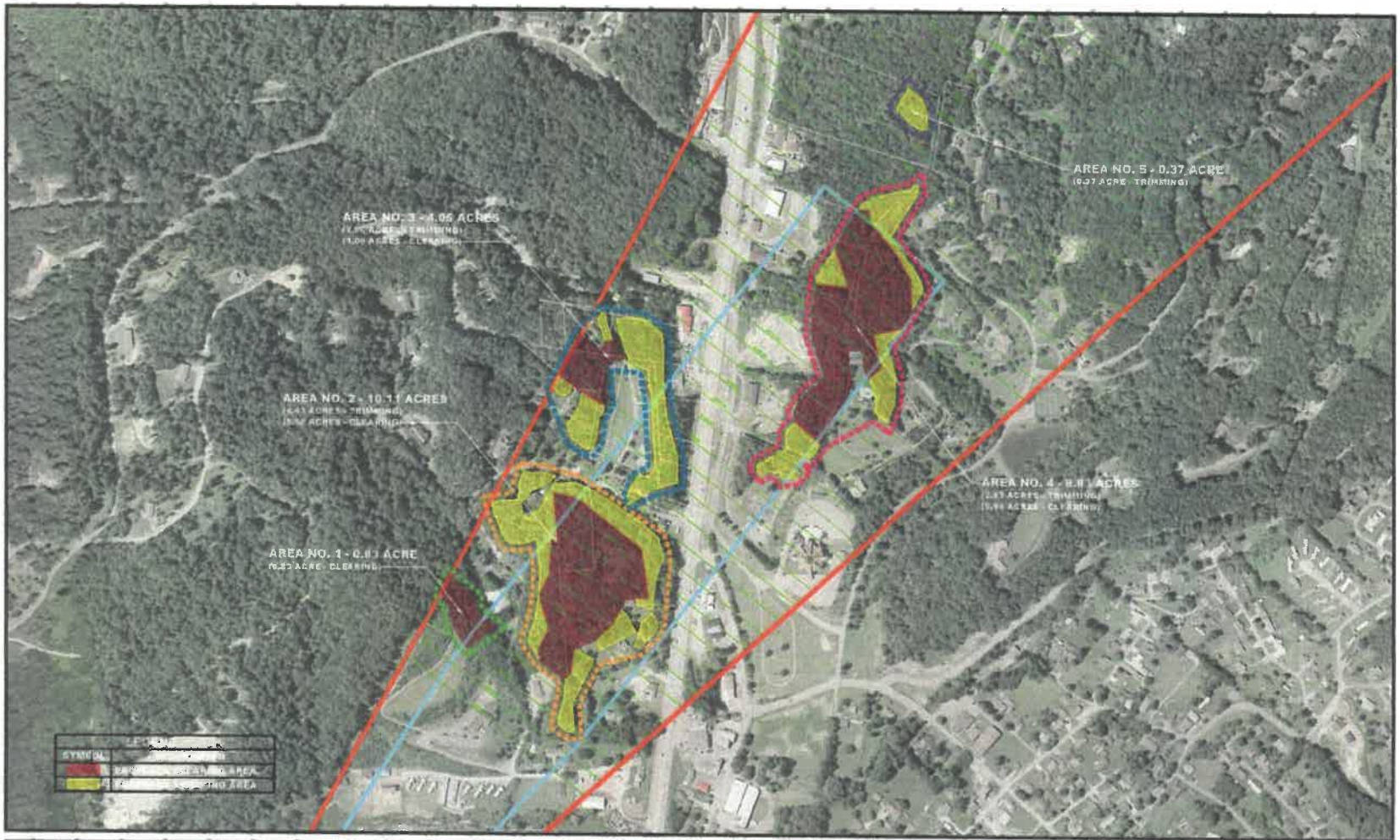
A thorough search of the nine (9) areas was completed during the appropriate season (May 1 – September 30) by the author, Gary W. Libby, a qualified plant surveyor in West Virginia (resume attached). Surveys were conducted following the U.S. Fish and Wildlife Service Species Survey Guidelines for *Isotria medeoloides* (Small whorled pogonia) and *Trifolium stoloniferum* (Running buffalo clover): Procedures for Conducting Surveys for Federally Threatened or Endangered Plants in West Virginia (USFWS concurrence attached). Field surveys were conducted by walking through the areas and documenting the flora while carefully looking for the target listed species on July 16th and 17th, and September 9th, 2019. A list of the vascular plants encountered, descriptions of the areas, and photograph documentation of the areas and any species in the same genus as the target species was completed.

IV. RESULTS

A description of each area (9 total), a list of the vascular plant species encountered, and photograph documentation of the area and species in the same genus as the target species follows this narrative. Neither Small whorled pogonia nor Running buffalo clover were encountered in the study area.

V. CONCLUSION

No *Isotria medeoloides* (Small whorled pogonia) (Federally Threatened) or *Trifolium stoloniferum* (Running buffalo clover) (Federally Endangered) were found during field surveys conducted in the study area. The proposed tree clearing and trimming is not likely to affect the continued existence of these species. This report should be submitted to the USFWS Elkins Field Office, WV, for concurrence of findings.



mark/ date	REVISIONS	init	ck

Chapman Technical Group

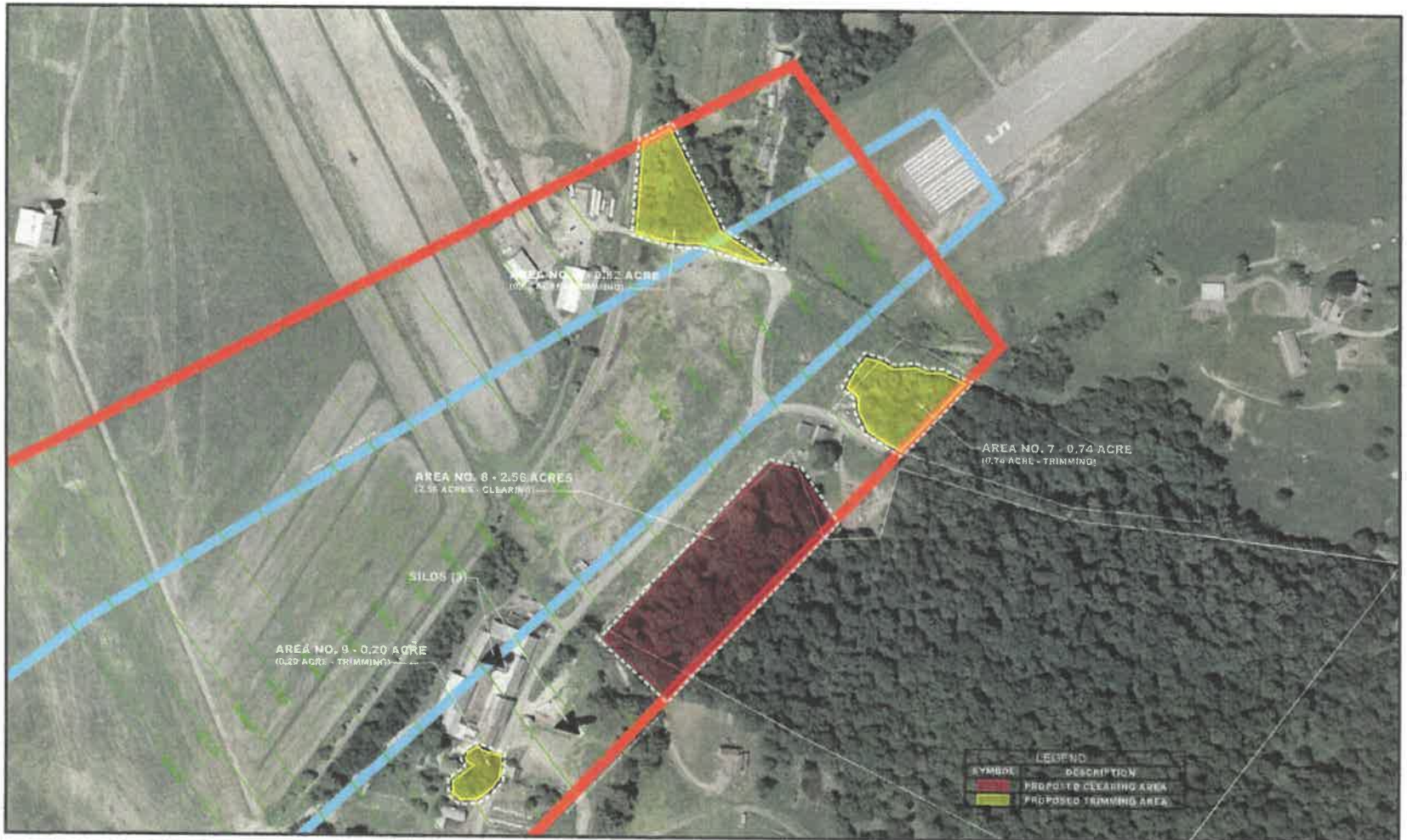
St. Albans, WV
Bridgeport, WV
Martinsburg, WV
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
RUNWAY 5-23 APPROACHES

RUNWAY 23 APPROACH SITE PLAN

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	23-0
DRAWN BY	J. A. Bailey
DATE	January 2024
CHECKED BY	
APPROVED BY	
SCALE	
Sheet No.	23



	REVISIONS	DATE	BY

Chapman Technical Group

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / MATERIALS DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV
(304) 776-7531
Beckley, WV
(304) 253-9114
Martinsburg, WV
(304) 260-4166
www.chapmantech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
RUNWAY 5-23 APPROACHES

RUNWAY 5 APPROACH SITE PLAN

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER	14035
DRAWN	JP, JC, BMP
DATE	JANUARY, 2015
SCALE 1" =	1 INCH
DESIGNED BY	J. PARSONS
DRAWN BY	J. PARSONS
CHECKED BY	J. PARSONS
SHEET NO.	5

Gary W. Libby
Skybax Ecological Services, LLC
PO Box 1093
Berea, KY 40403
(859) 302-2897
garylibby@windstream.net

YEARS OF EXPERIENCE: 20

EDUCATION: B. A. Biology, Berea College, 1992
M. S. Biology/Applied Ecology, Eastern Kentucky University, 1992-98
(classes, exams and research report completed)

EXPERTISE: Wildlife Biology & Management, Botany, Ecological Restoration

Skybax Ecological Services, LLC - Principal Ecologist/Owner (2005 to present). Responsibilities include design and construction of stream and wetland mitigation projects, amphibian breeding ponds, educational wetlands; 401 and 404 stream/wetland permitting, endangered and threatened species coordination and surveys, biological surveys, botany and vegetation studies, rare plant surveys, bat mist netting, harp trapping and hibernacula surveys, ANABAT recording, analyses, and training, small, medium, and large mammal surveys, nuisance wildlife removal, wildlife habitat improvement planning and implementation, native species re-vegetation plans, installation of native warm season grasses and prairie forbs using a seed drill, control of invasive plants, and environmental education programs (ecology, wetlands, bats, amphibians and reptiles, trees, shrubs, and wildflowers), meeting with clients and government officials, writing proposals and project reports.

Eco-Tech, Incorporated – Senior Scientist (1997-2005) Responsibilities included conducting rare plant and animal surveys, botany surveys, vegetation studies, bat studies, radio-tracking wildlife, cave and abandoned mine portal evaluations, biological assessments and evaluations, stream and wetland assessments, designing and overseeing implementation of stream and wetland restoration projects, annual vegetation monitoring of several restored, enhanced, or created wetlands using quantitative methods, conducting wetland delineations, communicating effectively with representatives of many government regulatory agencies, development groups and private landowners concerning wetland issues, and preparing project reports, providing scope of work, proposals and qualifications to a variety of clients (government and private) and contract negotiation and approval.

Lewis Publishers/Audubon International/US Golf Association/National Fish & Wildlife Foundation – Restoration Ecology Researcher & Author (1996-2004) Responsibilities included researching technical aspects of a variety of ecological restoration projects in many different types of ecological communities such as salt marshes, deserts/arid lands, bogs, upland and bottomland forests, prairies/grasslands, and savannas/woodlands. I helped develop a natural regions map of the US using the prior work of Küchler and Bailey for use in determining natural vegetation types.

Analyzed journal articles, books, and technical reports to develop native plant species list for ecological communities across the US. I communicated with numerous professionals (academic, government, and private) involved in ecological restoration projects to learn about their successes and failures so that these could be incorporated into the handbook. This work resulted in the publication of two books, *Landscape Restoration Handbook* (1999, Lewis Publishers) and *Managing Wetlands on Golf Courses* (2004, John Wiley & Sons, Inc.).

Kentucky State Nature Preserves Commission – Botanist/Ecologist (1994-1996) Responsibilities included conducting botany surveys, many specifically targeting federally or state-listed rare plants, vegetation studies, conducting Natural Areas Inventory using available mapping (topographic, aerial, public records, historic), helicopter surveys, and on-the-ground inventory to delineate and rank high quality examples of unique ecological communities, writing project reports, processing records of rare plants, animals, and ecological communities for addition to the database.

Eastern Kentucky University – Research Associate/Plant Ecologist (1992-1994) Responsibilities included designing and conducting a detailed study of the flora and vegetation of a 15,000-acre military installation in central Kentucky. This included qualitative and quantitative vegetation studies. A variety of quantitative methods were employed: line-transect point-centered quarter plots, and quadrats. Multivariate analysis was used to interpret data collected. Over 600 species of vascular plants were documented during the study.

Berea College – Landscaper (1990-1992) Responsibilities included propagation and installation of annual bedding plants, installation of perennial herbaceous plants and woody plants (trees and shrubs), maintenance of planted beds and landscape trees and shrubs, chainsaw work, operated front end loader, dump truck, and brush chipper, and operated watering tractor and tank.

PROFESSIONAL CERTIFICATIONS AND AFFILIATIONS

River Restoration and Natural Channel Design, Wildland Hydrology, 2003
River Assessment and Monitoring, Wildland Hydrology, 2002
River Morphology and Applications, Wildland Hydrology, 2001
Applied Fluvial Geomorphology, Wildland Hydrology, 2000
Eastern Kentucky Stream Assessment Protocol, USACE, 2002 & 2006
Eastern Regional Wetland Restoration Institute, U. of Kentucky/US Forest Service 2007
Streambank and Channel Stabilization, USACE, 2001
Open Water Diving Certification, PADI, 2004
Bat Conservation and Forest Management Workshop, BCI, 2002
Land Snails of the Southern Appalachians Workshop, Cherokee National Forest/Cumberland Mountain Research Center of Lincoln Memorial University, 2005
Vertical Rope Training Course, National Cave Rescue Commission, 2006
Endangered Species Identification (Red Cockaded Woodpecker, Flatwoods Salamander, Chaffseed, Pondberry), D & D WEST, 2007
Kentucky Native Plant Society, Contributing Member, 1994-present
ANABAT Techniques Workshop, General Butler SP, Carrollton, KY, Sept 20-23, 2010

BOOKS

Harker, D., G. Libby, K. Harker, S. Evans, and M. Evans. 1999. Landscape restoration handbook. Second edition. Lewis Publishers, Boca Raton, Florida. 145 pp. + appendices and map.

Libby, G., D. F. Harker, and K. Harker. 2004. Managing wetlands on golf courses. John Wiley & Sons, Incorporated, Hoboken, New Jersey. 210 pp.

JOURNAL ARTICLES

Mears, R. L., and G. W. Libby. 1995. New records of *Cyperus* (Cyperaceae) from Kentucky. Castanea 60(1): 79-82.

Libby, G. W., R. L. Mears, and C. T. Bloom. 1997. Noteworthy vascular plant discoveries from Kentucky. Transactions of the Kentucky Academy of Science 58(2): 74-79.

Libby, G. W., and C. T. Bloom. 1998. *Nestronia umbellula* Rafinesque (Santalaceae) from the Highland Rim of Kentucky. Castanea 63: (2): 161-164.

McKinney, L. E., G. Libby, and R. Mears. 2000. New and noteworthy records of *Carex* (Cyperaceae) from Kentucky. Castanea 65(3): 221-224.

Libby, G. W. 2005. Sooty tern in Southeastern Kentucky. The Kentucky Warbler 81(1):34-36.

PRESENTATIONS

Libby, G. W., R. L. Mears, and J. D. Husband. 1994. Biomonitoring of *Leavenworthia exigua* var. *laciniata* (Shepherdsville glade cress): a cedar glade endemic. Presented at the 80th Annual Meeting of the Kentucky Academy of Science. Paducah, Kentucky, 3-5 November 1994.

Libby, G. W., R. L. Mears, and C. T. Bloom. 1996. Range extensions and new state records for some rare Kentucky plants. Presented at the 82nd Annual Meeting of the Kentucky Academy of Science. Frankfort, Kentucky, 14-16 November 1996.

Libby, G. W. *et al.* 2001. Bats of Tapoco Lands, North Carolina and Tennessee. Presented at the 6th Annual Meeting of the Southeastern Bat Diversity Network. Memphis, Tennessee, 21-23 February 2001.

Libby, G. W. 2002. Daytime foraging in *Myotis leibii* and *Myotis lucifugus*. Presented at the 7th Annual Meeting of the Southeastern Bat Diversity Network. Clemson, South Carolina, 21-22 February 2002.

Libby, G. W. *et al.* 2004. Maternity colonies of *Myotis leibii* in North Carolina and Tennessee. Presented at the 1st Annual Meeting of the Tennessee Bat Working Group. Nashville, Tennessee, 9 November 2004.

Libby, G. W. *et al.* 2005. Maternity colonies of *Myotis leibii* in North Carolina and Tennessee. Presented at the 10th Annual Meeting of the Southeastern Bat Diversity Network. Paris Landing, Tennessee, 17-18 February 2005.

Libby, G.W. 2011. The Use of Bridge Expansion Joints as Maternity Roosts by *Myotis leibii* (Eastern Small-footed Bat) in West Virginia. Presented at the 2nd Joint Meeting Northeastern Bat Working Group, Midwest Bat Working Group (3rd Annual), Southeastern Bat Diversity Network (16th Annual), and 21st Colloquium on the Conservation of Mammals in the Eastern United States, Louisville, Kentucky, February 23 – 25, 2011.

Libby, G. W. 2013. Methods for the Capture and Study of *Myotis leibii* (Eastern Small-footed Bat). Presented at the Eastern Small-footed Bat Working Group 1st Annual Meeting, Fall Creek Falls State Park, Pikeville, Tennesse. February 13, 2013.

SELECTED BOTANY STUDY REPORTS, PRINCIPAL INVESTIGATOR

Libby, G. W. 1994. Field survey for Cumberland Sandwort (*Minuartia cumberlandensis* [Wofford and Kral] McNeill). Prepared for the United States Fish and Wildlife Service, Atlanta, Georgia. 20 pp.

Libby, G. W., and B. L. Palmer-Ball, Jr. 1995. Biological inventory of Kentucky River Lock and Dam Nos. 5 through 14. Prepared for the Kentucky River Authority, Frankfort, Kentucky. 64 pp.

Libby, G. W. 1996. Field survey for Cumberland Sandwort (*Minuartia cumberlandensis* [Wofford and Kral] McNeill). Pages 10-15 in White, D. L. (ed.). Progress report: Section 6 Program Segment E-1-9. Prepared for the United States Fish and Wildlife Service, Atlanta, Georgia.

Libby, G. W., and R. L. Mears. 1996. Inventory for *Ageratina luciae-brauniae* (Fern.) King & H. Robins. (Lucy Braun□s snakeroot) and evaluation of habitat impacts in Kentucky. Pages 3-15 in Kentucky State Nature Preserves Commission. Inventory for five federal candidate (Category 2) plants for federal listing. Prepared for the National Biological Service, Species at Risk Initiative, Washington, D.C.

Libby, G. W. 1996. Inventory for *Aureolaria patula* (Chapman) Pennell (Cumberland false foxglove) in Kentucky. Pages 16-43 in Kentucky State Nature Preserves Commission. Inventory for five federal candidate (Category 2) plants for federal listing. Prepared for the National Biological Service, Species at Risk Initiative, Washington, D.C.

Libby, G. W., Z. E. Murrell, and P. Carroll. 1996. Inventory for *Hexastylis contracta* Blomquist (southern heartleaf) in Kentucky and Tennessee. Pages 57-76 in Kentucky State Nature Preserves Commission. Inventory for five federal candidate (Category 2) plants for federal listing. Prepared for the National Biological Service, Species at Risk Initiative, Washington, D.C.

Libby, G. W., J. D. Kiser, and H. D. Bryan. 1997. Species survey for the federally protected plant Running Buffalo Clover (*Trifolium stoloniferum*) along the proposed waterline corridors in Woodford County, Kentucky. Report prepared for Haworth, Meyer, and Boleyn, Incorporated, Frankfort, Kentucky. 7 pp. + maps and photographs.

Libby, G. W., H. D. Bryan, and J. D. Kiser. 1997. Species survey for two rare Indiana plants, Deam's Beard-tongue (*Penstemon deamii*) and American mistletoe (*Phoradendron serotinum*) at the Bridgeport development site, Harrison County, Indiana. Report prepared for RDI Caesars Riverboat Casino, L.L.C., Elizabeth, Indiana. 10 pp. + map and photographs.

Libby, G. W., J. D. Kiser, and H. D. Bryan. 1998. Field survey for the federally endangered Braun's rockcress (*Arabis perstellata*) along a proposed gas pipeline near South Elkhorn Creek, Franklin County, Kentucky. Report prepared for Columbia Gas of Kentucky, Incorporated, Lexington, Kentucky. 6 pp. + map and photographs.

Libby, G. W., J. D. Kiser, and H. D. Bryan. 1998. Field survey for the federally endangered Braun's rockcress (*Arabis perstellata*) along a proposed gas pipeline between Frankfort and Georgetown, Kentucky. Report prepared for Columbia Gas of Kentucky, Incorporated, Lexington, Kentucky. 7 pp. + maps.

Libby, G. W., and J. E. Spencer. 1999. Field survey for the federally endangered running buffalo clover (*Trifolium stoloniferum*), habitat evaluation for the federally endangered Indiana bat (*Myotis sodalis*), and jurisdictional waters determination along proposed waterline corridors in Clark County, Kentucky. Report prepared for East Clark County Water District, Winchester, Kentucky. 10 pp. + appendices, maps, and photographs.

Libby, G. W., J. E. Spencer, and S. M. Cochran. 1999. Field survey for the federally endangered Price□s potato bean (*Apios priceana*) and habitat evaluation for the federally endangered Indiana bat (*Myotis sodalis*) along proposed waterline corridors in Lyon County, Kentucky. Report prepared for Elrod-Dunson, Incorporated, Nashville, Tennessee, and Lyon County Water District, Kuttawa, Kentucky. 9 pp. + appendices, maps, and photographs.

Libby, G. W., and J. E. Spencer. 1999. Vascular plant survey for a surface mine near Big Laurel, Harlan and Letcher counties, Kentucky (Application 897-0376 Amendments #2 and #3). Report prepared for Nally & Hamilton Enterprises, Incorporated, Bardstown, Kentucky, and Leo Miller & Associates, Incorporated, Harlan, Kentucky. 12 pp. + maps, photographs, and site plans.

Libby, G. W., and J. E. Spencer. 2001. Habitat evaluation for federally endangered running buffalo clover (*Trifolium stoloniferum*), Indiana bat (*Myotis sodalis*), Kentucky State Nature Preserves Commission (KSNPC) special concern northern leopard frog (*Rana pipiens*), and wetland determination for proposed water lines in Madison County, Kentucky. Report prepared for Chrisman-Miller-Woodford, Incorporated, Richmond, Kentucky. 12 pp. + appendices, maps, and photographs.

Libby, G. W., and S. M. Cochran. 2001. Field survey for running buffalo clover (*Trifolium stoloniferum*) at the Berger Farm Tower Site, Woodford County, Kentucky. Report prepared for Alt & Witzig Engineering, Incorporated, Evansville, Indiana. 3 pp.+ appendix, map, and photograph.

Libby, G. W. 2001. Habitat evaluation for the federally endangered running buffalo clover (*Trifolium stoloniferum*) along a proposed gas line corridor in Fayette County, Kentucky. Report prepared for Columbia Gas of Kentucky, Lexington, Kentucky. 4 pp. + appendices, map, photographs, and plan sheets.

Libby, G. W., J. E. Spencer, and H. D. Bryan. 2002. Field survey for the federally endangered Braun's rockcress (*Arabis perstellata*), federal candidate species Short's bladderpod (*Lesquerella globosa*), and wetland determination along three proposed water lines, Franklin County, Kentucky. Report Warner A. Broughman, III & Associates, Lexington, Kentucky. 4 pp. + appendices, map, and photographs.

Gary Libby

From: "Defibaugh, Melissa" <MDefibaugh@chaptech.com>
Date: Wednesday, May 29, 2019 8:46 AM
To: "'Gary Libby'" <garylibby@windstream.net>
Attach: PlantProcedures2019.pdf
Subject: FW: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Gary-

I received this email yesterday. You have been approved by USFWS. We are working through property access with the attorney currently. When do you think that you might be available to conduct the survey?

Thanks so much!

Melissa Defibaugh
Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn Subscribe to Our Client E-Newsletter

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Tuesday, May 28, 2019 1:21 PM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

No, I don't need a new study plan - but please be aware that we've also updated our reporting guidelines and Mr. Libby should follow these if he is not aware of the changes. We're still working on distributing these to all of the qualified surveyors.

Thanks,
Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_murnane@fws.gov ***(Please note the change in email address)***
http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 5/28-31

On Tue, May 28, 2019 at 1:16 PM Defibaugh, Melissa <MDefibaugh@chaptech.com> wrote:

Amanda-

Thanks so much! Do I need to submit a survey plan or anything for your review prior to initiating the survey?

Melissa Defibaugh

Chapman Technical Group | a division of GRW
engineering | architecture | geospatial
43 East Main Street | Buckhannon, WV
P 304.472.8914 | C 304.481.6136
Email: MDefibaugh@chaptech.com | Website: www.chaptech.com
Follow Us On LinkedIn Subscribe to Our Client E-Newsletter

From: Murnane, Amanda [mailto:amanda_murnane@fws.gov]
Sent: Tuesday, May 28, 2019 1:13 PM
To: Defibaugh, Melissa <MDefibaugh@chaptech.com>
Subject: Re: [EXTERNAL] RE: Elkins Randolph County Regional Airport Consultation Code 2016-1-0730

Hi Melissa,

The WVDNR and USFWS has updated our list of qualified surveyors - Mr. Libby is now approved for both RBC and SWP and we will accept his results for surveying the airport's obstruction removal areas.

Thanks,
Amanda (Selnick) Murnane
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
304-636-6586 x 24
amanda_murnane@fws.gov ***(Please note the change in email address)***
http://www.fws.gov/westvirginiafieldoffice/index.html

Teleworking 5/28-31

OBSTRUCTION AREA #1

Description: Northeast-facing slope. Some of this area (0.83 acre) was graded and filled about 30 to 40 years ago and has regenerated in young forest with dense understory of shrubs and trees. Part of this area consists of planted spruce with many downed trees. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
^*Picea abies* (Norway spruce)
Fagus grandifolia (American beech)
Gleditsia triacanthos (honey locust)
Ilex opaca (American holly)
Liriodendron tulipifera (tuliptree)
Prunus serotina (wild black cherry)
Robinia pseudoacacia (black locust)
Tsuga canadensis (eastern hemlock)

Shrubs & Vines – Midstory
Amphicarpa bracteata (hog-peanut)
Aralia spinosa (devil's walking stick)
**Berberis thunbergii* (Japanese barberry)
Crataegus punctata (dotted thorn)
Lindera benzoin (spicebush)
**Lonicera maackii/tatarica/morrowi* (shrub honeysuckle)
Parthenocissus quinquefolia (Virginia creeper)
**Rosa multiflora* (multiflora rose)
Rubus argutus (southern blackberry)
Rubus flagellaris (dewberry)
Sambucus candensis (elderberry)
Vitis aestivalis (summer grape)

Forbs & Grasses – Ground Cover
Ambrosia artemesifolia (common ragweed)
**Arctium minus* (burdock)
Asclepias syriaca (common milkweed)
Carex platyphylla (broad-leaved sedge)
**Chysanthemum leucanthemum* (ox-eye daisy)
Cryptotaenia canadensis (honewort)
Erigeron strigosus (daisy fleabane)
Eupatorium rugosum (white snakeroot)
**Festuca elatior* (tall fescue)
Lycopodium flabelliforme (groundpine)

**Microstegium vimineum* (stilt grass)
Mitchella repens (partridgeberry)
Oxalis stricta (yellow wood sorrel)
Panicum dichotomum (bushy panic grass)
Pilea pumila (clearweed)
Polystichum acrostichoides (Christmas fern)
Prunella vulgaris (self-heal)
Solidago canadensis (Canada goldenrod)
Tovara virginiana (Virginia knotweed)
Verbesina alternifolia (wing-stem)



OBSTRUCTION AREA #1



OBSTRUCTION AREA #1



OBSTRUCTION AREA #1

OBSTRUCTION AREA #2

Description: Hilltop and forest area (10.12 acres), disturbed from previous logging and old building sites (open areas) present. Deer browse is apparent. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer rubrum (red maple)
Acer saccharum (sugar maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Ilex opaca (American holly)
Liriodendron tulipifera (tuliptree)
Nyssa sylvatica (blackgum)
Oxydendron arboreum (sourwood)
**Picea abies* (Norway spruce)
Pinus strobus (white pine)
Prunus serotina (wild black cherry)
Quercus alba (white pine)
Quercus prinus (chestnut oak)
Quercus rubra (northern red oak)
Robinia pseudoacacia (black locust)
Tsuga canadensis (eastern hemlock)

Shrubs & Vines – Midstory
**Berberis thunbergii* (Japanese barberry)
Cornus florida (flowering dogwood)
Elaeagnus umbellata (autumn olive)
Hamamelis virginiana (witch hazel)
Lindera benzoin (spicebush)
**Ligustrum sinense* (common privet)
**Lonicera maackii/tatarica/morrowi* (shrub honeysuckle)
Parthenocissus quinquefolia (Virginia creeper)
Rubus flagellaris (dewberry)
Sassafras albidum (sassafras)
Toxicodendron radicans (poison ivy)

Forbs & Grasses – Ground Cover
Allium tricoccum (ramps)
Carex glaucodea (gray-green sedge)
Carex rosea (rose-like sedge)

Caulophyllum thalictroides (blue cohosh)
Danthonia spicata (poverty grass)
Dryopteris intermedia (intermediate wood fern)
**Galinsoga ciliata* (raceweed)
Glyceria striata (fowl manna grass)
Goodyera pubescens (rattlesnake plantain)
Impatiens capensis (orange jewelweed)
Lycopodium flabelliforme (groundpine)
Lycopus virginicus (bugleweed)
Microstegium vimineum (stilt grass)
Mitchella repens (partridge berry)
Monarda fistulosa (bee balm)
Monotropa uniflora (Indian pipe)
Muhlenbergia schreberi (nimblewill)
Onoclea sensibilis (sensitive fern)
Pilea pumila (clearweed)
Polystichum acrostichoides (Christmas fern)
Prunella vulgaris (self-heal)
Scirpus atrovirens (green bulrush)
Senecio aureus (golden ragwort)
Thelypteris novaboracensis (New York fern)
Tovara virginiana (Virginia knotweed)
Vaccinium stamineum (deerberry)
Verbesina alternifolia (wing-stem)



OBSTRUCTION AREA #2



OBSTRUCTION AREA #2



OBSTRUCTION AREA #2



OBSTRUCTION AREA #2

OBSTRUCTION AREA #3

Description: Hilltop and upper slopes adjacent to homes (4.05 acres). Trails (manmade and wildlife) are present throughout the area. Invasive shrubs (common privet and shrub honeysuckle) are abundant. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer rubrum (red maple)
Acer saccharum (sugar maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Liriodendron tulipifera (tuliptree)
Magnolia acuminata (cucumber tree)
Nyssa sylvatica (blackgum)
Ostrya virginiana (hop hornbeam)
Oxydendron arboreum (sourwood)
**Picea abies* (Norway spruce)
Pinus strobus (white pine)
Prunus serotina (wild black cherry)
Quercus alba (white oak)
Quercus prinus (chestnut oak)
Quercus rubra (northern red oak)
Quercus velutina (black oak)
Robinia pseudoacacia (black locust)
Sassafras albidum (sassafras)
Tsuga canadensis (eastern hemlock)
Ulmus rubra (slippery elm)

Shrubs & Vines – Midstory
Amelanchier arborea (serviceberry)
Amphicarpa bracteata (hog-peanut)
**Berberis thunbergii* (Japanese barberry)
Cornus florida (flowering dogwood)
Hamamelis virginiana (witch hazel)
Ilex opaca (American holly)
**Ligustrum sinense* (common privet)
Lindera benzoin (spicebush)
**Lonicera japonica* (Japanese honeysuckle)
**Lonicera maackii/tatarica/morrowi* (shrub honeysuckle)

Parthenocissus quinquefolia (Virginia creeper)
Prunus americana (wild plum)
**Rosa multiflora* (multiflora rose)
Rubus flagellaris (dewberry)
Smilax glauca (smooth greenbrier)
Symphoricarpos orbiculatus (coralberry)
Toxicodendron radicans (poison ivy)
Vaccinium stamineum (deerberry)
Viola blanda (sweet white violet)
Viola canadensis (Canada violet)

Forbs & Grasses – Ground Cover
Asplenium platyneuron (ebony spleenwort)
Aster macrophyllus (bigleaf aster)
Aureolaria laevigata(smooth yellow foxglove)
Carex platyphylla (broad-leaved sedge)
Chimaphila maculata (spotted wintergreen)
Danthonia spicata (poverty oatgrass)
Dioscorea villosa (wild yam)
Galium circaezans (wild licorice)
Gaultheria procumbens (teaberry)
Luzula multiflora (common woodrush)
Lycopodium flabelliforme (groundpine)
Mitchella repens (partridgeberry)
Monotropa hypopithys (pinesap)
Osmorhiza longistylis (smooth sweet cicely)
Panicum dichotomum (bushy panic grass)
Poa cuspidata (short-leaved bluegrass)
Polystichum acrostichoides (Christmas fern)
Solidago flexicaulis (broadleaf goldenrod)



OBSTRUCTION AREA #3



OBSTRUCTION AREA #3



OBSTRUCTION AREA #3



OBSTRUCTION AREA #3

OBSTRUCTION AREA #4

Description: Hilltop and upper slopes adjacent to homes and businesses (8.83 acres). An old county road bisects the area and is utilized by hunters and ATVs. Heavy deer browse is evident in the understory. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer rubrum (red maple)
Acer saccharum (sugar maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Ilex opaca (American holly)
Liriodendron tulipifera (tuliptree)
Nyssa sylvatica (blackgum)
Oxydendron arboreum (sourwood)
**Picea abies* (Norway spruce)
Pinus rigida (pitch pine)
Pinus strobus (white pine)
Prunus serotina (wild black cherry)
Quercus alba (white oak)
Quercus coccinea (scarlet oak)
Quercus prinus (chestnut oak)
Quercus rubra (northern red oak)
Sassafras albidum (sassafras)

Shrubs & Vines – Midstory
**Berberis thunbergii* (Japanese barberry)
Carpinus caroliniana (ironwood)
Cercis canadensis (eastern redbud)
Cornus florida (flowering dogwood)
Crataegus punctata (dotted thorn)
**Elaeagnus umbellata* (autumn olive)
Hamamelis virginiana (witch hazel)
**Ligustrum sinense* (common privet)
**Lonicera japonica* (Japanese honeysuckle)
**Lonicera maackii/tatarica/morrowi* (shrub honeysuckle)
Parthenocissus quinquefolia (Virginia creeper)
Rubus argutus (southern blackberry)
Rubus flagellaris (dewberry)
Smilax glauca (smooth greenbrier)

Smilax rotundifolia (round-leaved greenbrier)
**Spiraea japonica* (Japanese spiraea)
Toxicodendron radicans (poison ivy)
**Vinca minor* (lesser periwinkle)

Forbs & Grasses – Ground Cover
Apocynum androsaemifolium (spreading dogbane)
**Arctium minus* (common burdock)
Aster macrophyllus (bigleaf aster)
Blephilia hirsute (hairy woodmint)
Carex pensylvanica (Pennsylvania sedge)
Carex rosea (rose-like sedge)
**Chrysanthemum leucanthemum* (ox-eye daisy)
Cirsium discolor (field thistle)
Conopholis americana (cancerroot)
**Dactylis glomerata* (orchard grass)
Danthonia spicata (poverty grass)
**Daucus carota* (Queen Anne's lace)
Erechtites hieracifolia (fireweed)
Erigeron strigosus (daisy fleabane)
Eupatorium rugosum (white snakeroot)
**Festuca elatior* (tall fescue)
Galium circaezans (wild licorice)
Goodyera pubescens (rattlesnake plantain)
Hypericum prolificum (shrubby St. John's wort)
Hypoxis hirsuta (yellow star grass)
Krigia biflora(false dandelion)
Lobelia inflata (rabbit tobacco)
**Microstegium vimineum* (stiltgrass)
**Miscanthus sinensis* (Chinese silvergrass)
Mitchella repens (partridge berry)
Monotropa uniflora (Indian pipe)
Muhlenbergia schreberi (nimblewill)
Panicum clandestinum (deertongue grass)
**Plantago lanceolata* (lance-leaf plantain)
Podophyllum peltatum (may-apple)
Polystichum acrostichoides (Christmas fern)
Prunella vulgaris (self-heal)
Scutellaria latiflora (mad-dog skullcap)
Senecio aureus (golden ragwort)
**Trifolium pratense* (red clover)
Verbesina alternifolia (wing-stem)

**Veronica officinalis* (common speedwell)



OBSTRUCTION AREA #4. *Trifolium pratense* (red clover).



OBSTRUCTION AREA #4



OBSTRUCTION AREA #4



OBSTRUCTION AREA #4



OBSTRUCTION AREA #4

OBSTRUCTION AREA #5

Description: Small knob/hilltop adjacent to area 4 (0.37 acre). Understory almost non-existent due to high number of deer in the area. Also, there is some disturbance from ATVs. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer rubrum (red maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Ilex opaca (American holly)
Nyssa sylvatica (black gum)
Quercus alba (white oak)
Quercus prinus (chestnut oak)
Sassafras albidum (sassafras)

Shrubs & Vines – Midstory
**Berberis thunbergii* (Japanese barberry)
Rubus flagellaris (dewberry)
Smilax glauca (smooth greenbrier)
Smilax rotundifolia (round-leaved greenbrier)
Symphoricarpos orbiculatus (coralberry)

Forbs & Grasses – Ground Cover
Antennaria plantaginifolia (pussytoes)
Circaea quadrisulcata (enchanter's nightshade)
Danthonia spicata (poverty grass)
Lycopodium flabelliforme (groundpine)
Podophyllum peltatum (may-apple)
Vaccineum stamineum (deerberry)



OBSTRUCTION AREA #5



OBSTRUCTION AREA #5

OBSTRUCTION AREA #6

Description: This 0.82 acre area is a lowland forest with an intermittent stream. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer negundo (boxelder)
Acer saccharum (sugar maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Ilex opaca (American holly)
Nyssa sylvatica (blackgum)
Prunus serotina (wild black cherry)
Quercus alba (white oak)
Quercus imbricaria (shingle oak)
Quercus rubra (northern red oak)
Robinia pseudoacacia (black locust)
Ulmus rubra (slippery elm)

Shrubs & Vines – Midstory
Carpinus caroliniana (ironwood)
Celastrus scandens (bittersweet)
Clematis virginiana (virgin's bower)
Cornus racemosa (gray dogwood)
Crataegus crus-galli (cockspur hawthorn)
**Ealeagnus umbellata* (autumn olive)
**Ligustrum sinense* (common privet)
**Lonicera maackii/tatarica/morrowi* (shrub honeysuckle)
Parthenocissus quinquefolia (Virginia creeper)
Prunus americana (wild plum)
**Rosa multiflora* (multiflora rose)
Rubus argutus (southern blackberry)
Rubus occidentalis (black raspberry)
Sambucus canadensis (elderberry)
Smilax rotundifolia (round-leaved greenbrier)
Viburnum dentatum (arrowwood)

Forbs & Grasses – Ground Cover
Ambrosia artemesifolia (common ragweed)
Ambrosia trifida (giant ragweed)
Aster lateriflorus (calico aster)

Calystegia sepium (bindweed)
Carex platyphylla (broad-leaved sedge)
**Cichorium intybus* (chicory)
Cicuta maculata (spotted water hemlock)
Cryptotaenia canadensis (honewort)
Cuscuta gronovii (common dodder)
**Dactylis glomerata* (orchard grass)
**Daucus carota* (Queen Anne's lace)
**Dipsacus sylvestris* (common teasel)
Elymus virginicus (Virginia wild rye)
Galium tinctorium (bedstraw)
Geum vernum (spring avens)
Hypericum punctatum (dotted St. John's wort)
Impatiens capensis (orange jewelweed)
Lactuca canadensis (wild lettuce)
**Lysimachia nummularia* (moneywort)
**Melilotus alba* (white sweet clover)
Mimulus alatus (winged monkeyflower)
Monarda fistulosa (bee balm)
Panicum clandestinum (deertongue grass)
Phalaris arundinacea (reed canary grass)
**Phleum pratense* (timothy grass)
Podophyllum peltatum (may-apple)
Rudbeckia laciniata (goldenglow)
**Rumex crispus* (curly dock)
Sedum ternatum (white stonecrop)
Senecio aureus (golden ragwort)
Solidago canadensis (Canada goldenrod)
Thalictrum dioicum (meadow rue)
Tovara virginiana (Virginia knotweed)
**Trifolium pratense* (red clover)
**Trifolium repens* (white clover)
Verbena urticifolia (white vervain)
Verbesina alternifolia (wing-stem)
Viola papilionacea (common blue violet)



OBSTRUCTION AREA #6. *Trifolium pratense* (red clover).



OBSTRUCTION AREA #6. *Trifolium repens* (white clover).



OBSTRUCTION AREA #6



OBSTRUCTION AREA #6

OBSTRUCTION AREA #7

Description: This 0.74 acre area is a lowland forest with an intermittent stream. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer negundo (boxelder)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Morus rubra (red mulberry)
Oxydendron arboreum (sourwood)
Pinus strobus (white pine)
Prunus serotina (wild black cherry)
Quercus rubra (northern red oak)

Shrubs & Vines – Midstory
**Berberis thunbergii* (Japanese barberry)
Carpinus caroliniana (ironwood)
Cornus racemosa (gray dogwood)
Ilex opaca (American holly)
**Ligustrum sinense* (common privet)
Parthenocissus quinquefolia (Virginia creeper)
**Rosa multiflora* (multiflora rose)
Smilax glauca (smooth greenbrier)
Toxicodendron radicans (poison ivy)

Forbs & Grasses – Ground Cover
Aster lateriflorus (calico aster)
Carex platyphylla (broad-leaved sedge)
Cinna arundinacea (wood reed-grass)
Epifagus virginiana (beechdrops)
Impatiens capensis (orange jewelweed)
Polygonum sagittatum (arrowleaf tearthumb)
Senecio aureus (golden ragwort)
Thelypteris noveboracensis (New York fern)
Tovara virginiana (Virginia knotweed)
Verbesina alternifolia (wing-stem)



OBSTRUCTION AREA #7



OBSTRUCTION AREA #7

OBSTRUCTION AREA #8

Description: Northeast-facing, gentle slope, disturbed from logging activity within the last 5 years. The midstory and ground cover is dense in much of the area (2.56 acres). There is a small drainage channel/stream is in the area. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer rubrum (red maple)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Liriodendron tulipifera (tuliptree)
Prunus serotina (wild black cherry)

Shrubs & Vines – Midstory
**Berberis thunbergii* (Japanese barberry)
Carpinus caroliniana (ironwood)
**Rosa multiflora* (multiflora rose)
Rubus argutus (southern blackberry)
Rubus flagellaris (dewberry)

Forbs & Grasses – Ground Cover
Agrostis alba (redtop)
Aster macrophyllus (bigleaf aster)
Cuscuta gronovii (common dodder)
Dryopteris spinulosa (spinulose shield fern)
Epifagus virginiana (beechdrops)
**Glechoma hederacea* (ground-ivy)
Impatiens capensis (orange jewelweed)
Lycopus virginicus (bugleweed)
**Microstegium vimineum* (stilt grass)
Panicum clandestinum (deertongue grass)
Phytolacca americana (pokeweed)
Pilea pumila (clearweed)
Polygonum pensylvanicum (Pennsylvania smartweed)
Verbesina alternifolia (wing-stem)



OBSTRUCTION AREA #8



OBSTRUCTION AREA #8

OBSTRUCTION AREA #9

Description: This 0.20 acre area is a residential front yard with a few large trees. The ground layer is regularly mowed. See photographs.

Vascular flora observed in area:

Trees – Canopy Layer
Acer saccharum (sugar maple)
**Picea abies* (Norway spruce)

Shrubs & Vines – Midstory
^*Juniperus communis* (common juniper)
Parthenocissus quinquefolia (Virginia creeper)
Sambucus canadensis (elderberry)
Toxicodendron radicans (poison ivy)

Forbs & Grasses – Ground Cover
Ambrosia artemesifolia (common ragweed)
Aster pilosus (hairy white aster)
Digitaria sanguinalis (crabgrass)
Echinochloa crusgalli (barnyard grass)
**Eleusine indica* (goose grass)
^*Hosta ventricosa* (blue plantain-lily)
Muhlenbergia schreberi (nimblewill)
Oxalis stricta (yellow wood sorrel)
Paspalum pubescens (hairy beadgrass)
**Poa pratensis* (bluegrass)
Plantago rugelii (common plantain)
Polygonum pensylvanicum (Pennsylvania smartweed)
**Rumex crispus* (curly dock)
**Taraxacum officinale* (common dandelion)
**Trifolium repens* (white clover) (see photograph)
Verbesina alternifolia (wing-stem)
^*Wisteria floribunda* (Japanese wisteria)



OBSTRUCTION AREA #9. ***Trifolium pratense*** **(red clover).**



OBSTRUCTION AREA #9. ***Trifolium repens*** **(white clover).**



OBSTRUCTION AREA #9



OBSTRUCTION AREA #9

* = non-native, introduced species

^ = planted species

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
90 Vance Drive
Elkins, West Virginia 26241

November 22, 2019

Ms. Melissa Defibaugh
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

Re: Elkins-Randolph County Regional Airport Obstruction Removal, Randolph County, WV (FWS File Number 2016-I-0730)

Dear Ms. Defibaugh:

This letter is in response to your October 28, 2019, request for concurrence in regards to surveys conducted to determine the occurrence of federally listed threatened and endangered species within the vicinity of the project listed above. The project is located in the vicinity of Elkins, West Virginia.

Elkins-Randolph County Regional Airport Authority proposes to remove obstructions which are currently penetrating the approach surfaces of Runway 5 and Runway 23. Nine locations, encompassing 28.53 acres have been identified for trimming and clearing. These comments are provided pursuant to the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). This project has been assigned file number 2016-I-0730; please reference this number in all future correspondence.

The U.S. Fish and Wildlife Service (Service) has determined that four federally listed species could occur in the project area and may be affected by project construction. These are the endangered Indiana bat (*Myotis sodalis*) and running buffalo clover (*Trifolium stoloniferum*), and the threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB) and small whorled pogonia (*Isotria medeoloides*).

Federally Listed Bats

The U.S. Fish and Wildlife Service (Service) has reviewed the report on the bat **mist net** survey conducted in the proposed project area and submitted on October 15, 2019. The survey followed the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB). The survey covered 26 acres of potential bat habitat and was conducted at 5 net sites from July 30, 2018 to August 9, 2018. No Indiana bats or NLEB were captured during this survey.

Surveys are considered current for 5 years (the summer they are completed and the following four summer seasons). In this case, the survey will expire on May 15, 2024. If a significant amendment is proposed to change or expand this project, or if timber will be removed after that date, a new survey may be necessary and the Service should be contacted.

The area was surveyed for caves and abandoned mine portals and none were found in the project area.

Federally Listed Plants

The small whorled pogonia is a perennial member of the orchid family, generally known from deciduous woods with acidic soil. It flowers from about mid-May to mid-June, typically with only one flower per plant, which lasts only a few days to a week. Individual plants may not flower every year and extended dormancy, although not scientifically documented, is purported to occur under certain conditions. This plant is believed to be self-pollinating by mechanical processes; no evidence of insect pollination has been observed. The current status of small whorled pogonia is attributed to loss of habitat and overutilization for scientific and private collections. However, some populations observed for a number of years have also declined for unknown reasons.

Running buffalo clover occurs in mesic habitats of partial to filtered sunlight, where there is a prolonged pattern of moderate periodic disturbance, such as mowing, trampling, or grazing. It is most often found in regions underlain with limestone or other calcareous bedrock, though limestone soil is not a requisite determining factor for the presence of this species. In West Virginia, running buffalo clover seems to prefer old logging roads, off-road vehicle (ORV) trails, hawthorne thickets, grazed woodlands, jeep trails, railroad grades, game trails, and old fields succeeding to mesic woodlands. All populations are associated with light to moderate disturbance such as occasional ORV or foot traffic, stream scour, or grazing.

The project area is within range and could provide habitat for both small whorled pogonia and running buffalo clover. A survey of the proposed project area was conducted by Skybax Ecological Services, LLC, July 16-17 and September 9, 2019, for small whorled pogonia, running buffalo clover and other rare, threatened, or endangered plants. Some potential suitable habitat was found within the project area; however, no small whorled pogonia or running buffalo clover plants were found during the survey. Therefore, the Service does not anticipate that the project is likely to adversely affect small whorled pogonia or running buffalo clover.

Conclusion

Based on the information provided to us, the Service has concluded that no federally listed species are expected to be adversely affected by the project and that any take of NLEB associated with this project is exempt under the 4(d) rule.

Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this determination may be reconsidered.

If you have any questions regarding this letter, please contact Kristin Stockton of my staff at (304) 636-6586, Ext. 24, or kristin_stockton@fws.gov, or at the letterhead address.

Sincerely,

David Byrd
Acting Field Supervisor

cc:
Project File
Reader File
ES:WVFO:KStockton:skd:11/22/2019
File Name: P:\1 - Users\Kristin Stockton\Section 7 Consultations\In Progress\2016-I-0730 Elkins-Randolph County Regional Airport Obstruction Removal.docx

APPENDIX 8
SHPO CONSULTATION

WEST VIRGINIA
Division of Culture and History

January 4, 2018

RECEIVED
JAN 10 2018
CHAPMAN TECHNICAL GROUP

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

Mr. Shawn Tucker, P.E.
Project Manager
Chapman Technical Group
43 East Main Street
Buckhannon, WV 26201

RE: Elkins-Randolph County Regional Airport – Runway 5-23 Approaches Obstruction Removal
FR#: 16-984-RD-2

Dear Mr. Tucker:

We have reviewed the additional information submitted for the above referenced project. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the proposed project has undergone a design change since our prior review in March 2017. The revised scope of work includes clearing approximately 16.14 acres of trees and trimming approximately 12.37 acres of trees. The total revised project footprint is 28.51 acres.

Architectural Resources:
Thank you for notifying us about the project changes. We remain in concurrence with our findings provided in our review letter dated March 30, 2017 that the proposed project will affect no architectural properties eligible for or included in the National Register of Historic Places. No further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change.

Archaeological Resources:
A search of our records located no previously documented archaeological resource within the proposed project area. Our records also note that a majority of the proposed project area has undergone a Phase I archaeological survey. Aerial photographs indicate that a large portion of the project area not previously surveyed is situated on sloped terrain. In our opinion, no archaeological historic properties will be affected by the proposed project. No further consultation is necessary with respect to archaeological resources. If, however, intact cultural materials are encountered during the proposed ground disturbing activities, please cease all activity within the discovery area and contact our office immediately.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Benjamin M. Riggle, Structural Historian, or Carolyn M. Kender, Archaeologist, at (304) 588-0240.*

Sincerely,

Susan M. Pierce

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/CMK/BMR

Chapman Technical Group
a division of GRW

December 13, 2017

Carolyn Kender, Archaeologist
State Historic Preservation Office
WV Division of Culture and History
1900 Kanawha Blvd East
Charleston, West Virginia 25305

Re: Elkins-Randolph Co. Regional Airport
Elkins, West Virginia
Runway 5-23 Obstruction Removal
Phase I (EA)
WVSHPO FR #16-984-RD

Dear Ms. Kender:

The purpose of this letter is to provide formal documentation for changes in the proposed project scope for the obstruction removal project at the Elkins-Randolph County Regional Airport. For ease of reference, I've included in the WV SHPO reference number above. Attached is a site plan showing the revised project areas as well as the original areas included in the previous correspondence dated August 23, 2016.

During the course of the environmental assessment process, several property owners requested additional surveys be completed to attempt to separate the project areas into areas in which the trees could be trimmed and areas which required complete tree removal. The attached drawings shows the areas which were classified as clearing areas and those classified as trimming areas. As you will note from the attached drawing, the proposed project footprint for some of the areas have changed. The previous proposed project limits are shown as white dashed lines to illustrate the changes. The previous scope of work included the clearing of approximately 26 acres of trees. The revised project scope includes clearing approximately 16.14 acres and trimming approximately 12.37 acres of trees. The total project footprint for the revised project scope is approximately 28.51 acres.

The intent of this letter is to request additional guidance as to whether or not the Phase I Archaeological Survey performed by ASC Group, Inc. needs to be revised. I would also like to request a revised consultation letter from your office providing project clearance for the revised scope of work.

We sincerely appreciate your assistance in this project. If you should have any questions, please do not hesitate to give me a call at (304) 472-8914 or an email at stucker@chaptech.com. I look forward to receiving your return correspondence.

43 East Main Street
Buckhannon, WV 26201

304.472.8914
304.472.8915 Fax

St. Albans, WV
Lexington, KY

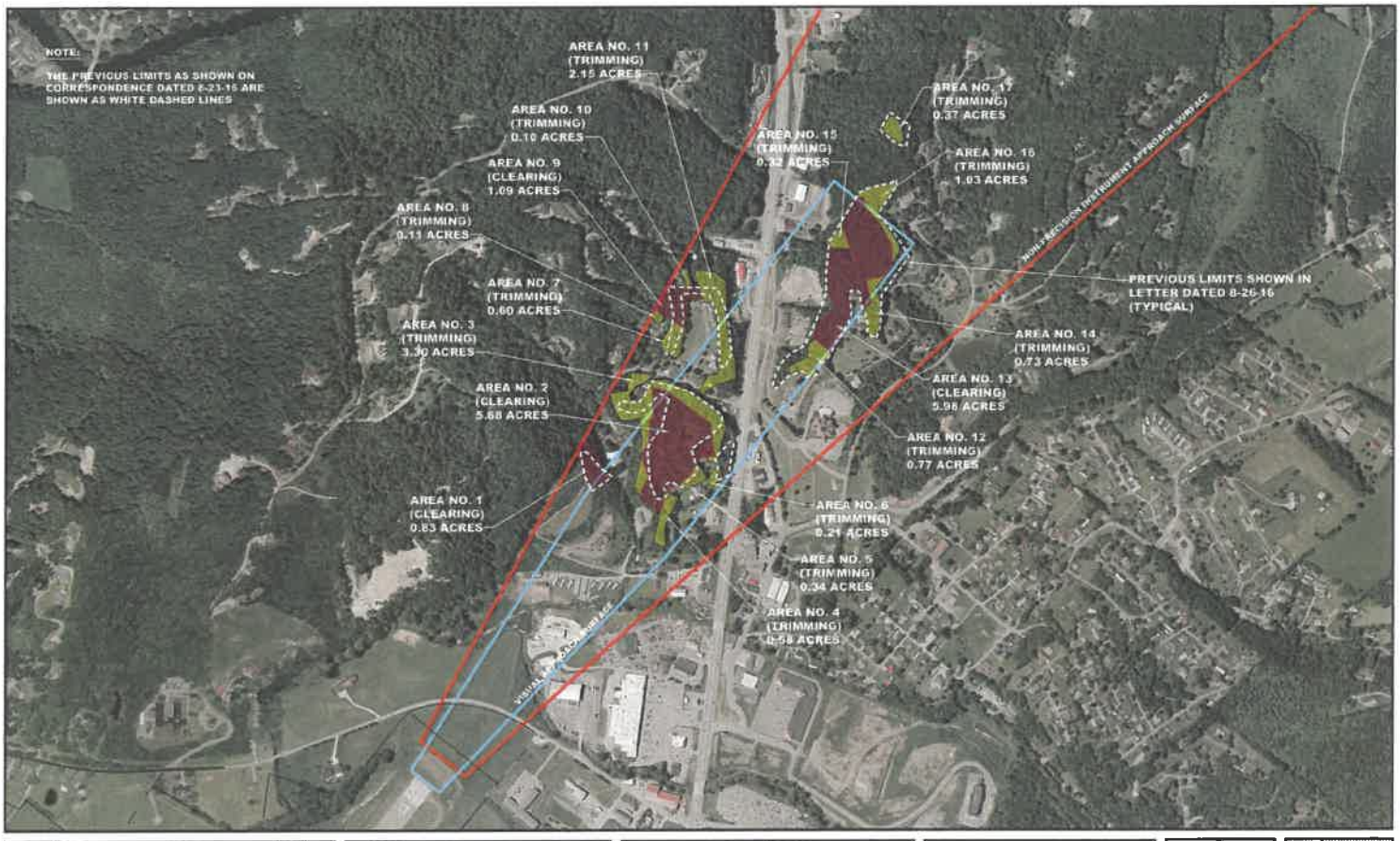
www.chaptech.com

Sincerely,

CHAPMAN TECHNICAL GROUP

Shawn D. Tucker, P.E.
Project Manager

Attachment



REVISIONS	BY

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5851
Swatmore, WV (304) 472-4814
Martinsburg, WV (304) 260-1003
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SITE PLAN (REVISED SCOPE)

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	17005A
SCALE	1" = 500'
DATE	DECEMBER 2017
DRAWN BY	S. TUCKER
DESIGNED BY	S. TUCKER
CHECKED BY	S. TUCKER
SHEET NO.	1
SHEET	1

RECEIVED
APR 06 2017
CHAPMAN TECHNICAL GROUP

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

March 30, 2017

Mr. Shawn Tucker
Project Manager
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

RE: Elkins-Randolph Regional Airport, Elkins – Runway 5-23 Obstruction Removal
FR#: 16-984-RD-1

Dear Mr. Tucker:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

Archaeological Resources:
The submitted technical report titled *Phase Ia Literature Review and Phase Ib Archaeology Survey for the Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA), Elkins, Randolph County, West Virginia*, which was prepared by ASC Group, Inc. for the above referenced project, satisfactorily addresses our concerns regarding the presence of cultural resources within the proposed project area. Systematic survey, comprised of the visual inspection of ten individual areas which make up the larger project area and the excavation of shovel probes within these areas, did not identify any archaeological resources. The report states that land owners in Areas 7 through 10 requested that no shovel probes be excavated on their property; therefore, these areas were only visually inspected. The consultant concludes that no further archaeological investigations are necessary, but recommended that this office be contacted in the event intact cultural materials are encountered. We concur with these determinations and recommendations. In our opinion, there are no archaeological resources located within the proposed project area that are eligible for or listed in the National Register of Historic Places. No further consultation is necessary regarding archaeological resources.

Architectural Resources:
We have reviewed the submitted information and determined that the proposed project will affect no architectural properties eligible for or included in the National Register of Historic Places. While the Cupp Farm, located on Arnold Road, will have three silos removed or altered as a result of this project, the farmstead has been altered numerous times and does not appear to represent any specific agricultural period. The other built resources over 45 years of age within the viewshed of the proposed project area appear to lack the significance and integrity necessary to be eligible for the National Register of Historic Places either individually or as a district. No further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change.

Cemetery Resources:
During the archaeological investigations of Area 5 one pet cemetery, of indeterminate age and burial population, was discovered. The consultant recommended that proposed project activities occurring around the pet cemetery should be exercised with caution. The consultant also recommended that this office should be contacted in the event that intact cultural materials are encountered in this area. The pet cemetery was not evaluated for potential eligibility to the National Register of Historic Places as the proposed project will not physically impact the resource. We concur with these determinations and recommendations.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Katie M. Turner, Archaeologist, or Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/KMT/BMR

WEST VIRGINIA
Division of Culture and History

RECEIVED
SEP 26 2016
CHAPMAN TECHNICAL GROUP

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

September 20, 2016

Mr. Shawn Tucker
Project Manager
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

RE: Elkins-Randolph County Regional Airport, Elkins – Runway 5-23 Obstruction Removal Phase I
FR#: 16-984-RD

Dear Mr. Tucker:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the Elkins-Randolph County Regional Airport proposes to remove approximately 26 acres of obstructions within approach surfaces for Runways 5 and 21 located in Elkins, Randolph County. It is our understanding that the proposed project will consist of clearing and grubbing trees and removing and/or placing an obstruction light on five structures (three grain silos, one obstruction light tower, and one utility pole). It is also our understanding that upon the completion of the obstruction removal process, all disturbed areas will be reclaimed and re-vegetated.

Archaeological Resources:
A search of our records indicates that there are several recorded archaeological resources located within the vicinity of the proposed project area. We therefore concur that a phase I archaeological survey should be completed within all proposed project areas prior to the removal of any trees. Per our guidelines (www.wvculture.org/shpo/techreportguide/guidelines.html), phase I methodology should include completion of a pedestrian survey within the entire proposed project area, systematic shovel testing within all visually undisturbed landforms situated on less than twenty percent slope, and geoarchaeological/deep testing where alluvial soils are encountered. All archaeological survey work should be completed under the supervision of an individual who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (https://www.nps.gov/hisotry/local-law/arch_stnds_9.htm). We will provide further comment upon the receipt of the resulting technical report.

Architectural Resources:
Based on the submitted documentation, there are properties located within sight of the proposed project area, some of which may be eligible for inclusion in the National Register of Historic Places. In order to evaluate the proposed project's indirect and visual effects to architectural properties, we request you forward to our office color photographs and original dates of construction of all properties that are forty-five (45) years or older and will have a line-of-sight of the proposed project area, including access roads. Your photographs need to be keyed to a USGS topographic or aerial map and should accurately depict from various angles any architectural resources, building or structural details, and outbuildings. Your photographs also need to document the project

area by showing general views, known disturbances, and any rock outcrops. Panoramic shots of surrounding landscapes and viewsheds are also necessary for us to complete our review. Be sure to include images of the proposed project area from the position of the individual properties. If nearby buildings or structures are less than forty-five (45) years old or will not be within the line-of-sight of the proposed project, please confirm in writing. We will provide additional comments upon receipt of the requested information; however, we reserve the right to request additional information, including the completion of Historic Property Inventory forms.

Public Involvement

Federal regulations in 36 CFR §§ 800.2(d)(1–2), 800.3(e), and 800.6(a)(4) all stress the importance of involving the general public in the Section 106 review process. If you have already completed this aspect of the requirements under Section 106, please provide written documentation along with any comments you have received, or any that you receive in the future, to this office. If you have not already done so, please consider forwarding a copy of the submitted information for the above-mentioned project to any individuals living near or within a line-of-sight of the proposed obstruction clearing project to request their comments or opinions on the matter. Please forward any comments that you receive to this office. If you receive no comments within thirty (30) days, please indicate that in writing to this office.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Katie M. Turner, Archaeologist, or Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/KMT/BMR

Architectural History Photolog for the Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA) Project, Elkins, Randolph County, West Virginia

By

Douglas Terpstra, MS

ASC GROUP, INC.
ARCHAEOLOGY | ARCHITECTURAL HISTORY | ENVIRONMENT
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Architectural History Photolog for the Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA) Project, Elkins, Randolph County, West Virginia

By

Douglas Terpstra, MS

Submitted By:
Annette G. Ericksen, PhD
Manager of West Virginia Region

Annette G. Ericksen

ASC Group, Inc.
3520 Teays Valley Road, Suite 5
Hurricane, West Virginia 25526-9479
681.233.4044

Submitted To:
Shawn Tucker, PE
Chapman Technical Group
43 East Main Street
Buckhannon, WV 26201

Lead Agency: FAA

March 14, 2017

Printed on Recycled Paper

TABLE OF CONTENTS

TABLE OF CONTENTS ii

LIST OF FIGURES iii

LIST OF PLATES iii

INTRODUCTION 1

APPENDIX A: RESUME OF QUALIFIED PERSONNEL A-1

LIST OF FIGURES

Figure 1. Portion of the 1995 Elkins, West Virginia quadrangle (USGS 7.5' topographic map) showing the project areas..... 3

Figure 2. Aerial photograph showing the project areas and plate locations. (3 Sheets) 4

LIST OF PLATES

Plate 1. Harvestore silo at Cupp Farm, east side of Arnold Hill Road, ca. 1965, looking southeast..... 7

Plate 2. Harvestore silo and concrete silo at Cupp Farm, west side of Arnold Hill Road, ca. 1965 and ca. 1940, looking west..... 8

Plate 3. Silos on west side of Arnold Hill Road in context with barn and extensions, looking southwest..... 8

Plate 4. Barn at Cupp Farm, Arnold Hill Road, ca. 1900, looking southwest. 9

Plate 5. Barn at Cupp Farm, Arnold Hill Road, ca. 1900, looking northwest. 9

Plate 6. House at Cupp Farm, Arnold Hill Road, 1935, looking northwest. 10

Plate 7. House at Cupp Farm, Arnold Hill Road, 1935, looking west-southwest. 10

Plate 8. Secondary house at Cupp Farm, Arnold Hill Road, 1930, looking east. 11

Plate 9. Gothic-roof barn at Cupp Farm, Arnold Hill Road, ca. 1965, looking southwest... 11

Plate 10. Overview of farmstead at Cupp Farm, Arnold Hill Road, looking north. 12

Plate 11. Cupp Farm barn adjacent to northwest project area south of airport, Arnold Hill Road, ca. 1965, looking west. 12

Plate 12. 480 Arnold Hill Road, 1965, looking north-northwest. 13

Plate 13. 593 Arnold Hill Road, 1937, looking southeast. 13

Plate 14. 593 Arnold Hill Road, 1937, looking southwest. 14

Plate 15. Airport maintenance building, west side of Arnold Hill Road, ca. 1960, looking west. 14

Plate 16. Panoramic view at intersection of Arnold Hill Road and driveway to Pegasus Farm Campground..... 15

Plate 17. House on Bowstring Lane, 1940, looking northwest. 15

Plate 18. House south of Twelve Oak Drive, 1965, looking northeast. 16

Plate 19. House at intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250, 1950, looking west. 16

Plate 20. House on north side of Twelve Oak Drive, 1946, looking northwest. 17

Plate 21. House on west side of Beverly Pike/US 219/US 250, 1920, looking southwest. 17

Plate 22. House on west side of Beverly Pike/US 219/US 250, 1920, looking northwest. 18

Plate 23. 481 Beverly Pike/US 219/US 250, ca. 1945, looking southeast. 18

Plate 24. House on east side of Beverly Pike/US 219/US 250, 1945, looking northeast. 19

Plate 25. Panoramic view at intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250 19

Plate 26. Panoramic view opposite intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250. 20

Plate 27. Panoramic view on Twelve Oak Drive west of project areas. 20

Plate 28. Modern houses north of Twelve Oak Drive, looking north. 21

Plate 29. Modern commercial development along west side of Beverly Pike/US 219/US 250 north of Twelve Oak Drive, looking southwest. 21

Plate 30. Commercial development of various ages along east side of Beverly Pike/US 219/US 250 south of Logan Drive, looking southeast. 22

Plate 31. Modern commercial development along east side of Beverly Pike/US 219/US 250 south of Logan Drive, looking northeast. 22

Plate 32. Modern commercial development along west side of Beverly Pike/US 219/US 250 north of Logan Drive, looking northwest. 23

INTRODUCTION

Under contract with Chapman Technical Group, ASC Group, Inc., has completed an architectural history photolog for approximately 26 acres (10.52 hectares) of approach areas associated with Runways 5 and 23 of the Elkins-Randolph County Regional Airport in Elkins, Randolph County, West Virginia (Figure 1). Trees and structures have been identified that currently obstruct air traffic and are slated for removal. A total of 26 acres (10.52 hectares) of tree removal is anticipated for the current project, as well as removal and/or alteration of five standing structures, including three farm silos, one obstructing light tower, and one utility pole. In some instances, structures or trees will be topped or lowered rather than removed (Shawn Tucker, personal communication to Dawn Walters Gagliano, February 8, 2017).

The architectural history investigation is governed by Section 101(b)(4) of the National Environmental Policy Act of 1969; Section 1(3) and 2(b) of Executive Order 11593; Section 106 of the National Historic Preservation Act, as amended; 36 CFR 800, as revised August 5, 2004; and West Virginia Code § 29, as amended. Additionally, all work will adhere to the standards of the Federal Aviation Administration (FAA) guidelines. Key ASC personnel meet appropriate professional standards as outlined in Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, *Federal Register*, Vol. 48, No. 190-September 29, 1983, Pt. IV, and formerly published in 36 CFR § 61, Section 106 of the National Historic Preservation Act as amended, and its implementing regulations, 36 CFR 800, the Archaeological and Historical Preservation Act of 1974, and the West Virginia State Code 29-1-8, including Title 82, Series 2, Code 29-18a, Title 82, Series 3.

Douglas Terpstra, MS, architectural history principal investigator, conducted the fieldwork on February 15–16, 2017. Doug's resume is included in Appendix A. Per the request of the West Virginia Division of Culture and History (the West Virginia State Historic Preservation Office [WVSHPO]), the field survey sought to photograph all architectural history resources 45 years of age or older within line-of-sight of the proposed project areas, general views of the project areas, known disturbances in the project areas, and panoramic shots of surrounding landscapes and viewsheds. The architectural history records search was conducted using the online WVSHPO GIS system. The records check, conducted February 14, 2017, did not identify any previously recorded architectural history resources or previous surveys including an architectural history component within or adjacent to any of the proposed project areas. The

construction dates included in the photolog for the architectural history resources were obtained via the Randolph County Assessor's GIS website (http://www.landmarkgeospatial.com/randolphgis/).

The project areas south of the airport (Figure 1; Figure 2, Sheet 1) are located in an area of rolling terrain that is mostly in agricultural use. All of the structures to be lowered are south of the airport: the three silos are located within a single farmstead, and the light tower and utility pole are modern structures. The project areas north of the airport (Figure 1; Figure 2, Sheets 2–3) are located in steeper and more wooded terrain. Beverly Pike/US 219/US 250 passes between the project areas; buildings along this road consist of modern commercial properties and a few old houses. Away from the highway, the project areas are found among residential subdivisions that contain mostly modern houses along with a few mid-twentieth century houses. All of the houses within line-of-sight east of the easternmost project area are part of a modern subdivision along Wood Ridge Drive and Westridge Drive.

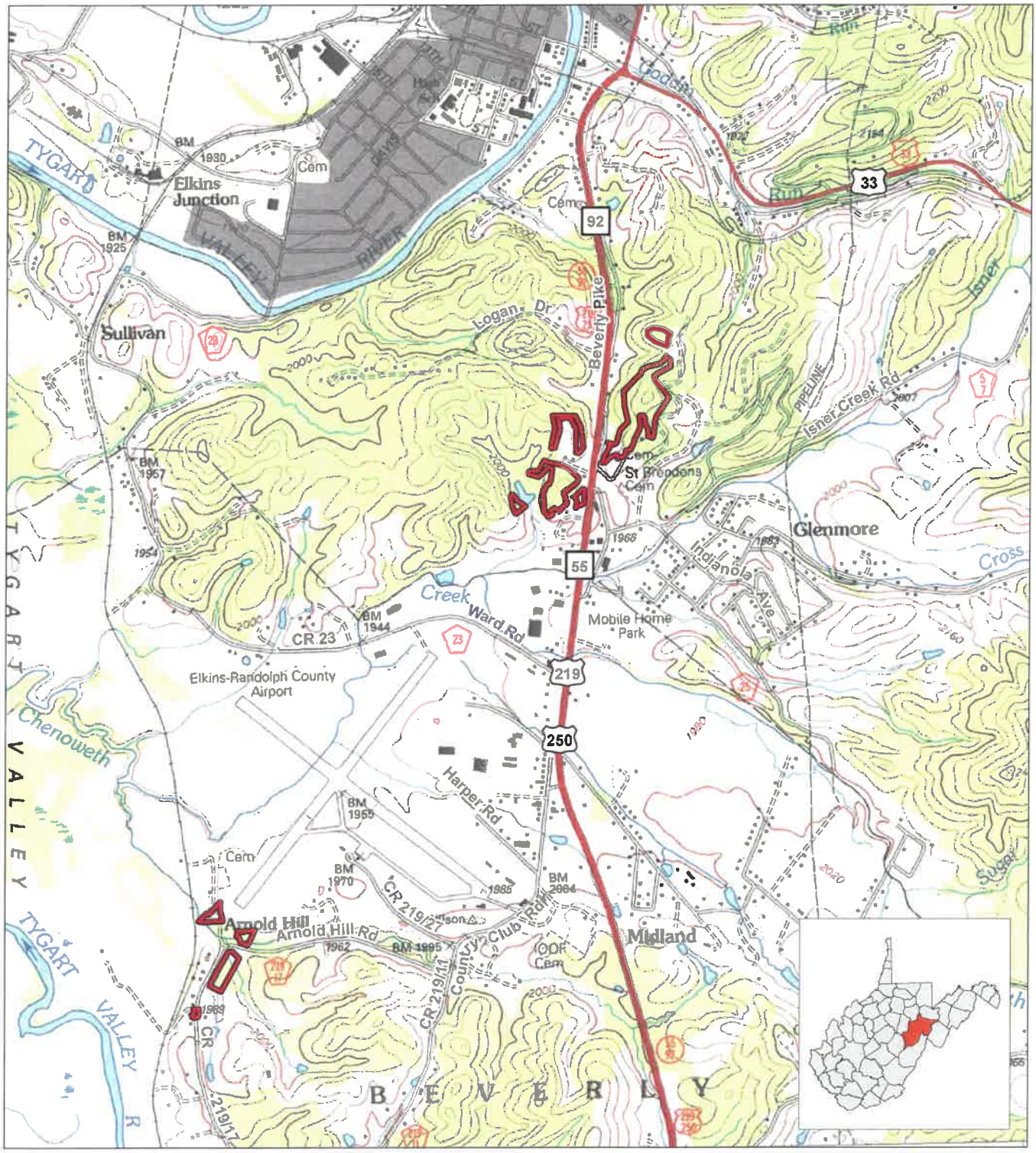
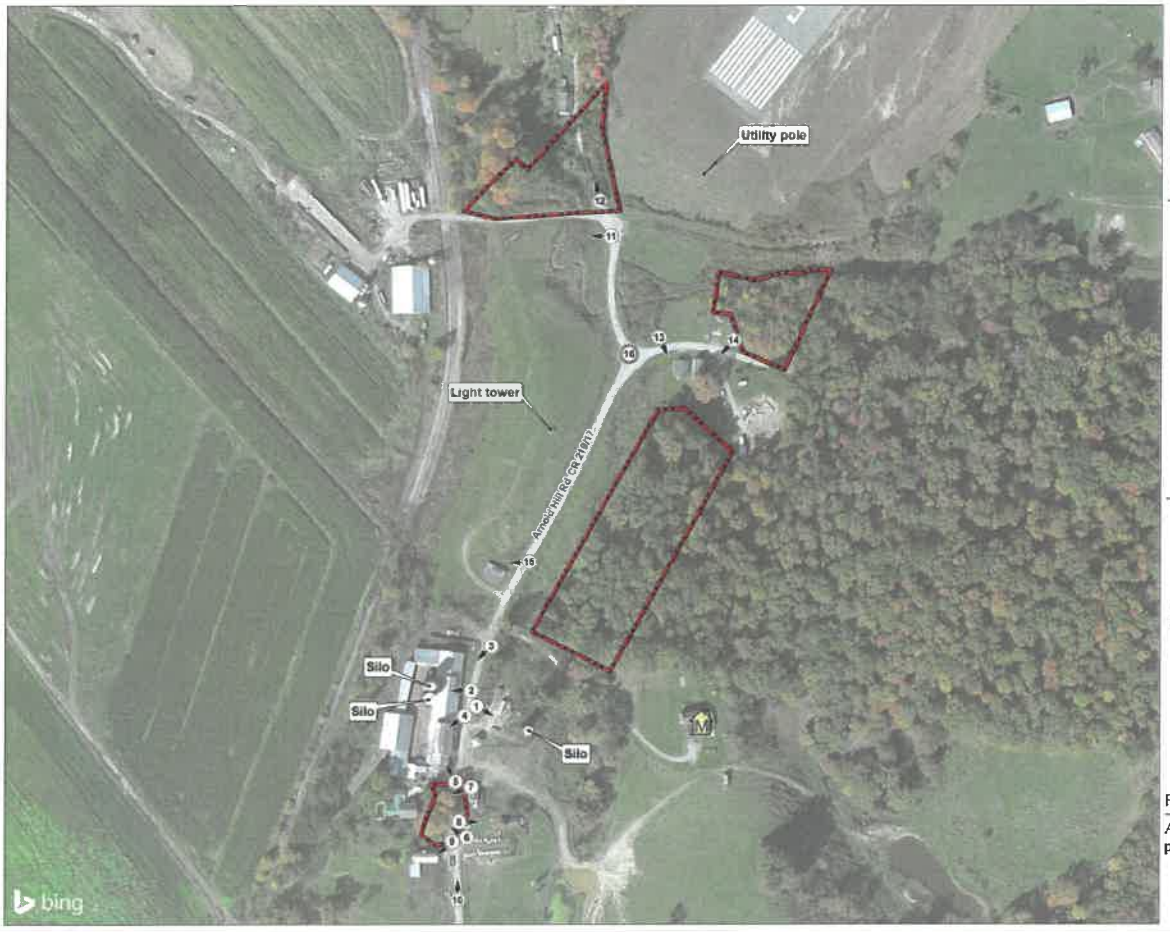


Figure 1

Portion of the 1995 Elkins, West Virginia quadrangle (USGS 7.5' topographic map) showing the project areas.

Base: USGS Elkins,West Virginia, 7.5' series quadrangle





Project area boundary

Modern building (less than 45 years old)

Plate location

Panorama

Base: Microsoft Corporation
Aerial photograph 2017

N

0 40 80 120 160 Meters

0 140 280 420 560 Feet

Figure 2 Sheet 1 of 3

Aerial photograph showing the project areas and plate locations. (3 Sheets)

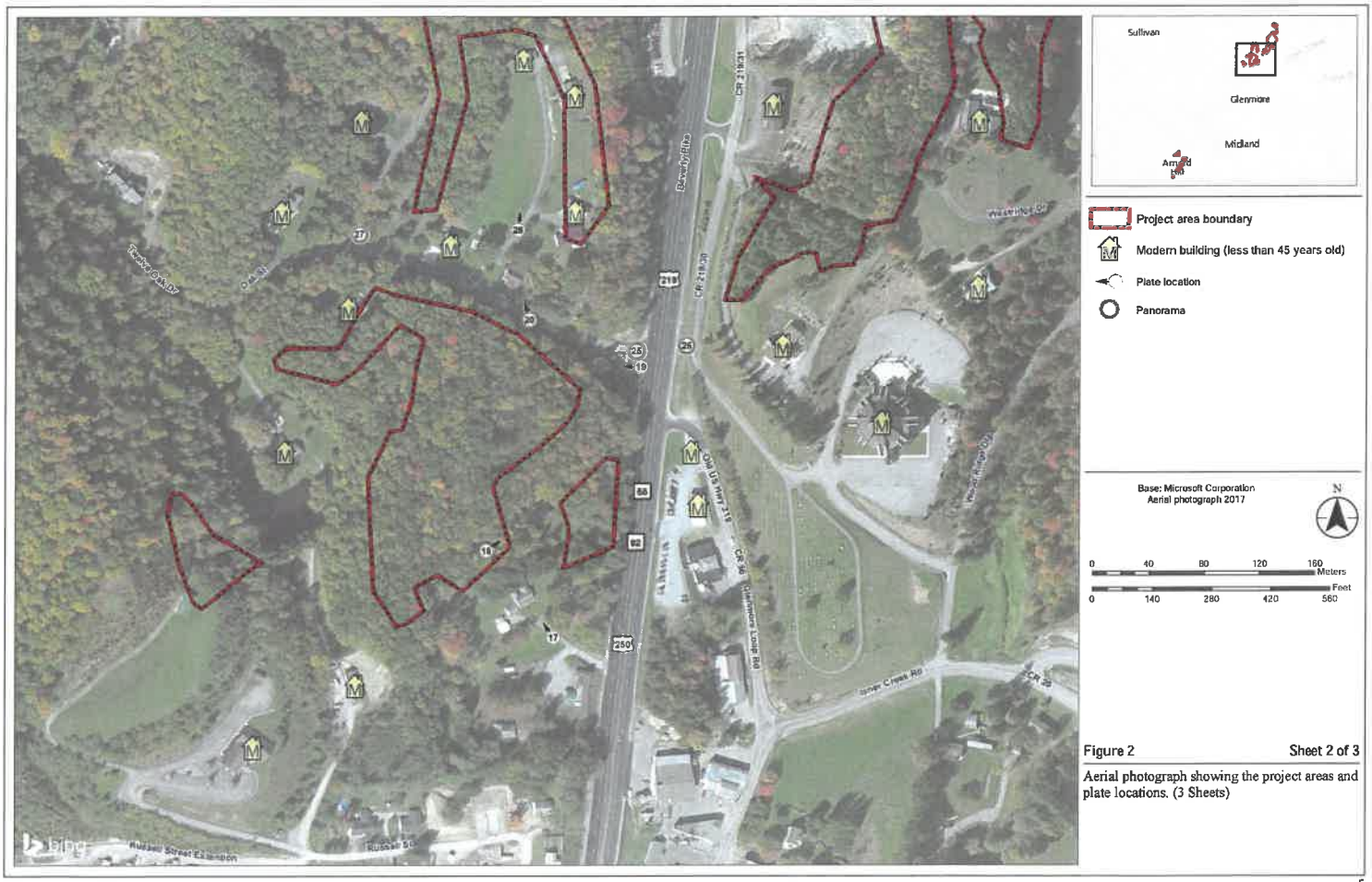


Figure 2 Sheet 2 of 3

Aerial photograph showing the project areas and plate locations. (3 Sheets)

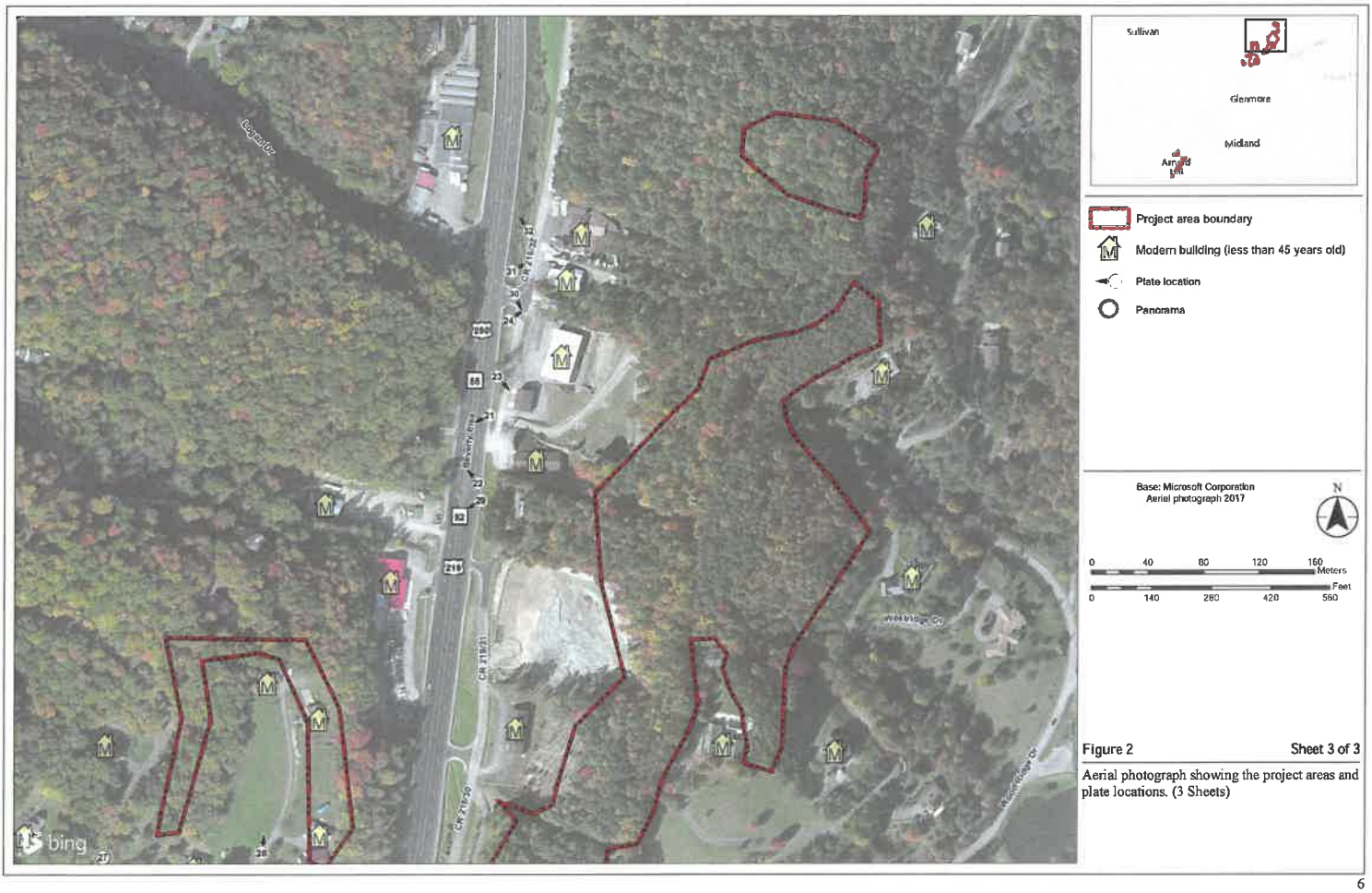


Figure 2 **Sheet 3 of 3**

Aerial photograph showing the project areas and plate locations. (3 Sheets)

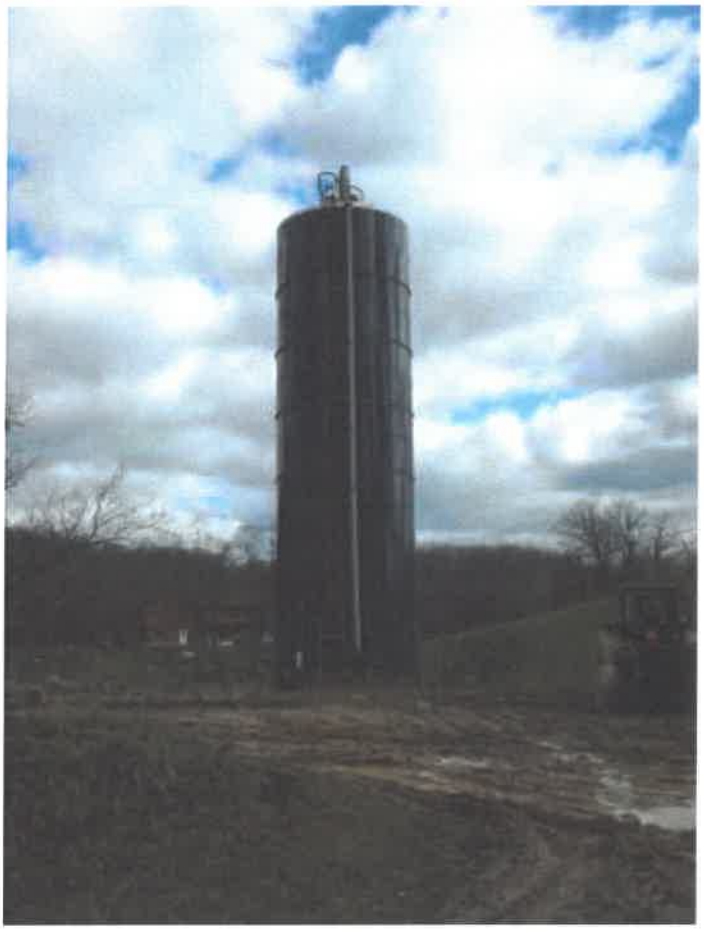


Plate 1. Harvestore silo at Cupp Farm, east side of Arnold Hill Road, ca. 1965, looking southeast.



Plate 2. Harvestore silo and concrete silo at Cupp Farm, west side of Arnold Hill Road, ca. 1965 and ca. 1940, looking west.

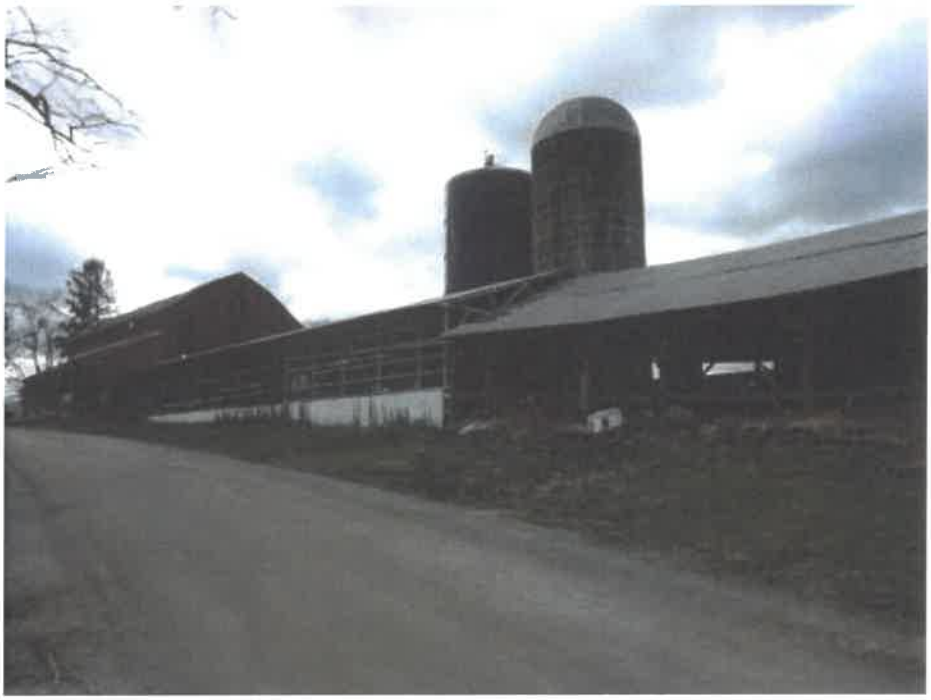


Plate 3. Silos on west side of Arnold Hill Road in context with barn and extensions, looking southwest.



Plate 4. Barn at Cupp Farm, Arnold Hill Road, ca. 1900, looking southwest.



Plate 5. Barn at Cupp Farm, Arnold Hill Road, ca. 1900, looking northwest.



Plate 6. House at Cupp Farm, Arnold Hill Road, 1935, looking northwest.



Plate 7. House at Cupp Farm, Arnold Hill Road, 1935, looking west-southwest.



Plate 8. Secondary house at Cupp Farm, Arnold Hill Road, 1930, looking east.



Plate 9. Gothic-roof barn at Cupp Farm, Arnold Hill Road, ca. 1965, looking southwest.



Plate 10. Overview of farmstead at Cupp Farm, Arnold Hill Road, looking north.



Plate 11. Cupp Farm barn adjacent to northwest project area south of airport, Arnold Hill Road, ca. 1965, looking west.



Plate 12. 480 Arnold Hill Road, 1965, looking north-northwest.



Plate 13. 593 Arnold Hill Road, 1937, looking southeast.



Plate 14. 593 Arnold Hill Road, 1937, looking southwest.



Plate 15. Airport maintenance building, west side of Arnold Hill Road, ca. 1960, looking west.



Plate 16. Panoramic view at intersection of Arnold Hill Road and driveway to Pegasus Farm Campground.



Plate 17. House on Bowstring Lane, 1940, looking northwest.



Plate 18. House south of Twelve Oak Drive, 1965, looking northeast.



Plate 19. House at intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250, 1950, looking west.



Plate 20. House on north side of Twelve Oak Drive, 1946, looking northwest.



Plate 21. House on west side of Beverly Pike/US 219/US 250, 1920, looking southwest.



Plate 22. House on west side of Beverly Pike/US 219/US 250, 1920, looking northwest.



Plate 23. 481 Beverly Pike/US 219/US 250, ca. 1945, looking southeast.



Plate 24. House on east side of Beverly Pike/US 219/US 250, 1945, looking northeast.



Plate 25. Panoramic view at intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250.



Plate 26. Panoramic view opposite intersection of Twelve Oak Drive and Beverly Pike/US 219/US 250.



Plate 27. Panoramic view on Twelve Oak Drive west of project areas.



Plate 28. Modern houses north of Twelve Oak Drive, looking north.



Plate 29. Modern commercial development along west side of Beverly Pike/US 219/US 250 north of Twelve Oak Drive, looking southwest.



Plate 30. Commercial development of various ages along east side of Beverly Pike/US 219/US 250 south of Logan Drive, looking southeast.



Plate 31. Modern commercial development along east side of Beverly Pike/US 219/US 250 south of Logan Drive, looking northeast.



Plate 32. Modern commercial development along west side of Beverly Pike/US 219/US 250 north of Logan Drive, looking northwest.

APPENDIX A: RESUME OF QUALIFIED PERSONNEL

ASC GROUP, INC.
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Douglas S. Terpstra

Project Manager/Principal Investigator
History/Architecture

800 Freeway Drive N, Suite 101 • Columbus, OH 43229 • Phone: 614.268.2514, x 3556 • dterpstra@ascgroup.net



Education

College of William and Mary,
BA History
1996

University of Vermont,
MS Historic Preservation
1999

Certifications

Architectural Historian:
Ohio (2001)
Indiana (2006)
West Virginia (2005)
Michigan (2011)
Principal Investigator (Cultural-Historic),
Kentucky (2011)

36CFR61: Historic Preservation,
Pennsylvania
(Principal Investigator)

36CFR61: History,
Pennsylvania (Principal Investigator)

36CFR61: Architectural History, Pennsylvania
(Principal Investigator)

PROFESSIONAL RESPONSIBILITES

Mr. Terpstra is responsible for conducting all phases of the Section 106 process, including conducting literature reviews, conducting fieldwork and report preparation for reconnaissance and intensive level surveys, preparing documentation for consultation, participating in consulting party coordination, preparing memorandums of agreement, and participating in the completion of mitigation products. As principal investigator for architectural history, Mr. Terpstra reviews work of subordinate architectural historians, helps to prepare proposals, manages schedules and budgets, and participates in marketing activities.

EXPERTISE

- More than 15 years of experience in the fields of architectural history and historic preservation.
- Experience as Project Manager and Principal Investigator.
- Authored or co-authored Section 106 and/or Section 110 review projects in Ohio, Indiana, Kentucky, Michigan, Minnesota, Pennsylvania, and West Virginia.
- Performed surveys for a wide range of project types such as transportation, federal building documentation, airport expansion, landfill expansion, cell tower evaluations, correctional institutions, pipeline corridors, dam removals, mining permit areas, and commercial development.
- Production of scoping reports, literature reviews, reconnaissance and intensive level survey reports, determination of effects reports, and mitigation documentation.
- Completion of two HABS and seven HAER-equivalent documentations
- Authoring or co-authoring nominations successfully listed in the National Register of Historic Places.

SELECTED PROJECT EXPERIENCE

- Utica Marcellus Texas Pipeline Project, Harrison, Scioto, and Tuscarawas Counties, Ohio – served as architectural history principal investigator, conducted fieldwork, and contributed to report preparation
- Improvements to US 36/East William Street, City of Delaware, Delaware County, Ohio – served as architectural history principal investigator, conducted fieldwork, served as lead report author
- Scioto Greenway Project, City of Columbus, Franklin County, Ohio – served as architectural history principal investigator, conducted fieldwork, served as lead report author, conducted consulting party coordination
- Mouth of Seneca Bridge Replacement, Pendleton County, West Virginia. Served as architectural history principal investigator, conducted fieldwork, and report author for the Phase I Architectural History Survey.
- Elkins Rail-Trail Connector, City of Elkins, Randolph County, West Virginia. Served as architectural history principal investigator, conducted fieldwork, and report author for the Phase I Architectural History Survey.

Phase Ia Literature Review and Phase Ib Archaeology Survey for the Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA), Elkins, Randolph County, West Virginia

By

Dawn Walter Gagliano, MA,
and Annette G. Ericksen, PhD

ASC GROUP, INC.
ARCHAEOLOGY | ARCHITECTURE | ENVIRONMENT
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Phase 1a Literature Review and Phase I Archaeological Survey for the Proposed Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA), Elkins, Randolph County, West Virginia

By

Dawn Walter Gagliano, MA, and Annette G. Ericksen, PhD

Submitted By:
Annette G. Ericksen, PhD
Manager of West Virginia Region

Annette G. Ericksen

ASC Group, Inc.
3520 Teays Valley Road, Suite 5
Hurricane, West Virginia 25526
681.233.4044

Submitted To:
Shawn Tucker, PE
Chapman Technical Group
43 East Main Street
Buckhannon, WV 26201

Lead Agency: FAA

March 14, 2017

TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF FIGURES ii
LIST OF TABLES iii
INTRODUCTION 1
ENVIRONMENTAL SETTING 4
FIELD TECHNIQUES 6
RESULTS 7
Phase Ia Literature Review 7
Fieldwork 11
SUMMARY AND RECOMMENDATIONS 31
REFERENCES CITED 33
APPENDIX A: RESUMES OF QUALIFIED PERSONNEL A-1
APPENDIX B: PROJECT DOCUMENTATION B-1

LIST OF FIGURES

Figure 1. Location of undertaking including the project area (direct APE for archaeology).... 2

Figure 2. WVSHPO GIS map indicating relationship between identified cultural resources, surveys and the northern portion and southern portions of the project area at the center of two 1.6-km (1-mi) study areas. 8

Figure 3. Project area delineated on historic cartographic resource, 1909.... 10

Figure 4. Northern portion of project area, indicating location of archaeological Areas 1–6..... 12

Figure 5. Southern portion of project area, indicting location of archaeological Areas 7–10. 13

Figure 6. Northern end of Area 1 at Oak Street. View southeast showing land modification and disturbance. 14

Figure 7. Sloped portion of Area 1, looking southeast.... 14

Figure 8. Shovel probe portion of Area 1, looking north. 15

Figure 9. Aerial view of Areas 1-6, showing area boundaries, location of shovel probes, and location of pet cemetery in Area 5. 16

Figure 10. Representative soil profile, Area 1.... 17

Figure 11. Overview of eastern portion of Area 2, looking at slope and highway. View northeast. 18

Figure 12. Western portion of Area 2 indicating slope and modern disturbances. View north. 18

Figure 13. Area 3, showing proximity to Beverly Pike and sloped, disturbed terrain. 19

Figure 14. View of Area 4 looking northwest indicating sloping topography and pond. 20

Figure 15. Overview of Area 4 looking south showing conditions and sloping topography.... 20

Figure 16. View of Area 5 looking northwest at houses in subdivision and sloped topography. 21

Figure 17. Flat, testable portion of Area 5, looking north.... 21

Figure 18. Representative Soil Profile Schematic, Area 5. 23

Figure 19. Overview of small pet cemetery identified in Area 5, showing grave markers..... 24

Figure 20. Close up of two largest markers in Area 5..... 24

Figure 21. View of small cemetery in Area 5, showing the possible 3–6 marked internments.... 25

Figure 22. Close up of largest stone, showing condition and lack of inscription/data..... 25

Figure 23. View of Area 6, from knoll, looking south toward Area 5..... 26

Figure 24. Schematic soil profile, Area 6..... 26

Figure 25. Aerial view of Areas 7-10 showing boundaries..... 28

Figure 26. View of Area 7, looking northwest at pine trees slated for removal. 29

Figure 27. Overview of Area 8, looking south. Section exhibiting hydric soils. 29

Figure 28. View of Area 8, looking northwest at modern debris near edge of Arnold Hill Road. 30

Figure 29. Ravine and slope that make up Area 9, running along the west side of Arnold Hill Road, looking south. 30

Figure 30. View of Area 9, from southern end, indicating sloped topography..... 31

LIST OF TABLES

Table 1. Previously Recorded Archaeological Sites Located within 1.6 km (1 mi) of the project. 9

Table 2. Previous Cultural Resource Survey Conducted within 1.6 km (1 mi) of the project. 9

Table 3. Soil profiles documented from STP excavation, Area 1..... 17

Table 4. Soil profiles documented from STP excavation, Area 1..... 22

INTRODUCTION

Under contract with Chapman Technical Group., ASC Group, Inc., completed a Phase Ia literature review and Phase Ib archaeological field reconnaissance for approximately 10.52 hectares (26 acres) of approach areas associated with Runways 5 and 23 at the Elkins-Randolph County Regional Airport in Elkins, Randolph County, West Virginia (Figure 1). The total acreage identified above defines the direct Area of Potential Effect (APE) for the undertaking. The APE and the project area are equivalent terms. Trees and structures in these discontinuous areas have been identified that currently obstruct air traffic and are slated for removal. Recent aerial mapping indicates the areas requiring investigation will not be amenable to surface collection and a shovel test probe (STP) strategy will be required to document the presence/absence of archaeological materials. Sixty five percent of the areas identified as harboring obstructive elements is in slope greater than 20 percent and were subjected to visual reconnaissance only. Hand testing and pedestrian survey was required on 3.67 hectares (9.09 acres). Access to areas associated with Runway 5 was limited by request of property owners in this locality. These areas were visually inspected and/or tested with limited probing as possible (Areas 7-10; Figure 1).

The project was conducted pursuant to the instructions and intents set forth in Section 101(b)(4) of the National Environmental Policy Act of 1969; Section 1(3) and 2(b) of Executive Order 11593; Section 106 of the National Historic Preservation Act, as amended; 36CFR 800, as revised August 5, 2004; West Virginia Code § 29, as amended; and the Criteria for Comprehensive Statewide Historic Survey and Plans, and the Guidelines for Phase I,II, and III Archaeological Investigations and Technical Reports (Guidelines, Trader 2001), both prepared by the West Virginia Division of Culture and History (WVDCH) as necessary. Additionally, all work will adhere to the standards of the Federal Aviation Administration (FAA) guidelines. Key ASC personnel meet appropriate professional standards as outlined in Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, Federal Register, Vol. 48, No. 190-September 29, 1983, Pt. IV, and formerly published in 36CFR § 61. Section 106 of the National Historic Preservation Act (NHPA) as amended, and its implementing regulations, 36 CFR 800, the Archaeological and Historical Preservation Act of 1974, and the West Virginia State Code 29-1-8, including Title 82, Series 2, Code 29-18a, Title 82, Series 3.

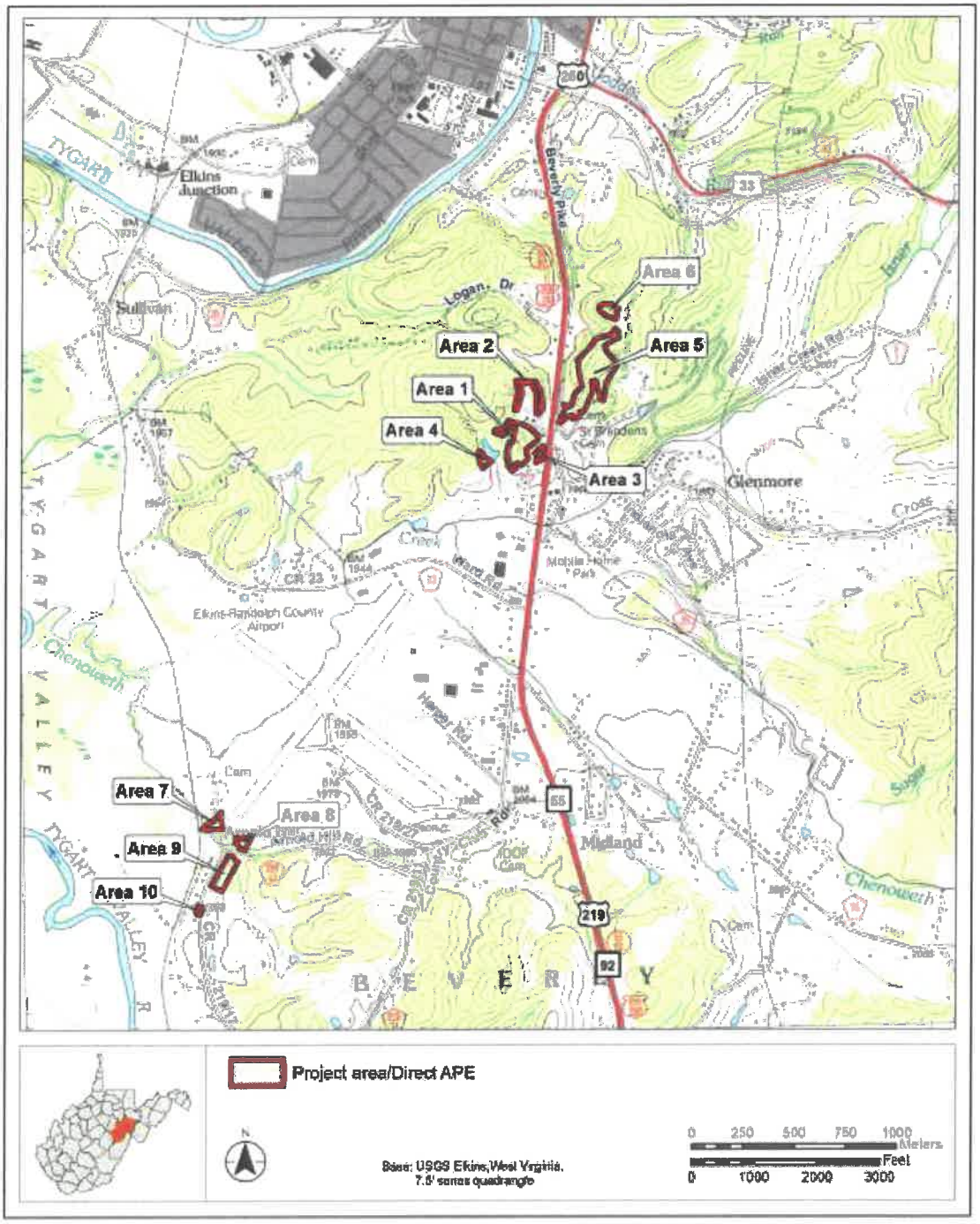


Figure 1. Location of undertaking including the project area (direct APE for archaeology).

The Phase Ia literature review was conducted by Annette G. Ericksen, PhD, on October 10, 2016, and Dawn Walter Gagliano. MA, on February 6, 2017. The fieldwork (Phase Ib) was completed under the direction of Dr. Ericksen by field supervisor Dawn Walter Gagliano, MA on October 19 and 20, 2016 and February 16, 2017. The field crew included Jessica A. Munday, Chase Searles, and Kyle Mayer.

The proposed project involves the removal of trees and structures, which are currently penetrating the approach to surfaces of Runway 5 and 23 and are identified obstructions to air traffic. A total of 10.52 hectares (26 acres) of tree removal is anticipated for the current project, as well as removal and/or alteration of five standing structures, including three grain silos, one obstructing light tower, and one utility pole. In some instances, structures or trees will be topped or lowered rather than removed (Shawn Tucker, personal communication February 8, 2017). Structure documentation is provided in a separate report (Terpstra 2017). Hand excavation and pedestrian survey was conducted on six discrete areas to the north of the airport complex and to a more limited degree due to access issues, four areas to the south. The areas were delineated on mapping provided by the client, which was then used to direct field examinations.

Fieldwork methods include visual inspection, digital photography, and shovel test probe (STP) excavation. All soils and sediments excavated were screened utilizing a 0.6-cm (0.25-in) mesh hardware cloth. The purpose of the investigation was to determine if archaeological properties exist within the direct impact area of the proposed undertaking and to document extant disturbance and the character of the terrain as an evaluative technique to determine the potential for archaeological remains.

Perceived impacts to archaeological deposits in the APE include disturbances from residential development, utility corridors, roadway construction and maintenance, erosion of upland surfaces and slope wash.

The field investigation identified a small cemetery in Area 5, located in a section of woods in the Woodridge Drive subdivision. Communication with the landowner indicates that this is location consists of a pet cemetery. Since the proposed project involves the removal of some trees and the topping of other trees within the current flight path, it is recommended that tree removal within the immediate vicinity of the cemetery proceed with caution. No additional archaeological deposits were identified as a result of this survey.

ENVIRONMENTAL SETTING

The project area in the unglaciated Appalachian Plateau physiographic province within the Allegheny Mountain Section of the Appalachian Plateau Physiographic Province of West Virginia. This section combines topographic features of the Appalachian Plateau and the Ridge and Valley. The combination of northeast-southwest trending rivers and valleys and the more dendritic systems of the Plateau forms a complex pattern of landforms across the region (Lessing 1996). Bedrock formations in his province are generally horizontal with several folds and faults in the eastern section where the oldest rock formations are located. These rocks were formed from the Ordovician through Mississippian periods (Lessing 1996). Bedrock formations within the project area include Devonian rock layers of the Brallier Formation (Db). This formation exhibits predominantly olive-gray to dark, thickly laminated marine shale, with considerable non-fossiliferous siltstone and thin sandstone lenses. These formations are associated with the ridge and slope landforms of the direct APE for archaeology. The undertaking also crosses bedrock of the Quaternary period; Quaternary Alluvium (Qal). These formations consist of alluvial deposits of sand, silt and clay (USGS Washington 2016).

The Appalachian Plateau and Ridge and Valley land resource area encompasses portions of east-central and northern West Virginia, western Maryland, and western Pennsylvania. Elevation ranges from 300 m (984 ft) in the lowest valleys to 600–800 m (1,969–2,625 ft) over much of the plateau top, although mountains in the southeast often extend to 1,100–1,400 m (3,609–4,593 ft) in elevation. Steep slopes are dominant, but level to gently rolling plateau remnants are found in the north. Local relief is mainly about 100 m (328 ft), but some mountain peaks in the south rise 300 m (984 ft) or more above the plateau or adjacent valleys (USGS Washington 2016). Topography in Randolph County is typically bedrock with moderately sloping to steep slopes, narrow to broad ridgetops, and narrow to moderately broad stream valleys represent typical landforms. Elevation ranges from 1,458 m (4,782 ft) on the Roaring Plains to 549 m (1,800 ft) at the point where Tygart Valley River flows out of the county (Rice 2006). The project, which encompasses a portion of Tygart Valley River bottomland, is underlain by Cenozoic age Quaternary Alluvium, described as alluvial deposits of sand, gravel, silt, and clay (USGS Washington 2016).

The county is located in the Cumberland and Allegheny Mountains section of the Mixed Mesophytic Forest region (Braun 2001 [1950]). In this region, the canopy is shared by several

hardwood taxa. North slopes are usually cool and moist and support the greatest variety of trees, shrubs, and herbaceous and non-vascular taxa. South-facing slopes are generally dry and, prior to extensive logging, supported mixed oak associations. Core (1966) describes the region as the Allegheny Mountain and Upland Section of Northern Forests. While similar to Braun's description, portions of the region supported significant spruce (*Picea rubens*) forests.

Because of West Virginia's physiographic and topographic features, faunal resources include several species most common in the boreal habitats of Canada. Randolph County is situated in a zone of Carolinian Fauna types (Merriam 1895). Larger species of both prehistoric and early historic economic importance include white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), black bear (*Ursus americana*), wild turkey (*Meleagris gallopavo*), and raccoon (*Procyon lotor*). In addition, the region would have supplied fresh water fish in the major rivers and streams of the area. Migratory waterfowl and terrestrial and lacustrine amphibians and reptiles would have been abundant.

The climate of West Virginia is humid continental (Core 1966). Summers are hot and winters cool to cold. Prevailing winds are from the south and west, resulting in the influx of warm, humid air masses from the gulf coast region. Precipitation and length of growing season are suitable for agricultural practices. Tropical cultigens are suited to the growth conditions without irrigation. Rainfall fluctuates to extremes of high precipitation and periods and drought.

Several soil types of the Berks-Weikert Complex have been mapped within the project area: Berks-Weikert Complex, 25 to 35 percent slopes (BkE), Berks-Weikert Complex, 8-15 percent slopes (BkC), and Berks-Weikert Complex 35 to 70 percent slopes (BkF). These soils develop on ridges and mountain slopes and form from residuum weathered from interbedded sedimentary rock. The soil is well drained and the potential for flooding is 0 percent (USDA 2017). The upland location of the project area indicates that there would be no potential for buried archaeological deposits. Although colluvial deposition is possible in area associated with the Tygert River Valley, the areas where potential site burial would exist may have been modified and/or filled by recent landscape modifications. The project area is primarily comprised of sloped topography where deflation is common and deposition unlikely.

Southern portion of project area contain similar Berks-Weikert Complex, 35-70 percent slopes (BkF) soils. In the low-lying area adjacent to the unnamed creek, the soils are represented

by Pope Atkins Complex (Pn), which are commonly found on floodplains that are subject to common flooding. They area nearly level, well drained and poorly drained soils (USDA 2017).

Overall, the project area is in steep slope, and/or has undergone modification at the near surface. The APE is surrounded by development, with most residential impacts associated in the area of Runway 5.

FIELD TECHNIQUES

The entire APE was visually inspected. More intensive survey methods including near surface examination for archaeological materials through STP excavation focused on approximately 3.67 hectares (9.09 acres) of non-slope terrain that presented a greater potential for prehistoric/historic habitation or use. Each area was evaluated for vegetation coverage, slope, disturbance, and above ground features. Access was restricted to areas to the south and associated with Runway 5. Documentation of the inspection is recorded through digital photography (Nikon Cool Pix L30). UTM and GIS data were collected with a Trimble, sub meter quality GPS unit.

The non-slope project areas were tested through near surface examination of soils and sediments. Surface visibility at the time of survey was less than 75 percent. As a result, a series of 50-cm (20-in) diameter shovel test probes (STP) were excavated in a grid patterns at 15-m (50-ft) intervals as could be best maintained given the topography. Micro benches were targeted for testing when encountered. GPS location of all shovel probes was recorded. STPs were excavated in natural units to a depth at which subsoil was documented. Excavation extended into the subsoil an additional 10-cm (4-in) to account for any displacement of cultural materials through natural or mechanical processes. Soil and/or sediment strata, color, texture, and inclusions were documented for each excavation. All excavated soil/sediment was screened though a box screen fitted with 0.6-cm (0.25-in) mesh hardware cloth in order to obtain a standard sample of cultural materials. As no cultural materials were encountered, no specific collection strategy was employed.

RESULTS

PHASE Ia LITERATURE REVIEW

The Phase Ia records search was conducted online. The WVSHPO GIS system was reviewed for known surveys and archaeological properties. For organizational purposes, two overlapping circular 1.6-km (1-mi) study areas, centered on the northern and southern portions of the project area, were reviewed as part of the background research (Figure 2). Results of the literature review indicate a single archaeological resources was documented adjacent to Area 9 in the southern portion of the project area. Archaeological site 46RD707, a small unassigned prehistoric lithic scatter located on small knoll on the west side of Aaron Hill Road, was document in 2010 during a similar obstruction removal project (01-1131-RD, Paternostro 2010). Fifteen archaeological sites have been documented within the study areas and four archaeological surveys have been mapped in the WVSHPO interactive GIS mapping system. (Tables 1 and 2). A review of the WVSHPO site files revealed that 46RD91, 46RD92, 46RD29, 46RD65, and 46RD95 were recorded on West Virginia Geological Survey forms only (personal communication with WVSHPO office 2/17).

Four Archaeological Survey Areas (94-373-RD-1, Warren et al. 1994; 97-449-RD, DeMott 1997; 04-757-RD, Stafford 2004; 10-1r131-RD, Paternostro 2010) are located within the study area (Table 2). The survey areas include two bridge related project (04-757-RD and 97-441-RD), a stabilization along a portion of the Tygart River (94-373-RD-1), and an obstruction removal project association with Runway 5 (10-1131-RD).

Elkins history is connected with a time of industrial and commercial expansion seen throughout the region in the early twentieth century. Founded in 1890 by two United State senators, Henry Davis and Stephen Elkins, this small farming community in the mountains developed into a promising industrial center as the railroads expanded during the early 1900s; and the timber and coal industries were exploited. The expansion of rail lines into the interior of West Virginia opened the area up to recreational endeavors as well, with passenger train service beginning in 1905 on the Western Maryland Railroad. The train depot became the hub of the town, bringing nearly 18 passenger cars daily into Elkins.

[REDACTED]

Table 1. Previously Recorded Archaeological Sites Located within 1.6 km (1 mi) of the project.

Project Area	Site No.	Site Name	Site Type	Cultural affiliation	Reported by
N	46RD91	Kyle Spring	Isolated find	Late Archaic	WVGS 1983
N	46RD92	Kyle Garden	Unknown	Early/Middle Archaic	WVGS 1983
N	46RD556	Weist 2	Scatter	Unassigned Prehistoric	Espenshade 1999
N	46RD579	Weist 1	Isolated find	Unassigned Prehistoric	Espenshade 1999
N	46RD581	Weist 5	Isolated find	Unassigned Prehistoric	Espenshade 1999
N	46RD580	Weist 4	Isolated find	Unassigned Prehistoric	Espenshade 1999
N	46RD557	Weist 3	Scatter	Unassigned Prehistoric	Espenshade 1999
N	46RD65	DNR Operations Center	Campsite	Unassigned Prehistoric	WVGS 1981
N	46RD652	Marson Historic Scatter	Scatter	19th Century scatter	Stafford 2004
N	46RD29	East Airport Site	Campsite	Unassigned Prehistoric	WVGS 1975
	46RD332	AHC 95-1	Scatter	Unassigned Prehistoric/Early 20th century	Tidlow 1998
S	46RD25	--	--	--	No report on file
S	46RD64	Lytle Farm	Campsite	Archaic/Woodland	
S	46RD707	N/A	Scatter	Unassigned Prehistoric	Paternostro 2010
S	46RD95	Cupp Farm	Unknown	Unassigned Prehistoric	WVGS 1985
S	46RD189	Hammack 33	Isolated Find	Unassigned Prehistoric	Warren et. al 1994

Table 2. Previous Cultural Resource Survey Conducted within 1.6 km (1 mi) of the project.

Project Area	WVSHPO Survey Number	Sites Documented	Reference
N	97-441-RD	None	DeMott 1997
S	10-1131-RD	46RD707	Paternostro 2010
S	94-373-RD-1	46RD189	Warren et al.1994
S	04-757-RD	46RD652	Stafford 2004

In addition to the above records search, a review of historic mapping failed to document any potential historic resources within the project area. The 1909 Elkins, WV 15' quadrangle (Figure 3) offers clear indication that the property has not been historically developed. This condition can be extended somewhat into the mid- to late-twentieth century through the examination of the 7.5' quadrangle as presented in Figure 1.

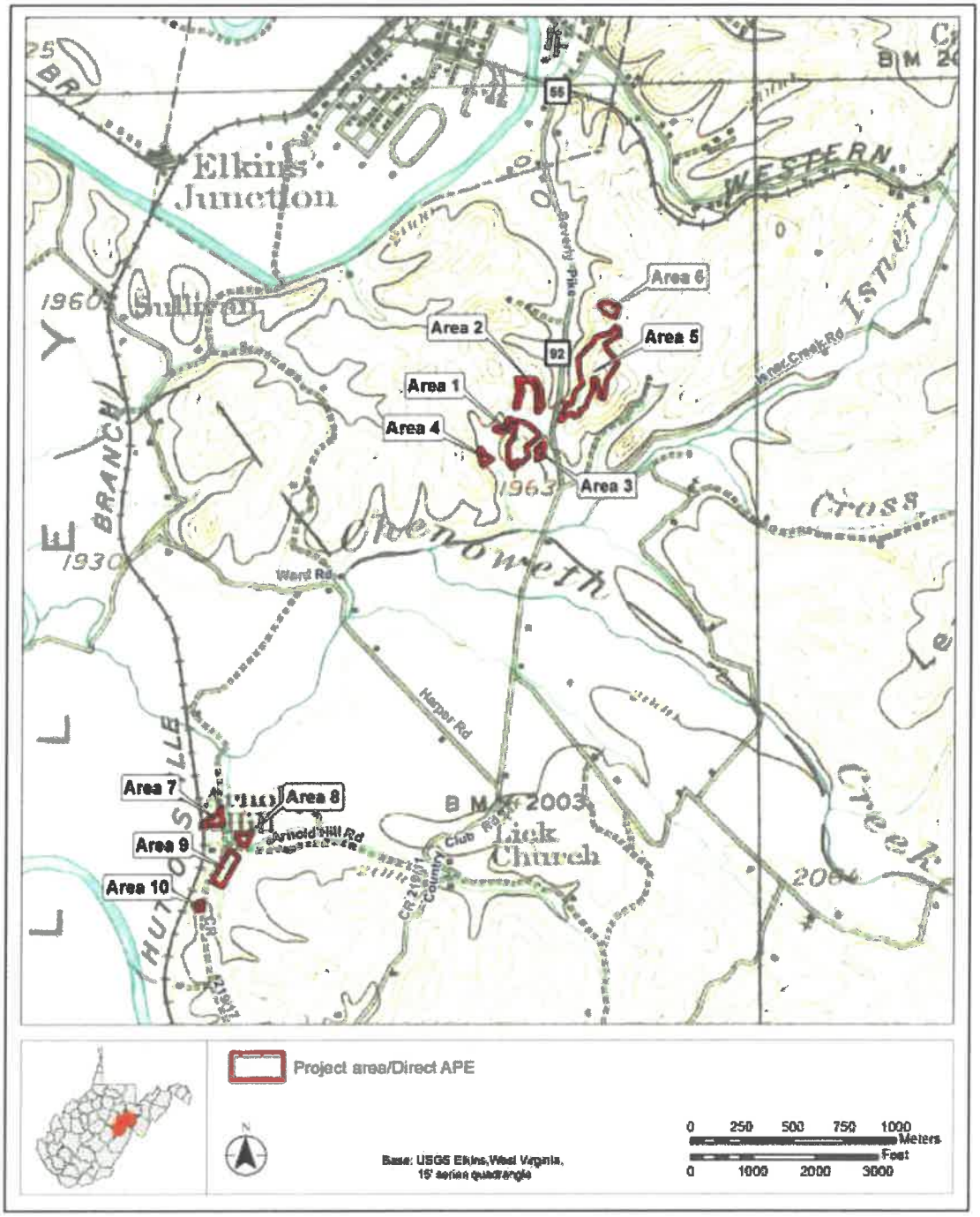


Figure 3. Project area delineated on historic cartographic resource, 1909.

The project area exhibits, as a result of its proximity to the Tygart River, a moderate potential for prehistoric cultural remains; however, this potential is limited because of the lack of habitable terrain within the project area. Based on previous surveys and previously documented archaeological resources, the majority of archaeological sites in the region consist of small prehistoric lithic scatters that do not provide an indication of age or cultural affiliation. Certainly, an Archaic and potential Woodland land use pattern is possible given the few diagnostic materials noted by these surveys. There is also a limited potential for historic era sites to occur within the APE for this undertaking.

FIELDWORK

Field investigations were completed on October 19 and 20, 2016 and February 16, 2017. The weather was sunny, temperature was mild with a slight breeze. Weather conditions did not affect field work nor did it hamper discovery efforts.

The project area consists of 10 discrete areas that were delineated on the client mapping and provided as a file for a Trimble GPS unit that aided in field investigations. For ease of survey, the areas were named Areas 1-10, based on the sequence of investigation. All areas were visually inspected for any above ground cultural remains or disturbances (Figures 4 and 5).

Area 1: Area 1 is located the south of Oak Street and west of Beverly Pike (Figure 4). The area is an amorphous shaped wooded area in an older residential subdivision and encompasses a 2.29 hectare (5.67 acre) area. The wooded area is moderately to steep sloped with a flat area on the top (in middle of overall area). An access road leading to a residence runs thought the middle of the area. The slopes were visually inspected and photodocumented (Figures 6 and 7). The flat portion of Area 1 was shovel probed to investigate the potential for intact subsurface deposits (Figure 8). Modern debris and bricks were scattered throughout. Five shovel probes were excavated and spaced approximately 15 m (50 ft) apart (Figure 9). The soils were slightly eroded woodland soils consisting of 0-20 cm A horizon of brown (10YR 5/3) silty loam over a 10 cm (3.9 in) light yellowish brown (10YR 6/4) silty loam B horizon. The soils are consistent with the Berks-Weikert complex 8 to 15 percent slope identified by the soils survey (USDA 2017).

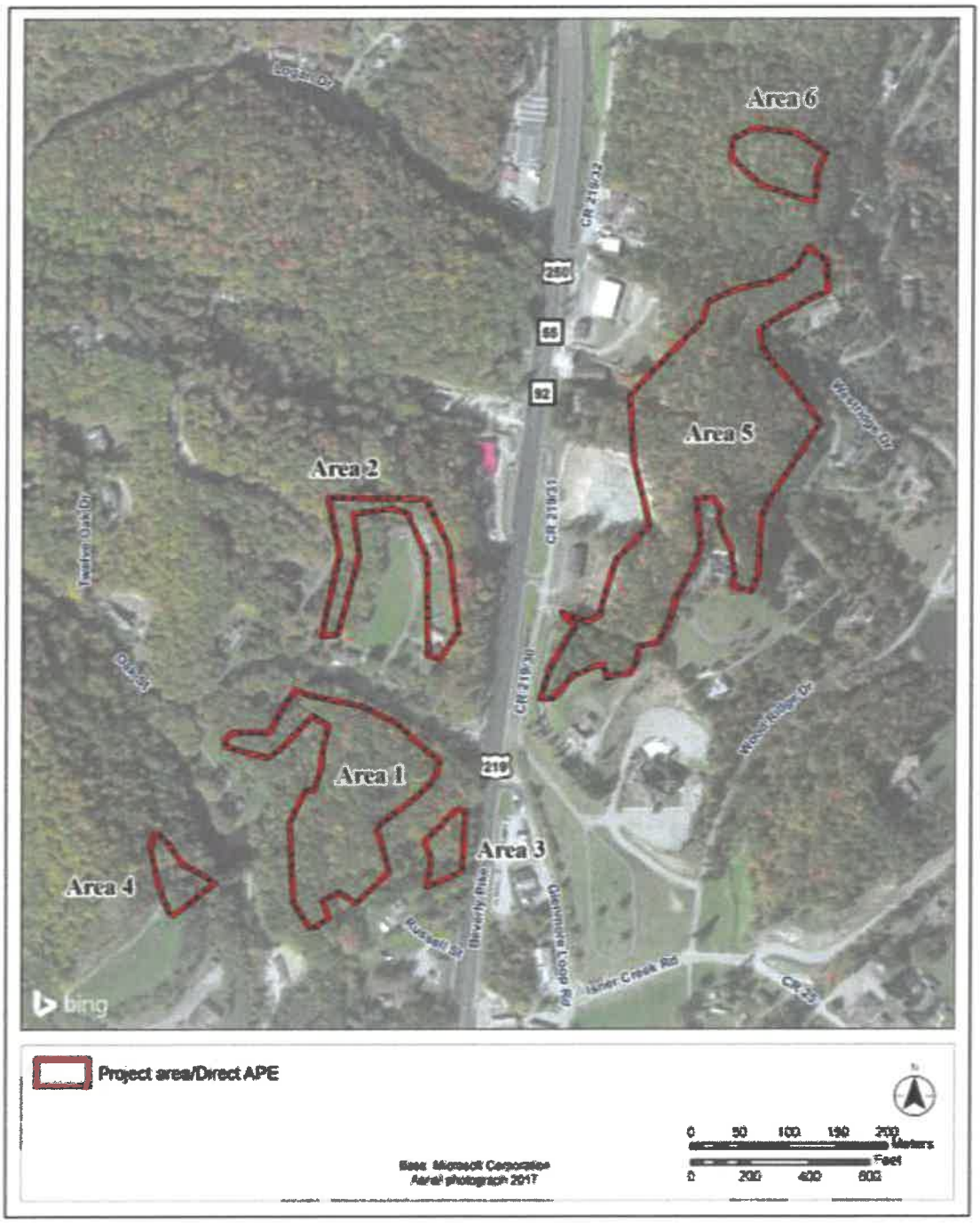


Figure 4. Northern portion of project area, indicating location of archaeological Areas 1–6.

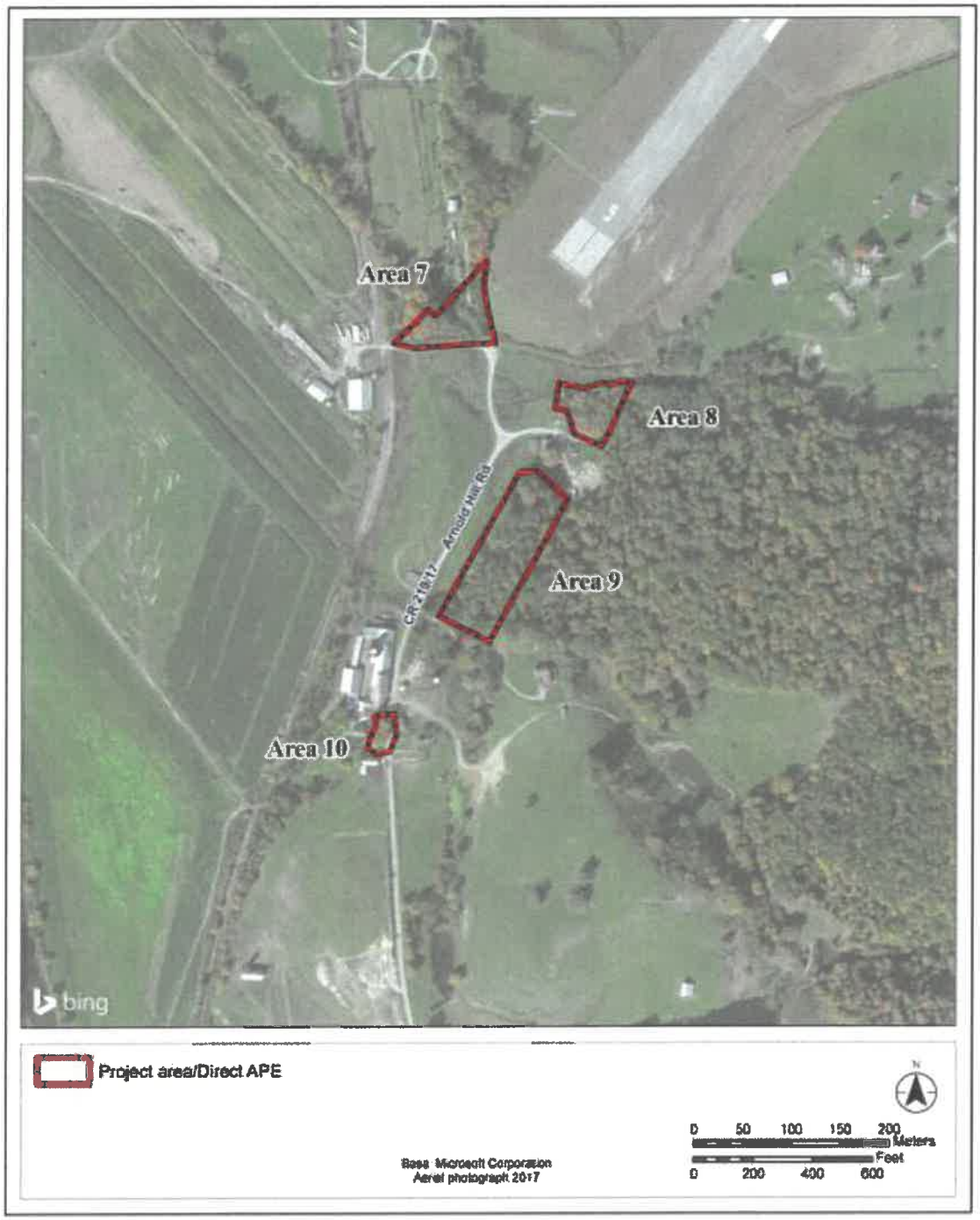


Figure 5. Southern portion of project area, indicting location of archaeological Areas 7–10.



Figure 6. Northern end of Area 1 at Oak Street. View southeast showing land modification and disturbance.



Figure 7. Sloped portion of Area 1, looking southeast.



Figure 8. Shovel probe portion of Area 1, looking north.

Key soil profiles are summarized in Table 3 and representative soil profile schematic is presented in Figure 10. No intact buried cultural deposits or above ground cultural resources were encountered in Area 1.

Area 2: Area 2 is located north of Oak Street and west of Beverly Pike. The area is a horseshoe shaped wooded area behind a series of houses in an older residential neighborhood encompassing a 2.90 hectare (1.79 acre) area (Figures 4 and 9). The wooded area is all steeply sloped (Figures 11 and 12). The slopes were visually inspected and photo documented. No cultural resources were identified in Area 2 and there are indications of modern disturbances on the northern portion.

Area 3: Area 3 is a small, 0.19 hectare (0.47 acre), wooded area immediately east of Beverly Pike (Figures 4 and 9). The area is wooded and partially disturbed from road berm construction (Figure 13). The area was visually inspected and photodocumented. No cultural resources were encountered in Area 3.

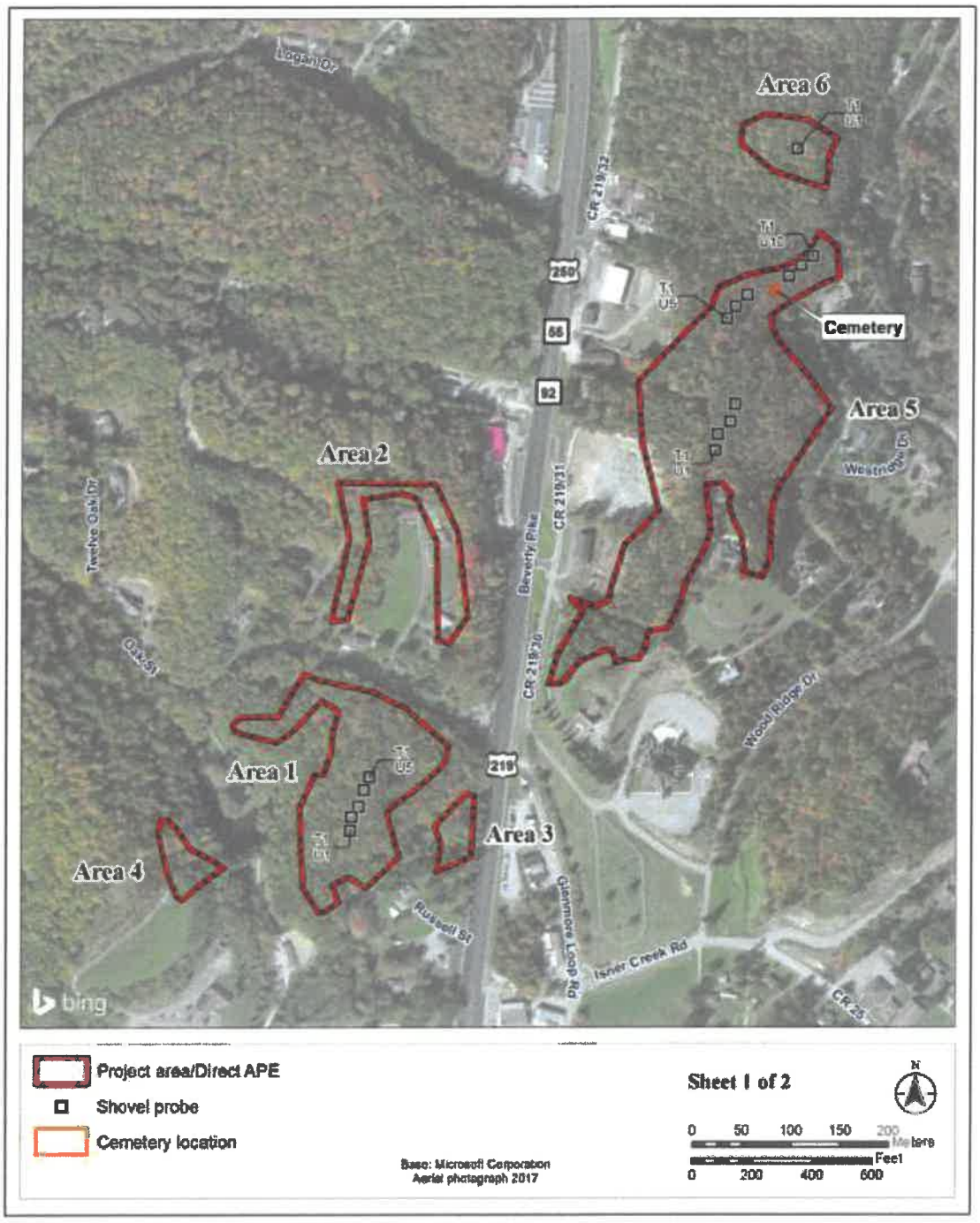


Figure 9. Aerial view of Areas 1-6, showing area boundaries, location of shovel probes, and location of pet cemetery in Area 5.

Table 3. Soil profiles documented from STP excavation, Area 1.

STP	Depth	Color	Classification
T1U1	Ap 0–15cm	10YR 5/3	Silt Loam
	B 15–25cm	10YR 6/3	Silt loam
T1U2	Ap 0–20cm	10YR 5/4	Silt Loam
	B 20–30cm	10YR 6/3	Silt clay loam
T1U3	Ap 0–15cm	10YR 4/3	Silt Loam
	B 15–25cm	10YR 6/4	Silt loam
T1U4	Ap 0-26 cm	10YR 4/3	Silt loam
	B 26-36 cm	10YR 5/4	Silt loam
T1U5	Ap 0–15cm	10YR 4/3	Silt Loam
	B 15–25cm	10YR 6/4	Silt loam

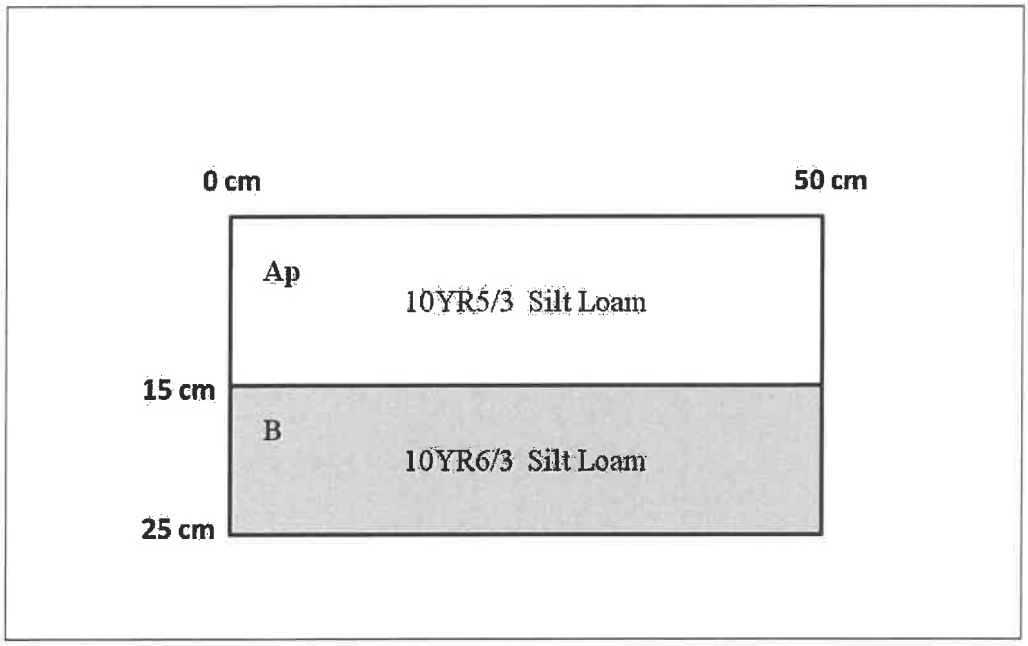


Figure 10. Representative soil profile, Area 1.



Figure 11. Overview of eastern portion of Area 2, looking at slope and highway. View northeast.



Figure 12. Western portion of Area 2 indicating slope and modern disturbances. View north.



Figure 13. Area 3, showing proximity to Beverly Pike and sloped, disturbed terrain.

Area 4: Area 4 is located southwest of Area 1, in the Oak Street subdivision and encompasses 0.26 hectares (0.64 acres) [Figures 4 and 9]. The area of investigation is a steeply sloped area to the west of a small man-made pond, associated with a residential dwelling (Figures 14 and 15). The slopes were visually inspected and photo documented. No cultural resources were identified in Area 4.

Area 5: Area 5 is located east of Beverly Pike and northeast of the Wood Ridge Drive subdivision. The area encompasses 4.75 hectares (11.74 acres) [Figures 4 and 9] and consists primarily of moderate to steep-sloped woods behind residential housing. An access road meanders through the area. The flat, narrow ridge-top was subjected to STP investigation (Figures 16 and 17). Ten STPs were excavate to examine for cultural deposits (Figure 9). The width of the ridgetop allowed for one transect of shovel probes, excavated in discontinuous 15-m (50-ft) intervals. Modern debris was scattered across the ridge top, but no cultural materials were documented in the shovel probes. The soils identified through excavation are consistent with the Berks–Weikart complex 25-25 percent slope (BkE) soils identified from previous soil surveys (USDA Washington 2017).



Figure 14. View of Area 4 looking northwest indicating sloping topography and pond.



Figure 15. Overview of Area 4 looking south showing conditions and sloping topography.



Figure 16. View of Area 5 looking northwest at houses in subdivision and sloped topography.



Figure 17. Flat, testable portion of Area 5, looking north.

The soils are heavily eroded, consisting of a 0-5 to 10 cm (0-1.9 to 3.9 in) brown (10YR 4/3) silt loam horizon over a brownish yellow (10YR 6/8) channery silty clay. All units provided similar results and excavations reached a total depth of 20 cm (Table 4). A schematic representation of the soil profile for Area 5 is presented in Figure 18.

Table 4. Soil profiles documented from STP excavation, Area 1.

STP	Depth	Color	Classification
T1U1	Ap 0–5cm	10YR 4/4	Silt Loam
	B 5–15cm	10YR 7/8	Channery Silty Clay
T1U2	Ap 0–5cm	10YR 4/4	Silt Loam
	B 5–20cm	10YR 7/8	Channery Silty Clay
T1U3	Ap 0–10cm	10YR 4/4	Silt Loam
	B 10–20cm	10YR 7/8	Channery Silty Clay
T1U4	Ap 0-3 cm	10YR 4/4	Silt loam
	B 3-20 cm	10YR 7/8	Channery Silty Clay
T1U5	Ap 0–4cm	10YR 5/1	Silt Loam
	B 4–20cm	10YR 7/8	Channery Silty Clay
T1U6	Ap 0-3 cm	10YR 5/1	Silt Loam
	B 3-15 cm	10YR 7/8	Channery Silty Clay
T1U7	Ap 0-3 cm	10YR 5/1	Silt Loam
	B 3-20 cm	10YR 7/8	Channery Silty Clay
T1U8	Ap 0-5 cm	10YR 5/1	Silt Loam
	B 5-20 cm	10YR 7/8	Channery Silty Clay
T1U9	Ap 0-7 cm	10YR 5/1	Silt Loam
	B 7-20 cm	10YR 7/8	Channery Silty Clay
T1U10	Ap 0-10 cm	10YR 5/1	Silt Loam
	B 10-20 cm	10YR 7/8	Channery Silty Clay

A small cemetery/interment area was identified in the Wood Ridge Drive area. Three to six possible interment locations were identified during visual inspection of a small section of Area 5 that juts out north (Figures 9 and 19–22). The area measures approximately 4 m x 4 m (13 ft x 13 ft). The headstones are sandstone and do not exhibit any discernible text.

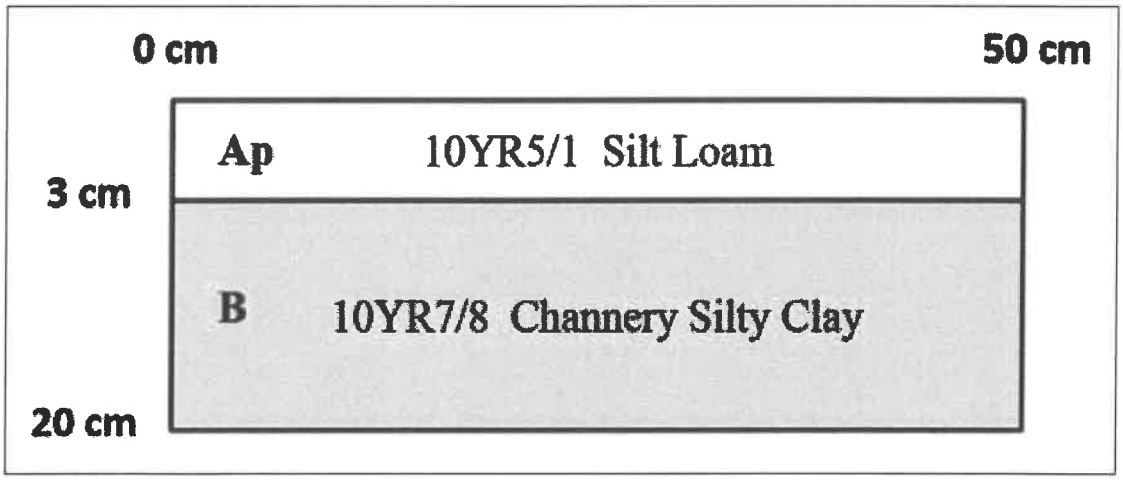


Figure 18. Representative Soil Profile Schematic, Area 5.

The configuration of stones may represent three interments with headstone and footer markers or six interments total. The largest stone is 50 cm (19.6 in) tall by 40 cm (15.7 in) wide and is broken at the top. The cemetery is located in a wooded lot north of a modern house and backyard. It sits adjacent (south) to an access road and old fence line that runs perpendicular to the access road. Subsequent communication with current landowner indicated that this is a pet cemetery (Shawn Tucker, Chapman Technical Group, personal communication, February 27, 2017).

As the project involves either the removal and/or topping of trees associated with the airport flight path, it is recommended that caution should be taken during the removal of any trees in proximity to the cemetery. Should intact cultural deposits or human remains be encountered, work should stop immediately and WVSHPO contacted.

Area 6: Area 6 is a small knoll northwest of Area 5 encompassing 0.48 hectare (1.21 acres). The area is wooded and moderately sloping with a small rise in the middle of the knoll (Figure 23). The area was visually inspected and photo-documented. One STP was excavated in the middle of knoll to examine the soils and test for any buried intact deposits. The soils are eroded, consisting of 5 cm of brown (10YR 4/3) silt loam humus over very channery, yellowish brown (10YR 5/8) silty clay. The maximum depth of the STP was 15 cm (Figure 24).



Figure 19. Overview of small pet cemetery identified in Area 5, showing grave markers.



Figure 20. Close up of two largest markers in Area 5.



Figure 21. View of small cemetery in Area 5, showing the possible 3-6 marked internments.



Figure 22. Close up of largest stone, showing condition and lack of inscription/data.



Figure 23. View of Area 6, from knoll, looking south toward Area 5.

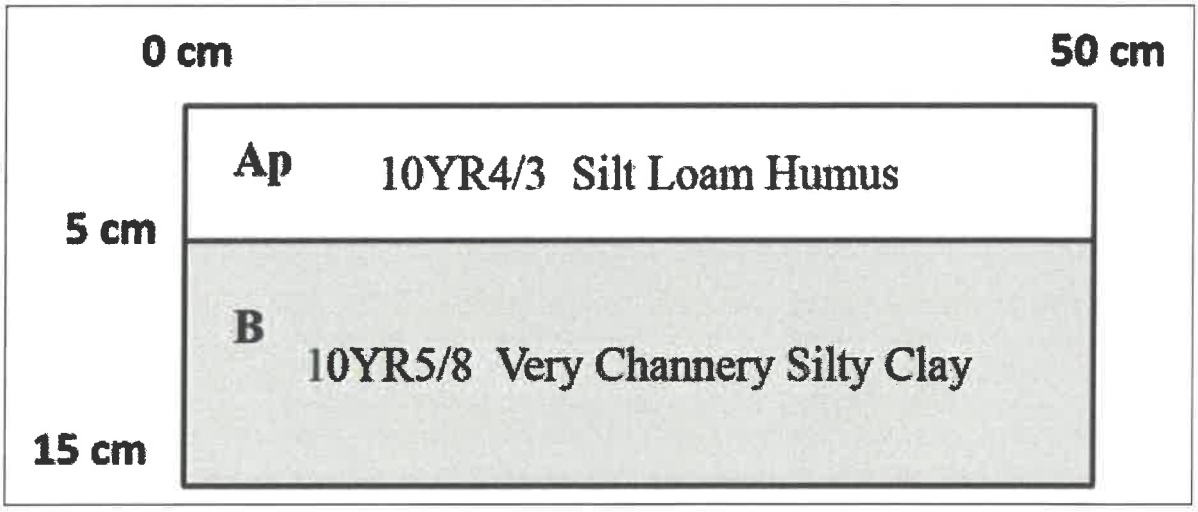


Figure 24. Schematic soil profile, Area 6.

Area 7: Area 7 is located south of the Elkins-Randolph Airport and west of a small cull-du-sac associated with Arnold Hill Road. This area was visually inspected from the roadway as access was limited due to property owner concerns. The area consists of a small wooded lot, encompassing 0.40 hectare (1.00 acre), with a small unnamed stream running through it (Figures

5 and 26). The area appears somewhat altered and landscaped; note the yucca plant in the lower right of Figure 25 just below a No Trespassing Sign. No cultural materials were observed. If intact cultural materials are encountered as a result of tree removal, it is recommended that work stop in this area and the WVSHPO be notified.

Area 8: Area 8 is immediately adjacent to Arnold Hill Road, on the north side of the road and is a small area encompassing 0.29 hectare (0.74 acre). Due to landowner concerns, this area received minimal direct investigation. A small unnamed stream traverses east-west through this area. A portion of the area is flat and was waterlogged at the time of survey (Figures 25, 27, and 28). A STP revealed soils that are frequently flooded (mottled and hydric); and the probe immediately filled with water. South of the stream, the area consists of modern debris, car parts, and road berm disturbance. No cultural materials were encountered or observed. Due to the hydric soils in this area, there is little potential for archaeological resources to be documented. However, if cultural materials, other than modern debris are encountered within the drier southern portion of the area, work should immediately stop and WVSHPO be notified.

Area 9: Area 9 is a scrubby ravine along Arnold Hill Road, running parallel to the east side of the road, encompassing 1.03 hectares (2.56 acres). The area consisted of a steep road side slope and a ravine paralleling a small unnamed stream (Figures 25, 29 and 30). The area was visually inspected and photo documented due to landowner concerns. No cultural materials were encountered. The presence of road grading and landform modification to direct stream flow point to a low potential for archaeological resources in this area. However, if cultural materials are documented during tree trimming and/or removal, work stop and the WVSHPO be consulted.

Area 10: Area 10 is a single pine tree slated for removal from a 0.08 hectare (0.20 acre) plot (Figure 25). The tree is in the front yard of a house. The soils around the house are visually disturbed from modern activity related to the current occupation. No formal testing was conducted in Area 10 due to landowner concerns. No cultural materials were observed and the area offers a low probability of intact archaeological resources. However, if cultural materials are documented during tree trimming and/or removal, work stop and the WVSHPO be consulted.

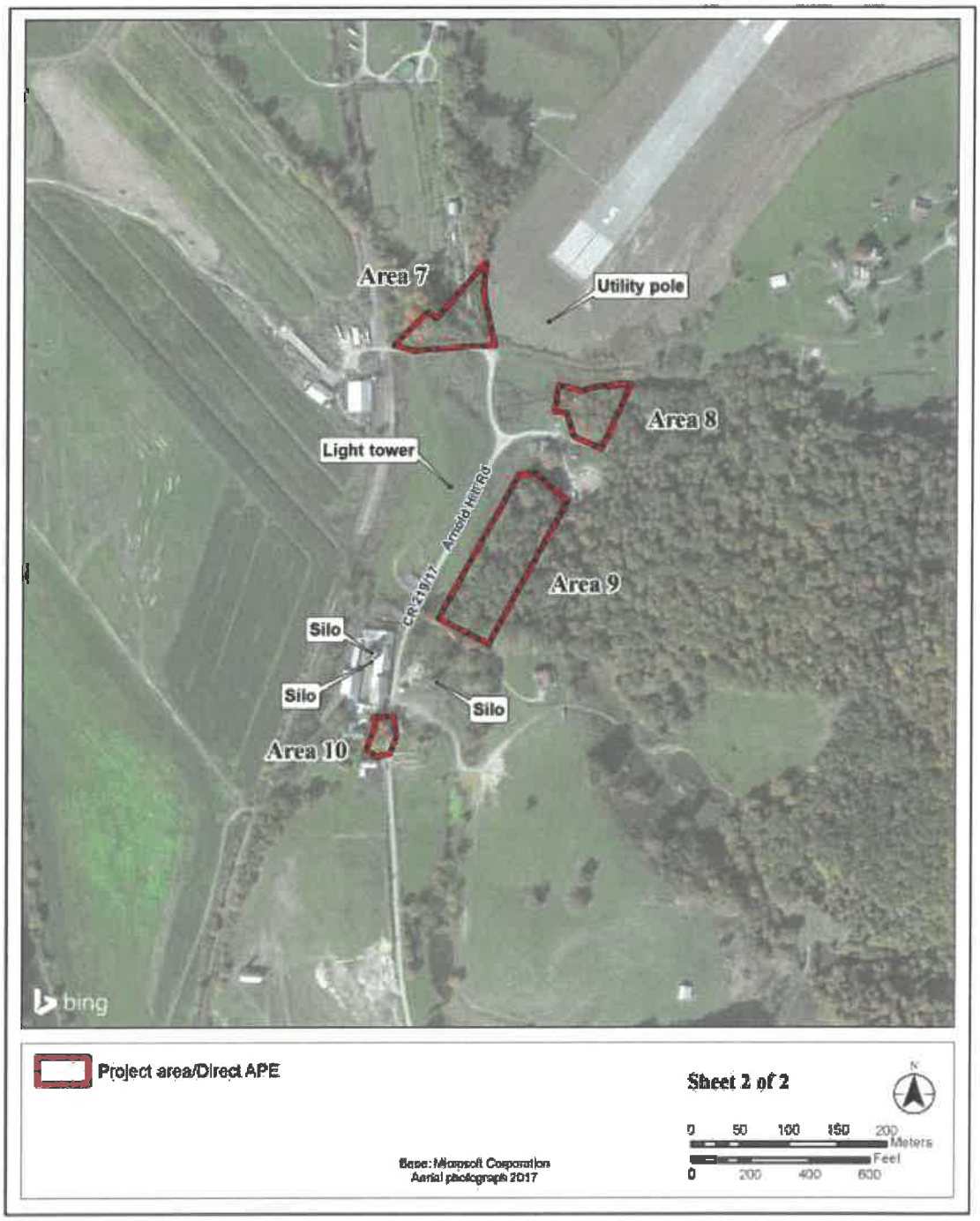


Figure 25. Aerial view of Areas 7–10 showing boundaries.



Figure 26. View of Area 7, looking northwest at pine trees slated for removal.



Figure 27. Overview of Area 8, looking south. Section exhibiting hydric soils.



Figure 28. View of Area 8, looking northwest at modern debris near edge of Arnold Hill Road.



Figure 29. Ravine and slope that make up Area 9, running along the west side of Arnold Hill Road, looking south.



Figure 30. View of Area 9, from southern end, indicating sloped topography.

In the southern portion of the project area along Arnold Hill Road area, several houses and farm related structures were documented by architectural historian, Doug Terpstra of ASC Group, Inc. Three grain silos and a tower, all slated for lowering/reduction in height as part of the project (Mr. Tucker, Chapman Technical Group, personal communications, February 8, 2017), are within the flight path for the runways. The photodocumentation of the four impacted structures and any additional structures that may be visually impacted by the proposed project are presented in a separate report submitted for review (Terpstra 2017).

SUMMARY AND RECOMMENDATIONS

Under contract with Chapman Technical Group, ASC Group, Inc., completed a Phase I archaeological literature review and field reconnaissance for approximately 10.52 hectares (26 acres) of approach areas associated with Runways 5 and 23 at the Elkins-Randolph County Regional Airport in Elkins, Randolph County, West Virginia. Trees and structures have been identified that currently obstruct air traffic and are slated for removal. Ten client-delineated areas were visually inspected and tested for near surface archaeological remains. Areas 7 through 10 were minimally examined due to access restrictions imposed by landowners. The

survey identified one small cemetery in Area 5, near the Wood Ridge Drive subdivision; which is reportedly a pet cemetery. It contains 3–6 interments of unknown age. Since the project involves either the removal and/or topping the trees associated with the airport flight path, it is recommended that the tree removal near the cemetery should proceed with caution. Should intact cultural materials and/or human remains be encountered, work should stop and the WVSHPO be contacted immediately for consultation. No further work is required in the remaining APE as no negative impacts to cultural resources were documented as a result of this study. In the event that an unexpected discovery is made, with particular emphasis on Areas 7 through 10, it is recommended that work stop and the WVSHPO be consulted for appropriate direction.

REFERENCES CITED

Braun, E. Lucy
2001 [1950] *Deciduous Forests of Eastern North America.* Reprinted. Blackburn Press, Caldwell, New Jersey.

Core, Earl L.
1966 *Vegetation of West Virginia.* McClain Printing Company, Parsons, West Virginia.

DeMott, Rodney
1997 *Management Summary Glenmore Bridge & I/S +1 State Project U342-5/7=0/00, Randolph County, Elkins, West Virginia.* On file with the West Virginia Division of Culture and History, Charleston.

Espenshade, Chris
1999 *Phase I Archaeological Survey for the Randolph County West Virginia: Elkins Bypass.* Skelly and Loy, Inc. On file with the West Virginia Division of Culture and History, Charleston

Lessing, Peter
1996 West Virginia Geology: Physiographic Provinces. Electronic Document: http://www.wvgs.wvnet.edu/www/geology/geolphyp.htm. Accessed: December 31 2008.

Merriam, C. Hart
1895 The Geographic Distribution of Animals and Plants in North America. *Yearbook of the United States Department of Agriculture 1894*:203–214.

Paternostro, Paul G.
2010 *Phase I Archaeological Survey for the Proposed Elkins/Randolph County Airport Extension, Elkins, Randolph County, West Virginia.* Contract Publication Series WV10-25. Prepared for Chapman Technical Group, Buckhannon, West Virginia. Prepared by Cultural Resource Analysts, Inc., Hurricane, West Virginia. On file with the West Virginia Division of Culture and History, Charleston

Rice, Donald L.
2006 Randolph County. In *The West Virginia Encyclopedia*, edited by Ken Sullivan, pp. 600 –602. The West Virginia Humanities Council, Charleston.

Stafford, Susan
2004 *Proposed bridge replacement over Chenoweth Creek in Randolph County.* On file at WVSHPO office, Charleston, West Virginia.

Terpstra, Douglas
2017 *Architectural History Photolog for the Elkins-Randolph County Airport Runway 5-23 Obstruction Removal (Phase I-EA) Project, Elkins, Randolph County, West Virginia.* Report prepared for Chapman Technical Group. On file with the West Virginia Division of Culture and History, Charleston.

Tidow, Evelyn
1998 *Phase I Cultural Resources Survey for Proposed 0.93 Mile Line X-77-F-1 Replacement Project Pocahontas and Randolph Counties, West Virginia (Line X-77-F-1 Replacement Project).* Report prepared for Columbia Gas Transmission Corporation, by Archaeological and Historical Consultants, Inc. On file with the West Virginia Division of Culture and History, Charleston.

Trader, Patrick
2001 *Guidelines for Phase I, II, and III Archaeological Investigations and Technical Report Preparation.* West Virginia State Historic Preservation Office, Charleston.

USDA Washington. US Department of Agriculture, Soil Conservation Service
2017 US Web Soil Survey. Electronic Document: http://www.websoilsurvey.nrcs.usda.gov/app. Accessed: October 18, 2016. USDA Washington, D.C.

USGS Washington. United States Geologic Service
2016 West Virginia Geologic Map Data. Electronic Document: http://www.mrdata.usgs.gov/geology/state/state.php?state=WV. Accessed: October 24, 2016. United States Department of the Interior, Washington.

Warren, George L., Joan Walker and William Gardner
1994 *Tygert Valley River Stabilization Project Abbreviated Phase I Results.* Report prepared for the USDA Soil Conservation Service, Morgantown, WV. Contract # 53-3D47-3-5. On file with the West Virginia Division of Culture and History, Charleston

APPENDIX A: RESUMES OF QUALIFIED PERSONNEL

ASC GROUP, INC.
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Annette G. Ericksen, Ph.D.

West Virginia Regional Manager

3520 Teays Valley Road, Suite 5 • Hurricane, WV 25526 • Phone: 681.233.4044 • aericksen@ascgroup.net



Education

The Ohio State University
Ph.D. Anthropology
1995

Certifications

Principal Investigator, Ohio (1995)

Principal Investigator, West Virginia (1998)

Principal Investigator, Indiana (1995)

ADIA – Archaeological Damage Investigation and Assessment

PROFESSIONAL RESPONSIBILITES

Dr. Ericksen applies three decades of experience in heritage resources, business development, and marketing to provide clients with solutions to their environmental needs. As the manager for ASC's West Virginia Region, she is responsible for the preparation of Federal, State and private industry proposals and the successful execution of awarded projects. Dr. Ericksen works to foster client success through the thoughtful management of staff, the application of appropriate methods of environmental regulation, agency collaboration, and community involvement.

EXPERTISE

- Heritage Resources
- Business Development
- Marketing

SELECTED PROJECT EXPERIENCE

- WV Department of Highways Mason County Headquarters. Served as Principal Investigator for archaeological survey.
- Blennerhassett Island Proposed Boat Dock Facility, Wood County, WV. Served as Principal Investigator and field supervisor for archaeological survey.
- Wellsburg Bridge Project, Brooke County, WV. Served as Project Manager.
- Mountain Valley Pipeline (MVP), West Virginia. Served as Project Manager.
- Old Hi Carpenter Bridge Replacement, Pleasants County, West Virginia. Served as Project Manager.
- Mouth of Seneca Bridge Replacement Project, Pendleton County, West Virginia. Served as Project Manager.

  Elkins Rail Trail Connector Project, Randolph County, West Virginia. Served as Project Manager.

ASC GROUP, INC.
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Dawn Walter Gagliano

PRINCIPAL INVESTIGATOR
ARCHAEOLOGY

3520 Teays Valley Road Suite 5 • Huricane, WV 25526 • Phone: 681-233-4044 • dgagliano@ascgroup.net



Certifications

Principal Investigator Archaeology: Prehistoric, Ohio (2011)

Principal Investigator Archaeology: Prehistoric/Historic, West Virginia (2011)

Principal Investigator Archaeology: Prehistoric/Historic, Kentucky (2015)

Work History

Present, ASC Group, Inc., Principal Investigator

Education

West Virginia University
BA Anthropology
1992

University College , London Institute of Archaeology
MA Archaeology
1997

PROFESSIONAL EXPERIENCE AND RESPONSIBILITES

Ms. Walter Gagliano has more than 23 years of experience in cultural resource management. She has supervised and conducted the research and field surveys on over 50 Section 106 review projects. These projects have ranged from cell towers project and small bridge replacement projects to large-scale road relocations and pipeline projects. Specialized training includes remote sensing, (magnetometer and resistivity); lithic and microwear analysis; historic and prehistoric artifact processing and analysis; paper, artifact, and digital preservation; and curation.

Training

ODOT:

- Section 4(f)/6(f) Training; Section 106 Training

Other:

- Remote sensing training (magnetometer and resistivity training), Hopewell Culture National Historical Park
- Lithic Usewear Analysis, The Ohio State University
- Preservation 101, online preservation and conservation course, Northeast Document Conservation Center

Representative Project Experience

Mountain Valley Pipeline (MVP), West Virginia	Principal Investigator for cultural resources survey for 100-plus mile corridor section in eight counties of West Virginia. Managed and scheduled numerous field crews and data management.
Wellsburg Bridge Replacement, West Virginia	Principal Investigator for WV Department of Highways bridge replacement project in Brooke County, West Virginia. Conducted fieldwork and was lead author of report.
Columbus Southerly Waste Water Treatment Plant Capital Improvement Project, Ohio	Supervisor for archaeological site assessment in Franklin County, Ohio. Supervised fieldwork and was lead author of report. Prepared data recovery plan for mitigation.
Dessecker Mine Reclamation Project, Ohio	Principal Investigator for NRHP evaluation and Ohio Historic Property Inventory for mine reclamation project in Tuscarawas County, Ohio. Conducted field work, prepared forms and was lead author of report.
Blennerhassett Island Boat Dock, West Virginia	Principal Investigator for Archaeological Monitoring in Wood County, West Virginia.
Mouth of Seneca Bridge Replacement, West Virginia	Principal Investigator for the Phase I Archaeological Survey in Pendleton County, West Virginia.

APPENDIX B: PROJECT DOCUMENTATION

WEST VIRGINIA
Division of Culture and History

RECEIVED
SEP 26 2016
CHAPMAN TECHNICAL GROUP

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

September 20, 2016

Mr. Shawn Tucker
Project Manager
Chapman Technical Group
43 East Main Street
Buckhannon, West Virginia 26201

RE: Elkins-Randolph County Regional Airport, Elkins – Runway 5-23 Obstruction Removal Phase I
FR#: 16-984-RD

Dear Mr. Tucker:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the Elkins-Randolph County Regional Airport proposes to remove approximately 26 acres of obstructions within approach surfaces for Runways 5 and 21 located in Elkins, Randolph County. It is our understanding that the proposed project will consist of clearing and grubbing trees and removing and/or placing an obstruction light on five structures (three grain silos, one obstruction light tower, and one utility pole). It is also our understanding that upon the completion of the obstruction removal process, all disturbed areas will be reclaimed and re-vegetated.

Archaeological Resources:
A search of our records indicates that there are several recorded archaeological resources located within the vicinity of the proposed project area. We therefore concur that a phase I archaeological survey should be completed within all proposed project areas prior to the removal of any trees. Per our guidelines (www.wvculture.org/shpo/techreportguide/guidelines.html), phase I methodology should include completion of a pedestrian survey within the entire proposed project area, systematic shovel testing within all visually undisturbed landforms situated on less than twenty percent slope, and geoarchaeological/deep testing where alluvial soils are encountered. All archaeological survey work should be completed under the supervision of an individual who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (https://www.nps.gov/hisotry/local-law/arch_stnds_9.htm). We will provide further comment upon the receipt of the resulting technical report.

Architectural Resources:
Based on the submitted documentation, there are properties located within sight of the proposed project area, some of which may be eligible for inclusion in the National Register of Historic Places. In order to evaluate the proposed project's indirect and visual effects to architectural properties, we request you forward to our office color photographs and original dates of construction of all properties that are forty-five (45) years or older and will have a line-of-sight of the proposed project area, including access roads. Your photographs need to be keyed to a USGS topographic or aerial map and should accurately depict from various angles any architectural resources, building or structural details, and outbuildings. Your photographs also need to document the project

area by showing general views, known disturbances, and any rock outcrops. Panoramic shots of surrounding landscapes and viewsheds are also necessary for us to complete our review. Be sure to include images of the proposed project area from the position of the individual properties. If nearby buildings or structures are less than forty-five (45) years old or will not be within the line-of-sight of the proposed project, please confirm in writing. We will provide additional comments upon receipt of the requested information; however, we reserve the right to request additional information, including the completion of Historic Property Inventory forms.

Public Involvement

Federal regulations in 36 CFR §§ 800.2(d)(1–2), 800.3(e), and 800.6(a)(4) all stress the importance of involving the general public in the Section 106 review process. If you have already completed this aspect of the requirements under Section 106, please provide written documentation along with any comments you have received, or any that you receive in the future, to this office. If you have not already done so, please consider forwarding a copy of the submitted information for the above-mentioned project to any individuals living near or within a line-of-sight of the proposed obstruction clearing project to request their comments or opinions on the matter. Please forward any comments that you receive to this office. If you receive no comments within thirty (30) days, please indicate that in writing to this office.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Katie M. Turner, Archaeologist, or Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/KMT/BMR

Chapman Technical Group
a division of GRW

August 23, 2016

Review and Compliance Staff
State Historic Preservation Office
WV Division of Culture and History
1900 Kanawha Blvd East
Charleston, West Virginia 25305

Re: Elkins-Randolph Co. Regional Airport
Elkins, West Virginia
Runway 5-23 Obstruction Removal
Phase I (EA)

Dear Review and Compliance Staff:

On behalf of the Elkins-Randolph County Regional Airport Authority, Chapman Technical Group is in the process of conducting an Environmental Assessment (EA) as the first phase of a project to remove obstructions which are currently penetrating the approach surfaces of Runway 5 and 23 at the Elkins-Randolph County Regional Airport. The airport is located approximately 2 miles south of the City of Elkins, West Virginia. The location of the airport in relation to the City of Elkins is shown on the overall topographic site plan attached to this letter as **Figure 1.** I have also included two enlarged aerial photograph site plans to more clearly illustrate the proposed project areas as **Figure 2** and **Figure 3.**

The proposed project will consist of clearing and grubbing approximately 26 acres of trees and removing and/or placing an obstruction light on 5 structures (3 grain silos, 1 obstruction light tower and 1 utility pole). Upon completion of the removal, all of the disturbed areas will be reclaimed and re-vegetated. The project will also include any mitigation measures which are determined necessary through the environmental assessment process.

The intent of this letter is to initialize the consultation with the State Historic Preservation Office for the project. The project includes components which will affect several residential areas with buildings of various ages. We have retained the services of ASC Group, Inc. to conduct a Phase I Archaeological Survey of the impacted areas to determine if there are any cultural resources which would be negatively impacted by the proposed action. As part of this process, we are requesting correspondence and/or guidance from your office as to any special requirements or recommendations you may have pertaining to the Phase I survey.

43 East Main Street
Buckhannon, WV 26201

304.472.8914
304.472.8915 Fax

St. Albans, WV
Martinsburg, WV
Lexington, KY

www.chaptech.com

The following is general contact information for the project:

- **Project Name**
  Elkins-Randolph County Regional Airport
  Runway 5-23 Obstruction Removal (Phase I – EA)

- **Federal Agency**
  Federal Aviation Administration
  Beckley Airports Field Office
  Main Terminal Building, Room 101
  176 Airport Circle
  Beaver, West Virginia 25813
  Phone: (304) 252-6216
  Contacts: Susan Stafford, Environmental Specialist

- **State Agency**
  West Virginia Aeronautics Commission
  Building 5, Room A-129
  1900 Kanawha Boulevard, East
  Charleston, West Virginia 25305
  Phone: (304) 558-3436

- **Project Contacts**
  Mr. Dick Chaney, Airport Manager
  Elkins-Randolph County Regional Airport
  1000 Co Rte 219/27
  Elkins, WV 26241
  Phone: (304) 636-2726
  Email: manager@elkinsairport.com

  Mr. Shawn Tucker, P.E., Project Manager (Consultant)
  Chapman Technical Group
  43 East Main Street
  Buckhannon, WV 26201
  Phone: (304) 472-8914
  Email: stucker@chaptech.com

  Ms. Annette Ericksen, Ph.D., Manager WV Region (Consultant)
  ASC Group, Inc.
  3520 Teays Valley Road, Suite 5
  Hurricane, West Virginia 25526
  Phone: (681) 233-4044
  Email: aericksen@ascgroup.net

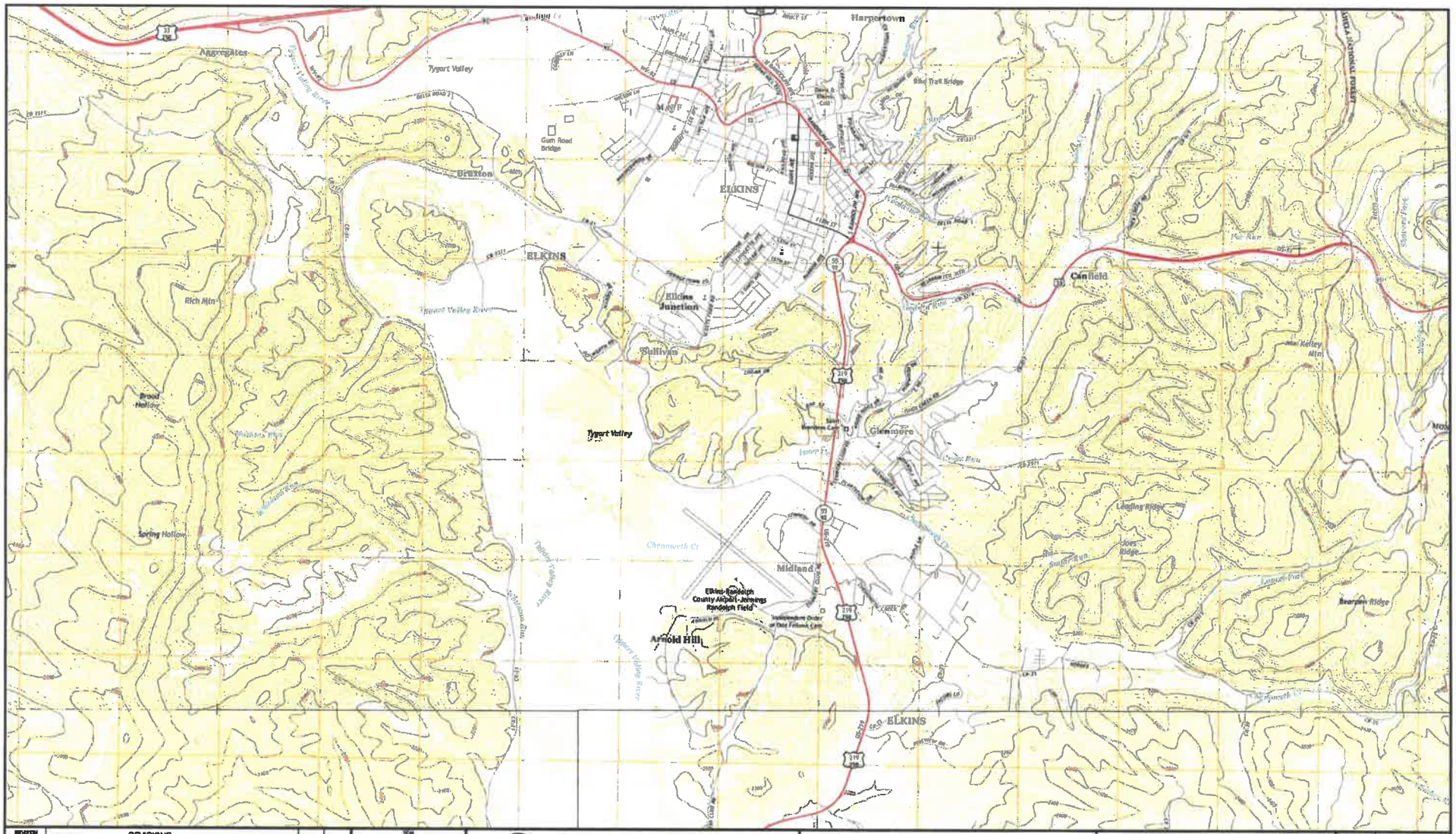
We sincerely appreciate your assistance in this project. If you should have any questions, please do not hesitate to give me a call at (304) 472-8914 or an email at stucker@chaptech.com. I look forward to receiving your return correspondence.

Sincerely,

CHAPMAN TECHNICAL GROUP

Shawn D. Tucker, P.E.
Project Manager

Attachments



REVISION NUMBER	REVISIONS	DATE	BY

SEAL

Chapman Technical Group

AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

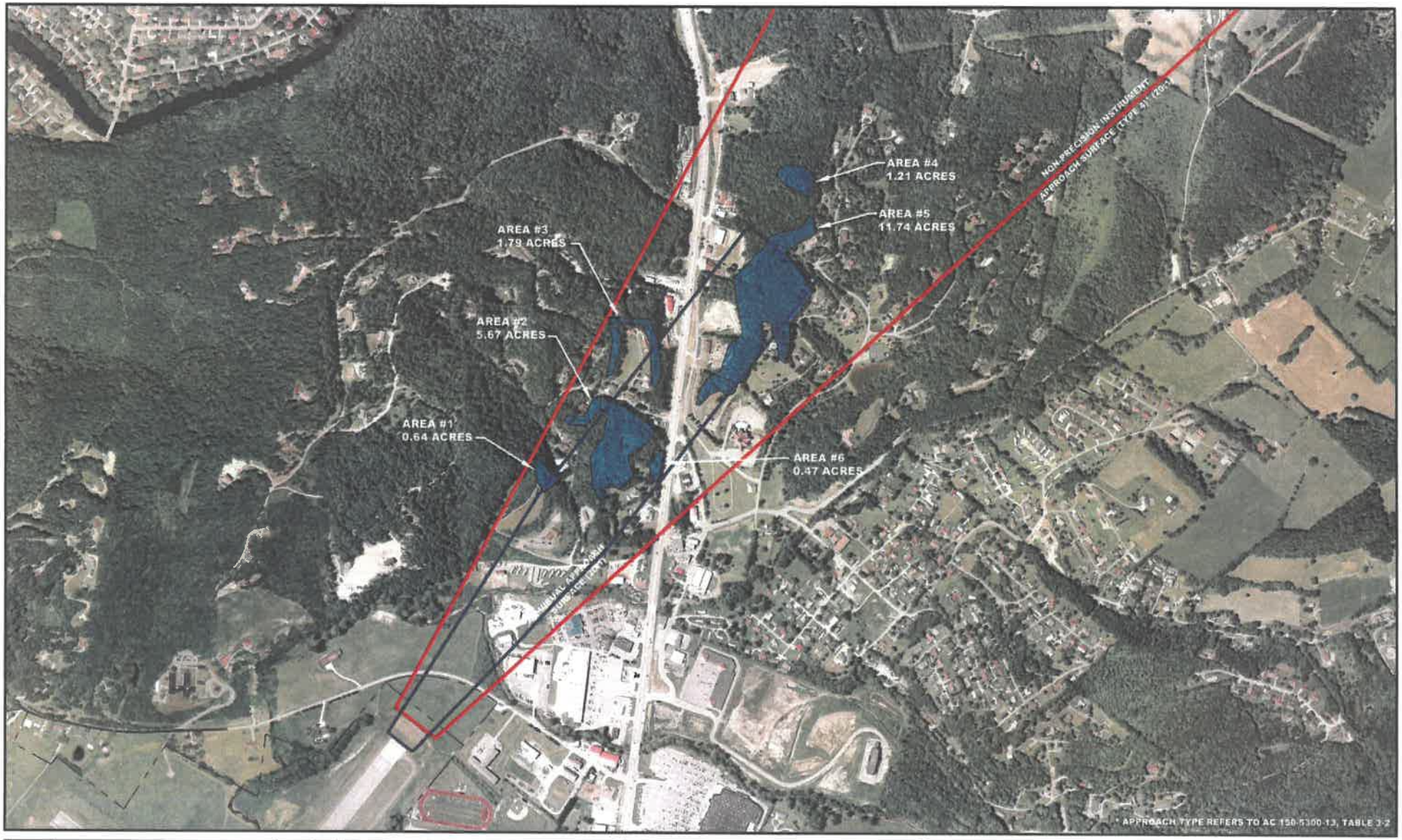
St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-6914
Martinsburg, WV (304) 269-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

Topographic Map

JOB NUMBER:	15003
SCALE:	1" = 5,000'
DATE:	AUGUST 2018
DRAWN BY:	C. MARKS
REVIEWED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	FIG. 1
REVISION	1

PRELIMINARY - NOT FOR CONSTRUCTION



	REVISIONS	DATE	BY

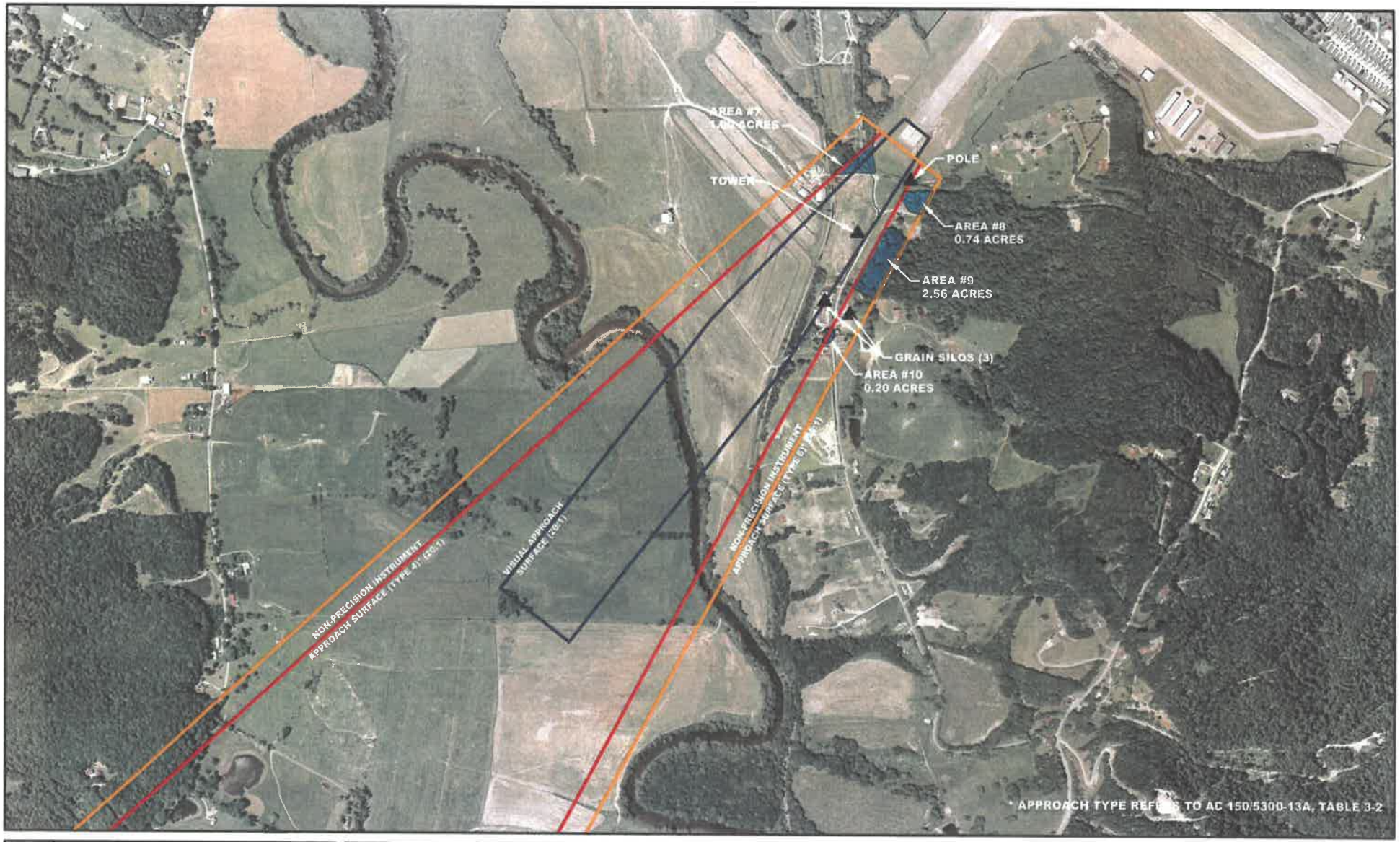
Chapman Technical Group, a division of Cowan
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5301
Buckhannon, WV (304) 472-5814
Martinsburg, WV (304) 260-1222
www.chapmantech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

OBSTRUCTION REMOVAL SITE PLAN
RUNWAY 23 APPROACH SURFACE

- PRELIMINARY - NOT FOR CONSTRUCTION

JOB NUMBER	18063
SCALE	1" = 300'
DATE	AUGUST 2018
DRAWN BY	S. TUCKER
DESIGNED BY	S. TUCKER
CHECKED BY	S. TUCKER
SHEET NO.	REVISION
FIG. 2	0



REVISIONS		

Chapman Technical Group, a division of Cardno
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-3931
Buckhannon, WV (304) 472-4914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REG. AIRPORT AUTH.
ELKINS-RANDOLPH CO. REG. AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
PHASE I - ENVIRONMENTAL ASSESSMENT

OBSTRUCTION REMOVAL SITE PLAN
RUNWAY 5 APPROACH SURFACE

- PRELIMINARY -
NOT FOR CONSTRUCTION

JOB NUMBER	160038
SCALE	1" = 300'
DATE	AUGUST 2016
DRAWN BY	S. TUCKER
DESIGNED BY	S. TUCKER
CHECKED BY	S. TUCKER

SHEET NO. FIG. 3 REVISION 0

APPENDIX 9
US CENSUS BUREAU INFORMATION

QuickFacts

Randolph County, West Virginia; West Virginia; United States

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

ALL TOPICS	Randolph County, West Virginia	West Virginia	United States
Population estimates, July 1, 2019, (V2019)	**28,823**	**1,792,147**	**328,239,523**
PEOPLE			
Population			
Population estimates, July 1, 2019, (V2019)	**28,823**	**1,792,147**	**328,239,523**
Population estimates base, April 1, 2010, (V2019)	29,405	1,853,018	308,758,105
Population, percent change - April 1, 2010 (estimates base) to July 1, 2019, (V2019)	-2.0%	-3.3%	6.3%
Population, Census, April 1, 2010	29,405	1,852,994	308,745,538
Age and Sex			
Persons under 5 years, percent	▲ 5.0%	▲ 5.3%	▲ 6.1%
Persons under 18 years, percent	▲ 18.8%	▲ 20.2%	▲ 22.4%
Persons 65 years and over, percent	▲ 21.9%	▲ 19.9%	▲ 16.0%
Female persons, percent	▲ 48.2%	▲ 50.5%	▲ 50.8%
Race and Hispanic Origin			
White alone, percent	▲ 96.3%	▲ 93.5%	▲ 76.5%
Black or African American alone, percent (a)	▲ 1.8%	▲ 3.6%	▲ 13.4%
American Indian and Alaska Native alone, percent (a)	▲ 0.3%	▲ 0.3%	▲ 1.3%
Asian alone, percent (a)	▲ 0.5%	▲ 0.8%	▲ 5.9%
Native Hawaiian and Other Pacific Islander alone, percent (a)	▲ Z	▲ Z	▲ 0.2%
Two or More Races, percent	▲ 1.1%	▲ 1.8%	▲ 2.7%
Hispanic or Latino, percent (b)	▲ 1.0%	▲ 1.7%	▲ 18.3%
White alone, not Hispanic or Latino, percent	▲ 95.4%	▲ 92.1%	▲ 60.4%
Population Characteristics			
Veterans, 2014-2018	2,251	134,508	18,611,432
Foreign born persons, percent, 2014-2018	0.6%	1.6%	13.5%
Housing			
Housing units, July 1, 2018, (V2018)	14,248	893,778	138,537,078
Owner-occupied housing unit rate, 2014-2018	70.5%	72.9%	63.8%
Median value of owner-occupied housing units, 2014-2018	$99,200	$115,000	$204,900
Median selected monthly owner costs -with a mortgage, 2014-2018	$883	$1,023	$1,558
Median selected monthly owner costs -without a mortgage, 2014-2018	$309	$319	$490
Median gross rent, 2014-2018	$643	$711	$1,023
Building permits, 2018	13	2,887	1,328,827
Families & Living Arrangements			
Households, 2014-2018	11,254	734,676	119,730,128
Persons per household, 2014-2018	2.38	2.42	2.63
Living in same house 1 year ago, percent of persons age 1 year+, 2014-2018	88.5%	88.4%	85.5%
Language other than English spoken at home, percent of persons age 5 years+, 2014-2018	0.9%	2.5%	21.5%
Computer and Internet Use			
Households with a computer, percent, 2014-2018	74.8%	81.8%	88.8%
Households with a broadband Internet subscription, percent, 2014-2018	66.4%	72.9%	80.4%
Education			
High school graduate or higher, percent of persons age 25 years+, 2014-2018	83.8%	86.5%	87.7%
Bachelor's degree or higher, percent of persons age 25 years+, 2014-2018	16.3%	20.3%	31.5%
Health			
With a disability, under age 65 years, percent, 2014-2018	11.5%	14.1%	8.6%
Persons without health insurance, under age 65 years, percent	▲ 8.0%	▲ 7.9%	▲ 10.0%

Economy			
In civilian labor force, total, percent of population age 16 years+, 2014-2018	50.4%	53.1%	62.9%
In civilian labor force, female, percent of population age 16 years+, 2014-2018	48.2%	48.9%	58.2%
Total accommodation and food services sales, 2012 ($1,000) (c)	38,396	4,036,333	708,138,598
Total health care and social assistance receipts/revenue, 2012 ($1,000) (c)	183,317	12,259,395	2,040,441,203
Total manufacturers shipments, 2012 ($1,000) (c)	189,375	24,553,072	5,696,729,632
Total merchant wholesaler sales, 2012 ($1,000) (c)	368,863	14,295,437	5,208,023,476
Total retail sales, 2012 ($1,000) (c)	352,705	22,637,923	4,219,821,871
Total retail sales per capita, 2012 (c)	$12,003	$12,201	$13,443
Transportation			
Mean travel time to work (minutes), workers age 16 years+, 2014-2018	22.5	25.8	26.6
Income & Poverty			
Median household income (in 2018 dollars), 2014-2018	$41,094	$44,921	$60,293
Per capita income in past 12 months (in 2018 dollars), 2014-2018	$24,162	$25,479	$32,621
Persons in poverty, percent	▲ 19.4%	▲ 17.8%	▲ 11.8%
BUSINESSES			
Businesses			
Total employer establishments, 2017	668	36,522[1]	7,860,674
Total employment, 2017	9,230	549,413[1]	128,591,812
Total annual payroll, 2017 ($1,000)	277,063	22,287,060[1]	6,725,346,754
Total employment, percent change, 2016-2017	-1.7%	-1.7%[1]	1.5%
Total nonemployer establishments, 2017	1,447	88,343	25,701,671
All firms, 2012	2,099	114,435	27,626,360
Men-owned firms, 2012	1,158	63,112	14,844,597
Women-owned firms, 2012	628	39,065	9,878,397
Minority-owned firms, 2012	47	5,777	7,952,386
Nonminority-owned firms, 2012	1,927	104,785	18,987,918
Veteran-owned firms, 2012	234	12,912	2,521,682
Nonveteran-owned firms, 2012	1,698	94,960	24,070,685
GEOGRAPHY			
Geography			
Population per square mile, 2010	28.3	77.1	87.4
Land area in square miles, 2010	1,039.68	24,038.21	3,531,905.43
FIPS Code	54083	54	00

About datasets used in this table

Value Notes

1. Includes data not distributed by county.

Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ i row in TABLE view to learn about sampling error.

The vintage year (e.g., V2019) refers to the final year of the series (2010 thru 2019). *Different vintage years of estimates are not comparable.*

Fact Notes

- **(a)** Includes persons reporting only one race
- **(b)** Hispanics may be of any race, so also are included in applicable race categories
- **(c)** Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

Value Flags

- **-** Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or open ended distribution.
- **D** Suppressed to avoid disclosure of confidential information
- **F** Fewer than 25 firms
- **FN** Footnote on this item in place of data
- **N** Data for this geographic area cannot be displayed because the number of sample cases is too small.
- **NA** Not available
- **S** Suppressed; does not meet publication standards
- **X** Not applicable
- **Z** Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Inco Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

DP03

SELECTED ECONOMIC CHARACTERISTICS

2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
EMPLOYMENT STATUS						
Population 16 years and over	3,478	+/-288	3,478	(X)	4,696	+/-332
In labor force	1,824	+/-280	52.4%	+/-5.6	2,645	+/-308
Civilian labor force	1,824	+/-280	52.4%	+/-5.6	2,645	+/-308
Employed	1,699	+/-259	48.8%	+/-5.3	2,374	+/-309
Unemployed	125	+/-77	3.6%	+/-2.2	271	+/-145
Armed Forces	0	+/-11	0.0%	+/-0.9	0	+/-16
Not in labor force	1,654	+/-197	47.6%	+/-5.6	2,051	+/-280
Civilian labor force	1,824	+/-280	1,824	(X)	2,645	+/-308
Unemployment Rate	(X)	(X)	6.9%	+/-4.0	(X)	(X)
Females 16 years and over	1,860	+/-147	1,860	(X)	2,400	+/-243
In labor force	846	+/-148	45.5%	+/-6.3	1,269	+/-196
Civilian labor force	846	+/-148	45.5%	+/-6.3	1,269	+/-196
Employed	807	+/-132	43.4%	+/-5.7	1,119	+/-201
Own children of the householder under 6 years	119	+/-99	119	(X)	478	+/-192
All parents in family in labor force	83	+/-81	69.7%	+/-35.3	435	+/-197

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Own children of the householder 6 to 17 years	534	+/-151	534	(X)	921	+/-255
All parents in family in labor force	450	+/-158	84.3%	+/-11.0	829	+/-265
COMMUTING TO WORK						
Workers 16 years and over	1,658	+/-262	1,658	(X)	2,329	+/-319
Car, truck, or van -- drove alone	1,355	+/-228	81.7%	+/-5.6	1,943	+/-289
Car, truck, or van -- carpooled	173	+/-82	10.4%	+/-5.1	142	+/-96
Public transportation (excluding taxicab)	0	+/-11	0.0%	+/-1.8	0	+/-16
Walked	97	+/-86	5.9%	+/-4.8	23	+/-29
Other means	0	+/-11	0.0%	+/-1.8	16	+/-21
Worked at home	33	+/-31	2.0%	+/-1.9	205	+/-98
Mean travel time to work (minutes)	12.0	+/-2.0	(X)	(X)	19.2	+/-3.4
OCCUPATION						
Civilian employed population 16 years and over	1,699	+/-259	1,699	(X)	2,374	+/-309
Management, business, science, and arts occupations	616	+/-149	36.3%	+/-7.9	891	+/-230
Service occupations	324	+/-119	19.1%	+/-6.5	418	+/-151
Sales and office occupations	435	+/-133	25.6%	+/-6.2	569	+/-147
Natural resources, construction, and maintenance occupations	170	+/-83	10.0%	+/-4.3	231	+/-91
Production, transportation, and material moving occupations	154	+/-61	9.1%	+/-3.6	265	+/-104
INDUSTRY						
Civilian employed population 16 years and over	1,699	+/-259	1,699	(X)	2,374	+/-309
Agriculture, forestry, fishing and hunting, and mining	77	+/-61	4.5%	+/-3.3	80	+/-48
Construction	84	+/-51	4.9%	+/-3.1	215	+/-114
Manufacturing	61	+/-47	3.6%	+/-2.6	81	+/-48
Wholesale trade	44	+/-51	2.6%	+/-2.8	93	+/-79
Retail trade	295	+/-121	17.4%	+/-6.0	287	+/-117
Transportation and warehousing, and utilities	93	+/-55	5.5%	+/-3.3	79	+/-56
Information	0	+/-11	0.0%	+/-1.7	54	+/-50
Finance and insurance, and real estate and rental and leasing	30	+/-28	1.8%	+/-1.7	260	+/-130
Professional, scientific, and management, and administrative and waste management services	75	+/-45	4.4%	+/-2.6	116	+/-97
Educational services, and health care and social assistance	640	+/-149	37.7%	+/-8.4	634	+/-157
Arts, entertainment, and recreation, and accommodation and food services	113	+/-66	6.7%	+/-3.9	284	+/-126
Other services, except public administration	45	+/-30	2.6%	+/-1.7	64	+/-50
Public administration	142	+/-76	8.4%	+/-4.4	127	+/-78
CLASS OF WORKER						
Civilian employed population 16 years and over	1,699	+/-259	1,699	(X)	2,374	+/-309
Private wage and salary workers	1,225	+/-238	72.1%	+/-6.8	1,810	+/-275

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Government workers	429	+/-115	25.3%	+/-6.6	334	+/-141
Self-employed in own not incorporated business workers	45	+/-32	2.6%	+/-1.8	230	+/-117
Unpaid family workers	0	+/-11	0.0%	+/-1.7	0	+/-16
INCOME AND BENEFITS (IN 2017 INFLATION-ADJUSTED DOLLARS)						
Total households	1,772	+/-114	1,772	(X)	2,360	+/-141
Less than $10,000	185	+/-66	10.4%	+/-3.6	296	+/-101
$10,000 to $14,999	106	+/-54	6.0%	+/-3.1	130	+/-70
$15,000 to $24,999	249	+/-84	14.1%	+/-4.7	335	+/-128
$25,000 to $34,999	185	+/-92	10.4%	+/-5.2	232	+/-106
$35,000 to $49,999	312	+/-87	17.6%	+/-4.5	298	+/-111
$50,000 to $74,999	289	+/-89	16.3%	+/-4.9	464	+/-155
$75,000 to $99,999	221	+/-92	12.5%	+/-5.0	200	+/-103
$100,000 to $149,999	148	+/-64	8.4%	+/-3.6	192	+/-91
$150,000 to $199,999	65	+/-39	3.7%	+/-2.2	65	+/-53
$200,000 or more	12	+/-19	0.7%	+/-1.1	148	+/-100
Median household income (dollars)	42,070	+/-6,011	(X)	(X)	46,576	+/-7,770
Mean household income (dollars)	52,721	+/-5,547	(X)	(X)	78,169	+/-24,651
With earnings	1,086	+/-121	61.3%	+/-5.1	1,590	+/-169
Mean earnings (dollars)	54,221	+/-7,270	(X)	(X)	76,559	+/-24,282
With Social Security	820	+/-107	46.3%	+/-5.7	950	+/-186
Mean Social Security income (dollars)	18,498	+/-1,993	(X)	(X)	17,048	+/-1,860
With retirement income	477	+/-107	26.9%	+/-5.7	469	+/-127
Mean retirement income (dollars)	23,790	+/-5,563	(X)	(X)	24,950	+/-5,318
With Supplemental Security Income	137	+/-65	7.7%	+/-3.7	304	+/-130
Mean Supplemental Security Income (dollars)	7,669	+/-1,592	(X)	(X)	9,234	+/-1,366
With cash public assistance income	34	+/-40	1.9%	+/-2.3	56	+/-51
Mean cash public assistance income (dollars)	N	N	N	N	1,213	+/-1,064
With Food Stamp/SNAP benefits in the past 12 months	286	+/-90	16.1%	+/-5.1	407	+/-120
Families	1,010	+/-116	1,010	(X)	1,650	+/-160
Less than $10,000	17	+/-16	1.7%	+/-1.6	141	+/-85
$10,000 to $14,999	32	+/-31	3.2%	+/-3.2	5	+/-9
$15,000 to $24,999	124	+/-66	12.3%	+/-6.4	189	+/-104
$25,000 to $34,999	49	+/-36	4.9%	+/-3.6	193	+/-93
$35,000 to $49,999	176	+/-55	17.4%	+/-5.1	185	+/-86
$50,000 to $74,999	233	+/-76	23.1%	+/-6.7	371	+/-143
$75,000 to $99,999	176	+/-82	17.4%	+/-7.5	188	+/-100
$100,000 to $149,999	138	+/-62	13.7%	+/-6.0	189	+/-91
$150,000 to $199,999	53	+/-36	5.2%	+/-3.7	65	+/-53
$200,000 or more	12	+/-19	1.2%	+/-1.9	124	+/-87

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Median family income (dollars)	60,208	+/-10,789	(X)	(X)	56,518	+/-8,014
Mean family income (dollars)	68,502	+/-8,123	(X)	(X)	85,564	+/-22,430
Per capita income (dollars)	24,081	+/-2,709	(X)	(X)	31,715	+/-9,724
Nonfamily households	762	+/-108	762	(X)	710	+/-148
Median nonfamily income (dollars)	22,606	+/-4,252	(X)	(X)	21,061	+/-5,186
Mean nonfamily income (dollars)	29,948	+/-5,726	(X)	(X)	60,746	+/-52,957
Median earnings for workers (dollars)	26,993	+/-6,052	(X)	(X)	28,432	+/-5,442
Median earnings for male full-time, year-round workers (dollars)	41,810	+/-5,068	(X)	(X)	44,861	+/-5,764
Median earnings for female full-time, year-round workers (dollars)	34,167	+/-4,471	(X)	(X)	33,309	+/-6,168
HEALTH INSURANCE COVERAGE						
Civilian noninstitutionalized population	3,892	+/-338	3,892	(X)	5,882	+/-458
With health insurance coverage	3,534	+/-310	90.8%	+/-3.9	5,310	+/-437
With private health insurance	2,374	+/-371	61.0%	+/-8.9	3,438	+/-524
With public coverage	1,984	+/-342	51.0%	+/-7.9	2,926	+/-407
No health insurance coverage	358	+/-159	9.2%	+/-3.9	572	+/-257
Civilian noninstitutionalized population under 19 years	819	+/-177	819	(X)	1,489	+/-366
No health insurance coverage	0	+/-11	0.0%	+/-3.6	77	+/-119
Civilian noninstitutionalized population 19 to 64 years	2,126	+/-231	2,126	(X)	3,119	+/-322
In labor force:	1,598	+/-247	1,598	(X)	2,328	+/-280
Employed:	1,473	+/-232	1,473	(X)	2,098	+/-286
With health insurance coverage	1,280	+/-197	86.9%	+/-8.3	1,663	+/-269
With private health insurance	1,062	+/-185	72.1%	+/-8.1	1,378	+/-274
With public coverage	291	+/-125	19.8%	+/-8.0	375	+/-166
No health insurance coverage	193	+/-135	13.1%	+/-8.3	435	+/-207
Unemployed:	125	+/-77	125	(X)	230	+/-120
With health insurance coverage	31	+/-29	24.8%	+/-27.0	193	+/-98
With private health insurance	23	+/-24	18.4%	+/-24.3	45	+/-55
With public coverage	8	+/-15	6.4%	+/-11.3	148	+/-88
No health insurance coverage	94	+/-73	75.2%	+/-27.0	37	+/-52
Not in labor force:	528	+/-134	528	(X)	791	+/-194
With health insurance coverage	457	+/-101	86.6%	+/-10.5	768	+/-191
With private health insurance	167	+/-76	31.6%	+/-14.3	422	+/-134
With public coverage	338	+/-105	64.0%	+/-13.3	552	+/-172
No health insurance coverage	71	+/-67	13.4%	+/-10.5	23	+/-31
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL						

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
All families	(X)	(X)	10.3%	+/-6.6	(X)	(X)
With related children of the householder under 18 years	(X)	(X)	15.9%	+/-14.3	(X)	(X)
With related children of the householder under 5 years only	(X)	(X)	0.0%	+/-82.3	(X)	(X)
Married couple families	(X)	(X)	7.2%	+/-6.0	(X)	(X)
With related children of the householder under 18 years	(X)	(X)	6.3%	+/-10.8	(X)	(X)
With related children of the householder under 5 years only	(X)	(X)	0.0%	+/-82.3	(X)	(X)
Families with female householder, no husband present	(X)	(X)	10.3%	+/-13.0	(X)	(X)
With related children of the householder under 18 years	(X)	(X)	10.2%	+/-16.2	(X)	(X)
With related children of the householder under 5 years only	(X)	(X)	-	**	(X)	(X)
All people	(X)	(X)	19.6%	+/-7.4	(X)	(X)
Under 18 years	(X)	(X)	22.4%	+/-19.6	(X)	(X)
Related children of the householder under 18 years	(X)	(X)	21.8%	+/-20.1	(X)	(X)
Related children of the householder under 5 years	(X)	(X)	0.0%	+/-28.7	(X)	(X)
Related children of the householder 5 to 17 years	(X)	(X)	25.1%	+/-21.5	(X)	(X)
18 years and over	(X)	(X)	19.0%	+/-6.0	(X)	(X)
18 to 64 years	(X)	(X)	24.7%	+/-8.1	(X)	(X)
65 years and over	(X)	(X)	5.9%	+/-3.4	(X)	(X)
People in families	(X)	(X)	11.8%	+/-7.8	(X)	(X)
Unrelated individuals 15 years and over	(X)	(X)	40.8%	+/-9.7	(X)	(X)

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
EMPLOYMENT STATUS		
Population 16 years and over	4,696	(X)
In labor force	56.3%	+/-5.1
Civilian labor force	56.3%	+/-5.1
Employed	50.6%	+/-5.8
Unemployed	5.8%	+/-3.0
Armed Forces	0.0%	+/-0.6
Not in labor force	43.7%	+/-5.1
Civilian labor force	2,645	(X)
Unemployment Rate	10.2%	+/-5.4
Females 16 years and over	2,400	(X)
In labor force	52.9%	+/-6.1
Civilian labor force	52.9%	+/-6.1
Employed	46.6%	+/-7.2
Own children of the householder under 6 years	478	(X)
All parents in family in labor force	91.0%	+/-10.5
Own children of the householder 6 to 17 years	921	(X)
All parents in family in labor force	90.0%	+/-7.4
COMMUTING TO WORK		
Workers 16 years and over	2,329	(X)
Car, truck, or van -- drove alone	83.4%	+/-5.8
Car, truck, or van -- carpooled	6.1%	+/-3.8
Public transportation (excluding taxicab)	0.0%	+/-1.3
Walked	1.0%	+/-1.2
Other means	0.7%	+/-0.9
Worked at home	8.8%	+/-4.2
Mean travel time to work (minutes)	(X)	(X)
OCCUPATION		
Civilian employed population 16 years and over	2,374	(X)
Management, business, science, and arts occupations	37.5%	+/-7.2
Service occupations	17.6%	+/-6.0
Sales and office occupations	24.0%	+/-6.3
Natural resources, construction, and maintenance occupations	9.7%	+/-3.6
Production, transportation, and material moving occupations	11.2%	+/-4.1
INDUSTRY		

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
Civilian employed population 16 years and over	2,374	(X)
Agriculture, forestry, fishing and hunting, and mining	3.4%	+/-2.0
Construction	9.1%	+/-4.5
Manufacturing	3.4%	+/-2.0
Wholesale trade	3.9%	+/-3.3
Retail trade	12.1%	+/-5.3
Transportation and warehousing, and utilities	3.3%	+/-2.3
Information	2.3%	+/-2.1
Finance and insurance, and real estate and rental and leasing	11.0%	+/-5.3
Professional, scientific, and management, and administrative and waste management services	4.9%	+/-4.0
Educational services, and health care and social assistance	26.7%	+/-5.4
Arts, entertainment, and recreation, and accommodation and food services	12.0%	+/-4.7
Other services, except public administration	2.7%	+/-2.1
Public administration	5.3%	+/-3.2
CLASS OF WORKER		
Civilian employed population 16 years and over	2,374	(X)
Private wage and salary workers	76.2%	+/-6.3
Government workers	14.1%	+/-5.8
Self-employed in own not incorporated business workers	9.7%	+/-4.6
Unpaid family workers	0.0%	+/-1.3
INCOME AND BENEFITS (IN 2017 INFLATION-ADJUSTED DOLLARS)		
Total households	2,360	(X)
Less than $10,000	12.5%	+/-4.1
$10,000 to $14,999	5.5%	+/-3.0
$15,000 to $24,999	14.2%	+/-5.5
$25,000 to $34,999	9.8%	+/-4.5
$35,000 to $49,999	12.6%	+/-4.5
$50,000 to $74,999	19.7%	+/-6.3
$75,000 to $99,999	8.5%	+/-4.4
$100,000 to $149,999	8.1%	+/-3.8
$150,000 to $199,999	2.8%	+/-2.3
$200,000 or more	6.3%	+/-4.2
Median household income (dollars)	(X)	(X)
Mean household income (dollars)	(X)	(X)
With earnings	67.4%	+/-6.1
Mean earnings (dollars)	(X)	(X)
With Social Security	40.3%	+/-7.4
Mean Social Security income (dollars)	(X)	(X)
With retirement income	19.9%	+/-5.2

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
Mean retirement income (dollars)	(X)	(X)
With Supplemental Security Income	12.9%	+/-5.4
Mean Supplemental Security Income (dollars)	(X)	(X)
With cash public assistance income	2.4%	+/-2.2
Mean cash public assistance income (dollars)	(X)	(X)
With Food Stamp/SNAP benefits in the past 12 months	17.2%	+/-5.2
Families	1,650	(X)
Less than $10,000	8.5%	+/-4.9
$10,000 to $14,999	0.3%	+/-0.5
$15,000 to $24,999	11.5%	+/-6.6
$25,000 to $34,999	11.7%	+/-5.6
$35,000 to $49,999	11.2%	+/-5.0
$50,000 to $74,999	22.5%	+/-8.3
$75,000 to $99,999	11.4%	+/-6.1
$100,000 to $149,999	11.5%	+/-5.3
$150,000 to $199,999	3.9%	+/-3.2
$200,000 or more	7.5%	+/-5.2
Median family income (dollars)	(X)	(X)
Mean family income (dollars)	(X)	(X)
Per capita income (dollars)	(X)	(X)
Nonfamily households	710	(X)
Median nonfamily income (dollars)	(X)	(X)
Mean nonfamily income (dollars)	(X)	(X)
Median earnings for workers (dollars)	(X)	(X)
Median earnings for male full-time, year-round workers (dollars)	(X)	(X)
Median earnings for female full-time, year-round workers (dollars)	(X)	(X)
HEALTH INSURANCE COVERAGE		
Civilian noninstitutionalized population	5,882	(X)
With health insurance coverage	90.3%	+/-4.2
With private health insurance	58.4%	+/-7.6
With public coverage	49.7%	+/-6.6
No health insurance coverage	9.7%	+/-4.2
Civilian noninstitutionalized population under 19 years	1,489	(X)
No health insurance coverage	5.2%	+/-7.9
Civilian noninstitutionalized population 19 to 64 years	3,119	(X)

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
In labor force:	2,328	(X)
Employed:	2,098	(X)
With health insurance coverage	79.3%	+/-9.0
With private health insurance	65.7%	+/-10.0
With public coverage	17.9%	+/-7.5
No health insurance coverage	20.7%	+/-9.0
Unemployed:	230	(X)
With health insurance coverage	83.9%	+/-18.8
With private health insurance	19.6%	+/-20.9
With public coverage	64.3%	+/-27.2
No health insurance coverage	16.1%	+/-18.8
Not in labor force:	791	(X)
With health insurance coverage	97.1%	+/-3.9
With private health insurance	53.4%	+/-12.7
With public coverage	69.8%	+/-13.0
No health insurance coverage	2.9%	+/-3.9
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL		
All families	14.5%	+/-5.8
With related children of the householder under 18 years	20.8%	+/-11.4
With related children of the householder under 5 years only	15.2%	+/-23.7
Married couple families	9.8%	+/-6.1
With related children of the householder under 18 years	7.9%	+/-10.6
With related children of the householder under 5 years only	8.0%	+/-21.3
Families with female householder, no husband present	36.9%	+/-20.2
With related children of the householder under 18 years	70.2%	+/-23.3
With related children of the householder under 5 years only	0.0%	+/-100.0
All people	20.1%	+/-5.8
Under 18 years	23.5%	+/-13.2
Related children of the householder under 18 years	23.5%	+/-13.2
Related children of the householder under 5 years	28.3%	+/-20.3
Related children of the householder 5 to 17 years	21.4%	+/-13.5
18 years and over	19.1%	+/-5.0
18 to 64 years	23.1%	+/-6.5
65 years and over	8.9%	+/-5.2
People in families	16.0%	+/-6.9
Unrelated individuals 15 years and over	43.8%	+/-9.6

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not

represented in these tables.

Employment and unemployment estimates may vary from the official labor force data released by the Bureau of Labor Statistics because of differences in survey design and data collection. For guidance on differences in employment and unemployment estimates from different sources go to Labor Force Guidance.

Workers include members of the Armed Forces and civilians who were at work last week.

Industry codes are 4-digit codes and are based on the North American Industry Classification System 2012. The Industry categories adhere to the guidelines issued in Clarification Memorandum No. 2, "NAICS Alternate Aggregation Structure for Use By U.S. Statistical Agencies," issued by the Office of Management and Budget.

Occupation codes are 4-digit codes and are based on Standard Occupational Classification 2010.

Logical coverage edits applying a rules-based assignment of Medicaid, Medicare and military health coverage were added as of 2009 -- please see https://www.census.gov/library/working-papers/2010/demo/coverage_edits_final.html for more details. The 2008 data table in American FactFinder does not incorporate these edits. Therefore, the estimates that appear in these tables are not comparable to the estimates in the 2009 and later tables. Select geographies of 2008 data comparable to the 2009 and later tables are available at https://www.census.gov/data/tables/time-series/acs/1-year-re-run-health-insurance.html. The health insurance coverage category names were modified in 2010. See https://www.census.gov/topics/health/health-insurance/about/glossary.html#par_textimage_18 for a list of the insurance type definitions.

Beginning in 2017, selected variable categories were updated, including age-categories, income-to-poverty ratio (IPR) categories, and the age universe for certain employment and education variables. See user note entitled "Health Insurance Table Updates" for further details.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

DP05

ACS DEMOGRAPHIC AND HOUSING ESTIMATES

2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
SEX AND AGE						
Total population	4,140	+/-350	4,140	(X)	5,990	+/-471
Male	1,977	+/-281	47.8%	+/-4.0	3,020	+/-340
Female	2,163	+/-184	52.2%	+/-4.0	2,970	+/-290
Sex ratio (males per 100 females)	91.4	+/-14.5	(X)	(X)	101.7	+/-14.1
Under 5 years	90	+/-87	2.2%	+/-2.1	431	+/-194
5 to 9 years	265	+/-109	6.4%	+/-2.5	517	+/-212
10 to 14 years	265	+/-93	6.4%	+/-2.2	212	+/-143
15 to 19 years	199	+/-96	4.8%	+/-2.2	394	+/-172
20 to 24 years	225	+/-120	5.4%	+/-2.8	251	+/-132
25 to 34 years	392	+/-110	9.5%	+/-2.5	579	+/-159
35 to 44 years	410	+/-135	9.9%	+/-3.0	760	+/-128
45 to 54 years	564	+/-147	13.6%	+/-3.7	686	+/-206
55 to 59 years	304	+/-98	7.3%	+/-2.4	462	+/-119
60 to 64 years	285	+/-87	6.9%	+/-2.1	329	+/-119
65 to 74 years	601	+/-128	14.5%	+/-3.0	830	+/-195
75 to 84 years	393	+/-93	9.5%	+/-2.3	326	+/-133
85 years and over	147	+/-56	3.6%	+/-1.3	213	+/-137

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Median age (years)	49.9	+/-4.4	(X)	(X)	42.3	+/-4.6
Under 18 years	752	+/-158	18.2%	+/-3.1	1,420	+/-357
16 years and over	3,478	+/-288	84.0%	+/-3.2	4,696	+/-332
18 years and over	3,388	+/-280	81.8%	+/-3.1	4,570	+/-323
21 years and over	3,267	+/-272	78.9%	+/-3.2	4,386	+/-292
62 years and over	1,300	+/-171	31.4%	+/-3.7	1,565	+/-231
65 years and over	1,141	+/-154	27.6%	+/-3.5	1,369	+/-210
18 years and over	3,388	+/-280	3,388	(X)	4,570	+/-323
Male	1,567	+/-205	46.3%	+/-3.3	2,231	+/-210
Female	1,821	+/-143	53.7%	+/-3.3	2,339	+/-238
Sex ratio (males per 100 females)	86.1	+/-11.4	(X)	(X)	95.4	+/-12.8
65 years and over	1,141	+/-154	1,141	(X)	1,369	+/-210
Male	480	+/-104	42.1%	+/-6.8	672	+/-152
Female	661	+/-115	57.9%	+/-6.8	697	+/-137
Sex ratio (males per 100 females)	72.6	+/-20.4	(X)	(X)	96.4	+/-27.4
RACE						
Total population	4,140	+/-350	4,140	(X)	5,990	+/-471
One race	4,105	+/-347	99.2%	+/-0.9	5,988	+/-471
Two or more races	35	+/-36	0.8%	+/-0.9	2	+/-5
One race	4,105	+/-347	99.2%	+/-0.9	5,988	+/-471
White	4,035	+/-338	97.5%	+/-1.6	5,949	+/-460
Black or African American	21	+/-21	0.5%	+/-0.5	39	+/-52
American Indian and Alaska Native	0	+/-11	0.0%	+/-0.7	0	+/-16
Cherokee tribal grouping	0	+/-11	0.0%	+/-0.7	0	+/-16
Chippewa tribal grouping	0	+/-11	0.0%	+/-0.7	0	+/-16
Navajo tribal grouping	0	+/-11	0.0%	+/-0.7	0	+/-16
Sioux tribal grouping	0	+/-11	0.0%	+/-0.7	0	+/-16
Asian	8	+/-14	0.2%	+/-0.3	0	+/-16
Asian Indian	0	+/-11	0.0%	+/-0.7	0	+/-16
Chinese	0	+/-11	0.0%	+/-0.7	0	+/-16
Filipino	8	+/-14	0.2%	+/-0.3	0	+/-16
Japanese	0	+/-11	0.0%	+/-0.7	0	+/-16
Korean	0	+/-11	0.0%	+/-0.7	0	+/-16
Vietnamese	0	+/-11	0.0%	+/-0.7	0	+/-16
Other Asian	0	+/-11	0.0%	+/-0.7	0	+/-16
Native Hawaiian and Other Pacific Islander	0	+/-11	0.0%	+/-0.7	0	+/-16
Native Hawaiian	0	+/-11	0.0%	+/-0.7	0	+/-16

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Guamanian or Chamorro	0	+/-11	0.0%	+/-0.7	0	+/-16
Samoan	0	+/-11	0.0%	+/-0.7	0	+/-16
Other Pacific Islander	0	+/-11	0.0%	+/-0.7	0	+/-16
Some other race	41	+/-44	1.0%	+/-1.1	0	+/-16
Two or more races	35	+/-36	0.8%	+/-0.9	2	+/-5
White and Black or African American	21	+/-31	0.5%	+/-0.7	2	+/-5
White and American Indian and Alaska Native	0	+/-11	0.0%	+/-0.7	0	+/-16
White and Asian	10	+/-19	0.2%	+/-0.4	0	+/-16
Black or African American and American Indian and Alaska Native	4	+/-8	0.1%	+/-0.2	0	+/-16
Race alone or in combination with one or more other races						
Total population	4,140	+/-350	4,140	(X)	5,990	+/-471
White	4,066	+/-340	98.2%	+/-1.2	5,951	+/-461
Black or African American	46	+/-39	1.1%	+/-0.9	41	+/-52
American Indian and Alaska Native	4	+/-8	0.1%	+/-0.2	0	+/-16
Asian	18	+/-33	0.4%	+/-0.8	0	+/-16
Native Hawaiian and Other Pacific Islander	0	+/-11	0.0%	+/-0.7	0	+/-16
Some other race	41	+/-44	1.0%	+/-1.1	0	+/-16
HISPANIC OR LATINO AND RACE						
Total population	4,140	+/-350	4,140	(X)	5,990	+/-471
Hispanic or Latino (of any race)	54	+/-48	1.3%	+/-1.1	30	+/-29
Mexican	51	+/-46	1.2%	+/-1.1	23	+/-26
Puerto Rican	0	+/-11	0.0%	+/-0.7	7	+/-11
Cuban	0	+/-11	0.0%	+/-0.7	0	+/-16
Other Hispanic or Latino	3	+/-6	0.1%	+/-0.1	0	+/-16
Not Hispanic or Latino	4,086	+/-339	98.7%	+/-1.1	5,960	+/-473
White alone	4,019	+/-337	97.1%	+/-1.7	5,919	+/-462
Black or African American alone	21	+/-21	0.5%	+/-0.5	39	+/-52
American Indian and Alaska Native alone	0	+/-11	0.0%	+/-0.7	0	+/-16
Asian alone	8	+/-14	0.2%	+/-0.3	0	+/-16
Native Hawaiian and Other Pacific Islander alone	0	+/-11	0.0%	+/-0.7	0	+/-16
Some other race alone	3	+/-6	0.1%	+/-0.2	0	+/-16
Two or more races	35	+/-36	0.8%	+/-0.9	2	+/-5
Two races including Some other race	0	+/-11	0.0%	+/-0.7	0	+/-16
Two races excluding Some other race, and Three or more races	35	+/-36	0.8%	+/-0.9	2	+/-5
Total housing units	2,040	+/-78	(X)	(X)	2,765	+/-92
CITIZEN, VOTING AGE POPULATION						
Citizen, 18 and over population	3,388	+/-280	3,388	(X)	4,570	+/-323
Male	1,567	+/-205	46.3%	+/-3.3	2,231	+/-210

Subject	Census Tract 9660, Randolph County, West Virginia				Census Tract 9664, Randolph County, West Virginia	
	Estimate	Margin of Error	Percent	Percent Margin of Error	Estimate	Margin of Error
Female	1,821	+/-143	53.7%	+/-3.3	2,339	+/-238

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
SEX AND AGE		
Total population	5,990	(X)
Male	50.4%	+/-3.5
Female	49.6%	+/-3.5
Sex ratio (males per 100 females)	(X)	(X)
Under 5 years	7.2%	+/-3.0
5 to 9 years	8.6%	+/-3.3
10 to 14 years	3.5%	+/-2.3
15 to 19 years	6.6%	+/-2.7
20 to 24 years	4.2%	+/-2.2
25 to 34 years	9.7%	+/-2.3
35 to 44 years	12.7%	+/-2.1
45 to 54 years	11.5%	+/-3.4
55 to 59 years	7.7%	+/-2.1
60 to 64 years	5.5%	+/-2.0
65 to 74 years	13.9%	+/-3.4
75 to 84 years	5.4%	+/-2.3
85 years and over	3.6%	+/-2.3
Median age (years)	(X)	(X)
Under 18 years	23.7%	+/-4.8
16 years and over	78.4%	+/-4.6
18 years and over	76.3%	+/-4.8
21 years and over	73.2%	+/-5.0
62 years and over	26.1%	+/-4.3
65 years and over	22.9%	+/-3.9
18 years and over	4,570	(X)
Male	48.8%	+/-3.4
Female	51.2%	+/-3.4
Sex ratio (males per 100 females)	(X)	(X)
65 years and over	1,369	(X)
Male	49.1%	+/-7.3
Female	50.9%	+/-7.3
Sex ratio (males per 100 females)	(X)	(X)
RACE		
Total population	5,990	(X)
One race	100.0%	+/-0.1
Two or more races	0.0%	+/-0.1

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
One race	100.0%	+/-0.1
White	99.3%	+/-0.9
Black or African American	0.7%	+/-0.9
American Indian and Alaska Native	0.0%	+/-0.5
Cherokee tribal grouping	0.0%	+/-0.5
Chippewa tribal grouping	0.0%	+/-0.5
Navajo tribal grouping	0.0%	+/-0.5
Sioux tribal grouping	0.0%	+/-0.5
Asian	0.0%	+/-0.5
Asian Indian	0.0%	+/-0.5
Chinese	0.0%	+/-0.5
Filipino	0.0%	+/-0.5
Japanese	0.0%	+/-0.5
Korean	0.0%	+/-0.5
Vietnamese	0.0%	+/-0.5
Other Asian	0.0%	+/-0.5
Native Hawaiian and Other Pacific Islander	0.0%	+/-0.5
Native Hawaiian	0.0%	+/-0.5
Guamanian or Chamorro	0.0%	+/-0.5
Samoan	0.0%	+/-0.5
Other Pacific Islander	0.0%	+/-0.5
Some other race	0.0%	+/-0.5
Two or more races	0.0%	+/-0.1
White and Black or African American	0.0%	+/-0.1
White and American Indian and Alaska Native	0.0%	+/-0.5
White and Asian	0.0%	+/-0.5
Black or African American and American Indian and Alaska Native	0.0%	+/-0.5
Race alone or in combination with one or more other races		
Total population	5,990	(X)
White	99.3%	+/-0.9
Black or African American	0.7%	+/-0.9
American Indian and Alaska Native	0.0%	+/-0.5
Asian	0.0%	+/-0.5
Native Hawaiian and Other Pacific Islander	0.0%	+/-0.5
Some other race	0.0%	+/-0.5
HISPANIC OR LATINO AND RACE		
Total population	5,990	(X)
Hispanic or Latino (of any race)	0.5%	+/-0.5
Mexican	0.4%	+/-0.4
Puerto Rican	0.1%	+/-0.2

Subject	Census Tract 9664, Randolph County, West Virginia	
	Percent	Percent Margin of Error
Cuban	0.0%	+/-0.5
Other Hispanic or Latino	0.0%	+/-0.5
Not Hispanic or Latino	99.5%	+/-0.5
White alone	98.8%	+/-1.0
Black or African American alone	0.7%	+/-0.9
American Indian and Alaska Native alone	0.0%	+/-0.5
Asian alone	0.0%	+/-0.5
Native Hawaiian and Other Pacific Islander alone	0.0%	+/-0.5
Some other race alone	0.0%	+/-0.5
Two or more races	0.0%	+/-0.1
Two races including Some other race	0.0%	+/-0.5
Two races excluding Some other race, and Three or more races	0.0%	+/-0.1
Total housing units	(X)	(X)
CITIZEN, VOTING AGE POPULATION		
Citizen, 18 and over population	4,570	(X)
Male	48.8%	+/-3.4
Female	51.2%	+/-3.4

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

For more information on understanding race and Hispanic origin data, please see the Census 2010 Brief entitled, Overview of Race and Hispanic Origin: 2010, issued March 2011. (pdf format)

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

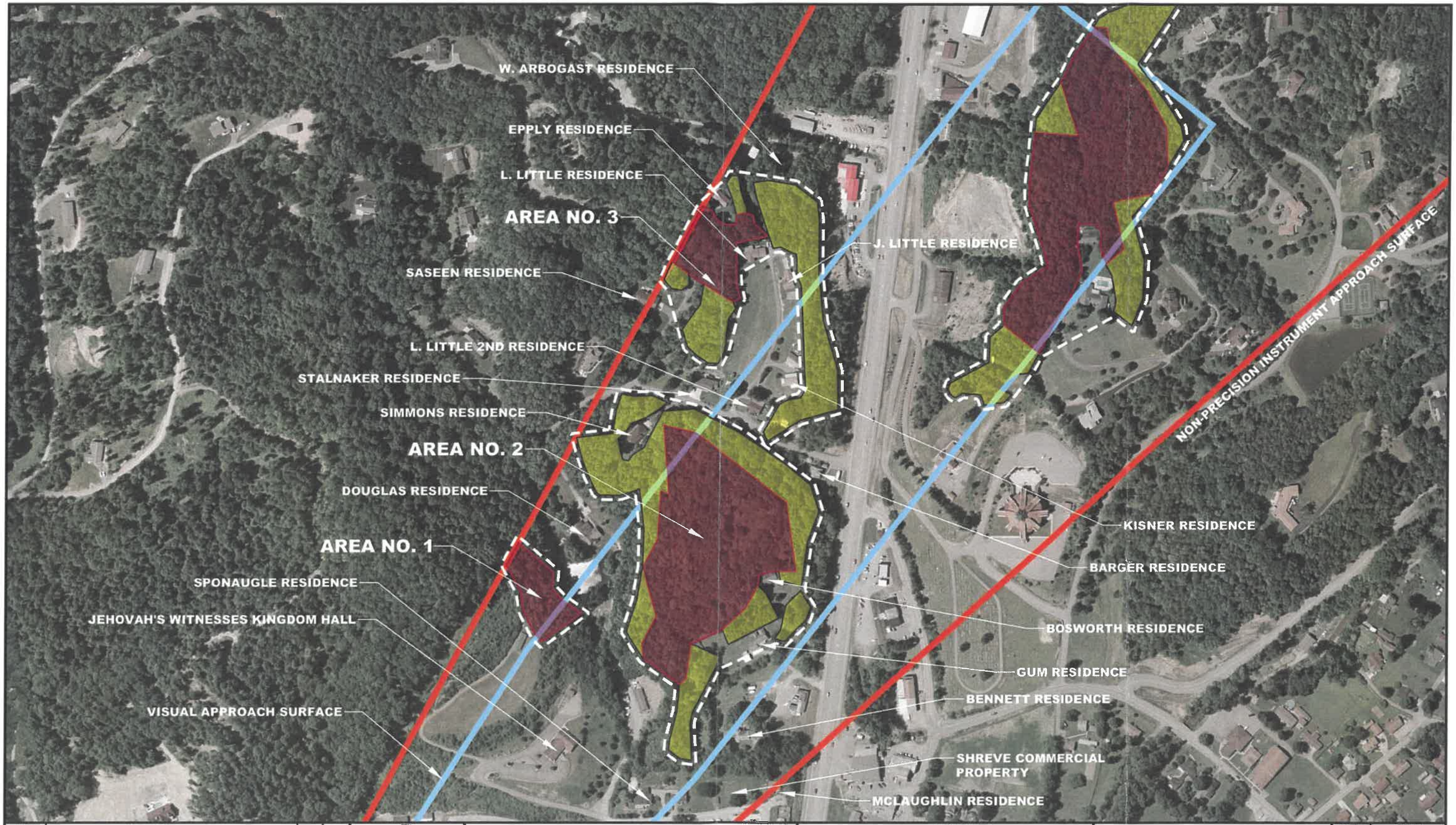
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.

3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

APPENDIX 10
VISUAL RESOURCES DRAWINGS



REVISION NUMBER	REVISIONS	DATE	BY

SEAL

Chapman Technical Group

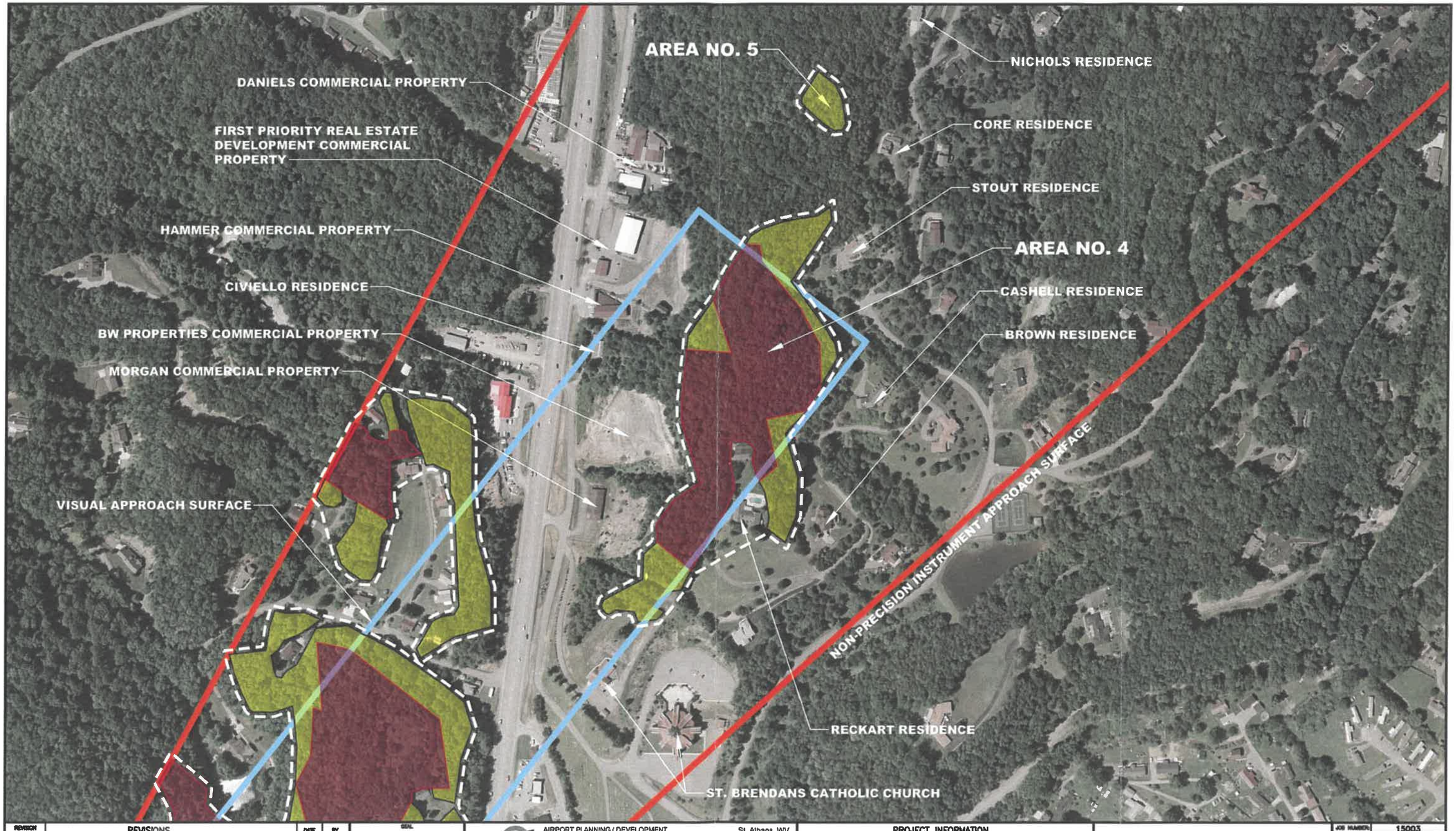
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING

St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH CO. REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SURFACE
VISUAL RESOURCES PLAN
(SHEET 1 OF 2)

JOB NUMBER:	15003
SCALE:	1" = 500'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	6.1
REVISION	1



REVISION NUMBER	REVISIONS	DATE	BY

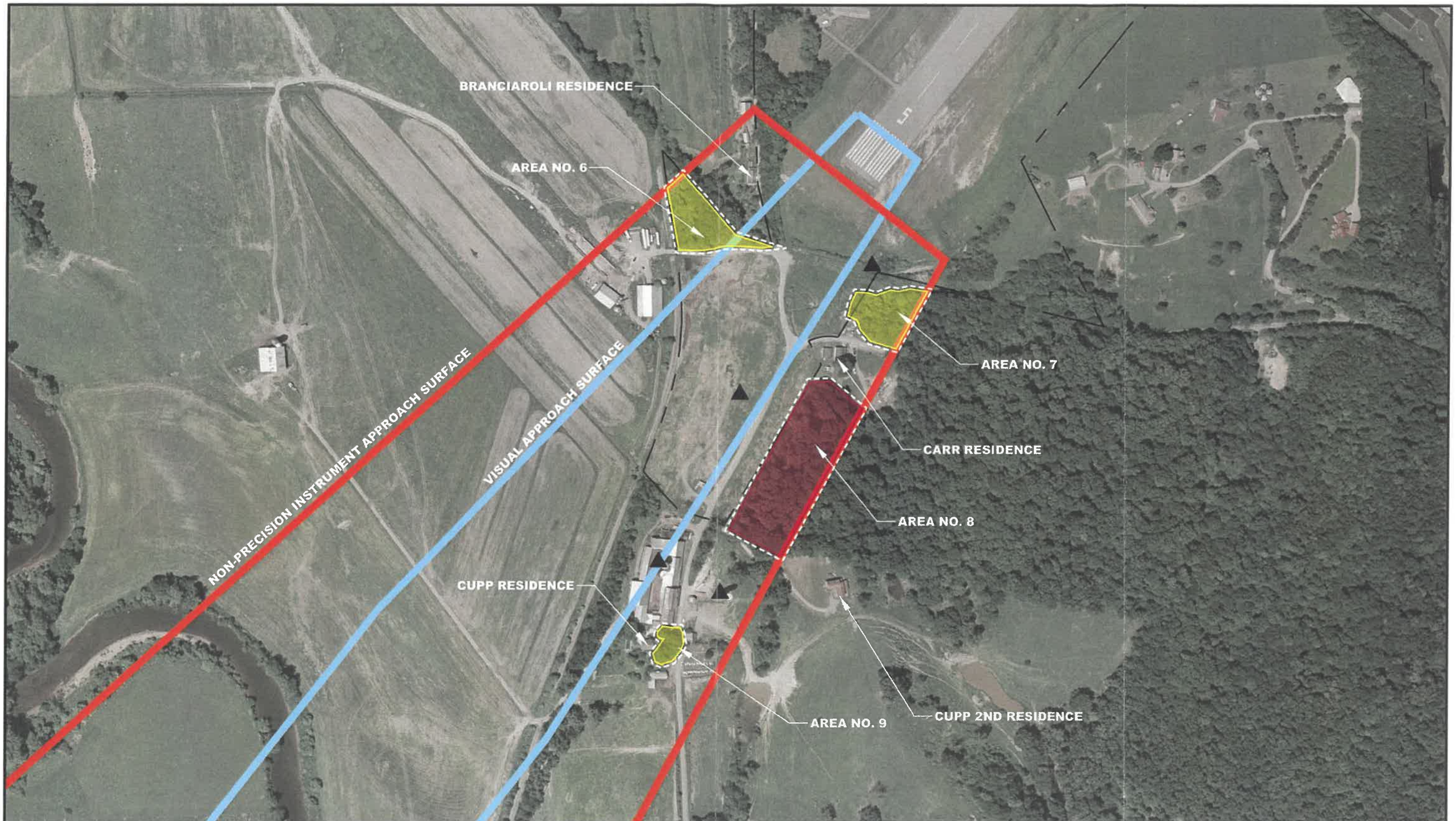
SEAL

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-6914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH CO. REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 23 APPROACH SURFACE
VISUAL RESOURCES PLAN
(SHEET 2 OF 2)

JOB NUMBER:	15003
SCALE:	1" = 500'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	6.1
REVISION	1



REVISION NUMBER	REVISIONS	DATE	BY

SEAL

Chapman Technical Group
AIRPORT PLANNING / DEVELOPMENT
ARCHITECTURE / INTERIOR DESIGN
CIVIL ENGINEERING / SITE DEVELOPMENT
ENVIRONMENTAL ENGINEERING
LANDSCAPE ARCHITECTURE
SURVEYING
St. Albans, WV (304) 727-5501
Buckhannon, WV (304) 472-8914
Martinsburg, WV (304) 260-1222
www.chaptech.com

PROJECT INFORMATION
ELKINS-RANDOLPH CO. REGIONAL AIRPORT AUTH.
ELKINS-RANDOLPH CO. REGIONAL AIRPORT
ELKINS, WEST VIRGINIA
OBSTRUCTION REMOVAL
(RUNWAY 5-23 APPROACHES)

RUNWAY 5 APPROACH SURFACE VISUAL RESOURCES PLAN

JOB NUMBER:	15003
SCALE:	1" = 300'
DATE:	MAY 2017
DRAWN BY:	S. TUCKER
DESIGNED BY:	S. TUCKER
CHECKED BY:	S. TUCKER
SHEET NO.	6.2
REVISION	1

APPENDIX 11
USACE CONSULTATION

U.S. Fish and Wildlife Service

National Wetlands Inventory

Elkins Randolph County Regional Airport



July 24, 2018

Wetlands

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

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